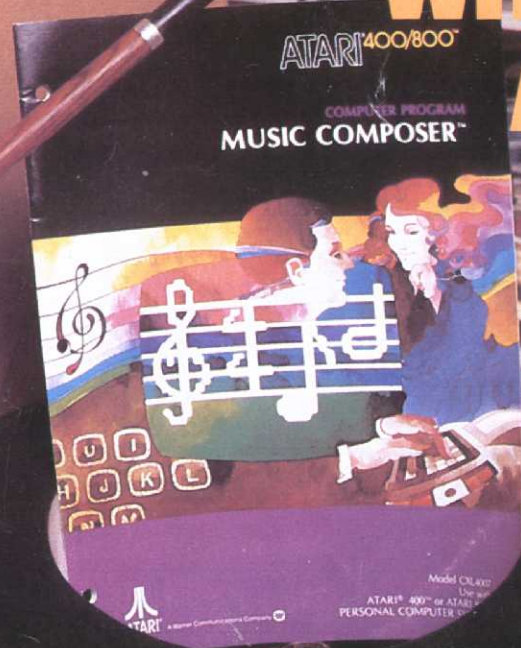


# I/O

THE MAGAZINE OF THE ATARI HOME COMPUTER CLUB  
ISSUE THREE · SUMMER 1983 · NINETY-FIVE PENCE

## PAUL DANIELS at home with his Atari



PLAYER MISSILE GRAPHICS · THE ATARI STORY

# Why user-written software really stacks up to the best

The ATARI Program Exchange — APX — publishes user-written software for ATARI Home Computers. Which means all APX software is written by and for people just like you.

Their Home Management programs are written by people who manage their own homes.

Their Home Office programs come from people whose offices are at home!

The APX Personal Development line is written by those with a natural love for the subjects they choose.

APX games are written by game-players with one single-minded objective: FUN.

So next time you're ready to invest in some new software, see how APX programs stack up against the rest. You'll see why ATARI Home Computer users make such great software writers.

In fact, you could get so carried away that you might end up writing your own software.

If you do, send it to APX!

#### LEADING APX CATALOGUE TITLES

**Home Management**  
Message Display Program

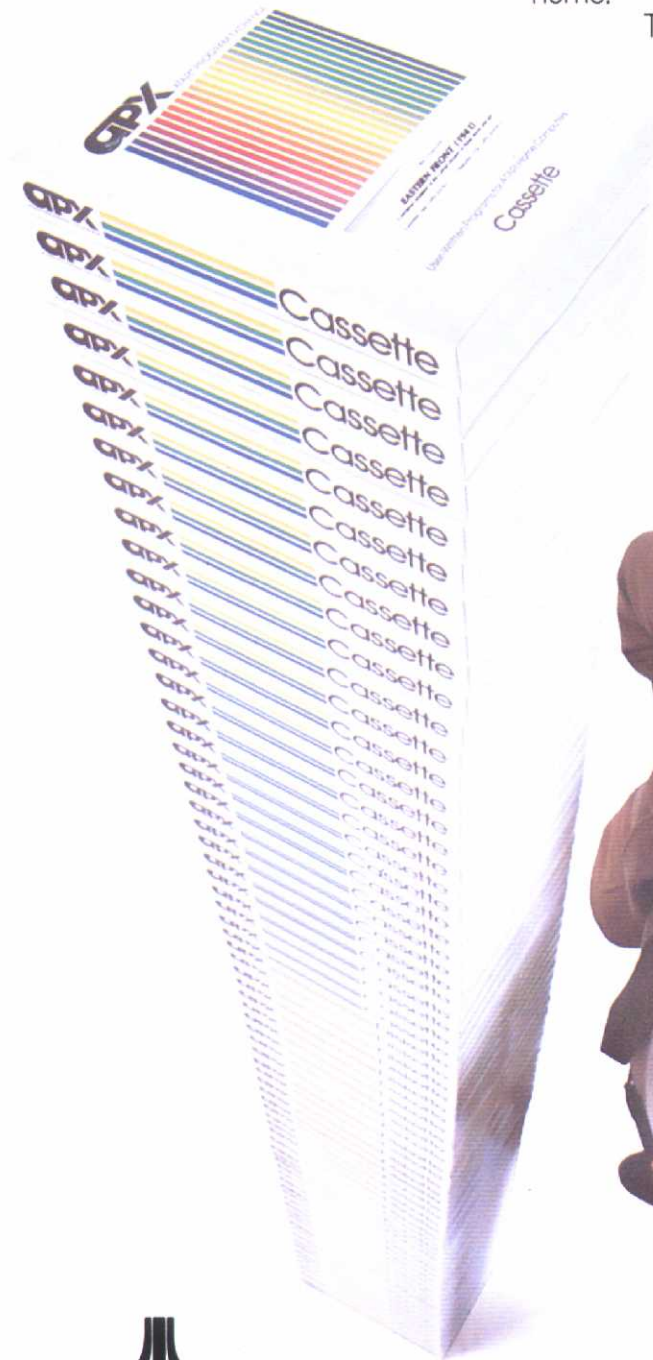
**Personal Development**  
Advanced Music System  
Personal Fitness Program\*\*

**Learning**  
Counter  
Cubbyholes  
Hickory Dickory  
Letterman  
The Magic Melody Box  
Mapware  
Math\* UFO  
Mathematic-Tac-Toe  
Number Blast  
Spelling Genie  
Starware  
Typo Attack

**Entertainment**  
Air-Raid  
Avalanche\*\*  
Centurion  
Dog Daze  
Downhill  
Eastern Front (1941)  
Galahad and the Holy Grail  
Jukebox // 1  
Melt Down  
Outlaw\*\*  
Howitzer  
Phobos  
Quarxon  
Reversi II  
747 Landing Simulator  
Salmon Run  
Seven Card Stud  
Yachtman

**Systems Telecommunications**  
BASIC Program Compressor  
Deep Blue C Compiler  
Deep Blue Secrets  
Dsembler  
Dunion's Debugging Tool  
Extended fig.FORTH  
Extended WSFN  
FORTH Turtle Graphics Plus  
Fun-FORTH  
Instedit  
Microsoft BASIC Cross Reference Utility  
Player Generator  
T:A Tex Display Device

\*\*Indicates trademark of Atari Inc



A Warner Communications Company

# APX-programs for users by users

# CONTENTS

---

NEWS	4/5
MAILSHOP	5
NEW PRODUCTS	6
INPUT	7
STATION TO STATION	8
ASSEMBLY LINE	9/10/11
PAUL DANIELS AT HOME	12/13
ATARI SERVICE	14/15
PLAYER MISSILE GRAPHICS	16/17
BRINGING THE COMPUTER AGE HOME	18/19
KIDS CORNER	20/21
HOW ATARI GOT ITS NAME	22
NEWS FROM THE USER GROUPS	22/23



# I/O

---

INPUT/OUTPUT THE QUARTERLY MAGAZINE  
OF THE ATARI HOME COMPUTER CLUB  
ISSUE THREE SUMMER 1983

---

A very warm welcome to the third edition of I/O. Besides our regular slots, this issue brings you a special interview with the wizard of tricks himself, Paul Daniels who talks about his magic and the magic of his Atari 800.

All those unanswered questions are revealed in our Player Missile Graphics feature on pages 16 and 17, and we take you into history on pages 18 and 19 where the Eniac story tells of the very first electronic computer, which appeared in 1946. On page 22 we give you an insight into the origins of Atari and the mystery behind the name.

A brand new section—Assembly Line gives you ideas and tips on how to achieve the maximum from your Atari computer. In this issue we look at Graphics Modes and the use of the Central Input/Output Utility.

Hats off to those of you who wrote in with improvements to the "On Tap" program which appeared in the last edition of I/O. An updated version can be found in the Atari Service section on page 15.

Finally, a million thanks to all of you who have taken the time and trouble to write in to I/O with ideas, suggestions and programs. Unfortunately, we can't print them all, but one thing's for sure, we reply to each and every one of them individually! Keep them coming!

*Editor*

---

**Editorial Office:**  
ATARI INTERNATIONAL (UK) INC  
ATARI HOUSE RAILWAY TERRACE SLOUGH BERKS

**Editorial Team:**  
Editor in Chief Mary Ann Bark  
News and Features Editors Vicki Ingle  
Barry Millns  
**Art Editor** Don Tregartha

Special thanks to contributors:  
Jon Dean, Martin Walker, Mike Wilding

---

Atari is a registered trademark of Atari Inc. All product illustrations and specifications are based on authorised information. Although the descriptions, articles and programs are believed correct on the date of publication approval, accuracy cannot be guaranteed. The Atari Home Computer Division reserves the right to make changes, from time to time, without notice or obligation, in colours, prices and materials and to change or discontinue products.

# ATARI'S IDEAL HOME

With just under 900,000 visitors pouring through this year's Ideal Home Exhibition Atari's stand proved to be an outstanding success. When your visitors include royalty, pop-stars, TV personalities and the national press you know that you are onto a winner.

On the first day Atari held a press reception, with chart-toppers Modern Romance and David Van Day (ex Dollar) coming along to join in the fun. Some 26 journalists crowded the stand to play games, run computer programs and conduct interviews with the "stars" and Atari personnel. To see Robbie James from Modern Romance take on David Van Day at Pac-Man was very entertaining but we won't say who won! Anyway, with eight computers and eight video games consoles on display, every one had ample chance to try their hand.

Following the press reception the Royal Tour then commenced in the afternoon when H.R.H. Princess Michael of Kent arrived to officially open the exhibition and tour selected high spots. The Princess eventually arrived at the Atari stand to be greeted by Graham Clark, Managing Director of Atari International (UK) Inc. and the glamorous Atari girls who graced the stand throughout the exhibition. The Princess was clearly very impressed by the turnout and asked a

number of searching questions about the computers.

From then on it was non-stop till the Easter weekend as more and more people poured onto the stand to try out Atari's full range of products. Amidst all the buzz and excitement it became apparent that the big hits on the computers were Qix, Video Easel, Home Filing Manager and the Invitation to Programming Series which proved a great help to hundreds of people who knew nothing about computers beforehand.



Press Day at the Atari stand.

For those who wanted even more, the Atari exhibition competition offered prizes of computers, video games consoles and t-shirts, with visitors having to answer four questions relating to the products on display. Over 5,000 people entered the competition and our congratulations go to Christian Robinson from Wigan and P Edmondson from Liverpool who both won Atari 400 Home Computers.

Visitors also had the opportunity to see for themselves how well Atari fits into the home. Atari's home computers were on display in the studios of both the Barratts and Potton show houses, which were popular attractions throughout. As well as these, four Atari 800 systems were put to good use on the Persil stand to help conduct a domestic questionnaire as part of their market research programme.



Four Atari 800s were put to good use on the Persil stand.

Back on the Atari stand the activity continued with hundreds of The Standard newspaper's Commuter Club members flocking to the stand with their own special competition coupons.

With the BBC broadcasting 'live' from the opposite stand, several interviews were conducted with Atari personnel by various national and local radio programmes, thereby helping to project Atari throughout the country. Thus by the end of the exhibition Atari had been extremely well placed before a massive 'home' audience. It was interesting to note that we were the only home computer manufacturer to have taken up this opportunity.



Modern Romance toasting success on the Atari stand.



Standard Commuter Club competition winners Nigel and Monique Bourns receive their prizes from Atari's Jack Knight.

# COMPETITION FEVER

Atari Home Computers have been very much to the fore in a variety of competitions since the New Year. Back in February *Woman* magazine invited its readers to move into the computer age with Atari, who offered over £10,000 of computer prizes. Entrants were required to list the 10 most suitable Atari software programs for a family of five, whose occupations and pastimes were listed. The response was staggering: over 30,000 people entered the competition and the results will be published as soon as the judges have managed to check all the entries!

Next up was a televised competition which many of you may well have seen and entered. Thames Television's "Freetime" programme, broadcast every Friday from 4.45pm to 5.15pm, asked us for a computer prize to be offered to the winner of a puzzle which had been sent in by a viewer. Well, we went one better and actually illustrated the puzzle on an Atari 400 Home Computer to bring it to life. When the results were announced over 15,000 viewers had entered and our congratulations go to Stephen Michael Grieve, aged 12 from West

Parley in Dorset, who sent in the correct answer and won the first prize—an Atari 400 Home Computer and Programmer Kit. Well done!

Then again, those of you who regularly subscribe to the popular monthly magazine *Personal Computing Today* no doubt entered their May issue Atari Competition, attempting to submit the best, most imaginative scenario for a computer game or education program. And keep an eye out for "What Micro?" from June to August!

