ATARI®
INPUT/OUTPUT™

THE MAGAZINE OF THE ATARI HOME COMPUTER CLUB

ISSUE FOUR · AUTUMN/WINTER 1983 · NINETY-FIVE PENCE

ATARI SHOW STOPPERS!

— See centre pages —

The Lone Raider

Donkey Kong JNR

Pole Position

MS.PAC-MAN

TENNIS

ATARI LOGO

PENGO

JOUST

Visi Calc

Juggles House

Mickey in the Great Outdoors

Juggles Rainbow

ATARI WRITER

Eastern Front

Timewise

Family Finances

NEW SERIES: ASSEMBLY LANGUAGE ● APX REVIEWS AND EXCLUSIVE OFFER

CLUB NEWS AND OFFERS

MAIL SHOP

Here are some super special offers to Club Members. When ordering, please quote your membership number (see address label). Please allow up to three weeks for delivery. Cheques /Postal Orders should be made payable to Atari International (UK) Inc, and sent with order form to Atari Mailshop, Atari House, Railway Terrace, Slough, Berks. All items are inclusive of VAT, Postage and Packing.
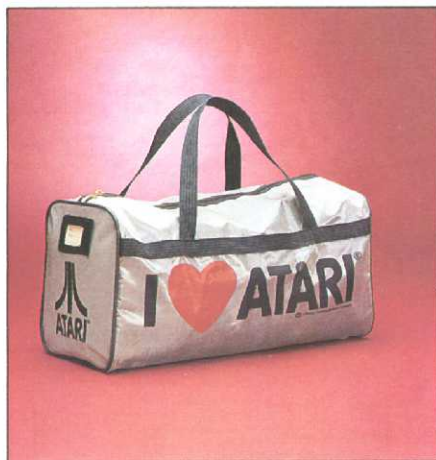
The **I Love Atari Tote Bag** is water-resistant and measures approx. 19"x 8"x8½". Ideal for carrying sports kits, as a week-end bag, or for your Atari accessories. £5.99

The Atari **Reference Folder** Specially designed to U.S. standards for all your user notes. £5.95

The **Atari Disk Holder** attractively finished to accommodate your personal disks for quick & easy reference. £4.95
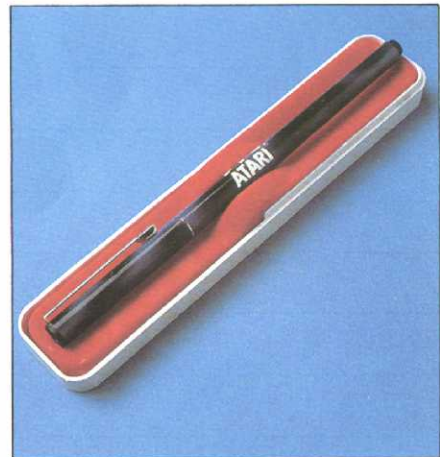
The **Atari Fine Liner Pen** in presentation case. £2.50

★★★★★★★★★★★★★★★★★★★
EXCLUSIVE OFFER
★★★★★★★★★★★★★★★★★★★

The following are available on APX, and can be obtained from us at a special price of £l4.99 (inc p & p). They are **T : A Display Device** and **Quarxon**. Please specify Cassette or Disk when ordering.

Lately we've had floods of programs from some of our very talented young readers. So that you all have a chance to see your program printed in I/O, please send your programs on cassette or disk to help us look at your work immediately! Cassettes /disks will, of course, be returned to you. And don't forget that we merit all readers' programs printed with a special prize! — Ed.

Donkey Kong Results

Our congratulations go to all those who sent in the correct answer to the Donkey Kong competition which appeared in the last issue of I/O. The answer was, of course, Ellipse Plotter by M. McGill and S. Palasingham, updated in part by Jon Dean. The lucky winner was Laurence May who, by now, has received his Donkey Kong cartridge! Well done, Laurence!

ORDER FORM

Please send me
- I Love Atari Tote Bag
- Atari Disc Holder
- T:A Display Device Disk
- Quarxon Disk
- Atari Reference Folder
- Atari Fine Liner Pen
- T:A Display Device Cassette
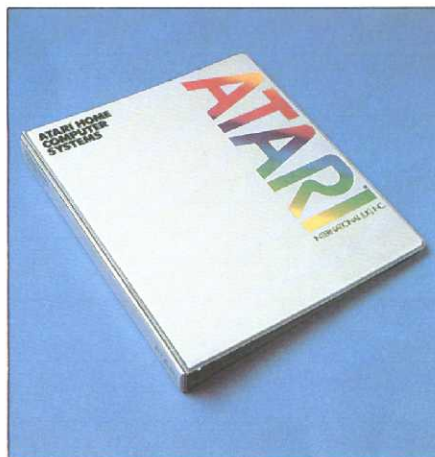- Quarxon Cassette

Name _____

Address _____

_____ Postcode _____

Membership No _____

Please send this Order Form with your cheque/postal order, made payable to **Atari International (UK) Inc**, to: Atari Mailshop, Atari House, Railway Terrace, Slough, Berks, SL2 5BZ. (Please allow three weeks for delivery. Offers subject to availability. UK, N Ireland & Channel Islands only).
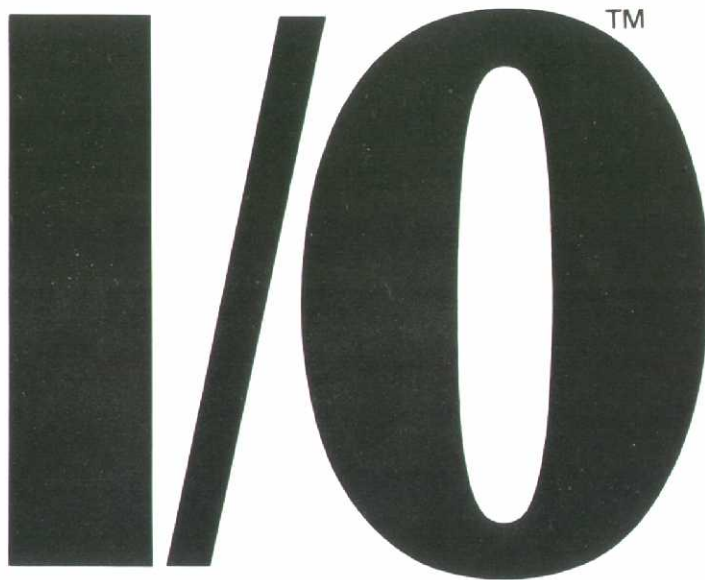
ATARI HELPLINE

Got a problem? Don't forget that our Customer Relations department is on hand to help out. Ring SLOUGH (0753) 24561 for advice on all matters relating to Atari Home Computers, software, peripherals and programming.

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I/O ™

INPUT/OUTPUT THE QUARTERLY MAGAZINE
OF THE ATARI HOME COMPUTER CLUB
ISSUE FOUR   ●   AUTUMN/WINTER 1983

And now, the new generation . . .

The Atari XL range will probably be the most exciting new phenomenon to enter the world of Home Computing. The Atari 600XL will shortly be released in this country followed at a later stage by the Atari 800XL and the Atari 1450XLD. If you are thinking of upgrading or exchanging your Atari 400 or 800 computer, hang on, for the best is yet to come! The new range of peripherals are very attractive and specialised with new features that make it easier than ever to explore the world of computing. And what's more, they are all FULLY COMPATIBLE with the Atari 400 and 800 computers. Should you want more technical information on our new range of hardware, do drop us a line at the Slough address.

We are focusing on a wealth of new educational, home management and games software which, as well as the older Atari software, is fully compatible with the new hardware. Whether you are just looking for fun or the ease of the more serious side of computing, we have the right software package for you. Find out what's in store and a taste of what's to come in our special full colour pull-out guide on the centre pages . . .

As well as the regular slots in I/O, you will notice opposite the CLUB NEWS & OFFERS page which shall be a regular feature in the magazine.

Once again, a huge THANKYOU to all of you who have written in with bright ideas, tips and programs the best of which are featured in the INPUT pages. We could not find the space to print the many contributions we received, but watch out for future editions of I/O as you may well find your letter or program in print! In the meantime, if you have a program, however small, a comment or idea as to how you would like to see I/O help you, then send it in — we'd love to hear from you!

In answer to hundreds of requests, we have started a series on learning the Assembly language. Part 1 begins in this edition in ASSEMBLY LINE on page 9.

Our roving reporter, Barry Millns, has been investigating the benefits and pitfalls of video and computer games in his exclusive report on page 20 which features Dr. Robert Olton, manager of Behavioural Research at Atari in the United States.

Don't forget that if you would like to get hold of back issues of I/O, a few are still available from Atari HQ at a cost of £1 which includes P&P.

As the next edition of I/O will not be published until the New Year, from everyone here at Atari —
SEASONS GREETINGS!

Editor

ATARI'S SOFTWARE DEVELOPMENT CENTRE

Atari's S.D.C. — teaming up for success

One of the fascinating things about the computer software market is that the range of programs is constantly being added to by the consumers themselves. Many amateur computer enthusiasts have designed programs that have been accepted for commercial development and have consequently found themselves becoming professional software authors.

Developing new software is a creative process. It would be foolhardy to ignore the massive creative potential of home computer users. Atari, by establishing a channel for feedback between those who produce computers and those who use them in their homes, have stretched their own resources beyond their Software Acquisition team at Slough to, potentially at least, all of their home computer users in the field. Their suggestions, criticisms and actual program designs, all provide a valuable creative input that will eventually help to broaden and enhance the Atari software inventory.

But assessing programs sent in by home computer users is only part of the role played by Atari's Software Development Group, based in Slough.

Established in October 1982, the group will play an increasingly important role helping Atari to compete in the UK market with quality programs. This will be especially so in areas such as education, where the standard is very high with a constant need for further development and research. The programs that are being designed today will quite literally change the face of tomorrow's education environment, initiating totally new approaches to both learning and teaching.

But educational programs are only one example of the type of research and development which is currently being undertaken by the Software Development Group. The group is headed by director, Steve Gerber who is supported by development manager John Norledge and the group's administrator, Frances Conolly.

The three central tasks they are currently engaged upon are:

1. Converting software from the United States for the UK market. Whether the programs are for business, education or pure entertainment, there are often necessary amendments to be made. From changing the US $ signs for £'s, to rephrasing and respelling, this conversion work serves as a useful reminder that, although our American friends speak the same language as us, we retain our idiosyncratic habits in other ways.

2. Third party software development — this involves the commissioning of individuals and publishing companies to develop software for eventual distribution under the Atari name (the copyright having been purchased).

3. In-house development — here, a tangible program provided by an outside source (a home computer user for example) or developed within Atari itself, is researched and refined and sometimes sent to Atari US headquarters for appraisal. Although only in its initial stages in the UK, a system called APX has been developed in the US.

Designed to encourage the flow of creative ideas, 'APX', as John Norledge recently told I/O, 'has been set up to manufacture, distribute and promote programs written by consumers for Atari Home Computers. We're interested in high quality programs which lack mass appeal but nevertheless fulfil a specialist need. APX increases the home computer's usefulness by providing a large collection of high quality imaginative programs. It helps us to have a range of software that appeals to all ages and spans a wide range of needs and interests.'

The APX system allows programs that might not otherwise see the light of day, to reach consumers via Atari's marketing and distribution.

Home computer users with bright ideas for programs will be able to fill in an APX form and send it to their local centre. The lucky few whose ideas are commercially viable will not only supplement their income, but may also discover that they have a talent that will change the course of their careers. In the US, many amateur home computer users have become professional software authors.

Of course, it's early days yet, but if any of you come up with any brilliant ideas, store them on a floppy disk before they're forgotten!

See page 19 for 2 exciting APX software reviews! — Ed

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ATARI UNVEILS THE FUTURE

The next generation of Atari video games and home computer products was unveiled to the press in London
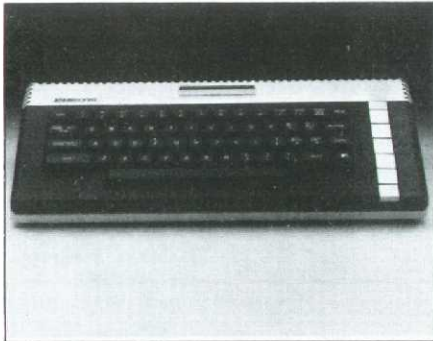
The Atari 600 XL Home Computer

this summer, and the first of these will appear in the shops this autumn.

