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# ATARI USER

Vol. 2 No. 12

April 1987

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magazine for  
Atari 6 bit users

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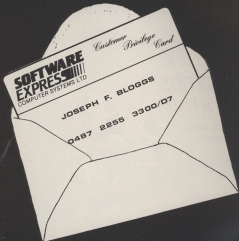
Gauntlet: The  
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Vol. 2 No. 12 April 1983

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Published by  
Database Publications Ltd.  
Temple Road, St Chester Road,  
Hazel Green, Stockport SK7 9ST.

ABC 1983 January-June, 1983

**Subscription rates for**  
**12 issues, post free**  
£12 + UK  
£16 + Europe  
£18 + Overseas

"Atari User" welcomes program listings and articles for publication. Material should be typed or computer-printed, and preferred double-spaced. Program listings should be accompanied by cassette tape or disk. Please enclose stamped, self-addressed envelope, otherwise the return of material cannot be guaranteed. Contributions accepted for publication by Database Publications Ltd will be on an all-rights basis.

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News Trade Distribution: Computer Sales and Distribution Limited, Unit 7, Burgess Road, Hockley Lane, Huddersfield, West Yorkshire WF6 4BN. Tel: 0484-610433.

## News 5

Catch up with the ever-changing world of the 8 bit Atari.

## Game 11

Type in Torpedol and sink the invading enemy fleet.

## Autoboot 14

We show how to give your programs the professional touch.

**NEW SERIES**

## Reviews 17

We take a long look at Vietnam, The Archers, Super 3D Plotter II, Robot Knight, Tomahawk, Crumble's Crisis.

## Competition 21

More than 70 chances to win in our exciting MicroPress competition.

## Interview 22

André Willey meets the programming team that produced Gauntlet.

## I/O Channels 24

Part 4 of our series on the Atari's input/output facilities.

## Adventuring 29

Dungeon master Brilling helps more of you escape from your adventure-related problems. Plus three-page Zork I map.

## Gadgets 37

Build your own Epson interface with Len Golding's help.

## Game 41

Fast and furious arcade game featuring an under-fire skate boarder.

## Five Liners 43

More of your 625 mini programs.

## Utility 45

Stephen Williamson introduces his Advanced Character Editor.

**NEW SERIES**

## Mailbag 53

Your queries and answers, means and praise.

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AN Atari 8-bit software revolution has begun, prompted by a bridge-building exercise from the company to developers and the arrival of the video games machine, the 68000.

Atari recently acknowledged its "inadequate support" for programmers in the past and vowed to get it right from now on.

And software houses are responding with more conversions to the 8-bit and a pledge of more new games on cassettes and cartridge.

Included in the shake-up to give more support to third parties is the appointment of Roland Whitehouse as man-

# SOFTWARE SHAKE-UP

## Atari promises much more support for programmers

ager of software marketing. He explained: "My role is to give help and support for software generally, and especially for that about to be launched.

"We need, and are actively looking for, more cartridge-based software for the 68000.

"This response has been excellent. Software houses are really cooperating. We know there was room for improvement and we feel we are turning the tide".

The company was approaching publishers about cooperative software advertising relating particular products to particular machines and everyone he had talked to was willing to help.

Atari told developers that it has set up a team of engi-

ners to test software from developers, and is aiming to cater for the growing demand for better communication between Atari and authors.

A bulletin board has been set up to aid this.

### Optimistic

Atari technical manager Les Player said: "As far as 8-bit computers and games consoles are concerned, we have revised our sales targets upwards and we are very optimistic about further multiple business.

"We hope this will motivate software companies to develop and market new titles for the 8-bit. This situation would be gratefully received by the existing base of extremely loyal users.

"Atari now offers an

expanding market opportunity", he said.

Tynesoft is already impressed by the share of the market now being claimed by the 8-bit machines.

It began with a conversion of its hit Jet Set Willy and is continuing its move into the market with two more games.

Winger Olympics is a multi-load simulation combining five sports, each of which uses 65k of code, and Who Dares Wins II is a conversion of the popular combat and strategy game.

Tynesoft's head of development, Dave Croft said: "We feel that considering the price of the 8-bit micro and the share of the market it is now

**A CONVERSION of the Star Wars casino game is promised for the Atari 8 bit by the end of the year.**

In something of a coup, Denmark has secured the European rights to produce home computer versions of Star Wars itself, plus The Empire Strikes Back and Return of the Jedi.

Atari Inc, holders of the copyright on these games, granted Denmark the rights through their licensing company, the International Development Group.

## All the more for us...

A VERY warm welcome to the first exclusively 8-bit edition of Atari User. Now that our ST fledgling has flown the coop we will be devoting all of our pages to you, the Atari 8-bit owner.

From now on you'll be able to read even more of your favourite articles, type in more games listings and find out more facts than ever before.

We've been looking carefully through your comments on the magazine to date via the recent Reader Survey, and it is encouraging to see how many of you enjoy our balance of features. We've got lots of exciting plans for the coming months, including our second birthday in May, but by

now we have no less than three great new features starting this issue. Look what we have to offer.

Two of our most popular writers, Len Golding and Stephen Williamson, present the first instalments of their new series - Len's long awaited tutorial on auto-booting your Basic programs, and Steve's advanced character-set editor.

We also take you behind the scenes on the development of one of the most sought after arcade conversions of the year - US Gold's (laurels), the massive Atari arcade hit of 1988. In addition, Brilly's adventuring column has had a complete face lift and boasts a massive monthly adventure map.

All of our regular features are

just as usual, of course, with not just one but two great games this month.

Len Golding's Gadgets column covers one of the most requested topics from the mailing - that of how to construct your own printer interface to run a Centronics printer without spending a small fortune on the extra hardware.

André Miller will be continuing to look at the workings of the central input/output system, and this month considers how to add your own disk handlers.

A final word on contributions. If you want to see your own work in Atari User turn to Page 52 for some useful tips on how best to go about it.



# Don't miss this launchpad for all that's new in Atari computing

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Friday, April 24  
Saturday, April 25  
Sunday, April 26

**Champagne Suite, Novotel,  
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On display for the first time in the UK, will be new Atari products that are set to rock the micro world.

Star of the show will be Atari's IBM PC compatible, offering a radically new design at a price that will revolutionise the PC marketplace. There, too, will be the latest models in the ST range - the Mega ST workstations. Plus the remarkable Atari laser printer, the machine that has broken the price barrier in desktop publishing. All of these - along with breakthroughs for the even-popular 8-bit range and hundreds of new software packages - will be on display at the April Atari Computer Show.

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# Show features games arcade

A TON of action hangs over Atari's plans for a play-it-yourself games arcade at the coming Atari Computer Show.

More than 20 machines running the latest 8-bit software will be available in the arcade, but the company is remaining tight-lipped as to which games visitors will be able to play.

"We'd like to keep the details under wraps until the last minute", said a spokesman.

Chosen as the UK launch pad for the company's new IBM PC compatible and Mega ST workstations, the three-day show opens at London's Royal Albert Hall in Kensington on April 24.

More than 70 exhibitors will be attending the exhibition and many will be unveiling new releases.

Three new games will be available from Red Fox Software - Asteroid, Death Racers and Forbidden Island - all costing £7.95 on tape, £9.95 on disc.

Timesoft will be offering a range of budget titles on its new Micro Value label, all priced at less than a pound.

The Atari Computer Show

takes place at the Royal Albert Hall, Kensington, London from April 24 to 26.

Doors open at 10am each day and close at 6pm on Friday and Saturday, 4pm on Sunday.

A money-saving advance ticket order form can be found on page 7.