Last but not least, those of you who read the *Daily Star* may well have entered their Starcheck competition run

from 25 to 30 April in which five super prizes were offered to readers. Atari was asked to back the competition and gladly donated an Atari 800 with disk drive and accessories as one of the star prizes.

The others included a two-week family holiday, colour TV, Laser-Vision system and top-brand SLR camera. Various clues were printed throughout the week and readers were simply asked to submit total retail values for each prize. So if you entered we hope your sums were right!



# CALLING ALL CAMPERS!

As the value of computers is becoming increasingly apparent to more and more people, both adults and children alike, so the number of computer courses and computer camps being run this year is a great increase on 1982. Atari has carefully chosen involvement with two of these to start with.

At the Inter-Action community enterprise centre in Kentish Town this summer, a computer camp will run using 20 Atari 800's for over two hundred children, including many deprived and handicapped girls and boys from the local area. They will be given the chance to learn about computers, from writing their own programs through to studying

the applications of computers in everyday life.

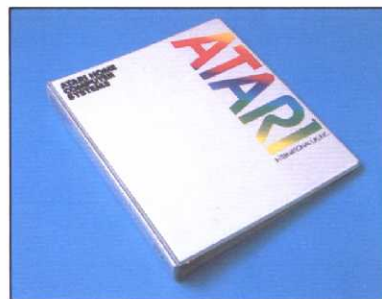
On an international basis, Atari is currently involved in running computer workshops at Club Méditerranée camps throughout the western hemisphere. The latest one to be established will run at the Punta Cana camp in the Dominican Republic this summer. At Punta Cana there will not only be computer workshops but also a total of 87 computers which will be totally integrated into the day-to-day activities of the club. For example, a team of guest divers will be able to study local marine life with the aid of Atari computers and computer files, as well as learning all about the capabilities of the machines.

# MAIL SHOP

Offer exclusive to club members. Please quote your membership number (see address label) when sending in your order. Please make cheques/postal orders payable to Atari International (UK) Inc. at:

Atari Mailshop  
Atari House  
Railway Terrace  
Slough, Berks.

Offers subject to availability, UK, N Ireland and Channel Islands only.



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**

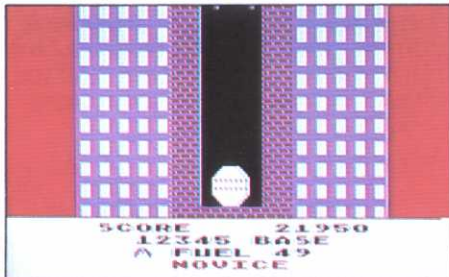
# NEW PRODUCTS

## COMING ATTRACTIONS FROM ATARI

The attractions of owning an ATARI Home Computer keep on coming, and these soon-to-be-released products have all the excitement and promise you've come to expect from Atari. Look out for them!

### HOME ENTERTAINMENT

#### CAVERNS OF MARS™



Conquer and escape!

Manoeuvre your spacecraft into the depths of the most dangerous caverns beneath the planet Mars. Watch out for those rubble-strewn walls as you guide your rocket down to the aliens' stronghold at the bottom of the cavern. Activate the bomb and escape! Dodge mines that float in mid-air!

There are four skill levels in this game for one player.

- CK 8130
- Diskette program
- Works with an Atari Home Computer with 16K RAM
- Requires an Atari Disk Drive and one Joystick Controller

#### E.T.™\* PHONE HOME!



E.T. is stranded on Earth, desperately trying to contact his ship before the government agents and scientists capture him. Luckily, he's befriended by Elliott, who can search for the pieces to make a phone. Your challenge is to find the pieces and bring them back before E.T. uses all his energy. Help him to get back up to his spaceship. For 1 player.

- RX 8030
- Cartridge program
- Works with an Atari Home Computer with 16K RAM
- Requires Joystick Controller

\*ET AND THE ET CHARACTER ARE TRADEMARKS OF AND LICENSED BY UNIVERSAL CITY STUDIOS INC. ©1982 UNIVERSAL CITY STUDIOS INC. ALL RIGHTS RESERVED.

#### DIG DUG™\*

You're looking for buried treasure deep below the earth's crust. In Dig Dug's world, the precious valuables are vegetables, gems of the soil. Serious digging will uncover the treasures, but look out for those fire-breathing dragons. You control Dig Dug as he blows up his pursuers with a special pump or foils his enemies by dropping rocks on them. For 2 players.

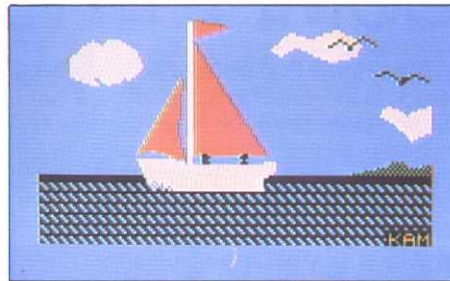


- RX 8026
- Cartridge program
- Works with an Atari Home Computer with 16K RAM
- Requires Joystick Controllers

\*CREATED AND DESIGNED BY NAMCO LTD., MANUFACTURED UNDER LICENSE BY ATARI, INC.

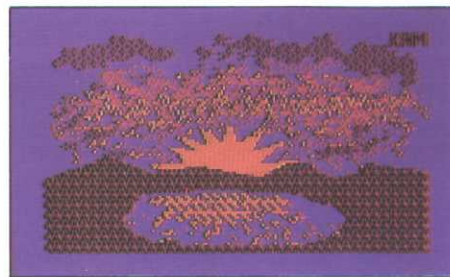
### PERSONAL DEVELOPMENT

#### PAINT\*

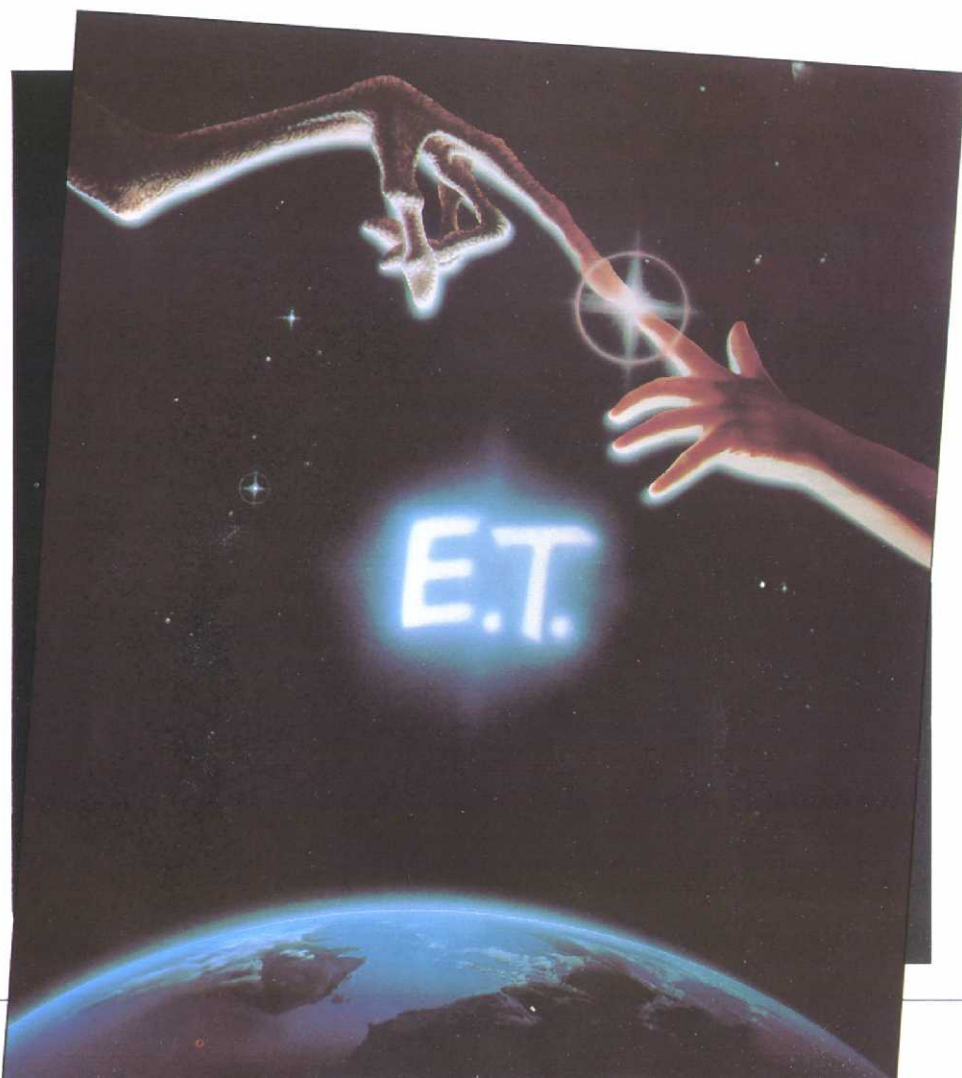


Using this program, you become the artist—your brush is the joystick and your canvas is the monitor. Create paintings of your own, using the tremendous colour capacities of your computer.

- Diskette program
- Minimum requirement: 48K



\*PAINT IS SUPERBOOTS™ SOFTWARE DEVELOPED BY THE CAPITAL CHILDREN'S MUSEUM, LICENSED FROM RESTON PUBLISHING COMPANY, INC.



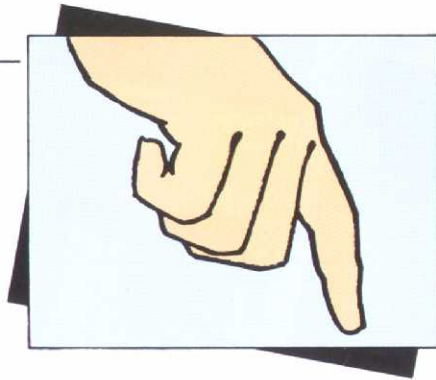
## STAR LETTER

Dear Editor

I am writing to tell you that I have parted with my excellent ATARI 400 computer and purchased an even better ATARI 800. I enclose the registration card.

I would also like to thank you for a very informative and useful quarterly magazine. Would it be possible that it would become monthly? I am sure other owners would echo this.

It could feature software reviews sent in by owners, programming tips and demonstrations, as well as reviews and recommendations on literature, all contributed by owners. I would like to



recommend "Your ATARI Computer", a book that is well worth the £11 price tag and full of hundreds of useful tips.

Many magazine racks seem to be dominated by magazines that avoid the ATARI Computer. That is except for two. They are Computers and Video Games and a new weekly magazine called Home

Computing Weekly. It is from such magazines I have gained many new tips and ideas.

A Penn  
Radlett  
Berks

Many thanks for your complimentary letter. I have noted the fact that you have upgraded your 400 to an 800 computer and your file shall be duly amended.

Thank you for your suggestions and recommendations! I would be interested to read what other readers think.

I hope you gain as much, if not more, satisfaction from your 800 as you did with your 400. Keep in touch and let me know how you get on — Ed.

Dear Editor

Thank you for the Spring issue of I/O, which I have enjoyed reading. I think it's much better this size.

Could you please send me details of how to start an "Atari User Group" as there does not seem to be one in my area.

Do you know where I could obtain a back issue of "ANTIC" Volume 1 Number 6, as I somehow missed that one.

Thanks for all your hard work in producing "I/O" Magazine. Keep it up because it's GREAT.

Dave Warcup  
Bromley  
Kent

I have enclosed some literature on how to set up an Atari User Group. Do let me know how you get on as we would like to continue to support User Groups in every way we can.

Back issues of ANTIC are difficult to obtain, however I would suggest you write to their editorial office direct or else contact your local dealer.

Thanks for the compliments! But we wouldn't exist without your support.  
— Ed.

Dear Editor

Congratulations on another success, your magazine is great.

I have put pen to paper in reply to your letter asking for the serial number and date of purchase of my Atari 400.

I found the article on Atari's unique sounds very explanatory and the few programs were like the real thing. I have attempted to create some of my own sounds. The results are very amusing!

S Webster  
Solihull  
West Midlands

Thank you for writing in with details of the serial number and date of purchase of your Atari 400. You are now an exclusive member of the Atari Home Computer Club and I shall be very happy to include you on our mailing list.

Thank you for the complimentary things you wrote about I/O—I'm glad you like it.

Do send in your creations of sound effects. We'd be delighted to print them in I/O — Ed.

Dear Atari

I have just received the Spring '83 edition of I/O and would like to congratulate you on a superb magazine. Would it be possible for you to send me

Issue One of this magazine as I found quite a few of the tips in Issue Two very useful.