Interactive devices for Atari's video games and home computer systems will be expanded to include a light pen which allows pictures to be drawn directly onto a television screen; a touch tablet which gives operators the ability to draw figures on the computer screen by using their finger like a paint brush to outline the design on a flat electronic pad; joysticks; and a Trak-Ball.

A new range of Atari Home Computers will also come onto the market starting with the Atari 600XL which has 16K RAM expandable to 64K. This will be followed by the Atari 800XL with 64K RAM and eventually the Atari 1450XLD with 64K RAM and built-in dual density, double-sided disk drive together with a number of other special features and functions.

These computers will be complemented by a line of low-cost, high quality printers headed by the Atari 1027 letter quality printer. Information storage devices also to be launched will include the Atari 1010 program recorder featuring the unique Atari sound-through system and the Atari 1050 disk drive offering dual-density format.

In addition, a trio of expansion units will be introduced to expand the use of Atari Home Computers. The CP/M expansion unit allows CP/M software to be used on all new models; the Atari expansion box provides eight expansion slots, two RS-232 ports, 1 centronix and a bi-directional parallel bus to allow use of control cards and special peripherals.

On the software front, the latest Atari releases are featured on pages 13 and 14 and both present and future Atari software will be compatible with all Atari Home Computers with sufficient memory.

A Sporting Challenge

Following the outstanding success of the Atari Soccer 6 Championship held earlier in the year, Atari is continuing to build its links with sport and family entertainment.

Atari has now established an exciting new sports competition for families, friends, clubs and companies to enter. It is being run at a number of leisure and sports centres throughout the country, with a view to running a fully national competition in 1984.

The Atari Challenge, as it is called, is hosted by the popular sports coach and television commentator Ron Pickering, and is a clear example of Atari's fasighted approach to consumer electronics and entertainment. It combines the challenges of Atari's video games and home computers with a variety of sports in a competition that is all about fun, fitness and skill.

The four centres taking part are:
● Harlow Sports Centre, Harlow
● Oasis Leisure Centre, Swindon
● Concordia Leisure Centre, Cramlington, Newcastle
● Charnwood Leisure Centre, Loughborough,

So if you're not already involved, why not go along and find out how your teams are doing.

There is plenty of action going on in the Atari Challenge as entrants compete in a number of events including:
Tug-of-War
Indoor Hockey
Fitness Tests
Video Game
Computer Quiz
Relay Races

Ron Pickering and one of the entrants to the Atari Challenge

So with prizes for all who take part, plus local celebrities joining in the fun, everyone will be onto a winner with the Atari Challenge.

The Final will be held in November so look out for details in the press!

Carry On Camping

Following our report in Issue Three about Atari's proposed computer camp involvement, we are delighted to say that the venture has proved extremely successful and worthwhile.

Having initially promised to lend 20 Atari Home Computer Systems to Inter-Action Trust for use in one borough, Atari in fact loaned over 100 of these systems for use in seven boroughs in London over the summer holiday period.

As a result, over a thousand London youngsters got the chance to find out all about computers. The 40 one-week non-residential Community Computer Camps ran between 25 July and 2 September. Throughout each course, children aged between 9 and 16 received expert tuition on the

Community spirit at camp

Atari 800's provided for them. Each child gained considerable 'hands on' experience, a basic knowledge of programming techniques and an insight into how computers can best further their educational and employment prospects.

For those of you who are keen to become involved in computer camps, a new Urban Aid circular has just been issued by the Government to local authorities announcing the availability of grants in 1984 for a number of holiday projects, including the use of computers.

For more information write to: Community Computer Camps Advisory Service, 15 Wilkin Street, London NW5.

Competition Report

At last the judges of the Woman magazine Atari Competition have been able to check through all the 30,000+ entries. After careful consideration, the following entrants have been awarded first prizes each of an Atari 800 Home Computer System and range of software:
Mr L Halstead, Chorley, Lancs
Mrs K Nash, Hollywood, Nr Birmingham
Ms E Nyiga, Peterborough, Northants
Mrs S Young, Walton-on-Thames, Surrey

Many congratulations to each one of them and also to the runners-up!

INPUT
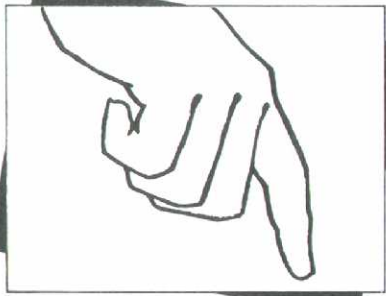
★★★★★★★★★★★★★★★★★

STAR LETTER

★★★★★★★★★★★★★★★★★

A Best Seller

On reading your Input page in the summer issue of I/O, I can only agree with A. Penn who wrote the Star Letter. It would indeed be a great idea to have a monthly magazine for the Atari Home Computer. I was only thinking this the other day when I took a PEEK into my local paper shop to LOCATE a magazine with an Atari program to type in. I wish Atari would publish one.

Being unemployed, it gives me great pleasure in using my Atari 400 16K. All those otherwise boring hours pass away while I am using my computer. It took me a long while to save for my fairly priced computer, but I'm glad I did and I hope to buy my cassette recorder soon.

I am sure that there would be a great market for a monthly games program, run competitions, have a letters page, a PEEK & POKE spot, giving all the latest info on computers and VCS games for the Atari. Plus, what I think would be an asset for all Atari owners, old and new alike, would be an agony column where users can write in with all those problems they come across during programming. I am sure that with all the talent you have you would be able to sort out most, if not all problems. Plus there are many features you can put in, interviews, APX, an ABS spot, ATARI BEST SELLERS, cartridges, etc.

The list is endless, so I had better end here before I run out of MEMORY.

P.S. Keep up the good work ATARI. For my money you are the up to Data, POP of the LIST and I shall GOTO you every time!

John D Winiarski
Coventry

Trade Secrets

I have an idea for some future I/O articles. How about doing a profile on an Atari programmer and/or designer, giving details about how he/she started, when they joined Atari and maybe invite them to give away a few 'trade secrets' on how they write or design a program. Perhaps it would be possible to outline the development of a typical Atari program, starting from the writing and design stage and finishing at the production and marketing stage.

Anyway, a great magazine and I hope you will change from being quarterly to monthly or bi-monthly since I cannot wait for the next issue!

A. Bartlett
Suffolk

Superb Graphics . . .

Thank you very much for sending the replacement copy of GALAXIAN. It is an excellent game and the graphics are superb. the smooth movement and multiple colours achieved for large numbers of 'players' and 'missiles' on the screen at once proves to me that there is yet more power waiting to be unleashed from my Atari 800 though no doubt some of the subtleties must remain a professional secret for the time being!

As I mentioned in my last letter, PAC-MAN has now joined the Hughes' software library and has rapidly become the family favourite!

Nigel Hughes
Aldershot
Hants

Language Aids

I have found that it is possible to use the Atari Assembler Editor for simple word processing. This means that you can use all the facilities provided by the Editor, including FIND and REPLACE although the 40-column display

limits those with 80-column printers.

The Editor carries out no syntax checking of source code. This means that you can type in anything you like (eg a letter to I/O !), providing you don't wish to assemble it. Each line must have a line number, but this does not appear when you use PRINT# P to print the result with line numbers surpressed. Furthermore, it is possible to include printer codes as part of the text to obtain different modes.

Copies can be saved on tape or disc using LIST in the normal way.

R. W. Gymer
Essex

A good tip, but anyone who is considering serious word processing should go for a complete package, such as the Atari Writer — Ed

In Mode

I would like to inform you for your I/O magazine of a book that I have written. It concerns the Atari 400/800 computers and explains in detail how to do the tricky things on the Atari such as player missile Graphics and redefining the character set. It also explains about building a custom mode display of mixed modes. It contains 28 programs, some of which are quite lengthy. There are 14 major games also included in the book. The book is published by Interface and costs £8.95.

Another book I have written, which is published by Virgin books, is 'Games for your Atari' and this costs £2.95. It contains 21 brilliant games for you to type in and run. Most will run with 16K, but some need more memory. Some of the programs use machine code routines, player missile graphics, redefined character sets and good sound effects. Some of the programs are written entirely in machine code and have quality you would only expect from expensive shop-bought software.

I am most impressed with I/O, keep up the good work!

Paul Bunn
Avon

Thanks for the info. Paul. In fact, Jon Dean has reviewed your books on page 19 — Ed.

PROGRAMS FROM OUR READERS

We've received a wonderful selection of programs from our readers, and here are a few of the best ones. They cover a variety of topics, and we hope you'll find them interesting. If you have any programs you'd like us to see, please send them in. There are prizes to be won for those featured in the Magazine.

```
5 REM P/M ANIMATION - MARK BELL.
6 REM RXD 15.8.83
10 GRAPHICS 24:SETCOLOR 2,0,0:COLOR 1
15 FOR I=1 TO 50:PLOT INT(319*RND(0)),
INT(190*RND(0)):NEXT I
20 A=PEEK(106)-40:PMBASE=256*A:POKE 54
279,A:POKE 559,62:POKE 53277,3
30 POKE 53248,0:POKE 704,136:Y=220:Z=5
0:A=0
40 FOR I=PMBASE+1024 TO PMBASE+1280:PO
KE I,0:NEXT I
50 FOR I=PMBASE+1024+Y TO PMBASE+1031+
Y:READ B:POKE I,B:NEXT I
60 POKE 53248,Z:POKE 704,Z
70 A=A+1:IF A>5 THEN A=1
80 ON A GOSUB 100,110,120,130,140
90 Y=Y-1:IF Y<20 THEN Y=20
92 Z=Z+1:IF Z>220 THEN Z=30
95 GOTO 50
100 RESTORE 200:RETURN
110 RESTORE 210:RETURN
120 RESTORE 220:RETURN
130 RESTORE 230:RETURN
140 RESTORE 240:RETURN
200 DATA 0,0,0,0,239,73,239,0
210 DATA 0,0,0,239,73,73,239,0
220 DATA 0,0,239,73,73,73,239,0
230 DATA 0,239,73,73,73,73,239,0
240 DATA 239,73,73,73,73,73,239,0
```

```
5 REM P/M ANIMATION - MARK BELL.
6 REM RXD 15.8.83
10 GRAPHICS 24:SETCOLOR 2,0,0:COLOR 1
15 FOR I=1 TO 50:PLOT INT(319*RND(0)),
INT(190*RND(0)):NEXT I
20 A=PEEK(106)-40:PMBASE=256*A:POKE 54
279,A:POKE 559,62:POKE 53277,3
30 POKE 53248,0:POKE 704,136:Y=220:Z=5
0:A=0
40 FOR I=PMBASE+1024 TO PMBASE+1280:PO
KE I,0:NEXT I
50 FOR I=PMBASE+1024+Y TO PMBASE+1031+
Y:READ B:POKE I,B:NEXT I
60 POKE 53248,Z:POKE 704,Z
70 A=A+1:IF A>2 THEN A=1
80 ON A GOSUB 100,110
90 Y=Y-1:IF Y<20 THEN Y=20
92 Z=Z+1:IF Z>220 THEN Z=30
95 GOTO 50
100 RESTORE 200:RETURN
110 RESTORE 210:RETURN
200 DATA 60,171,255,213,126,36,0,0
210 DATA 60,213,255,171,126,36,0,0
```

```
1 REM _____
2 REM *<PROG>*    STEAM
3 REM *<FUNC>*    STEAM ENGINE SOUNDS
4 REM *<AUTH>*    G.ARROWSMITH
5 REM *<DATE>*    18-JUL-83
6 REM _____
10 FOR X=1 TO 10:NEXT X
20 SOUND 0,6,8,10
30 IF X=0 THEN END
40 FOR X=1 TO 20:NEXT X
50 SOUND 0,2,3,4
60 FOR X=1 TO 30:NEXT X
70 GOTO 20
80 NEXT X
90 GOTO 60
```

```
0 REM A COMPUTER WORLD
1 REM SOUNDS LIKE ONE ANYWAY!!
2 REM BY N. O'NEILL
3 REM BOLTON, LANCS
4 REM RXD 17.8.83
10 FOR I=0 TO 255
20 FOR A=0 TO 6
30 POKE 53760+(A*2),I
40 POKE 53761+(A*2),199
50 REM TRY I INSTEAD OF 199
60 NEXT A
70 NEXT I
80 RUN
```

```
10 REM TIRED AND RUN DOWN IN SPACE
20 REM SOUNDS BY A.J. PENN
30 FOR Z=14 TO 0 STEP -5
40 FOR P=255 TO 0 STEP -10
50 SOUND 0,P,10,Z
60 NEXT P
70 NEXT Z
80 RUN
```

All programs are written in BASIC.