Atari games machines are go

## Hard disc men fly in

AMERICA's leading supplier of hard disc drives for Atari machines is to jet over to London to exhibit at the April show.

The Supra Corporation is to share a stand with its UK distributor, Frontier Software of Harnage, North Yorkshire.

It will mean that Atari users will get their first opportunity to see Supra's revolutionary 20MB 8-bit hard disc.

Supplied with MyDOS disc operating system,

cables, power supply and interface unit, the drive plugs into the parallel bus at the rear of the 60002 and the 130XE.

Though priced at £799.95, this drive is likely to be much sought after by software writers and developers anxious to capitalise on the boom in the Atari 8-bit market.

Supra is well established in the United States, with its drives currently outselling their counterparts from Atari by a ratio of

three to one.

All the drives supplied by Premier will come with boot and utility programs and carry a 12-month guarantee.

"The Supra range of hard discs bring previously unheard of speed and capacity to the Atari market", says Dave Fields, Frontier's sales manager.

"We are excited about bringing them into the country, where we're sure they'll prove as popular as they are in the States".

### Prestel via MicroLink

ATARI games enthusiasts may soon be able to access Prestel's massive 300,000 page database through MicroLink.

British Telecom is offering the messaging services of Prestel and Telecom Gold, with which MicroLink is associated. This will immediately create a 180,000-strong user base of micro owners able to exchange messages with each other.



## Repair service launched

A REPAIR service for owners of 8-bit Atari machines has been launched by Heywood-based company M-Data.

Offering a professional service and using the latest diagnostic and test equipment available, the company

has already attracted customers worldwide.

Senior managing director Ian Cartwright: "We consider our company to be an extension of the good names of Atari and as such we offer the quality of service they would expect".

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- Sector SEIZE is now no longer required to obtain Hi-speed or with US Densities.
- Other Special features are: Slow down, Fast write, Fast read, Drive write lock, Slow on/off, Fast formatting.
- Fast write with verify. This system is faster than other systems which write without verify.
- A double sided operating system disc is supplied which offers the following:  
A Doubler, US Doubler, Standard 1050 and Archive emulation.  
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# TORPEDO!

By GARY TINSLEY

"ENEMY boats on radar Captain!"

"OK, Battle stations! Torpede bay, Load torpedos . . . Up periscope . . ."

Enemy ships have finally invaded our territorial waters, and your mission is to sink as many as possible. You are armed with a large number of deadly high explosive torpedoes but your mission is limited by the length of time your air supply will let you stay submerged.

Can you score enough points to enable you to be awarded the rank of Admiral — or will you be thrown out of the Navy?

Type in the listing, and check it out with our Get It Right! checksum routine. When you're happy with it, SAVE a copy and then type RUN to start the game.

Press Select or move your joystick to choose between the three difficulty levels. The number on the left will show the level number selected. Now press START or the joystick fire button to begin the game.

During the game you can press Start to quit, Option to pause and



Select to return from pause mode.

An extra 48 points are added if a boat is destroyed in foggy conditions.

The "Air low" warning will sound to tell you when the game is nearly over, so hit as many boats as you can!

## WHAT YOU SCORE

Boat on the horizon	25 points
Boat mid sea	15 points
Boats put off shore	5 points

## PROGRAM BREAKDOWN

Lines 48-208

Set up player missile graphics, create the boat shapes, clear sound registers, change each Graphics 0 line to mode 130 (ANTIC 2-178, for DLI-II). The CPU routine and its colouts are POKE'd into Page 0. This routine first appeared in *Analog magazine* and it enables each screen line of ANTIC 2 mode 1 (Graphics 0) to be a different colour, and the text a different luminance. Try changing some of the numbers in lines 125 & 126. Print title screen, check for Start or fire button to be pressed — also check for joystick movement or Select to be pressed for level change.

Lines 208-213

Lines 218-238

Lines 242-268

Lines 308-410

Set air deterioration rate (LV1), miss score and boats hit, choose random FOG duration, choose initial boat positions, add numbers of boats hit. Draw the game screen.  
Main game loop — adjust air level ML, check for joystick movement and

Lines 508-528

Lines 738-745

Lines 808-891

Lines 908-938

miss submarine, move boats and check positions. If boats move off-screen then reset, check for fire button and if so fire torpedos. If ML reaches FOG then darken boat colours and set fog flag.

Test for a hit — check player collision registers (POKE 50190-50200) and if any of these contain 4 then a torpedo has hit a boat. Add to score, set hi-score, set score, set boats hit (BT), set BDN (BDN 000), flash screen and make explosion noise.

Pause routine. Flash GAME HOLD until to STARTLED, check for Select to be pressed (for return), then loop back to line 70.

End of game. Clear screen, disable DLI, (DAC001), print score, print number of boats hit and individual boats hit, print new rank, make solar type raise, return to title screen.  
Air low warning. Print Air low and continue with game.







return via an RTS.

The second jump is another JSR, this time to the initialization address, copied from the header and now held in C40504. In Program 1, initialization starts at INT1, and this is where we change the screen border colour, starting with the instruction LDA #148.

Any code between the initialization address and its RTS instruction will be executed not only during power up but also whenever System Reset is pressed.

If you want to alter any system pointers, such as MEMLO, you must do it here, otherwise pressing Reset will wipe out all your new values. This "initialization" section must always exit with an RTS instruction.

The final stage of the boot load depends on whether or not a cartridge is waiting to take control. If so, the OS simply does a JMP to the cartridge start address, usually 40000 (\$A000). With Basic installed this produces the familiar READY message.

If no cartridge is present, or if it's a peculiar type that doesn't want to run, the OS will do a JMP to the address contained in a pointer called DOSVEC

at 1601 (\$A01).

During power up the OS sets this to point to the "blackboard" routine - memory pad made on 400800 (cartridges), or self-test mode on XL300 models.

If your autoboot file is a self-contained machine code game, or other program which doesn't need support from a language cartridge, you should change DOSVEC to point to the start of your main code. This may be accomplished during either the stage one or stage two machine code segments.

One way of doing this would be to add the following lines before the final RTS in Program 1:

```
LDA #MAINCODE+255
STA DOSVEC
LDA #MAINCODE+255
STA DOSVEC+1
```

Insert your main program between the final RTS and the label FINISH, and begin it with the label MAINCODE. So long as no cartridge is installed, (and Internal Basic is switched off) the final JMP will now give control to your machine code program instead of to the blackboard routine.

The OS will repeat steps two and three whenever System Reset is pressed, which means that you could write an entirely new reset routine and the user would never even know about it. We'll show you how to take advantage of this later on.

Now that we know what an autoboot file looks like and how it works, we still have to get it on to tape somehow. This isn't as simple as it sounds, because autoboot files must be saved in binary form, with short inter-record gaps.

No instruction in the repertoire of Basic or the Assembler/Editor cartridge will produce the correct format automatically, so we need a special routine to do it for us.

Program 2 is the one to use if you're working in assembly language. The code as up to tape 400 is the new save routine. It calls OS2 directly to write all the data from HEADER to FINISH directly on to tape. It is important to keep this code separate from the data you want written to tape, so we've put it out of the way in page 6.