I have written several programs and am now progressing into Player Missile Graphics. Keep the I/Os coming.

E C Skingley  
Ipswich  
Suffolk

If you've written programs, send them in! We'd be delighted to publish them in I/O and there's always a special prize for readers' efforts.

Subject to availability, back-issues of I/O can be obtained from Atari HQ at a cost of £1, which includes post and packaging — Ed.

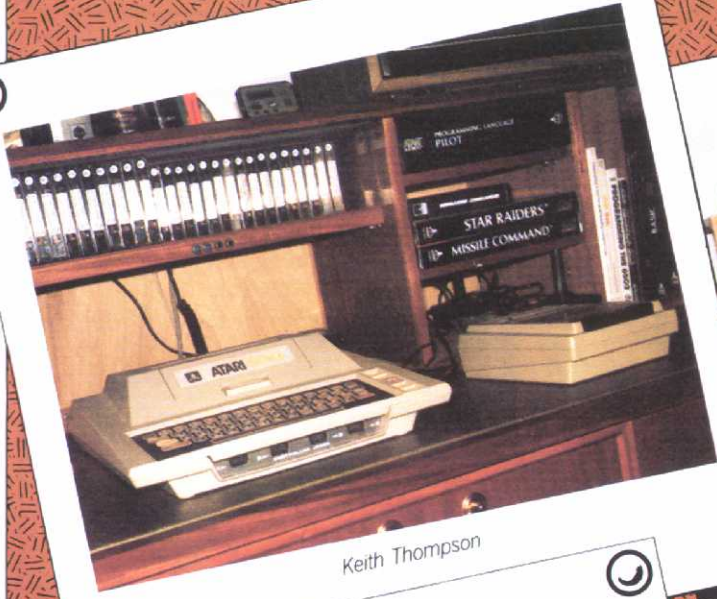


In the last issue of I/O we asked you to send us photographs of your Atari graphics as well as how you set up your Atari computer system at home.

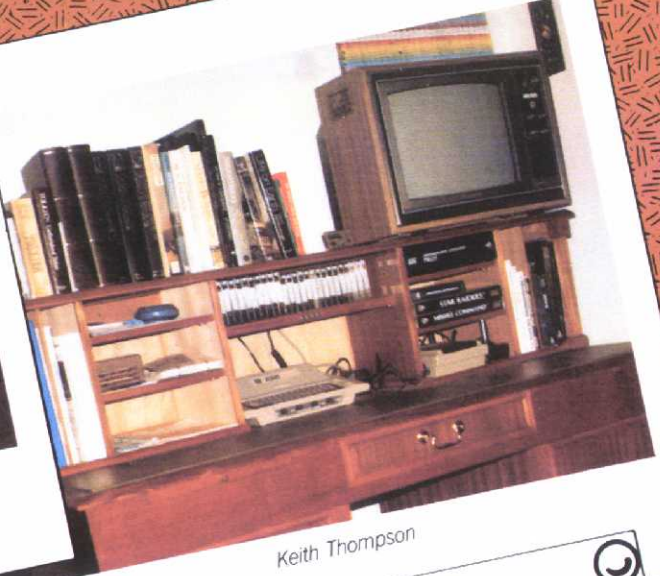
Many thanks to readers Cameron McDade of West Yorkshire, Keith Thompson of Stockton-on-Tees, Dave Leggett of Huntingdon in Cambridgeshire and Darren Martin of Woodside Park in London for your contributions, which are printed overleaf.

Special Atari prizes have been sent to you for your enthusiasm and efforts — Ed.

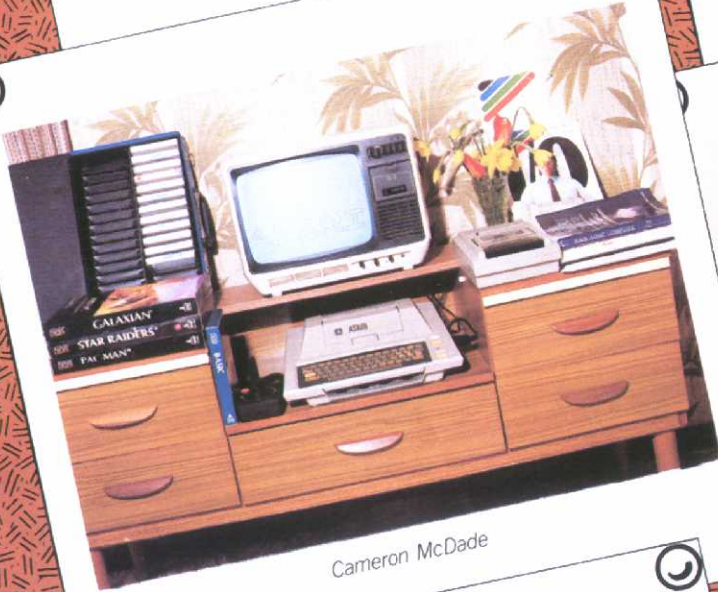
# STATION · TO · STATION



Keith Thompson



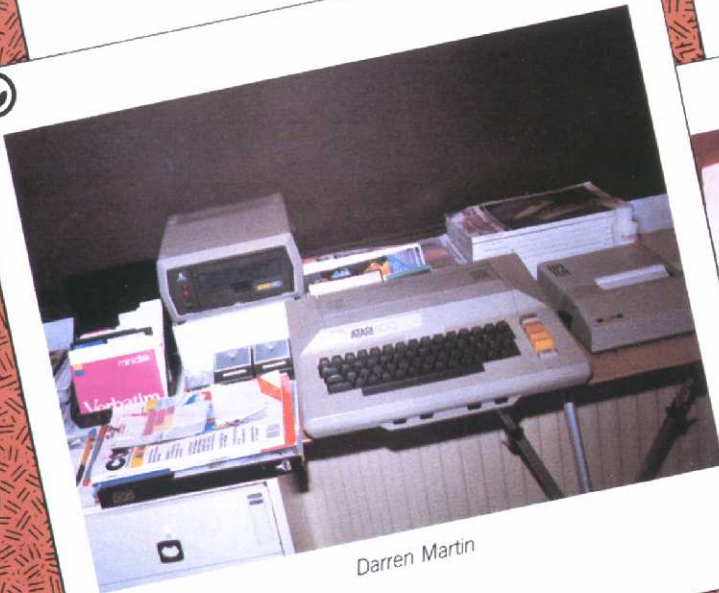
Keith Thompson



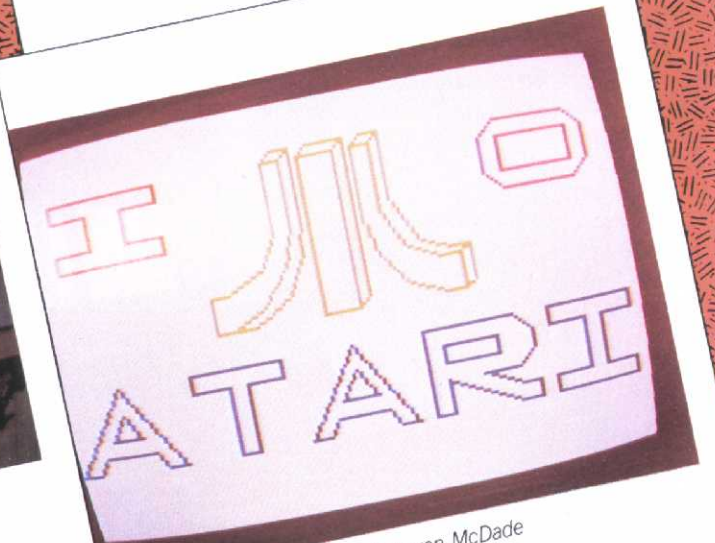
Cameron McDade



Cameron McDade

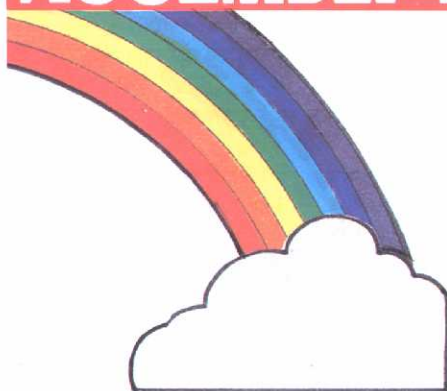
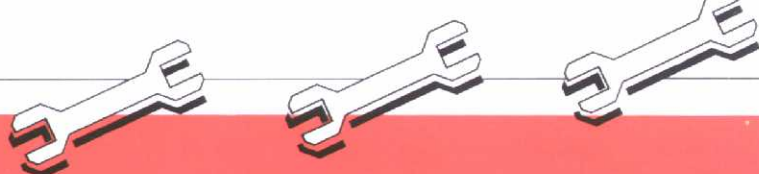


Darren Martin



Graphics by Cameron McDade





## ATARI'S 256 COLOURS

by Mike Wilding

The intention of this article is to show how you can manipulate your Atari computer's memory and make it do something it would not do normally. Along the way I shall be telling you various things without necessarily explaining them in detail. The only reason for this is lack of space. To fully explain all the technical tips you're about to use would take a book and all your Editor has given me is 1 page! So, where to begin?

Well, for those who don't know, your Atari has three Graphics modes that aren't mentioned in the manual. This is simply because they did not exist at that time. In the original 400/800 computers there was a chip called CTIA, and this gave the modes you know about. But then somebody managed to squeeze another three out of the Operating System and so was GTIA born. The new modes are 9, 10 and 11. The one that we are going to use here is Graphics 9, and don't worry whether you have GTIA. If you bought your Atari in the UK and it works on the PAL television system—you have!

In Graphics 9 you have a choice of background colour and then 16 shades of that colour. We are going to fill the screen with these shades and then change the background as we go down the screen, so that at the bottom you will have gone through all of the 256 possible colour/shade combinations that are available.

Let's list the Technical Expressions and then look at them one at a time. They are:

Display List Interrupts (DLI)

Vertical Blank (VBLANK)

String Manipulation

Display List Interrupts (DLI)

Here's where it gets technical. When the television draws a screen it starts at the top left-hand corner and draws a line across until it reaches the right-hand edge. Then it switches off the beam and returns to the left edge, moves down a

line and switches on again. And so it goes until it reaches the bottom of the screen. After the last line has been drawn, the beam is switched off and repositioned at the top left-hand corner again ready for the next screen. The period between lines is called the "horizontal blank" and the time between screens is the "vertical blank".

About 14 microseconds are available during "horizontal blank" and roughly 1400 microseconds in "vertical blank". These are very short periods of time so we have a limit on the amount of things we can do. Thankfully, machine code programs run a lot faster than BASIC so we have enough time to change the colour and save it in memory.

So much for the TV. Now to the computer. When the computer is feeding information to the TV it takes time out during the "horizontal blank" to look in its memory and find out what information goes on the next line. The area of memory it examines is called the Display List of instructions or DL. Besides showing what Graphics Mode the next line is, the DL can also give various instructions. One of these is the Display List Interrupt (DLI).

When it comes across this instruction the computer immediately looks to see if this is true. If we have changed the correct location in memory then it goes off in search of the routine it is to execute. It will find out where this is by looking at locations 512 and 513 in memory where it hopes to find the start address of the routine. All being well, the routine gets done and the computer goes back to what it was doing before being rudely interrupted.

For us to use this facility we do four things:

1. Enter our Machine Code in memory. (Lines 100 and 110)
2. Change the Display List to include DLI's. (Lines 180 to 200)
3. Place the address of our routine in memory. (Line 230)
4. Change location 54286 to say yes. (Line 230 again).

### Vertical blank (VBLANK)

Next comes the Vertical Blank (VBLANK). Here we are doing the same as we did in the DLI, but this time it's a lot simpler. Inside the Operating System is a routine that does the work for us. All we have to do is set up certain registers in Machine Code and let the computer get on with it. As I don't have enough space to explain the ins and outs of the routine I will just tell you what our routine does in this particular case.

As we are working in BASIC, which is reasonably slow, the TV could be anywhere down the screen when we switch on the DLI. The result of this is that our rainbow of colours could be in an

order different to what we want. To make sure that it looks the same each time, VBLANK is used to make the counter in our DLI zero each time a new screen is begun.

The information for VBLANK is placed in memory in line 210 and the routine is set into action as one of the instructions in line 230.