When Jim Hotchkiss purchased his Atari 800, disk drive and program recorder, he was faced with a growing dilemma — where to install them. After careful research, Jim decided to build an Atari cabinet of his own.

The material Jim used was teak veneered contiboard and the cabinet was put together by using wood glue. He then completed the unit by giving it a smooth varnish finish. The unit is mounted on four heavy duty coasters and can be moved around very easily. The cost for materials amounted to about £40 and Jim is very pleased with the result as he has never attempted anything like it before. You can see for yourself what a grand job Jim has done. And you don't have to be a D.I.Y. expert either! As a result of his efforts, we at Atari have decided to send Jim a special prize.

If you would like to know more about how Jim constructed his Atari unit, simply drop me a line at Atari HQ in Slough and I'll put you in touch. In the meantime, I look forward to some more imaginative photos of Atari work places and graphics from readers! — Ed.
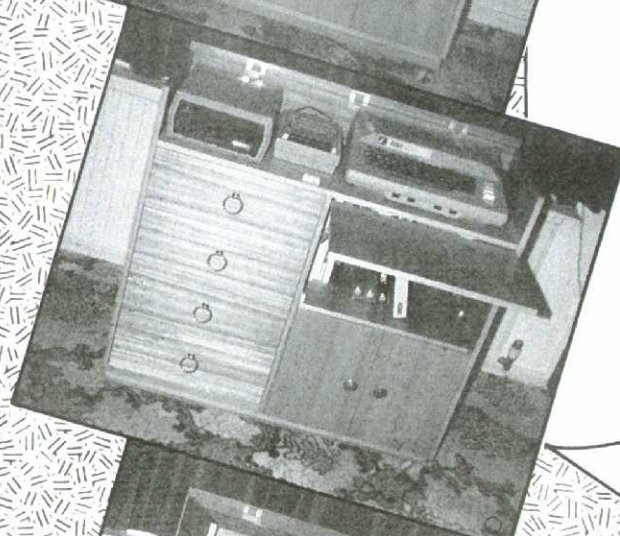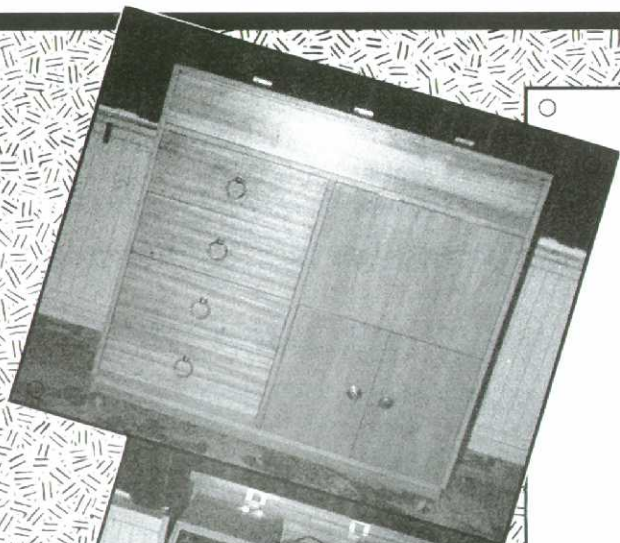
Photographs by Jim Hotchkiss, Stalybridge, Cheshire.
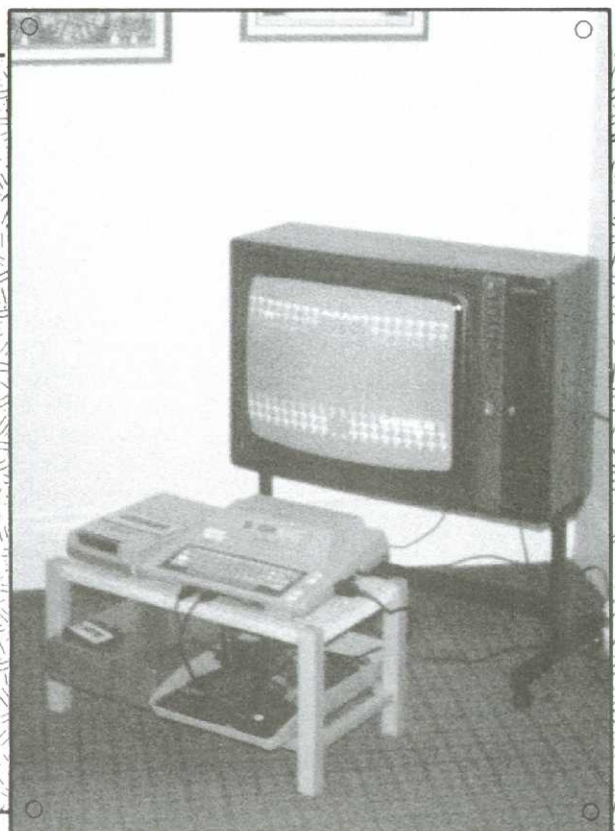
Photograph by D. V. Harry, Solihull, W. Midlands.

ASSEMBLY LINE

LEARNING THE ASSEMBLY LANGUAGE (Without too much pain!)
by Steve Waters & Martin Walker

PART ONE — AN INTRODUCTION

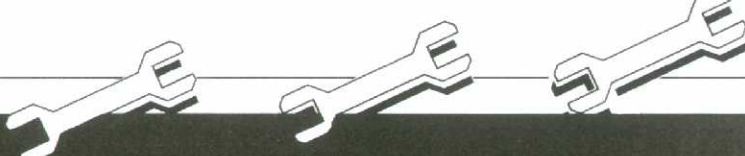The following series will help you to learn the Assembly language at your own pace and ease. As we go along we will be using Basic (which you should all have learned by now) as a comparison; Assembly language is often used in conjunction with Basic.

The Assembly language is generally implemented for routines for which Basic is too slow. For example, supposing you had player missile graphics in a Basic program and wanted to move them around the screen. To move them left and right in Basic is straight forward but to move them up and down is not, yet it is quite simple to do so in Assembly language. By the end of this series with your new found knowledge, you should be able to accomplish tasks such as these. Above all, you should have acquired the same ease of programming in Assembly language as Basic to program your Atari computer more effectively than ever before.

The Microprocessor

The 6502 is the brains of the Atari Home Computer system. The 6502 actually executes your program and is, along with numerous other chips in your computer, what makes the Atari one of the best microcomputers available.

The Assembler/Editor Cartridge — An Overview

There are three sections in the Assembler/Editor cartridge:
1. The Editor
2. The Assembler
3. The De-Bugger

This is the only complete package to create, test, run and correct Assembly language programs.

In order to program in Assembly language you will need an Assembler/Editor cartridge. The essential difference between the Basic cartridge and Assembler/Editor cartridge is that the latter does not have to be used when running an Assembly language program, thus enabling full use of the computer's memory. Also, the Assembly language is 50 — 1000 times faster than Basic.

So what does Assembler/Editor mean? The Assembler is the part of the cartridge that converts all you enter as a program to numbers. These numbers are "understood" by the 6502 to run your program. However, rather than learn all the numbers off by heart (a long and tedious task) the Assembler "accepts" simple statements from the programmer which are automatically translated into numbers to run your program effectively. This process saves an enormous amount of programming time. It might take you an entire day to convert a 100 line program into numbers; it would take the Assembler just a few minutes.

The Editor is the part of the cartridge that allows you to enter your program into the computers memory (the Editor is similar to Basic's Screen Editor). The Editor is a simple word processor, it can for example, search for a string and replace it with another — eg, we could search and replace ARATI with ATARI. The Editor will find all occurrences of the word ARATI and replace them with the correct spelling of ATARI.

What is binary and what are flags?

If we ask if you are over 21 you could give the answer yes or no — there is no in-between. Binary is very similar to this system of yes or no. The main difference is that yes is represented as a "1" and no as a "0". All information stored in the memory of our computer is stored in this way. Each binary digit (or bit) of information can be "on" (a "1") or "off" (a "0"), and in most home computers like our Atari these bits of information are stored in groups of eight, so the 6502 chip inside our machine is known as an eight bit microprocessor.

There are many special bits in the 6502 known as "flags", which can be set (up) or cleared (down). Say a flag up means that a train is coming and down means that it must stop. This is exactly how the 6502 manipulates the flags under its control. We as the programmers can look at these flags or change them, and then make decisions based on what we find. We could, in our example, look at the flag to see at any time if the train is coming from London so, the flag has two possible conditions, up ("1") or down ("0"). The meaning given to this flag is entirely up to us as the programmers.

What is Hexadecimal?

Hexadecimal is a form of notation that makes it a lot easier for us to control the information stored in our groups of eight bits (known as "bytes"). All of the memory in the computer is set out in this way and each byte has its own unique address (just like we do). When we program in Basic we don't normally need to know this, we just tell the computer what to do using commands in English. An Assembly language is the only programming language that directly tells the 6502 what to do and this is why it can be so much faster. However, to do this we must control each byte in our program directly.

Hexadecimal notation encodes a group of four bits into a unique symbol, so that any byte of memory can have a value represented by two hex symbols. Hex was born because of a simple need; there are sixteen possible combinations that can be stored in our group of four bits. We need to be able to count from zero to fifteen but only using one digit. The answer is to use letters as well as numbers; we use zero to nine and then A to F, where A equals ten, B equals eleven, C equals twelve, D equals thirteen, E equals fourteen and F equals fifteen.

If you have a two digit number in decimal you can only count as high as ninety-nine, which is nine times ten plus nine. But what about hexadecimal? Well, we know that F equals fifteen, so the maximum hex number with two digits will be FF — what decimal equivalent will this have? It won't be fifteen times ten plus fifteen, but fifteen times sixteen plus fifteen, giving 255. When we count in decimal we add one to the tens column when we add one to nine. In hexadecimal we add one to the sixteens column when we add one to F, so each byte in our memory can hold a value from zero to 255 in decimal, or zero to FF in hex.

Example:

Decimal	Hexadecimal
07	0F
04 +	06 +
11	15

6502 Addressing Modes

Having explained why hexadecimal is so useful to us, let's now see how Assembly language compares with Basic. There are three main registers (used to hold a hex number) within the 6502. These are the Accumulator (or A register) and the X and Y registers, and can be thought of rather like Basic variables. They can only hold integer (whole) numbers from 0 to 255. If, for instance, we let the A register have the value 55 and then add 201 to it, the result (in the A register) would be 1.

You can use these registers in many different ways to do different things. Each mode performs a specific function and many of the addressing modes have approximate equivalents in Basic. The easiest way to look at them is to describe each in turn with an example and Basic equivalent.

As a convenience to most people, the column with the Assembly language instruction will have the operand (the data that needs to be operated on) in

hexadecimal. Conversely, the Basic column will have numbers in decimal. The value in each case will be identical but normally a hex number is preceeded by a $ sign ($30 is equivalent to 48).

Immediate Mode

In this form of addressing, the operand is the data. The rest of our memory is not involved. We tell the 6502 that we want this mode by preceeding the operand with a # .

Example:

Assembly Language	Basic
LDA # 8	LET A = 8
Loads the accumulator with the value 8.	The basic variable A is set to 8.

Zero Page Addressing

Each block of 256 bytes of our memory is known as a page (with the bytes numbered 0-255 inclusive). Page 0 is the special case of the first 256 addresses. Zero page addressing requires only two bytes; the first is the instruction; and the second one is for the 8 bit, or short address. Because of this, any instruction that can use this mode will run faster than if absolute mode is used (see below).

Example:

Assembly Language	Basic
LDA $30	LET A = PEEK(48)
Loads A register with the contents of memory address $30	Sets the variable A to the contents of memory address 48

Absolute Addressing Mode

This is very similar to zero page, except that instead of being able to look at the first 256 bytes of memory, this can look at any address in the range 0 to $FFF (or 0 to 65535, known as 64K, in decimal). This mode needs three bytes; the instruction, and then two bytes of address.

Example:

Assembly Language	Basic
LDA $FFFF	LET A = PEEK(65535)
Loads accumulator with the contents of $FFFF	Sets the variable A to the contents of memory address 65535

Implied Addressing Mode

This mode means that no addresses are needed to carry it out.

Example:

Assembly Language	Basic
TAX	LET X = A
This instruction transfers the contents of A to the register X	This sets value of the variable X to the current value of the variable A

Accumulator Addressing Mode

This is where the instruction operates on the accumulator itself.