The rest of Program 2 is a duplicate

```

00 ;PROGRAM 1 - PROGRAM 1 WITH AN ADDITIONAL ROUTINE FOR SAVING TO TAPE(ITS)
01 ;INITIALS OF AUTOSAVE CARTRIDGE FILE FROM THE CODE BETWEEN C40400 AND C40404
02 ;
03 ;
04 ;C40400+1000
05 ;C40400
06 ;C40400+1000
07 ;C40400+1000
08 ;
09 ;Start by putting the OS2 routine into page 6.
10 ;
11 ;C40400
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Program 1

# Autoboot

of Program 1. When you have typed everything in, assemble it then enter DEBUG mode and type G 800 to run the machine code at address 8000. Set the tape to record and press the Return key and the data will be written to the tape in the correct autoboot format.

If you don't have an assembler, Program 18 will do virtually the same thing. As the DATA statements contain machine code they must be absolutely correct or your computer will probably lock up - so make sure you save a copy before you try running this program.

Type RUN to start things off, then follow the same procedure. Only the code at lines 150 and 160 will be written to the cassette file. We'll be using this program again next month, so keep a copy safely.

To load the resulting file, switch off the computer, rewind the tape and switch on again, holding down START (but not Options). Press Play when the beep sounds and hit any key. After the usual leader delay, you'll hear the autoboot file being loaded, then it all