### String manipulation

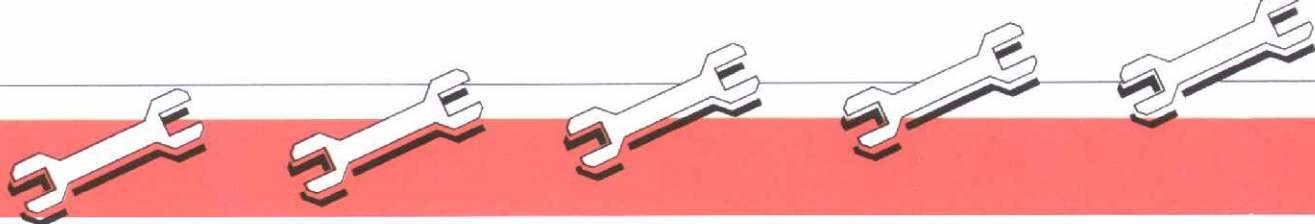
I've saved the hard one until last. This is how we fill the screen in double-quick time. In the RAM part of memory your Atari holds a table that tells it where to find a string. If we change this table to point somewhere else then it will think the string is where we say, and not where it is. In the program we keep changing the location of the string and then telling the computer to make A\$ the same as B\$. As it carries out our instruction in machine code, it does it very fast. We then change the location of A\$ and tell it to do the same thing again. Now here's the trick. What we are doing in this case is to place the location of A\$ to the same as screen memory. The information held in B\$ is the same as would normally be in screen memory if we plotted the screen the hard way. The figures for B\$ are held in lines 70 and 80, and the routine that fills the screen fast is in lines 130 and 140.

### Random thoughts

You have just been shown, very quickly, around the insides of your Atari. It has not been possible to explain in detail exactly how everything in the program was accomplished but I hope you now understand a little more than when you started reading. If this has whetted your appetite for more then I recommend a good book. It's called "De Re Atari" and should be available from the place where you bought your computer.

When you enter the program, remember to type in the DIM statement for the strings first. When you have finished typing it in, LIST it to your cassette or disk. Then turn the computer off and on and ENTER it again. The reason for doing this will not become apparent unless you did it differently. The variable we keep moving around the screen is A\$ and this needs to be the first one in the table. If you enter any other variable before it then it's not the string that is being altered when you RUN the program. The result of this will be a blank screen, and probably you yelling at me that it doesn't work. IT DOES!!

In future issues of I/O we will try to find time to explain each of the different bits used here in more detail. In the meantime, take the time to enter the program and see for yourself the spectacular range of Atari colours.



```

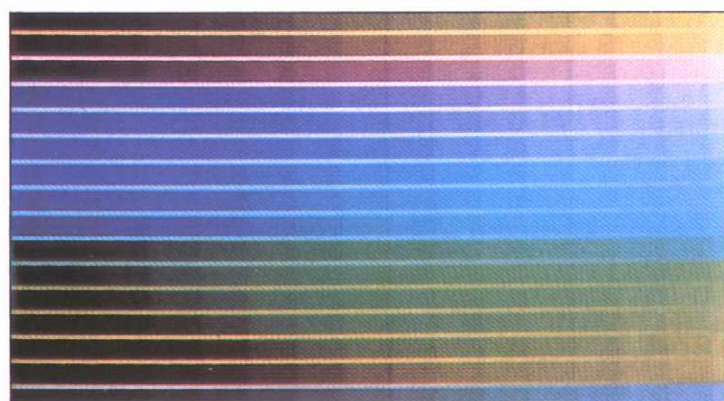
0 REM *****
1 REM *
2 REM *      256 COLOURCARD      *
3 REM *      WRITTEN BY MIKE WILDING *
4 REM *      All lines not ending in *
5 REM *      0 are remarks and can *
6 REM *      be removed if not needed *
7 REM *      *
8 REM *****
9 REM
10 GRAPHICS 8+16
11 FOR A=9 TO 159 STEP 25
12 FOR B=20 TO 95 STEP 25
20 SETCOLOR 4,4,4
30 SETCOLOR 2,12,15
40 SETCOLOR 1,12,2
50 COLOR 1
58 REM *****
59 REM MAKE UP STRINGS FOR SCREEN
60 RESTORE :CLR :DIM A$(320),B$(320),JMP
$(11)
70 FOR A=1 TO 40:READ DA:B$(A,A)=CHR$(DA
):NEXT A:DATA 0,0,1,17,17,34,34,35,51,51
,68,68,69,85
80 DATA 85,102,102,103,119,119,136,136,1
37,153,153,170,170,171,187,187,204,204,2
05,221,221,238,238,239,255,255
90 B$(41,80)=B$(1,40):B$(81,160)=B$(1,80
):B$(161,320)=B$(1,160)
98 REM *****
99 REM > ENTER MACHINE CODE ON PAGE 6
100 FOR A=0 TO 30:READ DA:POKE 1536+A,DA
:NEXT A
110 DATA 72,138,72,238,32,6,175,32,6,189
,100,6,141,10,212,141,26,208,224,16,208,
5,169,0,141,32,6,104,170,104,64
118 REM *****
119 REM > USE GR.9 AND ZERO COLOUR
120 GRAPHICS 9:POKE 712,0
128 REM *****
129 REM > FILL SCREEN IN FAST TIME
130 DL=PEEK(560)+256*PEEK(561):DM=PEEK(D
L+4)+256*PEEK(DL+5):C=PEEK(140)+256*PEEK
(141):DA=DM-C
140 F=PEEK(134)+256*PEEK(135):FOR A=0 TO
23:D=INT(DA/256):E=DA-256*D:POKE F+2,E:
POKE F+3,D:A$=B$:DA=DA+320:NEXT A
148 REM *****
149 REM > DRAW LINES TO MASK DLI's
150 COLOR 15:FOR A=0 TO 16:READ DA:PLOT
0,DA:DRAWTO 79,DA:PLOT 0,DA+1:DRAWTO 79,
DA+1:NEXT A:PLOT 0,1:DRAWTO 0,191
160 DATA 1,12,24,36,48,60,72,84,96,108,1
20,132,144,156,168,180,190
168 REM *****
169 REM > CLEAR DLI TABLE ON PAGE 6
170 FOR A=1637 TO 1653:POKE A,0:NEXT A
178 REM *****
179 REM > PLACE INTERRUPTS IN DL
180 DL=PEEK(560)+256*PEEK(561)
190 FOR A=0 TO 15:READ DA:POKE DL+DA,143
:NEXT A
200 DATA 6,16,28,41,53,65,77,89,102,114,
126,138,150,162,174,186
208 REM *****
209 REM > VBLANK ROUTINE TO ZERO TABLE

```

```

210 FOR A=1576 TO 1583:READ DA:POKE A,DA
:NEXT A:DATA 169,0,141,32,6,76,98,228
218 REM *****
219 REM > START INTERRUPT
220 FOR A=1 TO 11:READ B:JMP$(A)=CHR$(B)
:NEXT A:DATA 104,169,7,160,40,162,6,32,9
2,228,96
230 POKE 512,0:POKE 513,6:X=USR(ADR(JMP$
)):POKE 54286,192
238 REM *****
239 REM > FILL DLI TABLE IN SLOW TIME
240 FOR A=1 TO 15:POKE 1636+A,A*16:FOR B
=0 TO 20:NEXT B:NEXT A
248 REM *****
249 REM > ENDLESS LOOP TO SAVE SCREEN
250 GOTO 250
1000 GOTO 1000

```

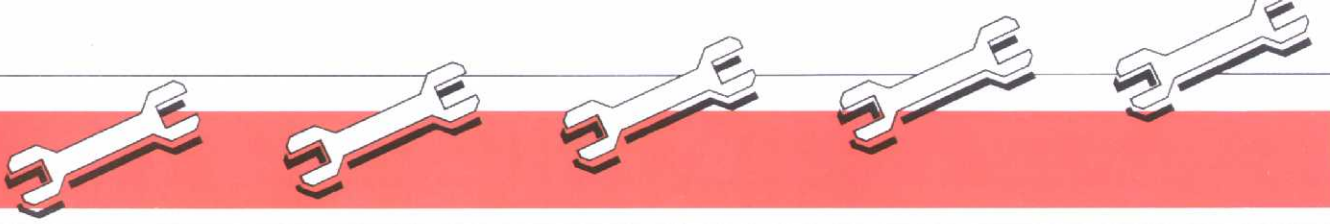


## FACTS FILE

### ATTRACT MODE

All of you will have noticed that after about ten minutes, the ATARI home computers start cycling through random colours on the screen. There is a very good reason for this—it is a feature built into the computer to ensure that no harm can come to the television screen if left unattended for long periods. When the earliest TV games machines came onto the market, some people found out the hard way that if you leave a bat and ball on the TV screen while having tea it can leave a permanent image on the screen.

In Appendix I of the BASIC reference manual, you will find Decimal Location 77 is the Attract Mode Flag. When you stop pressing keys, this location looks at a timer and adds one to its contents every five seconds or so. When the contents reach 128, then the computer goes into Attract Mode. You can use this effect in your own programs by typing POKE 77,128. Conversely, to stop colour cycling in your own games when using a joystick or paddle instead of the keyboard, make sure you use the command POKE 77,0 in the movement part of the program.



```

10          .OPT      NOEJECT
20 ;ASSEMBLY PROGRAMME TO MAKE GR.2 SCREEN
30 ;The end result is the same as BASIC GR.2
40 ;
50 ;BY MIKE WILDING, ATARI INTERNATIONAL (U.K.) INC.
60 ;PUBLISHED I/O MAGAZINE SUMMER 1983
70 ;
80 ;SET UP THE LABELS THAT WE USE.
90 ;
0100 IOCB      =      $340
0110 ICCDM     =      IOCB+2
0120 ICBAL     =      IOCB+4
0130 ICBAH     =      IOCB+5
0140 ICAX1     =      IOCB+10
0150 ICAX2     =      IOCB+11
0160 CIO       =      $E456
0170 CIOINV    =      $E46E
0180 OPEN      =      $03
0190 ORDWRT    =      $0C
0200 SRDWRT    =      $1C
0210 ;
0220 ;ASSEMBLE AT PAGE SIX FOR DEMONSTRATION PURPOSES
0230 ;
0240          *=      $0600
0250 ;
0260 ;CLOSE ALL IOCBs FIRST OF ALL
0270 ;
0280          JSR      CIOINV
0290 ;
0300 ;OPEN SCREEN EDITOR FIRST USING BLOCK ZERO
0310 ;
0320          LDX      #$00
0330          LDA      #OPEN
0340          STA      ICCDM,X
0350          LDA      #EC&#xFF
0360          STA      ICBAL,X

0370          LDA      #EC/256
0380          STA      ICBAL,X
0390          LDA      #ORDWRT
0400          STA      ICAX1,X
0410          JSR      CIO
0420 ;
0430 ;NOW OPEN DISPLAY HANDLER IN SPLIT SCREEN
0440 ;MODE FOR DEMONSTRATION
0450 ;
0460          LDX      #$10
0470          LDA      #OPEN
0480          STA      ICCDM,X
0490          LDA      #SC&#xFF
0500          STA      ICBAL,X
0510          LDA      #SC/256
0520          STA      ICBAL,X
0530          LDA      #SRDWRT
0540          STA      ICAX1,X
0550          LDA      #2
0560          STA      ICAX2,X
0570          JSR      CIO
0580 SPACER    BRK
0590 ;
0600 ;BYTES FOR SCREEN EDITOR
0610 ;
0620 EC        .BYTE "E:",$9B

0630 ;
0640 ;BYTES FOR DISPLAY HANDLER
0650 ;
0660 SC        .BYTE "S:",$9B

0670 ;
0680 ;THATS ALL FOLKS!!!
0690          .END

```

**USING THE CENTRAL INPUT/OUTPUT UTILITY.**  
by Mike Wilding.

The most important part of your Atari system is the Central Input/Output Utility, and yet in machine language programming it is the most abused. Here we are going to break the system down and show you how easy it is to use, with the minimum of technical notes.

Anything that your Atari does to data within the system is done through CIO. Whether it is the straightforward movement of data from the keyboard to the screen or reading a file from disk and placing it in memory. It makes no difference to your Atari computer, it is all handled in the same way, unless you program differently.

If, at the end of this article you would like to know more about the way you can write programs using the CIO then I recommend that you take the dog for a walk in the direction of your Atari stockist and get a copy of the Technical Reference Notes (CO16555) as this will fully explain in over 60 pages, and simple examples, all of the various ways in which you can manipulate the system.

I am now going to give you a brief glimpse of what is possible by showing you how to set up a Graphics 2 screen with the minimum of effort. There's no longer any need to copy the Display List from BASIC and write it out in longhand when you do a machine coded program.