Example:

Assembly Language	Basic
LSR A	A = A/Z
Shifts the contents of every bit in the accumulator right one bit, and puts a zero into highest bit	Divides the current value of the variable A by 2

Indexed Addressing Modes

This is a useful set of modes that can access in turn the contents of a block or table of memory addresses. Both the X and Y registers can be used as the index register. The instruction will specify which index register is to be used, and a memory address. Then the contents of the register are added to the address, in the most general example, to give a new address to operate on.

Example:

Assembly Language	Basic
LDA $30, X	LET A = PEEK (48 + X)
Loads the accumulator with the contents of address ($30 + X))	Sets variable A to the value of memory address (48 + X)

There are two modes of indexed addressing, known as Pre-indexing and Post-indexing. We will go into these in a future article.

Indirect Addressing

The only instruction that applies to this mode is JMP (Jump to new location). It is followed by the two byte address of the new location.

Example:

Assembly Language	Basic
JMP ($30)	20 GOTO PEEK(83)
	30 STOP
	39 ?"THIS IS LINE 39"
Jump to memory address whose value is found in location $30	Line 20 will cause the program to jump to the line number found in memory location 83. This is the right hand margin value, normally 39

Relative Addressing

The IF statement in Basic has a parallel in Assembly language in the form of a set of branch instructions. These test the special flags found in the 6502, and branch to another instruction if the tested condition is true. Just as in Basic, if the condition is not true then the program continues with the next instruction after the test. It is known as relative addressing because rather than branching to a specific memory address (or absolute address), it branches so many steps forward or backward, and continues from there.

Example:

Assembly Language	Basic
BEQ LABEL	IF X = O THEN GOTO LABEL
If the zero flag is set, the program will branch to the memory address called LABEL	If the variable X = 0 then goto the line whose number is the value of LABEL, otherwise carry on to the next line number

As you can see, the different modes used by the 6502 do have in most cases an equivalent in Basic, although at this stage the reason for the speed of an assembled program is perhaps not obvious. If you look back to our introduction, you'll see that the Assembler takes our instructions and operands, and turns them into the numbers that the 6502 understands. This is known as assembling a machine code program. Once the M/C has been produced from our Assembly program, the 6502 can use the numbers directly. Our BASIC program, on the other hand, must be interpreted (or changed into the M/C numbers) each time we type RUN. Both Assembly and Basic have their advantages and disadvantages, but in order to produce the spectacular high speed graphics and sound effects used in STAR RAIDERS and DEFENDER, we must use Assembly Language.

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In Part II we shall be taking a more in depth look at programming with the 6502. For those of you who are keen to start programming in Assembly language before the next issue of I/O, try to get hold of a copy of "6502 Assembly Language Programming" by Lance Levanthal.

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New Products From ATARI

A Special pull-out guide

THE ATARI 600XL HOME COMPUTER

New Peripherals

Have it on tape and discover our unique sound-through system. Or the convenience of disk for faster access. Whichever system you choose, you have the added advantage of direct connect, saving you time and money.

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Add storage and retrieval capability to your computer system without spending a lot of money. The ATARI 1010 program Recorder uses economical cassettes to store text, programs and other information. You'll also gain access to a variety of Atari program cassettes, including programs like ATARI Conversational French, Italian, German and Spanish which feature recorded audio instructions to reinforce learning.
- SRP: £49.99

Atai 1050 Disk Drive

Adding an ATARI 1050 Dual-Density Disk Drive to your home computer system gives you fast, convenient information access. Store text, data or programs permanently on compact, easy-to-handle 5¼-inch diskettes. Each diskette holds up to 127K bytes of information (as much as 100 pages). And you can get to that information fast - because the ATARI 1050 Disk Drive will find any file in a fraction of a second. And with an ATARI 1050 Disk Drive, you can also enjoy the many diskette-based programs available for ATARI Home Computers.
- SRP: £299.99

Whatever you need to put on paper — words, graphics or both, Atari offers a significant choice. Three specialised printers provide the right tool for every job.
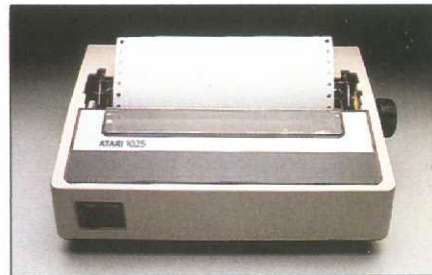
Atari 1025 80 Column Printer

For speed and versatility, the ATARI 1025 80—Column Printer is just the ticket. This dot-matrix printer uses regular typing paper for correspondence or computer paper for lengthy reports. And it offers a choice of print styles, from a standard 80 characters per line to an extra bold 40 characters per line.
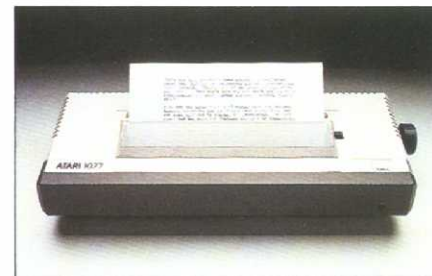- SRP: £349.99

Atari 1020 Colour Printer

Four colour graphics and text are the speciality of the ATARI 1020 Colour Printer. Perfect for creating charts, graphs and even artistic designs, it also comes with programs that let you draw on the screen and plot on paper directly, using a joystick and any ATARI Home Computer.
- SRP: £199.99

Atari 1027 Letter Quality Printer

Choose the ATARI 1027 Letter Quality Printer when you need to make your best impression. It prints

fully-formed letters like a quality electric typewriter, so it's ideal for use with a word processor like Atari Writer. Since it accepts single sheets of paper, you can even print on your own letterhead or heavy bond.
- SRP: £299.99

Atari Touch Tablet

Paint pictures, draw diagrams, write scripts, or even invent new art forms. The ATARI Touch Tablet puts all the built-in graphics power of your ATARI Home Computer at your fingertips. Put the pen to the Graphics Tablet and create the designs and images you want to make...right on your own TV screen. An ideal choice for creative kids, aspiring artists, or anyone who wants to create computer designs easily.

Atari Touch Tablet CX77
- INCLUDES: graphics tablet cassette program, pen
- REQUIRES: program recorder
- OPTIONAL: ATARI colour printer
- SRP: £69.99

Atari Super Controller

The ATARI Super Controller Joystick lets players feel the excitement of any game played on an ATARI Home Computer. Easily connected through controller ports, it is designed for left or right hand operation and may be hand held or used as a table top controller.

It features a self centering mechanism, two side mounted "fire" buttons — one on each side — and high quality leaf switches for directional control and accuracy. The Super Controller Joystick provides eight direction output to give that exacting edge to every game played. It has been engineered for hours of comfortable use.
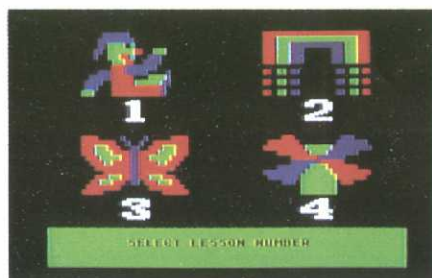- SRP: £14.99

Atari Trak-Ball

Roll into action with the new ATARI TRAK—BALL for your Home Computer! Turn tighter corners, zero in on video villains faster and blast 'em more accurately! Works with any joystick game — Centipede, Missile Command, Galaxian, and more. Capture the ultimate in arcade action and excitement at home.
- SRP: £39.99

New Software

Juggles' Rainbow teaches the *concepts of above, below, left and right*. Juggles' Rainbow helps children more readily grasp alphabet, spelling and reading skills. For ages 3 to 6.

- CASSETTE CX4129 DISKETTE CX8137
- REQUIRES: 16K RAM, program recorder or disk drive.
- SRP: £22.99

Juggles' House teaches essential spatial relationships like *upper, lower, inside* and *outside*, to make learning the fundamentals fun. For ages 3 to 6.

- CASSETTE CX4130 DISKETTE CX8138
- REQUIRES: 16K RAM, program recorder or disk drive.
- SRP: £22.99

Mickey in the Great Outdoors takes youngters through two complete learning adventures; *Mickey Goes Hiking* and *Mickey Goes Exploring*. *Mickey goes Hiking* helps children build word recognition and learn sentence construction while *Mickey Goes Exploring* sharpens arithmetic skills. More programs in the Disney Education Series are coming soon. For ages 7 to 10.

- CASSETTE TX9035 DISKETTE DX5050
- REQUIRES: 16K RAM for cassette or 32K RAM for diskette, program recorder or disk drive ©MCMLXXXIII Walt Disney Productions
- SRP: £29.99

VisiCalc. VisiCalc, the most widely known electronic spread sheet, combines the ease of a pocket calculator with the powerful graphics and memory capabilities of your ATARI Home Computer. Whether you are working with investments, tax records, inventory, cost estimates or business plans the valuable benefits and powerful financial modelling abilities of VisiCalc will allow you to explore the alternatives in just seconds.

- DISKETTE DX5049
- REQUIRES: 32K RAM (larger amounts of data require more RAM), disk drive.
- OPTIONAL: printer
- SRP: £159.99
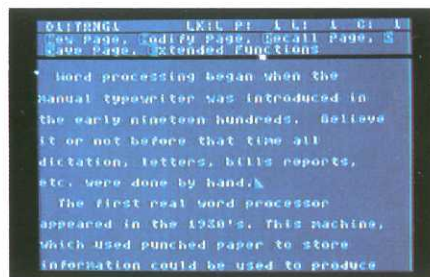
AtariWriter Packed onto a convenient 16K cartridge, AtariWriter does everything a word procesor should: makes corrections instantly, moves blocks of text quickly, and reorganises pages with a few commands. You'll find AtariWriter invaluable for writing anything from letters, reports and poetry to invitations and novels.

- CARTRIDGE RX8036
- REQUIRES: 16K RAM, printer
- OPTIONAL: disk drive or program recorder.
- SRP: £65.00

Family Finances. Get a clearer picture of where your money is going. Plan a budget and evaluate results, establish goals and track your progress toward those goals. This practical two-diskette program itemises over 125 entries in 13 different expense categories for each month and 25 income entries in each of 5 income categories — then prints a variety of reports to help keep you up to date.

- DISKETTE CX431
- REQUIRES: 32K RAM, Atari Basic,disk drive
- OPTIONAL: printer
- SRP: £34.99

Timewise. Now there is a way to organise your time wisely! Keeping track of important business meetings or special events is easier on Timewise and better than carrying around a calendar for the whole year. With your ATARI printer, Timewise lets you select from a variety of ways the schedule you personally require on paper. Whether you create a month's itinerary or print your day's activities Timewise helps you organise your time.

- DISKETTE DX5047
- REQUIRES: 32K RAM, disk drive
- OPTIONAL: printer
- SRP: £22.99

Eastern Front (1941). The ultimate computer war game — or is it more? With you as the German commander and the computer determining Russian strategy, the stage is set for the most complex re-creation of battle ever devised.

- CARTRIDGE RX8039 1 player
- REQUIRES: 16K RAM, joystick
- OPTIONAL: disk drive, program recorder. ● SRP: £29.99
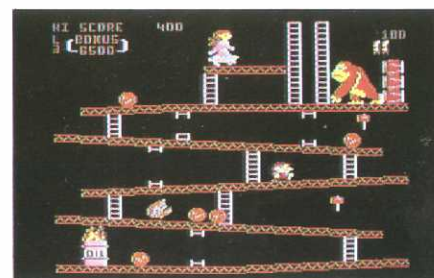
Donkey Kong. Donkey Kong steals Mario's girl, takes her up to his hideout, and dares the intrepid little hero to fight his way up to save her. An instant classic!

- CARTRIDGE RX8031 1 or 2 players
- REQUIRES: 16K RAM, joystick
- SRP: £22.99

Coming Soon!