```

5 REM PROGRAM 3 - BASIC version of Pro
  gram 2
10 REM Writes the data on line 100 to
  a an autoboot cassette file.
20 OPEN "PROG3.BIO" FOR APPEND
  REM reserve
  a safe area at the top of BIO as a
  program buffer
30 FOR I=0 TO 255:GOTO 5000:GOTO 1000:G
  O 1000
40 FOR I=0 TO 255:GOTO 5000:GOTO 1000:G
  O 1000
50 FOR I=0 TO 255:GOTO 5000:GOTO 1000:G
  O 1000
60 FOR I=0 TO 255:GOTO 5000:GOTO 1000:G
  O 1000
70 FOR I=0 TO 255:GOTO 5000:GOTO 1000:G
  O 1000
80 FOR I=0 TO 255:GOTO 5000:GOTO 1000:G
  O 1000
90 FOR I=0 TO 255:GOTO 5000:GOTO 1000:G
  O 1000
100 FOR I=0 TO 255:GOTO 5000:GOTO 1000:G
  O 1000
110 FOR I=0 TO 255:GOTO 5000:GOTO 1000:G
  O 1000
120 FOR I=0 TO 255:GOTO 5000:GOTO 1000:G
  O 1000
130 FOR I=0 TO 255:GOTO 5000:GOTO 1000:G
  O 1000
140 FOR I=0 TO 255:GOTO 5000:GOTO 1000:G
  O 1000
150 FOR I=0 TO 255:GOTO 5000:GOTO 1000:G
  O 1000
160 FOR I=0 TO 255:GOTO 5000:GOTO 1000:G
  O 1000
170 FOR I=0 TO 255:GOTO 5000:GOTO 1000:G
  O 1000
180 FOR I=0 TO 255:GOTO 5000:GOTO 1000:G
  O 1000
190 FOR I=0 TO 255:GOTO 5000:GOTO 1000:G
  O 1000
200 FOR I=0 TO 255:GOTO 5000:GOTO 1000:G
  O 1000
210 FOR I=0 TO 255:GOTO 5000:GOTO 1000:G
  O 1000
220 FOR I=0 TO 255:GOTO 5000:GOTO 1000:G
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230 FOR I=0 TO 255:GOTO 5000:GOTO 1000:G
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240 FOR I=0 TO 255:GOTO 5000:GOTO 1000:G
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630 FOR I=0 TO 255:GOTO 5000:GOTO 1000:G
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640 FOR I=0 TO 255:GOTO 5000:GOTO 1000:G
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650 FOR I=0 TO 255:GOTO 5000:GOTO 1000:G
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660 FOR I=0 TO 255:GOTO 5000:GOTO 1000:G
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670 FOR I=0 TO 255:GOTO 5000:GOTO 1000:G
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990 FOR I=0 TO 255:GOTO 5000:GOTO 1000:G
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1000 FOR I=0 TO 255:GOTO 5000:GOTO 1000:G
  O 1000

```

Program 18

is well the screen colour will change before READY is printed.

As an experiment, try changing the border colour back to its default value by POKE 11020. Now press System Reset, and you'll see the new colour is restored as the OS performs its JSP through CARS.

Next month we'll be exploring how to make your own Easy programs into autoboot cassette files.



LINE	FROM	LINE	FROM	LINE	FROM
1	1000	10	1000	100	1000
20	1000	40	1000	70	1000
80	1000	110	1000	140	1000
170	1000	180	1000	190	1000
200	1000	210	1000	220	1000
230	1000	240	1000	250	1000
260	1000	270	1000	280	1000
290	1000	300	1000	310	1000
320	1000	330	1000	340	1000
350	1000	360	1000	370	1000
380	1000	390	1000	400	1000
410	1000	420	1000	430	1000
440	1000	450	1000	460	1000
470	1000	480	1000	490	1000
500	1000	510	1000	520	1000
530	1000	540	1000	550	1000
560	1000	570	1000	580	1000
590	1000	600	1000	610	1000
620	1000	630	1000	640	1000
650	1000	660	1000	670	1000
680	1000	690	1000	700	1000
710	1000	720	1000	730	1000
740	1000	750	1000	760	1000
770	1000	780	1000	790	1000
800	1000	810	1000	820	1000
830	1000	840	1000	850	1000
860	1000	870	1000	880	1000
890	1000	900	1000	910	1000
920	1000	930	1000	940	1000
950	1000	960	1000	970	1000
980	1000	990	1000	1000	1000

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Kent: S.D.L. 01-309 0300

Midlands: Software Express 021 328 3585

# Crafty plotter

Program: *Super 3D Plotter II*  
Price: £29.95 (inc. vat)  
Supplier: Elemen Software,  
81 Fleetwood Avenue,  
Hemel Hempstead AL9 9JF  
Tel: 0762 333267

EVER since I bought my first computer I've always regarded the prospect of 3D imaging on-screen - with the opportunity to rotate the image in any direction and dump it down to printer - as being well beyond my programming capabilities.

Well, with *Super 3D Plotter II*, I can not only do just that but much more at a fraction of the time and cost it would have taken me.

Disc-based, the program auto-boots without Basic. It can display complete drawings in low, medium and high resolutions. Menu-driven, the first options enable you to load or create.

Luckily the program has plenty of images stored on disc. Until you get used to the complete array of instructions for creating your image, the best way to

changed to either low or high resolution at the touch of a button.

The main feature of *Super 3D Plotter II* is its ability to rotate in any direction. Using a combination of key-strokes, left to right movement can be combined with up and down direction to achieve a really impressive display of bit-mapped graphics.

Each time the image moves all the lines that make up the display change position so as to give the impression of basic animation.

The speed at which your display rotates can be altered and at any time you can freeze the image to take a closer look at the display or dump the screen to printer.

Any image can be viewed in a range of perspectives by using the freeze button selectively, thus allowing the image to continue moving in one direction - say left to right while the up/down movement is frozen.

If you want to get closer to



not before loading up the main program.

*Super 3D Plotter II* is automatically configured for Epson and compatibles only, although by adapting the printer configuration file it should work for the 1628 Dot Matrix printer. More comprehensive dumps can be obtained by displaying the image in binary mode.

Other useful facilities are screen save, which will save the entire screen in a 62-sector MicroPainter format called Picture.

And if you really want to get creative, you can overlay a screen.

Just think of it - your favourite picture as a background with your 3D image displayed as the foreground.

Further designs can be achieved by image trailing: instead of lines being erased and redrawn when your image is moving, you can alter the functions to leave old lines on the screen and still have the computer draw new ones.

Creating images is somewhat harder than controlling a screen display, but a tutorial is written into the manual which sees you into the intricacies of creating your own masterpieces.

There are two methods of data input: The Interactive Graphic Editor lets you use the joystick to define and position coordinates, draw connecting lines and link the whole image into a 3D drawing.

The safest way to plot your designs is to use the old-fashioned system of pencil and graph paper, then either type in the coordinates or trace the pic-

ture around the screen until you reach the desired position.

The other method of data input is the Image Data Editor - all the commands are entered from the keyboard. In some respects this method can be easier to use once you understand the philosophy of 3D design.

Whichever method you use there are plenty of commands available to edit and reify positions before saving the image to disc.

Using the joystick input routine I entered the coordinates for the cube image (shown) and within 10 minutes had the design rotating around the screen.

I was surprised at the ease of constructing an image, although the more complex the design, the greater the need to use graph paper and pencil.

The manual is 56 A4 pages printed on yellow paper - an extremely important part of the package. You also get an A4 Help card which outlines the function of each key. All this is packaged in a sturdy plastic box.

In conclusion, I was surprised that such complex images could be so easily produced. The author has obviously put an immense amount of time and effort into this and should be congratulated.

Whether you're a budding graphical artist or just a plain doodler, this program wouldn't go amiss in anybody's collection.

Alan Goldacre

Performance	A
Graphics	10
Ease of use	B
Value for money	B
Overall	B



see what *Super 3D Plotter II* can do is to load an existing image. Having made your choice another three options are engaged: Display, Edit and Store current image.

Images are loaded into memory in medium resolution mode and can be

the image, just hit the magnify button until you achieve the desired result. Your image can also be enlarged reduced and kept in true perspective at the same time.

You can produce hard copies at any time providing you tell up the printer con-

# Fuzzy problems

**Program:** Crumble's Crisis  
**Price:** £7.95 (suggested) £9.95 (retail)  
**Supplier:** Red Hat, 11-15  
Parson Street, Manchester  
M4 3DE  
Tel: 061-635 1665

THE Director of the Intergalactic Zoo is rather less than pleased with you, Crumble. It seems that you were in charge of closing the zoo last night – and you didn't set the time locks on the fences' cages properly.

During the night they all escaped into the depths of the Multiverse and you are going to have to track down and recapture them.

To help you get around you'll have a jet-pack – just press the joystick button to fly. That's all you'll need, oh, and a steady hand and a minimum of coordination – these Fuzzies can get into some pretty awkward corners.

Altogether 30 Fuzzies

have escaped and you should find six in each of the five levels of the Multiverse. Just go up to them and pop them into your cage, they shouldn't struggle.

You'll be able to see through the bars of the cage how many of the penalties you've caught, so even you won't lose count.

You can always tell a Fuzzy by its loose grin and shorting shoulders, rather like a cross between Gek Dastardly's Mutter and Edward Hirsch. They aren't actually vicious, but they are rather devious and cunning, so watch your step.

No slacking now Crumble. Time Lightning starts sparkling all over the place if you loiter for too long, so don't get waylaid by some of the rather pretty locations.

If you find you're getting tired, just look for the Energy Packs. One rather important tip, don't touch the walls or ceilings. They're

composed of anti-matter and it's pretty bad news if you come into contact with that stuff.

Oh, before you go, you know I said the Fuzzies were basically harmless? Well, there are some rather mean unfriendly creatures around, ghosts, goblins, evil weasels and such like. Keep your eyes peeled and don't try catching any for the Director will you?