The calling mechanism between you (the programmer) and the CIO is called the Input/Output Control Block (IOCB), of which there are eight arranged one after the other in memory beginning at

address \$0340 (HEX). Each block contains 16 bytes and one IOCB is needed for each open device or file. You can choose any of the IOCBs for your use, but IOCB 0 is normally assigned to the Screen Editor (E:), and you are advised to keep to this protocol.

You do a CIO call in this way:

1. Place the IOCB number times 16 into the x register
2. Insert the relevant data to perform the operation, (referenced to x)
3. Call CIO by performing a JSR through CIOV (\$E456 HEX).

I said that there are 16 bytes to each IOCB and a glance at the listing shows that we haven't used all of them. With the exception of four bytes all the missing locations are set by CIO and should not be altered by you once you have opened a device/file. The four exceptions are the PUT address (bytes 6 and 7) which is only used if you have the BASIC cartridge inserted, and the Buffer Length (bytes 8 and 9) which are not used to open a device/file.

As we are setting up a split screen, the bottom four lines are in text mode and are controlled by the Screen Editor. The remainder of the screen is in Graphics 2 mode and is controlled by the Display Handler.

In order to operate in this way we must first open the Screen Editor and then the Display Handler, using separate IOCBs, with the split screen option set in AUX1.

In the program you will notice that I have used 2 in AUX2. You can experiment with this to open various different displays. Any number up to 11 is valid, but remember that in modes 9, 10 and 11 there is no split screen so you will need to add a loop after the display

has been opened or you will automatically go back into Graphics 0.

I haven't explained how to PUT, GET, DRAW or FILL. I have left out some of the things you would normally do in a program, to keep the listing down to a decent length. However, by using the CIO in this way we have not made a list of the display from BASIC, or set up an area of memory separately, or made any alterations to the OS database for such things as cursor positions and margins. All of this has been done automatically by the CIO when it was called to set up a Graphics 2 screen. It has also set up the Display List, the screen data region and the test data region.

Looking at the listing you will see that it has Remarks to inform you what is happening at each point. First we have closed down all the CIOs and then opened the Screen Editor. Then we have gone on to open the Display Handler. Study the listing and try to follow through the various stages of operation. If you have understood the program then you are ready for the Technical Reference Notes I mentioned earlier. This article has been very short and cannot hope to cover the area fully (it takes the Notes over 60 pages). But I do hope that you now have a better understanding of the system you are using and will be encouraged to find out more about it. In this way you will improve your programming skills.

Next issue I will show you how to mix the BASIC and Assembly pages to give you a simple but effective means of opening your programs, or HOW TO BEGIN YOUR SHOW WITH 128 SCROLLING COLOURS while the title remains STATIC!!!

Situated in one of London's more exclusive crescents is a Regency house, which at first sight, is no different from the rest. But having been shown inside I felt as though I was entering the sorcerer's secret cave, not quite knowing in what shape or form I would eventually leave it.

World famous magician Paul Daniels welcomed me into his study and let my eyes feast on the bookshelves and display cases overflowing with tricks, props and awards gathered over the years. A mass of electronic wizardry filled the room with a huge projector, television and Hi-Fi system taking pride of place on one side, and an Atari 800 computer system standing out from a mass of paperwork by another. Regaining my equilibrium a little I asked Paul firstly if he had always been fascinated by tricks and gadgets. "Yes, I've always been a practical person. I like anything mechanical or electronic, cameras, video recorders and that kind of thing."

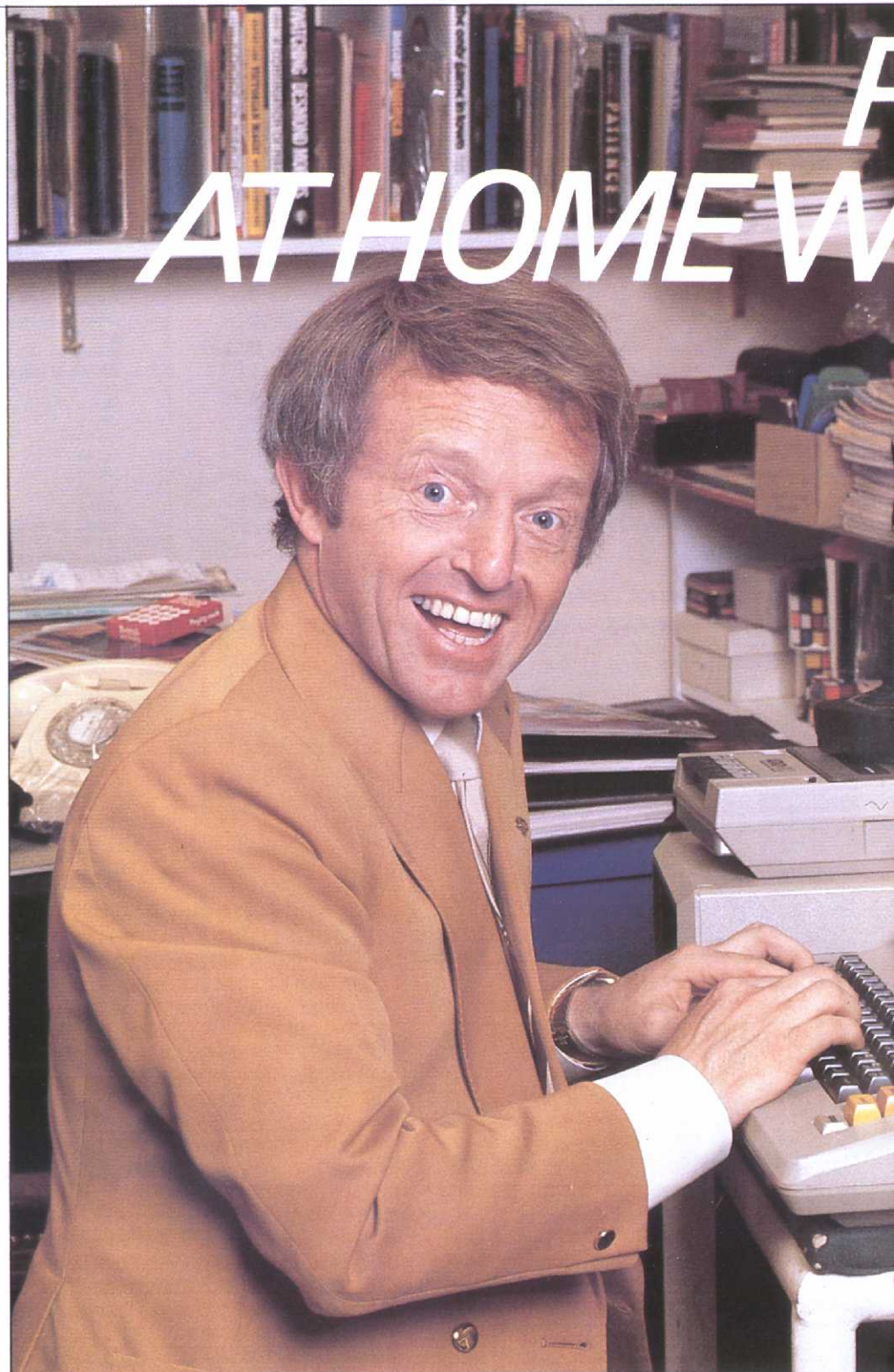
On his NTSC television Paul watches a whole spectrum of games shows sent over from the States so that he can study audience reaction and participation to help develop his craft.

When, I then asked him, had he first decided he wanted to be a magician. "Oh, when I was eleven. I was on holiday in the country and one rainy day I opened a book about magic and thought, wow, what a good trick! So I copied it all out by hand and I just did it. Then everyone said 'how did you do it?', and I knew I'd found something that no one else around me could do, and I've been doing it ever since."

Paul's passion for playing games is obvious. I had already been subjected to the "pick the card" trick and kept on pulling out the Joker, and a glance in one direction had shown me a video games console stacked up on one shelf. So I asked Paul what had made him want to buy a computer. "Well, at the time everybody was talking 'computers, computers' but no one explained what they actually did. So I bought every magazine available and set about trying to learn for myself.

"But after an 18-month period I still didn't know what on earth they were talking about. They're definitely not written for the general public and you can walk into most computer shops to ask what will a computer do and be told 'anything'. So then they ask you 'well what do you want to do with it?' and of course you don't know because you've never used one before. It's a nonsense!

"Eventually I walked into a shop in Guernsey and said 'Here's £1,000, give me the best computer you've got for that price and I'll take it home and find out what it can do'. But of course I'm lucky to be in the position of having the money to do that. There are many people who can't do that and who miss out. Anyway, I



can honestly say I got very good value for money. The man sold me an Atari 800 with 48K, Disk Drive, Program Recorder and some software.

"I think that the Atari is a good product. The graphics are excellent, the memory is adequate, certainly for all my purposes, and I like the keyboard.

"I would like to see more business software for it, but the games and education programs are generally very good value. There are one or two things that I'd like to see altered, but then, nothing is perfect. This is a good computer."

Paul has already taught himself a lot about computing and cites Atari's Invitation to Programming Series and a

couple of magazines and books as being a good way in. He made special mention of Clive Prigmore's book "30 Hour Basic" and showed me a couple of magazines full of Atari which he'd picked up in America including "Kids and the Atari" by Datamost, which, after a thoughtful pause he said came top of the list. "It's designed for kids. Fine! I always say that the magic which I market is simple enough for a child to understand but good enough to fool an adult."

Now those of you who read the feature entitled "Hello Mr Chip!" in the previous issue of I/O will be aware of the name Amazon Systems, the company formed by husband and wife team Gil and Beryl Williamson, a delightful couple who have

# PAUL DANIELS WITH HIS ATARI

Interviewed by Barry Millns



developed software for the Atari computers. That feature focused on their Key-Rs package for use in schools. Paul drew my attention specifically to another of their programs which he rates above all others—Keyword.

"The reason I like it so much is because on one disk you simply have a filing system, word processor, mail merge and printout facility with the instructions given to you in English on the screen step by step."

Talking about this program led us into discussing what Paul is actually doing with his computer. "I'm an entertainer in a high-tech world and I had people (who are computer programmers) coming onto my shows and talking to me in beeps! So

I had to learn all that. Then I have a fan club which I want to communicate with by writing a lot of letters to a lot of people. I also want to list this library. I mean I've got 8,000 books and 15,000 magazines all on magic! And an alphabetical list of tricks would be marvellous."

As for Atari's own software, Paul particularly likes the foreign language programs which he says give one a good basic grounding and help one to get around very well. The Spanish package was sitting on top of one pile on his desk, as Paul had just returned from a week's work over there. The Music Composer was also visible and whilst Paul admitted that this was really used more by his brother Trevor, a professional organist, he

himself enjoyed "playing with no hands" as it were.

For entertainment, though, Paul loves good adventure games produced by a number of different manufacturers. Some of his current favourites include Zork, Starcross and one called Deadline produced by Infocom. It was interesting to learn that he'd not yet challenged the Atari at Chess or Backgammon—too much of a headache, he said.

"Of course, I'm looking for programs that can serve a useful purpose for me as a magician. Graphics are of interest to me and although it sounds crazy I am at the moment looking for something that will draw fatter lines! I'd also like to get a light pen. If I can get a good graphics device working then I'll be able to draw the illusions on the screen and look at them in different colours and different shapes, quickly and easily, so that I can say to my designers, 'Look, that's what I want, this colour, that shape.'"

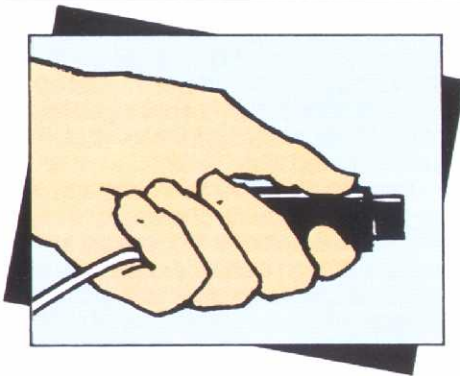
Warming to his subject I then asked Paul if he'd developed any trick images or games to appear on the screen. "Oh yes," he said. "There's one where you have to think of a number and it will tell you what that number is at the end of a few questions which don't seem relevant to the number at all. That's an area that fascinates me anyway. I mean, I've got a whole set of books here by a chap called Martin Gardner, who writes for Scientific American, and he's a mathematician! Some of that stuff I think will convert quite well. Ultimately I think I'll probably write my own adventure because that's nice." A man obviously getting into programming! "Well yes. I can already get it to do things in verbal terms but I'm nowhere near to getting the graphics up as fast as I want. There should be a fast way of drawing on the screen."