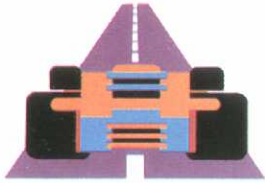**Pole Position.** The ultra-realistic graphics and sounds of the Gran Prix explode into your living room in this computer version of the popular arcade game. Complete a lap in qualifying time, then take on the Fuji raceway and competing drivers in a high speed race.
- CARTRIDGE: RX8034 1 player
- REQUIRES: 16K RAM, joystick

Pengo. Smash or be stung! You propel a penguin through an ice block field as he smashes the deadly sno-bees before they crush him. Freeze the little critters before they catch up to him. The faster he clears the field, the more bonus points you win.
- CARTRIDGE: RX8045 1 or 2 players
- REQUIRES: 16K RAM, Joysticks
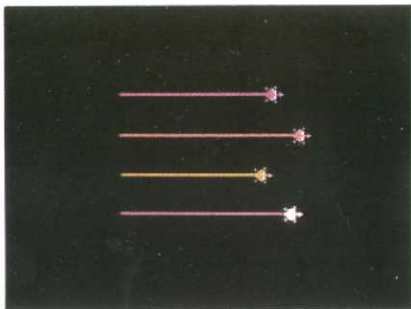
Atari Logo. Plug in an ATARI LOGO programming language cartridge, and enter a stimulating environment where mathematical and logical thinking become second nature. ATARI LOGO is both elegantly simple and easily expandable. Learners of all ages gain insights into geometry, maths or physics by using ATARI LOGO Turtle Graphics. ATARI LOGO uses ordinary words and sentences to simulate the richness and complexity of natural language. Here's a computer language that lets you start at your own level — and explore to the limits of your imagination.
- CARTRIDGE RX8032
- REQUIRES: 16K RAM
- OPTIONAL: printer, program recorder or disk drive.
- SRP: £59.99

Donkey Kong Junior. Another great arcade favourite brought home! When Mario the carpenter captures Donkey Kong, Junior pursues him through the jungle in an effort to save his papa.
- CARTRIDGE: RX8040 1 or 2 players
- REQUIRES: 16K RAM, Joystick

Tennis. So authentic, it's like being on centre court at Wimbledon. Play singles or doubles matches against the computer or an opponent. From a baseline perspective you position yourself for each return and choose your best shot. You can even serve to your opponent's forehand or backhand at will.
- CARTRIDGE RX8042 1 or 2 players
- REQUIRES: 16K RAM, Joystick

Memory Module
In order to expand the l6K memory of the low cost ATARI 600XL Home Computer to 64K, Atari has introduced the 64K memory module. The module plugs directly into the expansion port on the rear of the computer. No power is required for this expansion.

CP/M Module
The ATARI CP/M MODULE is an external microprocessor upgrade to allow CP/M software to be used with all models of ATARI Home Computers. CP/M software is used for word processing, databases, spreadsheets and many other professional and small business applications. The ATARI CP/M MODULE is fully compatible with the ATARI 810TM and 1050TM Disk Drives. Its built-in interface connects directly to any ATARI Home Computer's serial port.

Features:
- Z-80 Microprocessor
- 4.0 MHz processing speed
- 64K RAM
- CP/M2.2 Operating System
- 40/80-column video output (switchable)
- Serial input/output port
- Monitor output

Atari Expansion Box
The ATARI Expansion Box allows control cards and special peripherals to be connected to all models in the new ATARI Home Computerline. It provides eight expansion slots, two RS-232 ports and a bi-directional, parallel bus.

Ms. Pac-Man. She's on her way, America'a first lady of the arcade, with the same great graphics and sounds. Guide the ever-hungry MS. PAC-MAN through multiple mazes, gobbling up dots, ghosts and fruits.
- CARTRIDGE: RX8043 1 or 2 players
- REQUIRES: 16K RAM, Joystick
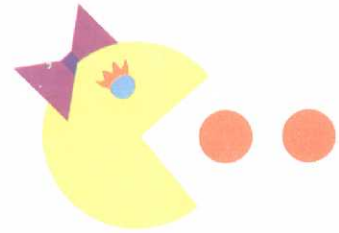
Joust. Take an adventurous ride on the back of an ostrich, as you jockey for position, attempting to knock the other players off their buzzards. Just like the arcade game, for one or two players.
- CARTRIDGE RX8044 1 or 2 players
- REQUIRES: 16K RAM, Joystick
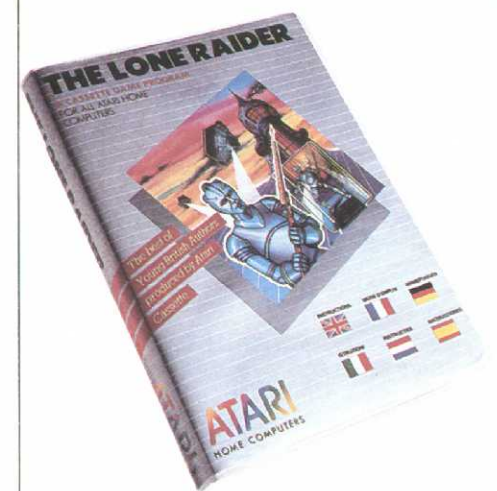
STOP PRESS!
The Lone Raider The first UK produced all action game from Atari. The Lone Raider was programmed by the 17 year old Justin Whittaker of Maidstone, Kent, using his ATARI 800. Available on cassette for all ATARI Home Computers.
- CODE: EC2001
- SRP: £14.99
- REQUIRES: 16K RAM

ATARI SERVICE

Tech Specs By Jon Dean

● Callers to the Atari HELPLINE may have noticed a change when they have been referred to Product Support recently. We're operating a new system here in an attempt to answer your enquiries more efficiently. Simply call the HELPLINE number — Slough (0753) 24561 — and your call will be answered by one of our Customer Relations specialists, Dawn or Helen. Give them a brief and concise description of your problem or enquiry, together with your name and daytime telephone number. This information will then be passed on to us in Product Support. We will then try to find a suitable answer or course of action for you and return your call within one working day. There are certain queries which may take some time to investigate! But remember, to help us to help you, please give us a clear description of your problem! We look forward to hearing from you!

● We are often asked for details of the monitor socket standard in all Atari Home Computers with exception of the 400. It is a standard 5-pin (180 degree) DIN-plug which can be used to connect your Atari Computer to a Hi-Fi, a composite video monitor or even a video recorder! Looking at the socket from left to right, the pin configuration is as follows:

Pin 3 (Audio Output)
Pin 5 (Composite Chroma)
Pin 2 (Ground)
Pin 4 (Composite Video)
Pin 1 (Composite Luminance)

Don't forget, you can only connect your UK (PAL-I) standard Atari to a PAL composite video monitor (not RGB!)

● Darren Blunt of Wisbech, Cambs., is one of many Atari enthusiasts who has come across the same problem: "I enjoy typing in games from magazines", wrote Darren, "but they often contain a special symbol . . ." which he described as "a kind of bracket". This symbol is supposed to represent the clear-screen function, but if you read your Basic Reference Manual (BRM) page 14, and program this function, you will see that a different character — a kind of 'bent arrow' — appears on the screen (equivalent to decimal code 125, BRM, Appendix C-3). Most printers cannot print the 'bent arrow', they print the brackets instead. Simply substitute the clear screen function for such brackets next time you see them in a listing!

● Mr Allen of Essex wanted a technical explanation of why we only recommend Atari Program Recorders for Atari Home Computers and not standard cassette machines. The simple answer is that the POKEY chip within the Atari computer sends signals to the Program Recorder known as Frequency Shift Key (FSK) tones and records the data on the digital data track of the cassette (this is the function of the 'record' circuit) So that the computer receives a serial binary data stream from the recorder (the tone the computer expects), a second circuit is needed on the board to translate the information (this is the function of the 'playback' circuit). A standard cassette machine does not have the 'playback' circuit required to translate FSK into the appropriate serial binary data.

Nationwide Service

You'll be delighted to know that we have recently added some more Independent Service Centres to our rapidly expanding network in the U.K. There are now over 70 Centres nationwide which means there is one local to you. And local service means fast service. I.S.C. staff are trained by Atari to ensure that your Atari Home Computer receives service of the highest standards possible!

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C.E.L.
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Belper
Lester & Nix Ltd.
Tel: (0773) 826199

DEVON
Plymouth
Plymouth TV Repair Service
Tel: (0752) 47076

ESSEX
Woodford Green
CCS Richmond
Tel: (01) 505 6983

MID GLAMORGAN
Pontyclun
Videocare (1982) Ltd.
Tel: (0443) 225482/225332

HERTFORDSHIRE
Letchworth
Spectrum Service Centre
Tel: (04626) 79548

HUMBERSIDE
Hull
Novacom Systems
Tel: (0482) 54083

LEICESTERSHIRE
Leicester
Mays Hi Fi
Tel: (0522) 22212

NOTTINGHAMSHIRE
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Tel: (0602) 264711

SUSSEX
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Gamer
Tel: (0273) 698424

WARWICKSHIRE
Atherstone
T. J. Foster Televisions Ltd.
Tel: (08277) 66222)

YORKSHIRE
Leeds
Vallance Service Centre
Tel: (0532) 565674

NORTHERN IRELAND
Belfast
Thor Appliance Service Co. Ltd.
Tel: (0232) 50826

SCROLLING VENETIAN BLINDS
By Mike Wilding

Last time I promised that I would show you how to open your programs in spectacular style with 128 scrolling colours on the screen. Here is a little utility to help you amaze your friends and make them wonder how you did it! Unless they already have an Atari Home Computer!

In Brief

In your Atari Home Computer is a location called WSYNC. This stands for **Wait for horizontal SYN Chronisation.** When working in machine code this location can be used to accurately time a change to the colour registers in the Operating System.

You may remember last time I described how a T.V. worked and told you that there was a delay between the drawing of lines on the screen. In the last edition of I/O, we used this technique to change the colours in the 256 Colourcard between drawing lines so that the colour always changed at the beginning of a line.

Those of you who understand Assembly language should look at Listing 3 to see what happens. The effective part of the program is below the REMarks that begin **ROUTINE TO CHANGE COLOURS** etc. This is a continuous loop that does two things:

1. It adds one to the colour register using WSYNC to delay until the next line is drawn.
2. It loads the keyboard register and checks whether a key has been pressed. As this is the register for the last key pressed you could still use this to check whether some-one has answered Y or N to a question you have asked, or perhaps chosen an item from a menu, when the program returns to BASIC.

The Listings

Listing 1 is just a small program to help demonstrate the effect. In the program you may notice that the width of the text screen alters so that there is a space down the sides for the colours to scroll. If you wish to use this in your program you will need to know where to put any text you Print to the screen. The reason for this is

that although the output to the screen knows that there are only 32 characters across the screen, the rest of the computer still believes there are 40. Refer to Table I to find the beginning of the line you wish to print on.

Listing 2 is the actual program that does all the work. You can use this anywhere in a program to add a splash of colour. The only thing you have to remember is that while this is running the USR call, the computer is effectively locked up in its own little world and will stay that way until you press the key. If you press the break key this will appear to have no effect. However, when you press another key you will find that the program will stop. You may also notice that the Data statements look rather strange. More about this in a moment!

Listing 3 is the Assembly listing of the Data statements in listing 2. This is for those who have an understanding of Assembly. It has been stripped of line numbers to fit the page!

Table I

Line Position

No.	X	Y			
0	0	0	12	24	9
1	32	0	13	16	10
2	24	1	14	8	11
3	16	2	15	0	12
4	8	3	16	32	12
5	0	4	17	24	13
6	32	4	18	16	14
7	24	5	19	8	15
8	16	6	20	0	16
9	8	7	21	32	16
10	0	8	22	24	17
11	32	8	23	16	18

Suit yourself . . .

The Data statements in Listing 2 have several lines with only one item of data. I did this so that you could change various bits to tailor the program to your choice.

As it stands, the program changes the background colour to give an effect of 'scrolling' 128 colours down the screen. You can change the direction by altering one of two lines. If you change line 32540 to read 32540

DATA 206, then the colours will scroll up. The same thing happens if you change line 32610 to read 32610 DATA 238.

The difference between these two lines is that one will make the bars appear to go from light to dark as you look down the screen and the other will make them appear to go from dark to light. If you change both, then the bars will still scroll down the screen but will go from light to dark instead.

Table II

A	B	C	D
PCOLR0	704	17	192
PCOLR1	705	18	193
PCOLR2	706	19	194
PCOLR3	707	21	195
COLOR0	708	22	196
COLOR1	709	23	197
COLOR2	710	24	198
COLOR3	711	25	199
COLOR4	712	26	200

Should you want the bars to remain static, then change lines 32610 to 32630 to read:

```
32610 DATA 236
32620 DATA 236
32630 DATA 236
```

Lastly, although I have used the background colour, there is no reason why any other colour register should not be changed, including Player/Missile registers. If you look at Table II, you will see that I have listed details in 4 columns. Choose the register you wish to change and look it up in the Table. Column A tells you which register it is, Column B tells you where you would normally find it when you are using BASIC. Simply choose the colour you wish to change and place the data in Column C in line 32570 (instead of DATA 26), and the data in Column D in lines 32620 and 32650 (instead of DATA 200).