Right, that's about the lot. It should be enough to keep you busy for a good while, so I don't want to see you again until all 30 Fuzzies are back under lock and key.

Stop complaining Crumble, all that running about through the levels of the Multiverse seems pretty good fun to me – if you don't pop your stops along the way that is.

More fun than I'm going to have anyway – I've been lumbered with making out the Megagalaxies' sage while you're away!

Nick Reynolds

Sound	7
Graphics	7
Playability	8
Value for money	8
Overall	8



# Platform for two

**Program:** Robot Knight  
**Price:** £7.95 (suggested) £9.95 (retail)  
**Supplier:** Red Hat, 11-15  
Parson Street, Manchester  
M4 3DE  
Tel: 061-635 1665

AS an introduction to Robot Knight you are given a history lesson to explain the task ahead – quite good reading it makes too.

The villain of the piece is Otto, living in a serene and easy-living Razzeworld, he constructed his evil plans for world domination. His plot, however, was uncovered and he was thrown in prison, but it wasn't long before he hatched an escape plan.

Feeling bitter and belated that his perchance for fame, disease and poverty wasn't appreciated in Razzeworld, he resolved to go

back to a time where these qualities were a daily part of life.

This was not Maggie's Britain in the late 20th century, but Europe in the 13th.

Finding an isolated chateau, he built a laboratory in which to perfect the ultimate being, to unleash it on an unsuspecting future world.

So far he's met with only limited success and comble-like rejects roam the lower reaches of the chateau, deterring all but the most hardy of double-glazing salesmen. It is your task to find Otto and destroy him before he perfects the final monster.

You materialise in the chateau and must battle through various dungeons and chambers, past the skeletal comble and their



trebuchs, collecting energy packs on the way.

The ultimate goal is Otto's laboratory, where the monster is about to evolve. Essentially a platform game, Robot Knight has a feature which makes the game much more interesting. When starting you have a choice of two knights?

Either knight can be used in a one-player game, in a two-player game both are used simultaneously and you can choose to act as

allies or enemies.

It is the rather fun two-player option that lets Robot Knight out from being just another platform game. If you play your computer games with a friend this would be a good buy. If not, I'm sure it's still sufficiently lively to appeal to some.

Nick Reynolds

Sound	8
Graphics	7
Playability	8
Value for money	8
Overall	8



# Real high flyer

**Program:** Tomahawk  
**Price:** £6.95 (retailer)  
**£14.95 (direct, minimum 50)**  
**Distributor:** Digital Integration,  
 Watchmoor Trade Centre,  
 Watchmoor Road,  
 Camberley, Surrey GU10 3JA  
**Tel:** 0706 86202

STAR  
GAME

FLIGHT simulators for home computers just can't compare with the real thing, but they can give you some of the flavour, and Tomahawk excels at that.

In fact I am constantly amazed at just how much can be crammed into a £6.95, £14.95 computer - regardless of make.

On the Atari, Tomahawk scores very highly. I have read how Tomahawk is jerky and unresponsive on other micros, but I found no such problems with this version.

Tomahawk's presentation immediately reminded me of Digital Integration's other flight simulator, *Fighter Pilot*. However, while that is strictly an air-to-air flying simulation for the P16 Eagle, Tomahawk is a simulation of the McDonnell Douglas (Hughes) AH-64 Apache Advanced Attack Helicopter.

As such, it includes both air-to-air and ground attack combat simulations.

Although there is no music, sound effects add to the feeling of realism without being too harsh. They include the launching of missiles and gunfire, explosions, engine and rotor whoosh.

The rotor sounds really stand out when the chopper is at rest, after turning off the engines.

You control the machine using a combination of joystick and keyboard input - an optional second joystick doubling as the rudder and collective lever.

Flying, it seems, is relatively straightforward. Pushing forward on the stick both increases speed and reduces the altitude depend-

ing on how much angle of attack you have set on the rotors, via the collective lever.

You pull back the stick to gain height and reduce speed, and the automatic stabilisers return you to level flight.

Landing is achieved by reducing lift and pulling back on the stick. You can land with up to 55 knots of forward speed and at ~10ft/sec - coming in for a sliding landing on one of the helipads is demanding, but very rewarding.

You can land anywhere, but you will only be refuelled, repaired and repaired on a friendly helipad.

You are equipped with eight helifire missiles, 18 2.75in missiles and a 30mm chain gun with 1,280 rounds.

Weapons are aimed and controlled via TAGS, the Target-Acquisition and Designation System. The chain gun can track out an enemy helicopter, but won't even start a tank.

There are three combat missions, one for training, in which the enemy forces don't return fire.

Mission two involves clearing just four sectors of allied territory of hostile forces. While in mission

three you must clear the entire map of enemy forces, and in the fourth you help allied troops push back the enemy front line.

You are also provided with a map, similar to the one used in *Fighter Pilot* but used to a much better advantage. It is divided into squares which change colour according to their allegiance.

Beacons and helipads are also shown, and facilities exist to help you find those without the map if necessary.

The cockpit display is fairly comprehensive, with a monitor to display targets identified by the TAGS computer, which are also colour coded to help you distinguish between allied and enemy forces.

The normal digital instruments are all there, including altitude, attitude, and rate of climb indicators. There are also meters for power consumption, rotor

angle and remaining fuel.

These all take up the lower part of the screen; the map and cockpit window use the top portion.

Colour is generally used to fairly good advantage, although after looking in some departments. All the ground is green for instance, and I think a little shading would not have gone amiss.

However, Digital has crammed a lot of features into the simulation. Having flown the RnPs Jaguar simulator which uses three banners full of relief map and a very expensive targeting camera technique to achieve exceptionally realistic visuals, I can understand the limitations imposed by a £6.95 home micro.

My only negative comment is that ground features - mountains, buildings and targets - are all line drawings. These are fast to repeat, but don't give a very good illusion of height - keep one eye on the altimeter at all times.

Overall, this is one of the best programs I've seen in a long time - it's well worth checking out.

Enough basic flying instructions are included to get you off the ground, and particular attention is paid to the use of the collective lever.

Tomahawk is thoroughly recommended for would-be helicopter pilots.

**Paul Anthony**



Excel	5
Display	5
Sound	5
Value for money	5
Overall	5

## Thoughtful warfare

**Program:** Vietnam  
**Price:** £14.99 (share)  
**Supplier:** LSC Code/ Unity 2/3  
**Address:** Prop, Birmingham  
B2 5LS  
**Tel:** 021-358 3388

WAR gamers will welcome this latest simulation from those acknowledged experts in the genre, Strategic Simulations. Although it has been available in the USA for about two years, it has only just reached these shores courtesy of LSC Code.

The program allows you to control some of the most bitter warfare of modern times. You control the combined US and South Korean forces against the Viet Cong and the North Vietnamese army.

The single display is a message area below a detailed map of the particular terrain where the action takes place. The map can be scrolled in any of the four cardinal directions, and

is used to move your forces and direct operations.

The documentation refers to the game as Main, the original US title and clearly describes the rules for playing. There are six historical scenarios to choose from, each of which can also be played as a non-historical randomised troop deployment episode.

Each scenario can take from 15 to 30 turns to play and each turn is divided into 10 consecutive phases. Most of the play involves moving a large square cursor around the map.

In the observation phase, the cursor can be moved on to friendly units to reveal their characteristics ( firepower, range, assault factor, movement potential, armour and strength). You can also dig in units in this phase.

Next, artillery and air-strike impact areas are targeted, following which the enemy fires at all your units that are in range and

then moves its forces.

After this, your troops can move and fire at the enemy. A second exchange of fire then takes place, followed by the another full phase in which the earlier plotted targets are struck.

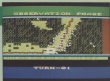
The final phase shows the comparative state of both sides, with points being gained for the number of units eliminated. A victory indication is also given - questionable, minor, major or decisive. At the end of each complete turn, an opportunity is given to see the game.

The graphics are clear and

adequate and sound effects are used to good effect. The simulation is easy to get into and the documentation is both lucid and detailed.

Vietnam is a program that should appeal to the dedicated wargamer and any one who likes games that require a liberal dose of strategic planning and thinking.

Bob Chappell



Sound	7
Graphics	7
Playability	8
Value for money	8
Overall	8

## Ze fly be on ye turnip

**Program:** The Archers  
**Price:** £13.99  
**Supplier:** Mosaic, 187 Cooper  
Street, London NW1 1AQ  
**Tel:** 07-226 0808

Bumpy-bumpy-bumpy-  
turn,  
Bumpy-bumpy-turn-tee,  
Bumpy-turn-  
pumpy-turn,  
Bumpy-bumpy-turn.

Do, art, me old pals, me old  
buddies. Now jist you put  
down them three rangel-  