Realising the time, I asked Paul one final question. What piece of software would he, as a magician, find most useful and which had not yet been produced? "I suppose a general utilities disk," he answered. "With all the graphics demonstrations and all the sound effects. An index disk of what you can do with the facility of loading any item on it into your own program. A disk that you can access and use." We paused and then he added with a laugh, "Maybe I should market that!"

Our eyes turned to the screen and I began to think about going when suddenly he clapped his hands and said, "Oh yes, one other thing that I'd really love to see, a device which would be programmed by a special disk in my computer to switch on and off all the power points in my house. This would give me a supreme personalised control and alarm system. If it received information from a pressure pad by the front door and shouted down the stairs 'Who the hell is that?' I'd buy it." And with that I disappeared.



# ATARI SERVICE



The Atari Service Centre's Product Support Group exists to help users like yourself with all problems relating to the proper working of both Atari hard- and software.

The Group, which is manned by a team of specially qualified Atari personnel, receives dozens of letters each week, a few of which are printed below.

If you have a problem that's bugging you—or your computer!—don't hesitate to drop them a line at Atari House, Railway Terrace, Slough.

I wonder if you could help me with the following questions:

Can disk drives be connected to an ATARI 400 Computer with 48K or less?

Can a RGB Colour Monitor be connected to the ATARI 400 Computer by an adaptor or an interface for instance?

If the answer to any of these questions is YES then the supplier name and price would be useful articles of data.

Thank you very much for your time.  
S Thompson  
Tyne & Wear

The Atari 810 Disk Drive can be connected to an Atari 400 (16K) Home Computer System (HCS), but the amount of remaining RAM will be very small, and so a larger memory, such as the 32K or 48K that can be used with an Atari 800 HCS is advisable. Atari do

not recommend memory expansions on Atari 400 HCS.

The Atari 800 has a Monitor socket as a standard feature, allowing connection to any standard Composite Video (not RGB) monitor. Using this socket, you can also connect the Atari 800 HCS to an external amplifier. The Atari 400 does not have this feature built in, and so to connect a monitor would involve opening up the machine and some complex electronics. A special decoding device would also be necessary if this was achieved, as the signal is Composite Video and not RGB.

I hope that this has adequately answered your questions. Please find enclosed some catalogues and magazines, which I hope will be of interest to you.

Jon Dean  
Atari Product Support

My Atari 800, new today, only displays characters across a line with a space on the left side. Is this usual as I understood the line displayed 40 characters?

G D Stringer  
Nottingham

The Atari 400 and 800 Home Computer Systems are capable of displaying 40 characters across the screen. The left and right-hand margins have a default setting of 2 and 39 respectively, which you have noted gives only 38 characters per line. You can alter the margins to suit your own requirements by poking locations 82 and 83 (see appendix I-1 of the Basic Reference Manual), for example POKE 82, 0 gives 40 characters per line.

Jon Dean  
Atari Product Support

I would like to request instructions on modifying the Atari 400 for separate video and audio output. Thank you.

K L Yeap  
London EC1

The Atari 800 has a monitor socket, suitable for connecting to a composite video monitor as standard. As you are aware, the Atari 400 does not have this feature and to modify it is indeed a difficult job! Unfortunately, we do not have any notes upon performing this modification, and we would not recommend anyone but a competent electronics engineer to even attempt it! The most detailed information on Atari Home Computer Systems available to the general public can be found in the Technical User Notes (CO16555), which your local dealer should be able to order for you.

Jon Dean, who heads up our hard-working Atari Product Support group here in Slough, received the following letter just a few days ago. We too would like to add our praise and thanks to Jon who helps to compile this Tech Specs page.

Thank you for the prompt and efficient way in which you dealt with my problem. I am very happy to say that the system is now working perfectly.

At a time when many manufacturers appear to pay lip service to their guarantee obligations, it is a pleasure to find a company that has a high regard to customer relations.

It is now quite common to read letters of complaint in computer magazines regarding bad or non-existent service from computer manufacturers; it is only rarely that one reads an article from a satisfied customer. Providing you have no objections, I intend to write to one or two magazines and applaud you.

Once again my sincere thanks.  
R M Ward  
Liverpool

# HOTLINE

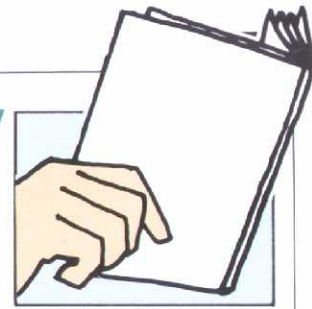


**(0753) 24561**

Got a problem? Don't forget that our customer support service is on hand to help out.

Ring Slough (0753) 24561 for advice on all matters relating to Atari Home Computer hardware, software, peripherals and programming.

# THE ATARI LIBRARY



"HOW TO BUY A PERSONAL COMPUTER (WITHOUT ANXIETY)"  
A review by Jon Dean.

Author: J D Lief. Publisher: Ballinger.  
Price: £4.95

"Why review this book, when all of our readers have already bought ATARI Home Computers?" asked the Ed. "Does it contain useful programming tips?"

"Er...no," I replied.

"Any deep, hidden secrets about ATARI?" she continued.

"Not exactly..."

"Well...?"

"Er...do you know what 'de-bugging' means?" I asked nervously.

"Of course..."

"Do you know how that term originated?"

I made a quick exit from her office amidst a hail of books, paper-clips and abuse. No one likes a smart-alec.

But what does "de-bugging" mean? For that matter, I'm sure there are many words that most micro owners don't really understand. You know, the sort happily bantered about by salesmen and those "micro-enthusiasts", always talking jargon.

This book, H.T.B.A.P.C., was designed to help a complete beginner to computing understand the micro-world, and is written in plain English with any terminology clearly explained, and includes a useful glossary at the back. The term "de-bugging", for example, many of us understand as meaning "to

check through a program-listing and find/alter any mistakes". H.T.B.A.P.C. explains the origins of "de-bugging"—"... a throwback to the days when all computers were very large. They contained wide tubes in which moths and flies would get caught. Periodically, engineers had to search for and remove these bugs, literally 'de-bugging' the system." A gem to quote at your next Users Group meeting!

H.T.B.A.P.C. contains a brief Computer history, beginning in 1642 with French philosopher PASCAL, through mainframes, mini-computers and finally micros. The book continues to survey the American market in 1982, and features a "brand-analysis". See where your ATARI computer fits into the micro "league", and how it matches up to machines ten-times the price!!

The future of micros is also discussed in some detail—the possibility of "grown" or cultured micro-chips, that "could be emplantated directly into a person's brain". Imagine! This and other possible future developments of the micro have a chapter to themselves.

Another interesting chapter deals with after-sales service. How many microcomputers have a good after-sales service and back-up? You chose

correctly!

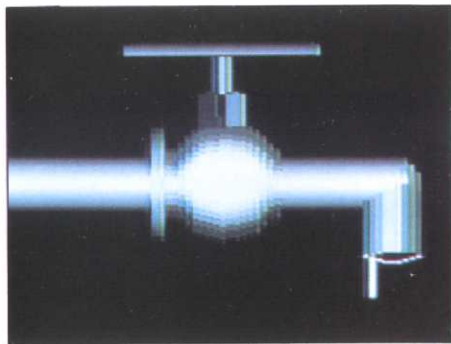
I feel that this book would be a useful addition to any micro-user's bookshelf. A mine of interesting facts and helpful comment, which can only help the reader to understand this complex and often frustrating field—an invaluable help to anyone considering buying a micro—not to mention those who already own them!

Incidentally, if you've come across any publications that you have personally found really useful, why not tell us about them?

Now...to face the Ed. again...

Here are some more excellent books we recommend you read to get the most out of your Atari computer.

Title	Publisher	RRP(£)
Atari DOS.2 Reference Manual	Atari	5.99
DOS. Utilities System Listing	Atari	3.99
Atari Basic by Using	Hofacker	4.85
Atari Games and Recreations	Reston	11.75
Don't!	Sybex	9.45
Master Memory Map	Santa Cruz	3.95
The Basic Handbook	Compusoft	14.75
Inside Atari Basic	Reston	10.35
Inside Atari DOS	Compute!	17.95



## ON TAP

Well spotted all of you who took the trouble to write in with amendments to the "On Tap" program which appeared in the last issue of I/O.

First out of the bag for Atari prizes were Sharon Dean of Warrington in Cheshire, N Grozier of Malton in North Yorkshire, and Peter Taylor of South Wirral — Ed.

```
40 REM *** delete this line ***
50 REM *** delete this line ***
60 REM *** delete this line ***
70 GRAPHICS 9:RESTORE
180 DATA 0,1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,15
190 REM *** delete this line ***
200 REM *** delete this line ***
240 FOR N=64 TO 95
300 FOR BOT=128 TO 96 STEP -1
510 FOR XB=38 TO 41
570 IF XC=43 THEN PLOT XC,47:DRAWTO XC,64
1049 FLIPCOL=0:COL=4
1050 IF FLIPCOL>15 THEN FLIPCOL=0
1052 COLOR COL
1057 SETCOLOR 4,FLIPCOL,0
1060 FOR DR=137 TO 191
1070 PLOT 63,DR
1080 NEXT DR
1090 FOR DN=77 TO 10 STEP -7
1100 SOUND 0,DN,10,DN
1110 NEXT DN
1120 SOUND 0,0,0,0
1130 COLOR 0
1140 FOR DR=137 TO 191
1150 PLOT 63,DR
1160 NEXT DR
1170 FOR A=0 TO 300:NEXT A
1175 COL=COL+1
1176 IF COL<>16 THEN 1050
1179 FLIPCOL=FLIPCOL+1:COL=4
1180 GOTO 1050
1190 REM *** delete this line ***
```

# PLAYER MISSILE GRAPHICS



You are no doubt aware, particularly if you've played Star Raiders, that your Atari Home Computer has by far the best graphics capabilities of any existing home computer.

In this article we will provide a basic outline of one of the most impressive and dynamic aspects of the graphics capabilities at your finger-tips—Player Missile Graphics.

The Atari system has very powerful graphics facilities incorporating four players. That means four different objects can be programmed to move around the screen at any one time. All four players work independently from one another, from the background or field of play.

Each player also has its own colour register, enabling one to allocate separate colours to each player and to the background. Up to nine different colours can be used on a single screen, depending on the graphics mode used in the program.

The Atari computer allows one to vary the size of players by either doubling or quadrupling their width. There is also an option of making players either single- or double-line resolution. Single-line resolution enables one to design a

player's shape with greater detail. With double-line resolution, some detailing is sacrificed.

Since both the player and the playfield will be presented on the screen in the same location, it is important to decide which should have priority. When a player is given priority it, and not the playfield will be displayed on the screen in the particular position. Conversely, when the playfield is given priority, the player will seem to disappear behind the playfield. It is also possible to give separate priority to different players, so determining which player will show if two players collide at the same location.

Finally, each player has one tiny player, a missile, associated with it. The missile takes on the same colour as the player, but can move independently. This means player craft can be made to drop "bombs", or whatever. When the four missiles are not required, they can be grouped together to form a fifth player. This player can also take on a separate hue from the other players.

So, how does one use all of these superb graphics capabilities? The simple program below shows you how as it puts a player aeroplane onto the screen.

This program was written to help you understand the principles of Player Missile Graphics and thus you can improve upon it in a variety of ways. All you need to do is add additional lines to your program.

You might add more players. To do this, copy lines 20 through 180 with new numbers and substitute the following numbers in the appropriate lines.

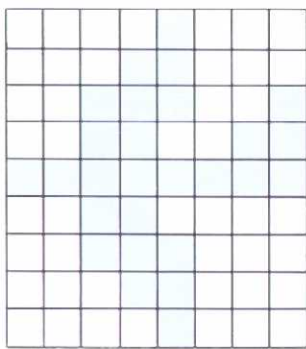
	Line Numbers	70,140,150	90	160	170
player 0	53248	704	512,511	511,512	
player 1	53249	705	640,639	639,640	
player 2	53250	706	768,767	767,768	
player 3	53251	707	996,995	995,996	

You might want to have each player controlled by a different joystick, which can be done by adding a new line like line 120 but with a different line number and the following change.

Joystick 1: 120 A=STICK(0)  
 Joystick 2: 120 A=STICK(1)  
 Joystick 3: 120 A=STICK(2)  
 Joystick 4: 120 A=STICK(3)

You can also change the colour of your players. To do this, change the number 88 in line 90. To determine the new number, multiply the number of the colour you want (use the colour chart in Issue Two) times 16 and add the luminosity you want (a whole number between 0 and 15). Put this new value in the line.