Last words

If you LIST Listing 2 to tape or disk, then it is easy to ENTER it to use again in another program. The line numbers are so high that they are unlikely to clash with your own program. All that is needed, therefore, is for you to add GOSUB 32000 to your own program. Have fun with the program and don't be afraid to experiment with it — it's how you learn more!

As the next time we meet will be in the New Year, I would just like to say Merry Christmas!!

```
100 REM DISPLAY PROGRAM BEGINS HERE
110 REM OPENING SCREEN WITH SCROLL
120 REM ==========================
130 REM BY MIKE WILDING,
140 REM ATARI INTERNATIONAL (U.K.)
150 REM AUTUMN 1983.
160 REM
170 REM DEMONSTRATION DISPLAY OF
180 REM SCROLLING 128 COLOURS
190 REM MAIN PROGRAM BEGINS HERE
200 REM SET UP THE OPENING SCREEN
210 REM AND DISPLAY THE SAMPLE TEXT
300 GRAPHICS 0:REM TEXT MODE
310 POKE 752,1:REM NO CURSER
320 POKE 82,0:REM NO BORDER
330 POKE 710,0:REM BLACK BACKGROUND
340 POKE 559,33:REM NARROW SCREEN
350 POSITION 32,8:REM SEE TABLE
360 PRINT "YOUR TITLE HERE-UP TO 32 LETTERS"
370 POSITION 16,10:REM SEE TABLE
380 PRINT "PLEASE PRESS ANY KEY TO CONTINUE"
390 GOSUB 32000
400 GRAPHICS 0
410 END
```

```
32000 REM READ ALL THE DATA INTO
32010 REM TOP HALF OF PAGE SIX OF
32020 REM MEMORY
32030 FOR A=0 TO 63:REM     A SIMPLE
32040 READ ITEM:REM         LOOP TO READ
32050 POKE 1664+A,ITEM:REM THE DATA AND
32060 NEXT A:REM            STORE IT.
32100 REM ALL WE NEED TO DO NOW IS MAKE
32110 REM A USR CALL FOR THE MACHINE
32120 REM CODE WE HAVE ENTERED IN
32130 REM PAGE SIX AND WAIT FOR SOMEONE
32140 REM TO PRESS A KEY TO CONTINUE!
32150 REM
32160 X=USR(1664)
32170 RETURN
32500 DATA 173,36,2,141,193,6
32510 DATA 173,37,2,141,194,6
32520 DATA 160,180,162,6,169,7
32530 DATA 32,92,228
32540 DATA 238
32550 DATA 192,6,173,192,6
32560 DATA 141,10,212,141
32570 DATA 26,208
32580 DATA 174,252,2,232,240,238
32590 DATA 172,193,6,174,194,6
32600 DATA 169,7,32,92,228,104,96
32610 DATA 206
32620 DATA 200
32630 DATA 2
32640 DATA 173
32650 DATA 200
32660 DATA 2,141,192,6,76,98,228
```

```
;MACHINE CODE PROGRAM TO CHANGE
;SCREEN DISPLAY WITHOUT
;USING DISPLAY LIST INTERUPTS.
;BY MIKE WILDING,
;ATARI INTERNATIONAL (U.K.) INC.
;PUBLISHED IN I/O MAGAZINE
;AUTUMN 1983.
;
;SETUP LABELS USED IN PROGRAM
;
WSYNC   =  $D40A ;WAIT HORIZ. SYNC LOCATION
COLBAK  =  $D01A ;BACKGROUND COLOUR LOC. IN ROM
SHADOW  =  $2C8  ;AND ITS SHADOW IN RAM
SETVBV  =  $E45C ;SET VBLANK ROUTINE AND
XITVBV  =  $E462 ;EXIT VBLANK ROUTINE IN ROM
VVBLANK =  $224  ;VBLANK POINTER IN RAM
CH      =  $2FC  ;LAST KEY PRESSED IN RAM
;
;ASSEMBLE THE PROGRAM IN THE TOP
;HALF OF PAGE SIX.
 *=$06B0
;
;
;SAVE OLD POINTERS FOR USE LATER
;
 LDA  VVBLANK  ;THESE 4 INSTRUCTIONS
 STA  P        ;SAVE THE OLD POINTERS
 LDA  VVBLANK+1;READY FOR USE WHEN THE
 STA  P+1      ;KEYBOARD IS TOUCHED.
;
;NOW SET UP VBLANK ROUTINE
;
 LDY  #VBLANK&255 ;LOAD LO AND HI BYTES TO POINT
 LDX  #VBLANK/256 ;TO THE VBLANK ROUTINE
 LDA  #$07     ;USE DEFERRED VBLANK
 JSR  SETVBV   ;CALL SETVBV
;
```

```
;ROUTINE TO CHANGE COLOURS AS WE
;GO DOWN THE SCREEN WITHOUT USING
;DLI'S.
L  INC  C        ;INCREMENT THE COLOUR
   LDA  C        ;THEN LOAD IT IN A
   STA  WSYNC    ;AND THEN WAIT A BIT
   STA  COLBAK   ;BEFORE SAVING IT
   LDX  CH       ;LOAD THE KEYBOARD
   INX           ;AND ADD ONE.
   BEQ  L        ;LOOP IF NOT TOUCHED
;
;WE ONLY COME HERE IF THE KEYS HAVE
;BEEN TOUCHED SO LOAD OLD VALUES
;AND RETURN TO BASIC.
   LDY  VPOINT   ;HERE WE GET THE
   LDX  VPOINT+1 ;POINTERS WE SAVED
   LDA  #$07     ;EARLIER AND PUT
   JSR  SETVBV   ;THEM BACK IN PLACE
;
;NOW PULL A OFF THE STACK AND RETURN
;
   PLA           ;ALL DONE NOW SO
   RTS           ;RETURN TO BASIC
;
;VBLANK ROUTINE FOLLOWS
;
V  DEC  SHADOW   ;DECREASE THE COLOUR
   LDA  SHADOW   ;SO THE COLOURS MOVE
   STA  C        ;DOWN THE SCREEN AND
   JMP  XITVBV   ;JOB DONE, SO EXIT
;
;OUR POINTERS
;
C  .BYTE 0       ;SCREEN COLOUR
P  .BYTE 0,0     ;VBLANK POINTERS
   .END
```

DISCOVERING ATARI BASIC

By Martin Walker

This is the first of an occasional series which will look at the different languages available for Atari computers. There are now nine available through Atari itself and APX, not to mention all the others written by other software houses. Much interest is being shown at the moment in FORTH, and this is available on cassette and disk through the Atari Program Exchange. We hope to cover this in a future issue, but to start off, let's take a look at the language most of us start with — ATARI BASIC.

It's amazing what you can find in the BASIC reference manual if you look carefully. A simple example is on page l4. Hands up all those who still try to stop long listings at the right place by trying to press the break key at the correct moment. You can use "control 1" to pause listings for as long as you like — press it again to restart when you are ready. Very useful indeed! Similarly, a useful tip when using the 410 Program Recorder is while a program is CLOADing or CSAVEing, press "Control 2". Then, as soon as the cassette stops, the buzzer will sound.

In fact, it's worthwhile studying the whole of chapter 3. The Atari's have one of the best full-screen editors available on any micro. If any of you have ever used another micro with a line editor, you'll know that to edit you have to select the line you wish to edit by, for instance, typing EDIT 90. Line 90 then appears at the bottom of the screen. You then alter the line, run the cursor to the end of that line, then press return. On the Atari, you can edit anywhere on the screen, then press return anywhere on that line to place the edited version into memory. The "escape" key is very useful for moving the cursor around the screen in deferred mode, and in fact you can use all the Control keys listed in Appendix F from within a program. Control 2 is again

useful, used in this way, to indicate an error when a program is running.

Another major feature in ATARI BASIC is one which any of you using a computer for the first time just won't notice. It is one of the very few which has Syntax Checking on entry. Simply put, this means that every time you press return, BASIC checks the whole of your program line, and then flags any errors you have made in typing keywords or commands.

Say for example, that you type in the following lines:

84 READ A, B, C, D
99 DATTA 1, 2, 3, 4

Most basics will quite happily accept these lines, then when you try to run the whole program, you'll be likely to get something like, OUT OF DATA ERROR IN LINE 84. Now line 84 is quite correct — it's the fact that the data it tries to read in line 99 is not, which causes the problem. A bit tricky for anyone. ATARI BASIC would flag up an error when you first try to enter Line 99, which is a lot easier to follow. I remember trying to program another make of computer when I first started, only to be met with SYNTAX ERROR after SYNTAX ERROR when I tried to run it, all of which took some tracing!

One way to make program listings more readable is to use "GOTO expression" and "GOSUB expression" rather than to line numbers. Instead of GOSUB 1000 you could if you liked enter GOSUB LASERBLAST = 1000 somewhere else in the program. Similarly, you can use "RESTORE expression" before reading data.

I have included with this article a few sample programs which I hope will help you with different aspects of the language. All these things make programming so much easier. It certainly pays to have another look in the manual!

```
100 REM DEMO 1-DRAWING CIRCLES
110 XC=80:YC=40:REM CENTRE POINT
120 XRAD=30:YRAD=30:REM RADIUS
130 GRAPHICS 7:COLOR O:DEG
140 FOR ANGLE=0 TO 360 STEP 10
150 XPOS=XC+XRAD*SIN(ANGLE)
160 YPOS=YC+YRAD*COS(ANGLE)
170 DRAWTO XPOS,YPOS
180 COLOR 1
190 NEXT ANGLE
```

```
100 REM DEMO 2 -BOXES-THE HARD WAY
110 GRAPHICS 7+16:COLOR 1
120 X=RND(O)*160:Y=RND(O)*96
130 PLOT X,Y
140 LINE=1
150 IF X-LINE<O OR Y-LINE<O THEN 120
160 IF X+LINE>159 THEN 120
170 IF Y+LINE>95 THEN 120
180 DRAWTO X-LINE+1,Y-LINE
190 DRAWTO X+LINE,Y-LINE
200 DRAWTO X+LINE,Y+LINE
210 DRAWTO X-LINE,Y+LINE
220 LINE=LINE+1
230 C=C+1:COLOR C
240 GOTO 150
250 REM
260 REM TO STOP PICTURE GOING OFF
270 REM SCREEN WE HERE TEST X & Y
280 REM USING IF/THEN STATEMENTS
290 REM IN LINES 150,160,& 170
```

```
100 REM DEMO 3 -BOXES-THE EASY WAY
110 GRAPHICS 7+16:COLOR 1
120 TRAP 120
130 X=RND(O)*160:Y=RND(O)*96
140 PLOT X,Y
150 LINE=1
160 DRAWTO X-LINE+1,Y-LINE
170 DRAWTO X+LINE,Y-LINE
180 DRAWTO X+LINE,Y+LINE
190 DRAWTO X-LINE,Y+LINE
200 LINE=LINE+1
210 C=C+1:COLOR C
220 GOTO 160
230 REM
240 REM THIS VERSION USES 'TRAP'
250 REM TO DO THE SAME THING AS
260 REM DEMO 2 -BUT IS SHORTER,
270 REM AND ALSO SLIGHTLY FASTER
```

```
100 REM DEMO 4 -READING KEYS WITHOUT
110 REM          HAVING TO PRESS RETURN
120 OPEN #1,4,0,"K:"
130 ? "PRESS ANY KEY":?
140 GET #1,KEY
150 ? "KEY PRESSED IS ";CHR$(KEY):?
160 GOTO 130
```

CPX

T: A Text Display Device

Have you ever wanted to mix text and graphics on the same screen line? It's ideal to use high resolution graphics for fine detail in a picture or a game program, but it can be more difficult to add lines of text for titles or scores for instance. The Atari TV picture is made up from 192 thin horizontal strips known as scan lines. You can use these all yourself in graphics mode 8, 9, 10 and 11 from Basic. The character modes (graphics 0, 1 and 2) use either 8 or 16 scan lines to make up each line of text and it is possible to create special screens which consist of lines of text and a graphics area. Unfortunately, each section extends right across the screen, you can't use this method to put both text and graphics on the same scan line.

Now, you're probably wondering why I have gone to the trouble of telling you all this. Well, the text display device, available through APX, is a machine code program that overcomes this very problem. You can use it to put text anywhere you like in any graphics mode. It also supports three different widths of character, 4, 5 and 8 pixels wide. This means that using graphics mode 0 with 40 columns and 8 pixel characters, you end up with only five enormous characters on each line.