worts and harken to old  
Walter Gabriel 'ee. Mine's a  
pair of Shires while you're  
at.

Our scriptwriters and  
there, three player-styles  
down at Level 3 have gone  
and taken the story of us  
everyday country folk, the  
Archers, and stuck it on one  
of them new-fangled com-

puter machines.

Seems the idea is that you  
be a brains scriptwriter and  
have to plot decisions about  
four of us lovable folk here  
at Ambridge: Jack Wooler,  
Elizabeth Archer, Eddie  
Grundy and Nelson Gabriel.

Course, if you be going  
and making decisions that  
make us folk look as boring  
as a wet weekend, then  
them ratings are going to  
fall.

Spice it up a bit though  
(watch out, Mrs. Perkins!)  
and then Controller helps  
up at the BBC might have  
something to say, I  
shouldn't wonder.

What you get on your T8  
is a picture and a load of  
writing, telling you what be  
going on. Every so often,  
you must choose from a list  
of three options as to what  
to do next.

You don't have to do any

writing yourself - just keep  
pressing any of those three  
numbers whenever you be  
told. Now even old Walter  
could do that.

Unless it's the Shires  
playing tricks (and I'll have  
another while you're about  
it Jack), seems like I remem-  
ber this sorta thing from  
way back in another Mosaic  
game about a dairy and a  
mole called Adrian.

Now, me old turnip,  
don't go thinking that the  
game is the same every time  
you play it 'cos it isn't be  
so. Like that Perks' Shires  
don't mind it I do, Jack, it's  
a little different every time  
you try it.

The game is as right as an  
egg as a haycock and so has  
to be forced in in several  
parts. The pictures are  
poor but don't know as  
how I get much on 'em. Still,  
you can always turn 'em off.

Well, me old cabbage, if  
you be a fan of us old cool-  
gers down here in  
Ambridge, then save us  
compost is compost, you  
going to love this here  
game.

As for me, I be the only  
one of the Archers clan I  
can stand for more than 10  
minutes at a time and so  
would as soon jump in a  
threshing machine as listen  
to their doings, whether it  
be on the crystal set or on a  
computer machine.

Each to his own tastes, is  
what I say - and speaking of  
tastes, my glass is empty,  
Jack, me old beauty.

Billy

Sound	n/a
Graphics	6
Playability	8
Value for money	7
Overall	7

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**20 runner up prizes:** A copy of Silent Service, plus a T shirt.

**50 further prizes:** A Silent Service T shirt.

The world's leading simulation software company, MicroProse, is offering readers of Atari User more than £500 worth of prizes in this easy-to-enter competition.

On offer are all of their top-selling titles for the 8 bit, and prizes centred around the smash hit submarine simulation Silent Service (including T shirts and framed posters which have been specially flown in from the US for the competition).

Other software prizes include P-15 Strike Eagle, a jet fighter simulation and Decision in the Desert, a strategic game which allows you to recreate the battle between Rommel and Montgomery.

## How to enter

All you have to do is make as many words as you can of four letters or more out of MICROPROSE. No plurals, no foreign words and no pronouns please – all words must be in the Oxford English Dictionary.

Then make up a slogan explaining why you enjoy MicroProse simulations, in no more than 35 words.

Send to: MicroProse Competition, Atari User, Europa House, 68 Chester Road, Hazel Grove, Stockport SK7 5HT.

All entries must be in by April 30.

Number of words found:

(Please list on separate sheet)

**"I enjoy MicroProse simulations because..."**

(Please use a separate sheet – no more than 35 words)

Send T shirt size: ☐ small ☐ medium ☐ large

Preferred format for prize: ☐ cassette ☐ disc

**Entry  
Form**

Name

Address

Age



# GAUDY

ANDRÉ WILLEY meets the  
US Gold programming team

If you had asked any dedicated game-a-holic last year what the arcade smash hit of 1988 was, you would more than likely have been given the answer: *Gauntlet*.

As far removed as imaginable from the straightforward respawn quest games which seem to dominate the arcade, this unlikely success was a multi-player graphic strategy affair based on the dungeons and dragons theme.

As long last, this amazing game has been converted for home computers, and the Atari 8-bit version was in the final stages of development when I went along to U.S. Gold's Birmingham headquarters to meet the programming team who have had murder one short hits with every new version they've completed.

First of all I wanted to see what all the fuss had been about, so Kevin

Gulmer, graphic designer of the team, took me down to the warehouse to see the original Atari arcade machine in action.

I'd often seen crowds of people huddled over these strangely designed machines, but I'd never quite had the nerve to try and play one on my own – it all looked so complex.

However, I quickly found myself getting the hang of it and an hour later I was blessing the fact that the coinbox was deactivated.

*Gauntlet* has four main characters – the Furies – for you to choose from, each with their own special powers and abilities.

There's Ther the Warrior, very strong, but with no magic powers to speak of, and Thera the Valkyrie, not so good in combat but with some ability in magic.

If you want real spell-casting power you should select Merlin the Wizard, but don't get him into hand-to-hand combat with one of the nasties. The same applies to Quetzor the Elf, but what he loses in magic he gains in swiftness.

The characters must find their way

around a series of complex dungeons, in which they fight off deadly ghosts, demons, gnomes and other adversaries. They may be shot at, fought hand-to-hand or killed with magic spells which you collect as you travel.

Also in the dungeons are keys to get through locked doors, food and drink to increase your health rating, treasure to boost your score and ghost generators which regularly create more nasties if you don't blow them up in time.

There are many other things to collect in dungeons, but I'll leave you to find out about them for yourselves...

Often you will need more than one player to complete a level successfully, with perhaps Merlin casting a spell to clear the way for the others to get through a door. He is the only one who can make full use of the magic potions you see, but he is very vulnerable to attack.

Any player may start at any time by dropping a few coins into the slot – there isn't any obvious start and finish to the game. The early stages are certainly easier, but as your skill develops you will find yourself moving into higher and higher levels.

Technically the game is fantastic, with stereo sound and speech and some amazing graphic action controlled by a 68000 processor with 4Mb of ram.

It has two main graphics chips at its disposal – with one, known by the unlikely name of *Slapstick*, responsible for generating the 24 by 24 pixel sprites in up to 16 colours from a palette of 4096.

The sound effects are generated by a chip with which most of you will be familiar since it is sitting inside your faithful 8-bit Atari.

*Gauntlet* actually uses a standard Police chip to generate its amazing sound, with a separate 6802 keeping track of what it is and the dedicated speech chip are up to. The whole thing is then separated out into stereo – but don't ask me how they manage it.

The Atari connection goes still further, because the whole *Gauntlet* concept was based on an old 8-bit



The main title screen as seen on an Atari

Atari 486 title called *Dandy Dungeons*, written by John Palowich, the man responsible for Deep Blue C, among other things.

Having seen the arcade machine in all its glory we went back to meet the rest of the team. I've already mentioned Kevin Bulmer, the artist of the group, who designed the title graphics, characters, monsters and so on.

Tony Porter developed many of the utility programs used for all versions of the game, and also wrote the Spectrum, Amstrad and MSX versions.

Bob Allen was responsible for the sound and music on all the conversions, and he developed special routines to allow programming to be carried out on a central TDI Pinnacle multi-Laser system and then downloaded to each machine in turn.

The final member of the team is Bob Armour, who was in charge of the Commodore and Atari 8-bit versions.

Bob was also responsible for developing a special machine code monitor program for the Atari to allow the Pinnacle to transfer its data via the second joystick port – considerably faster than a disc drive could. An entire 128k block of program data could be transferred in about 18 seconds.

Logically enough then, it was Bob who took me through some of the differences between the arcade and home versions of *Dandy*.

The first obvious and necessary alteration is the fact that only two characters can function at a time, as opposed to the original arcade machine's four controller systems.

The only home computer capable of working with four joysticks is the Atari 400/800, but it wasn't considered viable to make a special four player version considering the limited number of these still in circulation – not to mention the lack of any more processor time and memory – Quantum needs a minimum of 64k to run.

You can, in fact, play a completely solo game, but there's almost no way to get through some of the higher levels without a friend's help.

You can choose your characters at the start of the game, or the second player can start at any other time and the computer will randomly select a persona.

The Atari version loses out somewhat in terms of colour range, and it really shows the lack of a '60 colour high resolution screen on the 8 bit machine.

The team opted for maximum detail rather than colour – the result is a far better colour playfield. That said, there is so much going on that you don't really

Think the Pinnacle protected the vast Dungeons for me, using later to open up new sections.



It marks the end to the original Dungeons. Back to the other battle which adds 100 points to your health rating.