To convert from BINARY GRID to DECIMAL add the values of the shaded areas horizontally using the numbers given below. Put these numbers into the DATA Statement (Line 110).



eg\*:  $32+16+2+1=51$



10 GRAPHICS 0:SETCOLOR 2,0,0	Sets the background or playfield colour.
20 X=130	Sets the horizontal position of the player. X must be a number between 48 and 207 (48=far left, 127 or 128=centre, 207=far right).
30 Y=70	Sets the vertical position (Y) of the player. For double-line resolution, Y must be a number between 4 and 123 (4=top, 63 or 64=centre, 123=bottom). For single-line resolution, Y must be a number between 8 and 247 (8=top, 127 or 128=centre, 247=bottom).
40 A=PEEK(106)-8:POKE 54279,A:PMBASE=256*A	Sets up location in memory for Player Missile Graphics.
50 POKE 559,46	Enables double-line resolution (46=double line resolution, 62=single-line resolution).
60 POKE 53277,3	A 3 enables Player-Missile Graphics.
70 POKE 53248,X	Sets the horizontal position (X) for player 0.
80 FOR J=PMBASE+512 TO PMBASE+640:POKE J,0:NEXT J	Clears player out first.
90 POKE 704,88	Sets colour of player 0.
100 FOR J=PMBASE+512+Y TO PMBASE+520+Y:READ A:POKE J,A:NEXT J	Tells computer to draw a player to be an aeroplane.
110 DATA 8,24,49,51,255,48,48,24,8	Data that defines the shape of the player.
<b>Now that you have a player on the screen, the following additional lines will allow you to move your player around with the joystick.</b>	
120 A=STICK(0)	Tells the computer to read joystick 1.
130 IF A=15 THEN 120	Checks to see if joystick is straight up and down; if yes, keeps reading the joystick position until it changes.
140 IF A=11 THEN X=X-1:POKE 53248,X	Checks to see if the joystick is pressed to the left for player 0; if yes, moves player left.
150 IF A=7 THEN X=X+1:POKE 53248,X	Checks to see if the joystick is pressed to the right for player 0, if yes, moves the player right.
160 IF A=13 THEN IF Y<115 THEN FOR J=1 TO 0 STEP -1:POKE PMBASE+512+Y+J,PEEK(PMBASE+511+Y+J):NEXT J:Y=Y+1 170 IF A=14 THEN IF Y>10 THEN FOR J=0 TO 10:POKE PMBASE+511+Y+J,PEEK(PMBASE+512+Y+J):NEXT J:Y=Y-1	
180 IF X<40 THEN X=220	Checks to see if the joystick is pressed to the top for player 0; if yes, moves player up.
190 IF X>220 THEN X=40	Checks to see if the joystick is pressed to the bottom for player 0; if yes, moves player down.
200 GOTO 120	Keeps the program continuing the subroutine for determining which direction the joystick is pressed.
<b>To stop the program, press SYSTEM RESET.</b>	



*The world's first all-electronic digital computer, ENIAC - Electronic Numerical Integrator And Computer.*

*Photograph by kind permission of Sperry Univac.*

One of America's top secrets to emerge after World War II was a revolutionary machine which for the first time could electronically solve mathematical problems—at a tremendous speed.

It was heralded as a device upon which to build the future and its inventors claimed that it could compute mathematical problems 1,000 times faster than had ever been done before.

The ENIAC, more formally known as "the electronic numerical integrator and computer", contained 18,000 vacuum tubes and many miles of wiring. The only mechanical moving part associated with it "interpreted" mathematical problems into terms understood by ENIAC, and vice versa for its human operators.

This computer, the world's first, was in fact the brainchild of two young

Pennsylvanian scientists—Dr John William Mauchley and J Presper Eckert Jr.

Whilst ENIAC's basic functions were nothing more than the ability to add, subtract, multiply and divide, it could do so by generating extremely accurately timed electrical impulses at a speed of 100,000 per second. It performed one operation every twentieth pulse, ie 5,000 additions per second.

Yet, and perhaps more importantly, the ENIAC also possessed the faculty of memory to perform certain tasks in the correct sequence, plus "control" elements to dictate its own action, albeit in a limited form. For example, the computer could compare two numbers and chose one of two possible courses, depending on which number was the larger.

Nevertheless, ENIAC was no pocket calculator for mere mortals. It could barely be contained in a room 30-foot by 60-foot, with its 40 panels each nine feet high, and displaying enough rows of lights and controls to baffle everyone but its creators.

When you consider that ENIAC, which took more than 200,000 man-hours to build, contained more than half a million soldered joints, cost about \$400,000 and required 150 kilowatts of electricity to run, you might doubt that your Atari Home Computer could ever have descended from such a monster. But there again, who would have thought that birds are descended from dinosaurs!

In spite of its size, ENIAC was undoubtedly the electronic miracle of the century and the father of the computer age.

# BRINGING THE COMPUTER AGE HOME

If cars had developed as fast as computers you would now be able to buy a Rolls Royce for £1.50. It would do three million miles to the gallon, pack enough power to drive the QE2 and could be miniaturised to fit six times onto a pin head.

No other industry or product has progressed so fast or with such dramatic effect as that associated with the silicon chip.

Today, so-called Information Technology affects almost every aspect of our daily lives—at work, at home and in the classroom. It is hard to believe that it all started just a generation ago.

ENIAC, the world's first computer, was developed in America during the Second World War and had its public debut in 1946.

It was a massive piece of equipment weighing 30 tons, using 18,000 vacuum tubes and taking up 1,500 square feet of space.

Today's computers are as small as their casing and peripherals will allow. Most fit onto a desk-top, some can be carried around with ease.

As computers become smaller they also become cheaper. So cheap, in fact, that they have now found a market into which they, quite literally, could not hitherto have fitted. The home.

And this is where Atari comes in. In 1979, with several years of success as the leading manufacturer of home video games, the company realised the potential for bringing the new compact computers into the home. Not long after that, the Atari 400 and Atari 800 appeared on the scene.

In 1983 the Atari name is fast becoming as synonymous with simple, yet powerful home computers as it is with video games. One reason for this is no doubt the fact that Atari recognises the needs of the home user; its soft- and hardware packages are geared particularly to those administrative and educational tasks in which we are all involved.

Atari Word Processor, Graph It,

Statistics, Mortgage & Loan Analysis, The Home Filing Manager and Visicalc are just some of the titles available in the Atari home management range.

The Atari Word Processor, which requires an Atari 800 Home Computer, a minimum of 48K RAM, an Atari 810 Disk Drive and a suitable letter-width printer, enables you to produce immaculate letters and documents, even after extensive changes. Any kind of text, reports, documents, or creative work can be typed, edited, stored on diskette and printed at any time.

Anyone who types or writes, who has standards and files to keep up, will find the Atari Word Processor a great tool for text editing and storage.

Most people find it much easier to understand and assimilate information which is presented in graphic form. So Atari developed Graph It—a colourful and fun software package which transforms even the most complex mathematical data into comprehensible bar charts and pie graphs. The package, which requires an Atari Basic cartridge and the Atari 410 Program Recorder, can be used with a Joystick Controller to plot two- and three-dimensional co-ordinate systems as well as polar plots.

Graph It is an ideal tool for business people, teachers and students and requires a minimum RAM of 16K.

Fiddling around with figures is murder for all but the most mathematically oriented of us. But with the Atari Statistics package number crunching can be fun.

Statistics enables your Atari computer to calculate and correct mean, mode and median values, as well as standard deviation, variance, skew, kurtosis and root mean square statistics. A serious but simple tool, the Atari Statistics cassette can be used to rationalise personal accounts, business data, school or college work. It requires a minimum of 16K RAM, the Atari Basic cartridge and the Atari 410 Program Recorder. The Atari 810 Disk Drive and Printer are optional.

As its name implies, the Atari Mortgage & Loan Analysis cassette program enables you to compare mortgage terms including monthly payments and total interest payments, according to differing rates of interest.

As we described in the last issue of I/O, Home Filing Manager is the definitive software package for everyone who would like to organise their lives a little better. Use it to create, edit, catalogue, file and retrieve information on all aspects of your day-to-day life: from birth dates to Christmas card lists; from books to recipes. This amazingly flexible program requires the Atari 810 Disk Drive, and a minimum of 16K RAM. Printers are optional.

Obviously, keeping track of one's expenses, belongings and business interests are not the only reasons for owning a home computer. The home is as important a centre of learning as any school, office or college.

Atari software is dedicated to the enhancement and reinforcement of learning at all levels. An entire library of Talk & Teach cassettes is available on a wide range of subjects for all ages. Some educational programs including Hangman, Energy Czar (the control and distribution of energy systems) and Scram (nuclear power plant simulation) enable the user to both learn and have fun at the same time.

The list of Atari software titles available in the UK already numbers over 200 titles—and it's growing all the time. Both through Atari's own Software Development Programme and through contributions from users like yourself.

The Atari Program Exchange (APX) is compiled exclusively by and for British users. As yet in its early stages of development, APX already promises to become one of the most exciting Atari growth areas.

So if you've created a program of which you are proud, do write in to APX, Atari House, Slough and tell us about it. You are, after all, on home ground...

# KIDS CORNER

Many thanks to all of you for sending in some great programs! Unfortunately, we don't have the space to print them all, but the best ones will be printed in this section and will each receive a special Atari prize. Keep them coming! — Ed.

Dear Editor

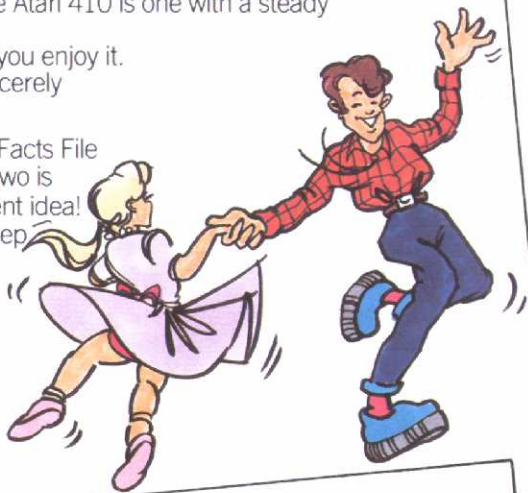
I got my Atari 400 for Christmas, and I enjoy using it. I do not know much about it yet but I am gradually learning.

I enjoy your I/O very much and I like reading the letters. As a novice I thought of a program that amused me; where two figures jive music from a tape. Using the graphic control keyboard and the statement ("ESC CTRL CLEAR") the program can be written.

If you run this program the best tape to put in The Atari 410 is one with a steady beat.

I hope you enjoy it.  
Yours Sincerely  
S Hewins

P.S. The Facts File in Issue Two is an excellent idea! Please keep it up.

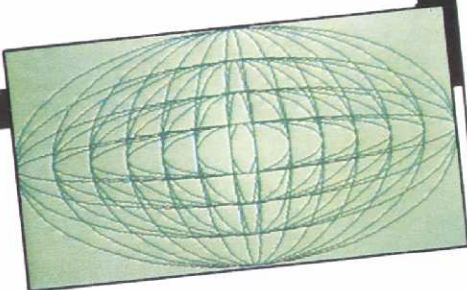


```

1 REM ***-DANCING FIGURES-***
2 REM ***-----BY-----***
3 REM ***-----S.HEWINS-----***
4 REM ***-----***
5 REM WHEN ENTERING THE PROGRAM
6 REM HOLD THE CONTROL KEY DOWN
7 REM WHILE TYPING THE LETTERS
8 REM AND PLACE AN INVERSE SPACE
9 REM BELOW EACH LETTER T
10 POKE 54018,52:POKE 752,1
20 PRINT CHR$(125)
30 SETCOLOR 2,0,0
40 POSITION 11,8
45 REM TYPE THE TEXT USING THE CONTROL
   KEY
50 PRINT " T TF
           Z C F
           FB B G"
60 FOR P=1 TO 75:NEXT P
80 POSITION 11,8
85 REM TYPE THE TEXT USING THE CONTROL
   KEY
90 PRINT " T GT
           Q E G
           B G FB "
100 FOR P=1 TO 75:NEXT P
110 GOTO 40
    
```

```

2 REM *** ELLIPSE PLOTTER ***
3 REM *** -----BY----- ***
4 REM *** ---M. MCGILL--- ***
6 REM *** -----AND----- ***
7 REM *** -S. PALASINGHAM ***
10 GRAPHICS 8+16
20 SETCOLOR 4,4,4
30 SETCOLOR 2,12,15
40 SETCOLOR 1,12,2
50 COLOR 1
60 RAD
70 PI=3.145927
80 FOR THETA=0 TO (2*PI) STEP (PI/20)
90 A=159
100 B=95
110 X=A*COS(THETA)+159
120 Y=B*SIN(THETA)+95
130 IF THETA=0 THEN PLOT X,Y
140 DRAWTO X,Y
150 NEXT THETA
1000 GOTO 1000
    
```



```

1 REM UPDATED IN PART BY JON.DEAN
2 REM *** ELLIPSE PLOTTER ***
3 REM *** -----BY----- ***
4 REM *** ---M. MCGILL--- ***
6 REM *** -----AND----- ***
7 REM *** -S. PALASINGHAM ***
10 GRAPHICS 8+16
11 FOR A=9 TO 159 STEP 25
12 FOR B=20 TO 95 STEP 25
20 SETCOLOR 4,4,4
30 SETCOLOR 2,12,15
40 SETCOLOR 1,12,2
50 COLOR 1
60 RAD
70 PI=3.145927
80 FOR THETA=0 TO (2*PI) STEP (PI/20)
110 X=A*COS(THETA)+159
120 Y=B*SIN(THETA)+95
130 IF THETA=0 THEN PLOT X,Y
140 DRAWTO X,Y
150 NEXT THETA
160 NEXT B
200 NEXT A
1000 GOTO 1000
    
```

Jon has added lines 11 and 12, 160 and 200 which puts loops into the program to make a larger pattern rather than just a single ellipse.