At the other extreme in graphics 8 using 4 pixel characters you get, wait for it, eighty characters on each line. In fact, in graphics 8 you get three choices, 40, 64 or 80 characters per line. It is admittedly difficult for a normal TV to show 80 characters very

clearly; a black and white TV or a monitor must be used for better results, but it is still perfectly readable. I used SETCOLOR 1,13,0 and SETCOLOR 2,13,6 for the clearest picture on my TV. Using graphics mode 7 with 4 pixel characters, I got forty characters per line just like graphics 0 but in four different colours. Using 8 pixel characters with graphics 7 again gave a screen just like our normal graphics 2, but you can get capitals, lower case and graphics symbols all on the screen at once.

I've already used T: to enhance my programs and it's really easy to use. The manual gives plenty of examples to run every possible combination (27 from Basic) and for those advanced programers out there, it also works with the extra antic modes as well. You have an invisible cursor to position your text, margins to set and offsets if you want your text in-between the normal character positions. I'm still exploring the possibilities.

Quarxon

Quarxon is an all-machine code game that uses many of the Atari special features to create a colourful and unusual scenario which is unlike any other that I've seen. Certainly while playing it at Atari (only in the lunch break, honestly) I've been challenged by our best games players and they've all enjoyed it. Like all the best games there is no set strategy, you develop your own skills and technique as you progress.

Set in an alien galaxy you control a lazer-equipped space ship and are trying to protect your Droids from attack. Luckily, there is a multi-coloured blockade to protect them, but the enemy also has this advantage to protect his Droids. Sounds easy so far doesn't it! Well it would be, but for the cosmic laws governing this strange galaxy. In the central atmosphere there is a boundary with

randomly changing openings which grow from nothing and then disappear just as mysteriously. It is only possible to fire through these openings to begin blasting away at the layers of the enemy blockade. If you hit the boundary and not a hole in it, your lazer blast bounces back and blows a hole in your own defences. If you accidentally fire twice without moving your ship, a temporary free zone appears in the boundary layer through which the enemy may fire unheeded. As if this wasn't bad enough, if either you or the enemy space ship gets hit, then the Crushing Wall appears which can often be fatal. It moves towards your ship from the central boundary and can only be escaped by blowing a hole in it when the vulnerable spot appears — tricky.

Quarxon has many game options. You can select a game for two players, one player (against the computer) or 0 players (demonstration mode). The number of Droids can be changed from 8 all the way down to 1. The strategy becomes quite different with fewer Droids; you have to protect them much more carefully and watch the boundary zone like a hawk to take advantage of any holes that appear above the enemies Droids. Probably the best strategy here is to try and hit the enemy ship and leave him trying to out-wit the Crushing Wall while you go after his Droids. You can also select the number of layers in the defences from 7 down to 0. With no layers, each well placed shot will knock out a single Droid immediately. Hole-watching and absolute accuracy are the key words here.

Skill can be beginner, intermediate or expert. I've not managed to beat the computer on expert level yet. All in all, an excellent game that's different from the rest. Good luck, and may the force be with you!

See page 2 for details of availability.

THE ATARI LIBRARY

By Jon Dean
"Games For Your Atari"
By Paul Bunn
Publishers : Virgin
"Making The Most Of Your Atari"
By Paul Bunn
Publishers : Interface

We received a rave review of these publications written by 16-year old Paul Bunn . . . (OK, Paul, tell your Mum to stop writing now!) Joking apart, Brian Moore of High Heaton, Newcastle-Upon-Tyne, had this to say about them : "...both are full of tips on how to get the best from your Atari and each contains around 20 excellent programs for the user to type in. . ."

"Games . . ." is a nice compendium of various games and routines for Atari Home Computers, including original

titles such as 3-D Noughts & Crosses, Skydiver, Space Docker, Display List Routine and Sound Program, together with some tips on writing "better programs" by Editor Tim Hartnell.

"Making The Most . . ." is a fairly good introduction to the basics of the Atari's advanced features although it is vague in places and sometimes difficult to follow. Typographical errors spoil the section on XIO which has been printed with a "1". Nevertheless, at the price one really can't grumble! A pat on the back to Paul from all of us. Well done!

"Making The Most . . ." price: approx. £8.95

"Games . . ." price: approx. £2.95

Many of you have 'phoned or written in saying that you can't find any books

or magazines for Atari Home Computer Systems in your local high street newsagents. Well, for those having difficulties, help is at hand! Here at Product Support we keep a Library Listing of publications that either relate to Atari products or might assist Atari owners. The listing also includes a selection of possible suppliers from which you can order titles if your local dealer or bookshop cannot help. Copies of the Library Listing are available upon request. Either telephone our HELPLINE on Slough (0753) 24561 or write to Product Support at our Railway Terrace address. Incidentally, we'd be very glad to hear from you about books or magazines which you've found useful!

At a recent three-day conference held by Harvard's Graduate School of Education in America, a number of leading psychologists, teachers and sociologists met to discuss the benefits and pitfalls of video and computer games.

Much of the conference was taken up with the presentation of a number of research projects assessing the use of video and computer games in medical and educational settings.

One person who attended the conference was Dr Robert Olton, now Manager of Behavioural research at Atari, who spent l2 years studying human thought and problem solving at the Psychology Department of California's Berkeley University. Therefore, when Dr Olton visited London soon after the conference, I took the opportunity to talk to him about it.

Taking the bull by the horns, I delved firstly into the sociological field
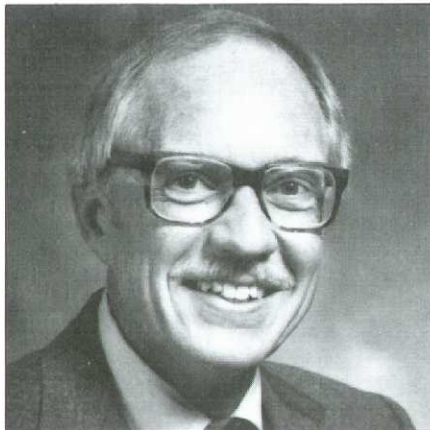
Dr Robert Olton, Manager, Behavioural Research Atari Incorporated.

and referred Dr Olton to the statement made by no less a personage than US Surgeon General, C Everett Coop, that regular indulgence in the intergalactic demolition derby might predispose children to violence. "The complete opposite is true", he declared, and in fact, one of Dr Olton's colleagues, Dr David Brocks, an educational specialist, spent days outside a video games arcade observing over 1,000 children entering and leaving. Subsequent posture analysis showed that prior to playing the arcade games, the children exhibited an average tension rating of 8/10, which is very tense indeed. Post-playing, their body posture rated a very relaxed 2/10. "This suggests that playing these games is a good way of venting tension, a catharsis", concludes Dr Olton.

In case any parents still need further reassurance, Dr Brocks' research also showed that 68% of the children he studied obtained well above the average in their school grades, that

ATARI'S OUTER LIMITS

A psychological look at video and computer games by Barry Millns

80% of them spent less than £3.00 a week on the games — much the same as they spent on going to films — and that most of the children saw the arcades as a place to meet their friends and socialise as well as test their skills.

A similar study focussing on the use of home video games was carried out by Edna Mitchell, Chairman of the Education Department, Mills College, Oakland, California. In a detailed survey of 20 families who had bought video games systems, she found that the games had helped to increase interaction and strengthen bonds within the family. She also reported that 40% of the parents believed that the games had improved their children's school work while none felt that their children's school performance had been adversely affected.

Dr William Lynch with assistant at the Brain Injury Rehabilitation Unit, Palo Alto Veterans Administration Hospital.

The next area we discussed was the increasing use of video and computer games in medicine, with particularly promising results emerging from their use with the brain damaged.

At the Brain Injury Rehabilitation Unit in Palo Alta Veterans Administration Hospital, Dr William Lynch has been using video games and computers to assist patients with brain disorders to re-learn skills as well as improve their motivation and attention span.

In the future, Dr Lynch will be co-operating in a joint study to evaluate the individual and social impacts of video game playing among groups of patients. He will be looking at in- and out-patient psychiatric patients.

Video games have also been used particularly among children in hospital to increase motivation, co-operation and speed up recovery. As Dr Olton said to me "This work has been particularly successful with cancer sufferers undergoing often unpleasant treatment. Similarly, Video games have been found to help with the treatment of children with serious burn injuries where, in addition to the positive effect on morale of the patients, the games have helped them to exercise painful limbs which is a vital part of the treatment."

The third and perhaps most significant area we then talked about was the use of video games and computers in education, a key concern of growing numbers of teachers and

Patients at the Palo Alto Veterans Administration Hospital.

parents. "Adults have absorbed so much hostile mythology about computers, whereas children suffer no such blocks. People brought up with the horse and trap found motor cars very threatening. The next generation has been brought up on serial processing — activities such as chess or reading which are performed in sequence.

"Today children are being brought up on parallel processing — lots of things happening at the same time, and video games reflect this. In the United States, the performance of air traffic controllers was monitored by having them play video games. Much cheaper than losing a DC-10", laughed Dr Olton.

"I see video and computer games developing in directions like the video construction kit, where children can learn how to design electronic circuits by pointing to components on the screen and putting them together. In real life, it would be downright dangerous; on the screen it is a learning experience and at Atari we are continuously researching these areas."
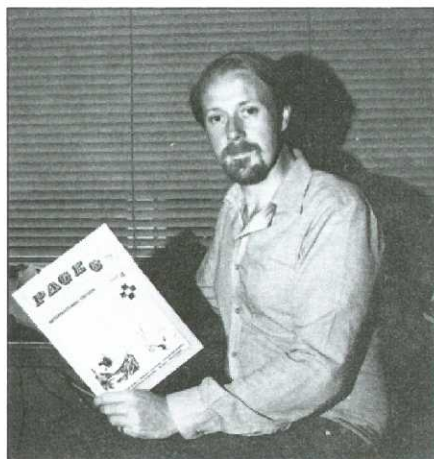
Les Ellingham's PAGE 6

As you are reading I/O you presumably already have an Atari Home Computer and know that the software you can buy is the finest available. In fact, there is so much good software around from Atari and the independent American software houses, that sooner or later you may find yourself short of money and will have to forego some of those games you wanted. Your software library will cease to grow and if you can't afford any new games your interest might start to wane. This is a problem which faces all of us, but there is an answer which will get you dozens of programs absolutely free. Write them yourself!

The Atari computers are amazing machines when you get to know them a little. You may find problems in writing software as good as that put out by Atari but, believe me, the advanced capabilities of the Atari are so easily accessible that you can certainly write programs as good as those commercially available for other machines. I expect many of you are now thinking that programming is easier said than done, having struggled through the BASIC manuals, but the secret to learning more is to see actual programs written by other users and to take routines from them to build your own programs. If you can find someone to share your learning — perhaps through one of the User Groups in I/O — then some of those insurmountable problems will soon be solved, but the most important thing is to READ. Read as much as you can, not only articles but program listings. Try to work your way through published listings and figure out what each section is doing. When you find a section that you can understand and which may work as a subroutine

on its own, write it down and use it in your own programs. There is no need to start from scratch — others have already worked out many of the more difficult routines for you. Use them!

One immediate problem is to find listings and articles for they seem few and far between for the

Les Ellingham, Founder & Editor of Page 6

Atari, but there are in fact users all over the world writing some very good programs and one man in America — Stan Ockers — churns out dozens of programs with very advanced subroutines written specifically for users just like you to experiment with and learn from.

About eight months ago I started producing a magazine called PAGE 6 which specifically sets out to bring to users in this country some of the best programs from around the world and Stan Ockers has been featured several times. The main objective is to encourage Atari owners in this country to begin writing their own programs, but for those of you who are not as yet ready there are plenty of reviews and hints and tips for beginners. The magazine started in conjunction with the Birmingham User Group, but is now
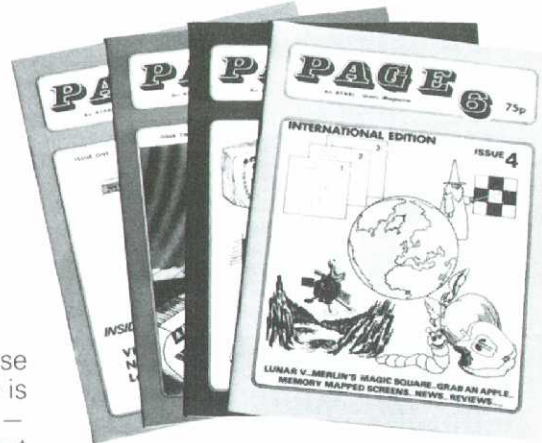
produced independently although several BUG members contribute material. It has grown quite quickly and many people see it as the UK equivalent to ANALOG magazine.