have time to think about graphics or colour – you can be attacked by up to 100 ghosts at once.

Much of the development work for all the home versions was completed on an 8 bit Atari, including the character sets, sprites and title screens.

These were then transferred to the Pinnacle development system for later downloading into the other machines. On the other hand, the game graphics, maps and sound effects were developed on an Amstrad and transferred in the opposite direction.

The arcade game had some 128 dungeons to explore, but you have 512 to work your way through, loaded at random after the first seven standard screens.

This means that no two games are ever likely to be the same, and even if you do somehow manage to get through them all, U.S. Gold will soon be releasing a disc and tape

containing another 512 rooms...

Some of these convoluted challenges have been designed by the main programming team, but others have been sent in by players of some of the other home computer versions following the guidelines given with the package.

This kind of interaction with the players is typical of the game, and something which the programmers have encouraged whenever possible.

Quantum is almost certainly set to be the best selling 8-bit game of the year, and from what I've seen no gamer's collection will be complete without it.

It combines a frantic arcade shoot-em-up with the strategic importance of obtaining and using the various items, potions and spells you'll find as you explore. Once you start playing, you won't be able to put it down.

Right then Merin, where's that amulet got to...



The Atari programming team. Kevin Bulmer and Bob Allen at the back, and Bob Armour in front.

We looked last month into the details of the OS command system, and armed with that information the question I left you with should have been a doozy.

If you remember, I asked you why it wasn't feasible to use the XIO command to perform the Binary Put and Binary Get operations from Basic.

There are actually two reasons, both related to the parameters which XIO passes to the operating system. The command number is obviously no problem, but in addition XIO passes three other pieces of information to OS — the values of ICAR1 and ICAR2 (the first two auxiliary bytes) and the address of a string containing the filemap information.

Unfortunately the Binary Put and Get commands need to be supplied with a buffer address, not a filemap address — though at a push that could be overcome by using a long string.

However, XIO has no facility at all to send the length bytes ICALLH, without which the binary transfer operations can't function. In fact, XIO actually corrupts any existing values, which means you can't FORCE them in beforehand.

Now that we've covered the operation of OS from the end-user's point of view let's take a look at how the operating system handles the connected block we've provided. Perhaps the easiest way to do this would be to follow the OS through the CIO vector at \$E498 and see what happens next.

Firstly, all the operating system has to work with is the value in the X register, which tells it which ICDB to use. We've re-printed the table of ICDB addresses as Figure 1, and let's assume in the example that we are using ICDB one, at address \$350.

The X register will therefore contain the value \$10 (16 in decimal), which is

ICDB Zero	\$340	(832)
ICDB One	\$350	(848)
ICDB Two	\$360	(864)
ICDB Three	\$370	(880)
ICDB Four	\$380	(896)
ICDB Five	\$390	(912)
ICDB Six	\$3A0	(928)
ICDB Seven	\$3B0	(944)

Figure 1: ICDB Start Addresses

# Delving into data transfer

## Part 4 of André Willey's series on the Atari's input/ output facilities

the offset from the start of the ICDB tables — 16 on from \$340 being \$350.

Using the X register as an offset, the OS now copies all of the relevant information into a special work area in page zero. Known as the Zero page Input/Output Control Block, or ZIOCB, it sits at \$20 (32 decimal), and needs to contain the same information as ICDB one did. ICCOM becomes IOCCOM, ICAR1 becomes IOCAR1Z, and so on.

The next thing the OS must decide is just what type of device you want to access — cassette, disc, printer, screen, or whatever. It finds this information

by checking the buffer address, which in turn points to your filemap string containing the device identifier (C, D, P, S, and so forth).

Once it has this device specifier (an argument's sake, let's say it was P) it must decide which piece of code is appropriate to handle the data, and where in memory it may be found.

You may remember Figure 8 from the first part of this series, in which we described the various types of device that the OS could access, and it is to this Handler Address Table that the OS goes next.

In fact, it starts looking for the name P at the end of HATABS rather than the beginning. This rather useful fact means that adding a new handler is very easy — you simply tack it on to the end of the list and the OS search will find and use your new entry before it reaches its own original version.

Once the device name has been found the OS knows that the next two bytes will contain an address for the

HATABS + 0	P	\$0430	(1840)
HATABS + 3	C	\$0440	(18432)
HATABS + 6	E	\$0490	(18068)
HATABS + 9	S	\$0470	(18064)
HATABS + 12	K	\$0470	(18068)
HATABS + 15	D	\$0C08	(1888)
HATABS + 18	R	\$2280	(8872)
HATABS + 21	-	\$0000	
HATABS + 24	-	\$0000	
HATABS + 27	-	\$0000	
HATABS + 30	-	\$0000	
HATABS + 33	-	\$0000	

RE: Apparent Dos 2.0 and \$50 RS-232 handler present. Unused entries are filled with zeros.

Figure 2: The Handler Address Table at \$20A (794)

handlers associated with it, as shown in Figure 8. In the case of our P example it is would be \$E40E (\$E41E) - high inside the machine's ram.

So have we at last found the address of the machine code which will transfer our data to the printer? Well, not quite. What we actually find when we look at \$E40E is yet another table.

This one, the Handler Vector Table, contains six two-byte addresses of the machine code routines to be used for each possible command we might have required. These are similar to the commands we talked about last time, and consist of Open, Close, Get (Byte(s)), Put (Byte(s)), Get Status and Special.

The addresses given in the table are in fact one byte lower than the actual beginning of the machine code routines, so if you want to call any of them for yourself don't forget to add one to the location given.

The reason for this is rather complex and involves the \$R02 JSR and RTS operations, so unless you want to delve further, it's probably best to take it at face value.

There are five of these vector tables in all - one each for the editor, screen, keyboard, printer and cassette - and each is 16 bytes long. The first is located at \$E40E (\$E05E), and then every sixteen bytes thereafter. The first 12 bytes in each table contain the six vectors mentioned, leaving us with four bytes per table so far unused.

The last three of these contain a machine code jump instruction to the installation code for the device, and the last byte is unused.

The first five commands (Open, Close, Get, Put and Status) are obvious, but the Special vector needs some clarification. This points to the machine code which handles all of the hardware-specific functions of a given device not covered by the normal I/O commands - basically all those operations with an I/O channel number greater than 13.

These include the disc commands (such as Rename, Erase, Protect, Unprotect and so on), the FDISK commands, the screen drawing commands and any others which apply to a specific device only.

In some cases - such as our printer example - no extra functions are available, so this command will do nothing but return an error 144 via the Y register - function not implemented.

Don't forget that when Atari modified the operating system for the SL/OS range it moved a lot of the machine code around in memory.

Device	Open	Close	Get	Put	Status	Special	JMP to
\$E40E E:	F0F9	F0C3	F0D0	F0A3	F033	F03C	F0E4
\$E41E S:	F0F6	F0C3	F0D0	F0B6	F033	F0F0	F0E4
\$E42E K:	F0C5	F0C3	F0E1	F0C0	F033	F03C	F0E4
\$E43E P:	E0E0	E0D8	E0D0	E0A6	E0B0	E0D0	E076
\$E44E C:	E7A8	F03A	E7D6	F0D0	F0D7	E7A8	F0A7

Figure 8b: The rom-based Handler Vector Tables (Old 400807 OS)

Thus, while the rom-based Handler Tables will always be found at the same locations in any Atari, the contents of those tables will be completely different for an XL or XE when compared to those of a 400 or 800.

Figures 8b and 8c show the values in both cases, but should Atari do another major re-write of the OS for a future machine, they could all change again.

You will notice that neither Figure 8b nor 8c contain any vectors for the disc or FDISK handlers. These are both special cases which load themselves into memory from the disk in question.

On disc this handler is the Dos system which you place on your boot disc. It obviously has no rom-based vector table, and so must contain its own.

When Dos loads it places an entry in the Handler Address Table (HAT\$B5) which points to a similar block of vectors within its own code in ram. Since there is no rule that a vector table must be in ram, we'll be using the same technique next time to add our own device drivers.

Now the OS has at last found the actual address of the routine it requires. It does a JSR to the relevant piece of code and the handler itself takes over, looking up the information it needs from the zero-page IOCB.

We won't be going any deeper into the IO system at this point because here the Serial Input Output system

(SIO) takes over in order to pass our data to the peripheral in question.

Once the data transfer is complete the handler updates the information in the IOCB, such as modifying the length count to the actual number of bytes transferred and updating the status variables.

All it then needs to do is place the error code back in the Y register and return control to DOS.

DOS now does a little housekeeping of its own. It places the original value back in the X register and moves the modified contents of the IOCB back into the calling IOCB - in our example that would be IOCB on.