# COMPUTER DICTIONARY

**Interface** — A device designed to pass information between the separate parts of a computer system.

**Serial** — A method of sending data one bit at a time. Imagine the eight bits of a computer word travelling single file.

**Parallel** — A method of sending all eight bits of a computer word at once. Imagine them marching eight abreast.

**Intelligent Serial Interface** — The serial interface used by the Atari Computer to connect your personal computer to the Atari 810 Disk Drive, Atari 410 Program Recorder or other "intelligent" devices. This interface requires that a device be capable of recognising an identification code to let it know when to operate.

**Modem** — A MOdulator/DEModulator device capable of sending data over telephone lines by converting the bits to sound or converting sound to bits.

**Hardware** — The electronic circuitry or machinery of a computer system.

**Software** — The programs required to make the physical machinery of a computer operate.

**Pokey** — The PORT KEYboard control integrated circuit in your Atari Home Computer.

**Operating System (OS)** — The program in your Atari Home Computer that makes it possible for you to load and run program cartridges and tapes.

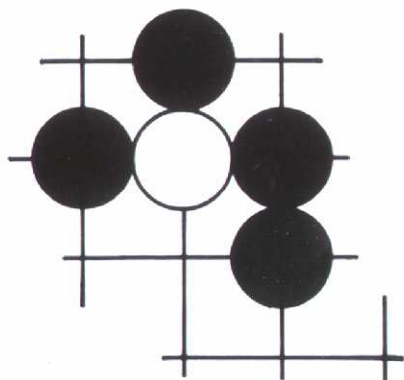
**Disk Operating System (DOS)** — The operating system received on a diskette that makes it possible to load and run programs from an Atari 810 Disk Drive.

```
10 GRAPHICS 9:SETCOLOR 4,3,0
20 FOR Z=128 TO 48 STEP -1
40 READ C:COLOR C
50 PLOT 14,Z:DRAWTO 64,Z
60 NEXT Z
70 GOTO 105
100 DATA 1,1,1,2,2,2,3,3,3,4,4,4,5,5,5,6
,6,6,7,7,7,8,8,8,9,9,9,10,10,10,11,11,11
,12,12,12,13,13,13,14,14,14
102 DATA 14,14,14,13,13,13,12,12,12,11,1
,11,11,10,10,10,9,9,9,8,8,8,7,7,7,6,6,6
,5,5,5,4,4,4,3,3,3,2,2,2,1,1,1
105 FOR REP=1 TO 2:ST=13:IF REP=2 THEN S
T=65
110 RESTORE 200
120 FOR Z=128 TO 48 STEP -1
130 READ R:IF R=-1 THEN 220
140 COLOR R
150 PLOT ST,Z:DRAWTO ST,Z
160 NEXT Z
170 NEXT REP
200 DATA 2,2,2,2,3,3,3,4,4,4,5,5,5,6,6,6
,7,7,7,8,8,8,9,9,9,10,10,10,11,11,11,12,
12,12,13,13,13,14,14,14,15,15,15
210 DATA 15,14,14,14,13,13,13,12,12,12,1
,11,11,10,10,10,9,9,9,8,8,8,7,7,7,6,6,6
,5,5,5,4,4,4,3,3,3,2,2,2,-1,-1
220 REM COLALETTERS
230 RESTORE 260
240 READ A,B,C,D:IF A=-1 THEN 310
250 PLOT A,B:DRAWTO C,D:GOTO 240
260 DATA 57,67,57,73,56,66,53,66,56,65,5
3,65,52,67,52,73,53,74,53,75,56,74,56,75
270 DATA 47,75,47,81,46,74,43,74,46,75,4
3,75,42,75,42,81,43,82,46,82,43,83,46,83
280 DATA 37,84,32,84,37,85,32,85,32,86,3
2,94
290 DATA 22,94,24,94,22,95,25,95,24,96,2
4,102,24,102,26,102,22,103,25,103,22,104
,24,104,25,96,26,96
300 DATA 26,97,27,97,26,101,27,101,28,98
,28,100,-1,-1,-1,-1
310 GOTO 310
```



**DISK OPERATING  
SYSTEM**

# HOW ATARI GOT ITS NAME



The name Atari actually comes from Japan. And yet the company is most definitely American. Ever wondered why? It's an interesting story and one well worth telling.

In 1972 three friends decided to invent and market the first commercially feasible video game. They were Nolan Bushnell, Ted Dabney and Larry Bryan.

To become a partner each man had to submit \$100 to the project—a

remarkably small sum when you consider the company's success! The next step was to find a name.

Drinking beer and thumbing through the dictionary one day, the three friends came across an interesting entry under "S". The word was Syzygy, or "the straight-line configuration between three celestial bodies". What a perfect name, they thought, for three such astronomically talented people!

Now they could get on with the business of inventing games. Their first, Computer Space, was produced and all seemed to be going well.

But then things started to get a little shaky. Larry Bryan decided not to ante up his \$100 and pulled out, leaving Bushnell and Dabney to go it alone.

They set up a shop in Santa Clara, California, and incorporated the business. A little later they invented Pong®.

Bushnell and Dabney applied for the name Syzygy to the Office of the California Secretary of State, which regulates Californian corporations, but were told that they were too late. The name was already taken.

Following unsuccessful attempts to buy the rights to the name from the first Syzygy corporation, which appeared to be inactive, the friends' solicitor pressed them to think up an alternative.

This proved difficult. BD Inc and DB Inc were tested and then rejected in turn: the first bore too close a resemblance to Black & Decker, the second to Dunn and Bradstreet.

Inspiration occurred at last, once again in an informal atmosphere. Bushnell and Dabney were both keen players of Go, a Japanese strategy game, and their best brainstorming always occurred over a good game and a bottle of beer.

This time, they decided to make a list of several Go words to see if one of them would fly as the new corporate name.

First choice was "Sente", which means "the upper hand"—something that greatly appealed. Second and third choices were "Atari", which has a similar meaning to the English "check", and "Hanne", an acknowledgement of an over-taking move.

Bushnell and Dabney submitted the list once again to the Office of the California Secretary of State, which approved "Atari". The rest is history.

When the company name changed, Bushnell and Dabney decided to update the logo too. They incorporated the "S" from Syzygy and the "A" from Atari into the new design, and if you look at the middle logo, you will be able to make out both letters.

It was not until later, as the company became increasingly successful, that an advertising agency designed the slicker and now famous Atari logo—the "fuji" or stylised "A" design.

## GROUPS... USER

If the rush of mail to our editorial offices here in Slough is anything to go by, both the number and size of Atari User Groups throughout the country is expanding fast!

Many of you have written in just to tell us how things are going. Some write to ask if there's anything they should know before setting up a Group of their own.

The answer, of course, is yes! We have prepared a special information pack for all new and prospective "groupees", which we would be only too delighted to send to you. Just drop a line to the Editor at Railway Terrace, citing your name, address and contact number. Then keep us up to date with all activities so that we can insert these details into our I/O list.

The letter below from Ken Ward of Norwich gives some information on a new group which he's started up—apparently with great success!

We look forward to hearing from you.

Thanks for sending the notes on starting a user group. They will be useful as our group grows.

We have had a couple of meetings, and there are already seven of us, and as I've had a couple more enquiries since our last meeting, hopefully we shall grow.

We are meeting at my home for the moment, but if we expand at the present rate we shall soon have to find somewhere else!

We have started off with a nice mixture of computer experience. And I'm pleased to say that information and ideas are passing both ways. Not just from the experienced to the beginners.

Would you please add our name to your list of clubs—include us in I/O—and send us any support material you can.

Yours sincerely  
Ken Ward

**HOW SUCCESSFUL IS YOUR GROUP? WOULD YOU LIKE TO SEE IT GROW? HOW CAN WE HELP YOU?**

If you have suggestions as to how you would like to see ATARI continue to help User Groups, please write to the following address:

Home Computer Club  
(User Groups)  
Atari House  
Railway Terrace  
Slough  
Berkshire

# GROUPS... USER GROUPS... USER GROUP

**AVON**  
**Bristol:**  
The East Bristol Atari Users Group  
C/o Micro-C  
2 Channons Hill  
Industrial Estate  
Fishponds  
Bristol

**BERKSHIRE**  
**Slough:**  
Contact: C/o David Bell  
Silicon Chip  
302 High Street  
Slough  
Berks  
Tel: (0753) 70639

**BUCKINGHAMSHIRE**  
**Milton Keynes:**  
T Jordan  
18 Buckman Close  
Greenleys  
Milton Keynes  
Bucks  
Tel: (0908) 314439

**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:**  
Mr P Silver  
Basildon Computer Club  
20 Pattocks  
Basildon  
Essex SS14 1QW

**Colchester:**  
C/o Mr Michael 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  
(Waltham Cross) 28168

**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 0LU  
Tel: (0322) 842338 (Home)  
(0322) 842244 Ext 269 (Office)

**LANCS**  
**Atherton:**  
Bolton Computer Club  
Secretary: Dave Atherton  
16 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 1767

**Harrow:**  
Harrow Atari User Group  
R T Bennett  
8A St Anns Road  
Harrow  
Middlesex  
Tel: 01-427 5828

**Harrow & Surrounding District:**  
Mr M Gutteridge  
Tel: 01-965 0511 Ext 3457

**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  
Chairman: Mr John Brown  
Software Manager: Mr Bob Smith  
Tel: WoT 22895  
WoT 21310 after 6.00pm

**Wallington:**  
Adrian Miles  
8 Cosdach Avenue  
Wallington  
Surrey

**SUSSEX**  
**Brighton:**  
Asterix User Group  
Brian Hills (Editor)  
253 Preston Drive  
Brighton  
Sussex  
BN1 6FL  
Tel: (0273) 561670

Roy Leith  
249 Mackie Avenue  
Brighton  
Sussex  
BN1 8SD  
Tel: (0273) 509413 (Home)  
01-357 4015 (Office)

**Worthing:**  
Mr J Butler  
18 Cumberland Avenue  
Worthing  
Sussex

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

**YORKSHIRE**  
**Leeds:**  
Atari User Group in Leeds and Area  
2 Wharfedale Grove  
Leeds  
LS7 2LQ  
Contact: Christopher Payne &  
Ray Evans  
Tel: (0532) 657 862

**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  
Tel: (041) 772 8964

OR  
C/o George Stevenson  
51 Skerry Street  
Milton  
Glasgow  
Strathclyde

**Edinburgh:**  
The Edinburgh Atari Computer Club  
President: Ian Wilson  
18 Henderson Court  
East Calder  
West Lothian  
Tel: (0506) 880175



# Now, service as good as your Atari.<sup>®</sup>

Now you can place your ATARI<sup>®</sup> in one of the safest pair of hands in the country: ours.

We're an authorised independent ATARI SERVICE<sup>SM</sup> Centre and equipped to service ATARI Video Computer Systems<sup>TM</sup> and Home Computers, in or out of warranty.

Our staff have been specially trained at the Atari factory and they've earned the right to wear the ATARI SERVICE Badge.

## Service that's as good as Atari.

©ATARI and design, Reg. in U.K. TM are trademarks of Atari Inc. SM is a service mark of Atari Inc.



W A Warner Communications Company