One of the most enjoyable things which came from producing the magazine is the number of friends I have made in America and Australia. People in User Groups who are as dedicated to their Atari as you or me but who know just a little more as they have had their machines much longer. Much of what they have discovered will find its way into the pages of PAGE 6. Hopefully one day your programs and articles will be featured and then we can repay the kindness and generosity of overseas users. Wouldn't it be nice to know that something you have written has been appreciated by other users all over the world? Wouldn't you like to see what others are writing?

The Atari Home Computing scene is at last beginning to develop rapidly with User Groups springing up and Atari doing a fine job with the Home Computer Club and I/O. Now you have PAGE 6 magazine to add to your enjoyment. You became a part of the worldwide Atari community when you bought your machine — why not get more involved!

PAGE 6 is published bi-monthly and is available for an annual subscription of £6.00 from:
PAGE 6
18, Underwood Close
Parkside, Stafford.

Why not take out a subscription? For more information, you can ring me on (0785) 41153

Les Ellingham, Editor

M.A.C.E. — FIRM Objectives

Once upon a time a couple of Atari fanatics met for the first time at a local "Watering hole" and started to discuss the possibility of a local User Group for Atari enthusiasts. Thoughts and ideas were exchanged and within 3 to 4 weeks the "Manchester Atari Computer Enthusiasts" was created. A room was hired, the word was spread and the first meeting successfully took off with about 18 attendees. A most encouraging start!

Our next objective was to increase the numbers attending to at least 30 and to then form some kind of management or committee to determine what exactly members wanted from the Club. A number of dealers in the Manchester area generously helped us to advertise the existence of the Club and as a result our third meeting produced an attendance in excess of our original goal! That evening questionnaires were distributed the results of which proved to be invaluable in assessing the requirements of our members. A committee was formed, consisting of about 8 people willing to help run the Club as well as a treasurer Secretary and Software Librarian.

We intend to hold on a regular basis informal talks on specific aspects of the Atari, such as hardware, player missile graphics, interrupts etc., and hopefully somebody will volunteer to help with the many questions we have on machine language!

It is hoped that the enthusiasm and response shown at our first meetings will strengthen and spread within the Club and that dedicated users in the Manchester area, or indeed any area, will come along and participate in the fun. Having spoken to a number of attendees in our initial meetings, it is quite evident that new friendships are being struck and that unsolved problems are now being tackled thanks to the simple advice given by our more experienced Atari users.

As the Club grows and matures we shall hopefully be able to publish a useful newsletter, dare I say equal to if not better than I/O or PAGE 6!!

Martin Davies
Secretary
M.A.C.E.

International

We currently run a successful Atari computer club here in Canada with over 150 members and are very interested in making contact with other Atari computer clubs arround the world.

Our address is:
C/o Mr. Thomas
229 College Street
Toronto
Ontario
Canada

New Additions

Here are some recently established Independent Atari User Groups. For our current list, see opposite.

CHESHIRE
Nantwich
South Cheshire Atari Users Group
48, Blagg Avenue
Nantwich
Cheshire
Contact: A.J. Davies, Secretary
Tel: (0270) 626969

DORSET
Bournemouth
Bournemouth Atari Users Group
7, Beaufort Road
Southbourne
Bournemouth
Dorset
Contact: Ralph Effemy
Tel Office: (0202) 21661
Home: (0202) 421591

LONDON
C/o P. Ronnie
67, Church Road
London
N.W.4

MANCHESTER
Manchester Atari Computer Enthusiasts (MACE)
Meetings held alternate Thursdays of the month at 7.30 pm at:
The Ellesmere Hotel
Worsley
Manchester
Contact: Martin Davies
Tel: (Bolton) 700757

SUFFOLK
Ipswich
The 800 Club
115, Oulton Road
Ipswich
Suffolk
IP3 OQE
Chairman: Stuart Mowles

SURREY
Farnborough
Surrey & Hants Atari Club (SHAC)
12, Busk Crescent
Cove
Farnborough
Hants
Contact: Paul Grant
Tel: Farnborough 547723

WALES
Wrexham
North Wales Atari Computer Club
(An Independent Users Group)
C/o Gareth Pritchard
GP Video
Wrexham
Tel: (Wrexham) 264451
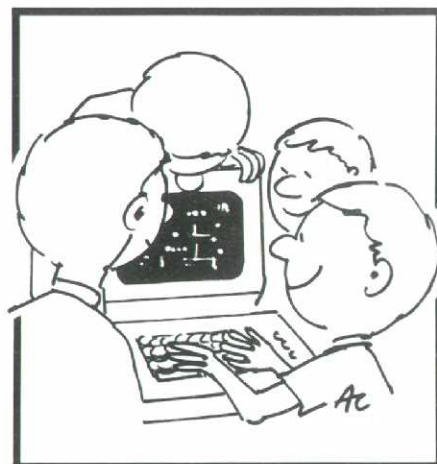
AVON
● Bristol:
The East Bristol Atari Users Group
C/o Micro-C
2 Channons Hill
Industrial Estate
Fishponds
Bristol

BUCKINGHAMSHIRE
● Milton Keynes:
T Jordan
18 Buckman Close
Greenleys
Milton Keynes
Bucks
Tel: (0908) 314439
● Slough
Slough Atari Users Club
Meetings every alternate Thursday
evening at:
Plough Lane Pavillon
Plough Lane
Stoke Poges
Bucks
Contact President: Colin Corne
Tel: (Fulmer) 3159
Or Secretary: Alan Tims
Tel: (Weybridge) 54043

CHESHIRE
● Warrington:
Warrington & North Cheshire Atari
computer Club
An Independent User's Club
23 Launceston Drive
Penketh
Warrington
Cheshire
WA5 2ND
President: K B Chatterton
Tel: Penketh 4597
24hr answer phone

DEVON
● Braunton:
Mr J R Casey
36 Hazel Avenue
Acland Park
Braunton
N Devon

DORSET
● Poole:
Gregory P Cox
3 Morrison Avenue
Parkstone
Poole
Dorset
BH12 4AD

ESSEX
● Basildon
Basildon Computer Club
24, Havengore
Pitsea
Basildon
Essex
Contact: Pete Silver
Tel: (0268)726141
Or: Geoff Gothard
(0268)25581
● Colchester:
C/o Mr Micheal D Murton
189 High Street
Kelvedon
Colchester
Essex
Tel: Kelvedon 71431 (Home)
● Rainham:
Mr John Farrar
138 Frederick Road
Rainham
Essex
Tel:(76) 22077 (Home)
01-555 3299 Ext 2176 (Office)
● Rayleigh:
UK Atari Computer Owners Club
Box 3
Rayleigh
Essex
SS6 2BR
President: Ron Levy
Tel: (Southend) 554000

HERTS
● Wormley:
The Lea Valley Atari User Group
1 Globe Court
Wormley
Herts
Contact: Nigel Fowler
Tel: (Hoddesdon) 60881
President: Nigel Fowler
Vice President: Matthew Tydeman
Tel: (Waltham Cross) 28I68

KENT
● Sidcup:
Silica Atari Users Club
1-4 The Mews
Hatherley Road
Sidcup
Kent DA14 4DX
Tel: 01-301 1111
01-309 1111
● Swanscombe:
Ken Matthews
29 Broomfield Road
Swanscombe
Kent DA10 OLU
Tel: (0322) 842338 (Home)
(0322) 842244 Ext 269 (Office)

LANCS
● Atherton:
Bolton Computer Club
Secretary: Dave Atherton
I6 Douglas Street
Atherton
Manchester M29 9FB
● Preston:
Preston Atari Enthusiasts
177 Forest Drive
Lytham St Annes
Lancs
Mr R Taylor
Tel: (0253) 738192
Monthly meetings.
Membership £5 pa
● Preston:
Mr Dineen
813 Blackpool Road
Preston PR2 1QQ
● Worsley:
John Young
35 Lymfield Road
Bothstown
Worsley
Lancs
Tel: 061 799 0124

LEICESTERSHIRE
Leicester Independent Atari Club
(LIAC)
18 Fitzwilliam Walk,
Cottesmore
Oakham
President: J Clark

LONDON
● Atari Users Group
C/o Thames Television Ltd
306-316 Euston Road
London NW1 3BB
Contact: Tony Cox
Tel: 01 387 9494 Ext: 552/550
● G Moore
Judd St Computer Club
105-109 Judd Street
London WC1

MERSEYSIDE
● Liverpool
Mr Teater
19 Graffington Crescent
Liverpool L25 9RU
● Upton:
Merseyside Atari Computer Club
Treasurer: R B Gibson
3 Dunning Close
Upton
Wirral
Merseyside L49 2RH

MANCHESTER
● Trafford Atari Computer
Owners Club
10 Ely Avenue
Stretford
Manchester M32 9TT
President: C D Hessing
Tel: 061 748 4120

MIDDLESEX
● Ashford:
South Middlesex Atari Club
Secretary: Brian Milligan
50 Linkscroft Avenue
Ashford
Middlesex
● Enfield:
Jennings Store Ltd
248 Hertford Road
Enfield
Middlesex
Contact: Mr Michaels
Tel: 01 804 I767
● Harrow
Harrow Atari User Group
R T Bennett
8A St Anns Road
Harrow
Middlesex
Tel: 01 427 5828
● Perivale:
C/o Steve Millar
319 Bilton Road
Perivale
Middlesex
Tel: 01 991 0488 (Home)

MIDLANDS
● Birmingham:
Birmingham User Group (BUG)
66 Cyril Road
Small Heath
Birmingham B10 0TG
Chairman: M D Reynold-Jones
Tel: 021 773 2849
Secretary: Mike Aston
Tel: 021 556 6578

NORFOLK
● Norwich:
Norwich Users Group
Meetings — 1st Friday of month
Organiser — Ken Ward
45 Coleburn Road
Norwich
Norfolk NR1 2NZ
Tel: (0603) 661149

NORTHAMPTONSHIRE
● Daventry:
R S T J Payne
Oldfield House
Coniston Close
Drayton Green
Daventry
Northants NN11 5EE
Tel: (03272)3773

NOTTINGHAMSHIRE
● Nottingham:
Nottingham Micro Computer Club
Atari Sub Group
7 Ashfurlong Crescent
Sutton Coldfield
Birmingham B75 6EP
Contact: Dane Carty

OXFORDSHIRE
● Oxford
Oxford Personal Computer Club
(OPeCC)
Information Officer: J S Linfoot
10 Pembroke Court
Rectory Road
Oxford

SURREY
● Walton-on-Thames
Elmbridge Computer Club
45 Wellington Close
Walton-on-Thames
Surrey KT12 1BA
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Software Manager: Mr Bob Smith
Tel: WoT 22895
WoT 21310 after 6.00pm
● Wallington:
Adrian Miles
3 Cosdach Avenue
Wallington
Surrey

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● Roy Leith
Asterix User Group
Brian Hills (Editor)
253 Preston Drive
Brighton
Sussex BN1 6FL
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Roy Leith
249 Mackie Avenue
Brighton
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Tel: (0273)509413 (Home)
01 357 4015 (Office)
● Worthing:
Mr J Butler
18 Cumberland Avenue
Worthing
Sussex
Tel: (0903)43815

WILTSHIRE
● Chippenham:
C/o Efficient Chip
40 The Market Place
Chippenham
Wiltshire
President: Matthew Jones
Tel: (0249) 654321 Ext 39

WALES
● Cardiff:
Cardiff Atari User Group
322 Whitchurch Road
Heath
Cardiff
S Glamorgan CF4 3NG
President: Ray Khan
Tel: (0222)35704 (Home)

SCOTLAND
● Glasgow:
Glasgow Atari Independent User
Group
C/o 11/4-27 Castlebay Drive
Milton
Glasgow G22 7LJ
Strathclyde
C/o Alan Fletcher
Tel: (041)772 8964
OR
C/o George Stevenson
51 Skerry Street
Milton
Glasgow
Strathclyde

● Edinburgh:
The Edinburgh Atari Computer
Club (ACE)
President: Alan Sedgewick
18 Henderson Court
East Calder
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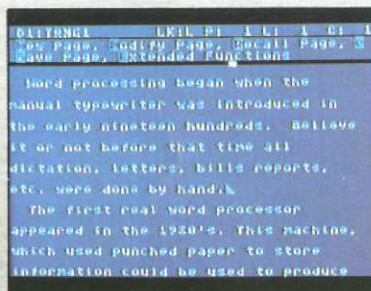
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