Finally, before returning to the calling program, it checks the Y register, and if its value is anything other than 1 (1 being the code for no error) it sets the status flag in the \$R02 to indicate that the user should look into the error condition.

So now you know what the operating system gets up to when you do a simple JSR IOCB. The whole operation takes time, of course, but is very flexible indeed.

You can see this time delay for yourself by sending 1000 bytes of data to a disc or tape using multiple PUT commands, and then by using the Binary Put program from last month.

● Have a thought about the difference in execution times and see if you can explain it - it'll let you know the answer *just* in time, when we'll begin to put together our own device driver program.

Device	Open	Close	Get	Put	Status	Special	JMP to
\$E40E E:	E7B0	F2D0	F2A8	F2A7	F2D0	F22C	E7B0
\$E41E S:	E7B0	F2D0	F27F	F2A3	F2D0	F2A0	E7B0
\$E42E K:	F2D0	F2D0	F2FC	F22C	F2D0	F22C	E7B0
\$E43E P:	FEC1	F7B0	FEC0	FEC0	FEC0	FEC0	F0B0
\$E44E C:	FCE5	FCE0	FCE9	FCE0	FCE0	FCE4	FCE0

Figure 8c: The rom-based Handler Vector Tables (Current XL/SE OS)

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# NEWSLETTER

## Software hotline fills the gap

A REVOLUTIONARY support package for business and communications software users which includes membership of MicroLink has been launched by systems consultancy and software design firm Interlec.

It will provide previously unavailable support for the lower-priced - generally under £150 - software packages.

In addition, MicroLink will provide Interlec users with the bases of electronic mail, telex and other communications facilities and databases.

Interlec managing director Mike Lane said: "As the trend toward low cost hardware and software has gathered momentum, the traditional dealer network has moved upward.

"Consequently the bulk of new business micro users have been left totally unsupported because the High Street and volume sellers supplying them are not geared up for the task. "Interlec will fill the vacuum by supplying support at a price the new generation of users can afford.

"Initially this will be provided through a telephone hotline, but we are pushing ahead with plans for an Interlec Bulletin Board on MicroLink to extend the service to remote users."

## MicroLink on the rates

BRITAIN'S 105-year-old Rating and Valuation Association has taken a giant stride into the 20th Century with the help of MicroLink.

Previously, the professional organisation for property experts in local government and private practice depended on phones and letters to communicate. It didn't even have telex.

Now its 5,000 members - town hall finance and

housing administrators, and chartered surveyors and valuers - will benefit from not only telex, but also electronic mail and Teletextpages.

The Association conducts a four year course leading to professional exams, provides an information service, publishes text books, and holds between 70 and 80 conferences a year.

Assistant secretary Julian Price said: "Micro-

Link will give us the means to speed up our organisational communications, moving documents to and fro between our Council members who are located all over the country, connecting our members and exchanging information with our affiliates in the US.

"It will also help us organise our conferences, book hotels and speakers and make travel arrangements for delegates".

## Japan comes to Salop

MICROLINK was the catalyst for language school proprietor Gordon Baker's latest venture - teaching Japanese to British business people.

The new addition to the curriculum at Lydney English Centre in Shropshire developed from a weekly electronic mail exchange on MicroLink

with antiquarian bookseller Tony Swann.

Swann revealed a long cherished ambition to study Japanese and suggested that Baker organise a course.

This has now been done, and after being advertised on MicroLink half the places were filled within a week.

## High peak, low tech in Tibet

ACCORDING to crack mountaineer Chris Bonington, "It's only a small trip compared to climbing Everest and I'm looking forward to coming home and getting to grips with MicroLink".

He was speaking a few days before leaving for Tibet, hoping to add the un conquered peak of Mount Everest to his own collection of Himalayan "scalps".

When he's not climbing mountains Bonington can often be found at a computer keyboard writing one of his numerous

books and articles or simply mastering the latest micro technology.

A self-confessed computer buff, he has joined MicroLink because it will help him organise his expeditions.

"The telex facility will be absolutely invaluable in this respect", he said. "At present I have to rely on the generosity of my accountant and use his office telex machine if I want to send and receive messages, but obviously this isn't always convenient for either of us.

"Transmitting text to

my publishers is a definite possibility. They are a rather old-fashioned firm, but who knows, I may be able to convert them to Email. As a newcomer to MicroLink I'm also looking forward to exploring its many sections just for the fun of it.

"Unfortunately I won't be able to use MicroLink to keep in touch with home while I'm in Tibet. Where I'm going is so remote that my messages will have to be carried by mule for three days before they reach the nearest road".

## By Brillig

# One way to make The Payoff

The pasting continues to bulge, and still the greatest number of cries for help are regarding The Payoff. In many shops The Payoff was thrown in as an extra goody with each new Atari micro bought, so this probably accounts for its apparent popularity.

Since I can't hope to answer every query that comes in about it, and also because The Payoff has been around quite a long time I've decided this month to give you a simplified and condensed solution to the whole adventure.

There are many different ways of solving The Payoff, so this solution is just one. But be warned — it does not aim to encompass all the nuances.

It doesn't always tell you what items to drop and when, so you might sometimes find you're carrying too much. However it shouldn't be too hard to work out which items can be disposed of once they've served their purpose.

Also this solution doesn't give all the required directions to get to a given location — you should be able to fill in the gaps here by exploring and referring to your own map as it is built up.

Well, you can't have it all on a plate, you know!

Before I leave The Payoff, you might be amused to hear that Matt Jones of the Winal, Manxville shortened the command "Break Window" to "Break Wind" and received the checks

responses, "That's better!"

Now to some more of your worries. Among others, Jason Kinnear of Hackney and Richard Coughlin of Luton are having trouble with the decoder listing in Basic that comes with Level 5's solution sheet to Worm In Paradise.

I have checked the listing and it definitely works, so perhaps you have misread part of the listing! Make sure that you haven't mistaken the number 1 for the letter l or vice for the letter Q and vice-versa.

Perhaps someone can help Darren Armit of Leicester, who is experiencing a little difficulty with the page in Mordian's Quest and the maze in Adventureland.

Playing the Golden Bators, Mr A. S. Smith from Havant can't see the dark hole and is unable to light the oil rag.

E. Ransome wonders how to use



### THE PAYOFF

Read note : Go counter : Place bet : Drop all : Drink pipe : Go up : Get host : Go down : Go ledge : Open window : Go window : Go South until you reach the street then Go East : Go tent : Get antidoghammer : Go North, West, North, North : Brush door : Go office : Get ashtray : Auto ashtray : Fast painting : Open safe : Look safe : Get control : Drop antidoghammer : Go to bathroom : Get coin, razor, pills : Go to kitchen : Drop hotel : Get gloves and wear them : Go back to tent : Go down : Get yellow wine : Drop gloves and razor : Go up : Go to newspaper : Get newspaper : Go to garage : Go pit : Get tire : Go to constainers : Hit constainer : Go East : Drink fence : Drop all : Drink fence and return to office then kitchen : Look fridge : Get meat :

Look cupboard : Get treacle : Get host : Return to courtyard and stand fence again.

Get pills : Drag meat : Give meat : Get coin, newspaper and control : Up to the fire escape : Go ledge : Spread treacle and stick newspaper on the window : Jump : Drop all : Down : Go shed : Look toothbrush : Get stool, hammer, screwdriver and drill : Go fast : Get tire : Up to the fire escape : Drop stool : Get coin : Stand stool : Open and then spray alarm : Go ledge : Brush window : Go window : Move cabinet : Unhook, open and go bedroom : Get pills and control : Go to security desk and drop coffee : Go to secretary's office and get umbrella : Go North and drop umbrella : Place guard the pill sack and drink the drugged drink : Get guard : Go lift

: Press button : Press control : Go chamber : Press piano for guard : Get hat from desk : Return to secretary's office : Look typewriter : Look plug : Get fuse : Put fuse into shelf : Go to storeroom : Go window : Down : Get host : Return to manager's office.

Drill floor : Get umbrella and put it in hole (not umbrella!) : Open umbrella : Drill floor again : Big hole : Get beer : Get coin (number found on list) : Open box : Get gem : Go hole : Return to storeroom : Go window : Open : Drink fence : Go to carpark : Give gem (and receive key) : Unlock car : Go car : Get breakfast : Go carpark : Go West, West, West, North, North, North and up : Climb gutter : Go down and West : Give instructions.

Voilà! The game is finished!

vive underwater in Red Moon.

The Dugbrieter Base from Total in High-Adventure Guide to the Galaxy is causing Ken Wilkie and many others to come to grief. Some relief is afforded to all those who in this month's Hints 'n' Tips section.

Leana Haden of Canterbury has got a fair way into The Pawn, but needs to know how to get past the dragon for maximum points. To the rescue comes Barnabas Townsend, of the romantically named Dick Turpin's Cottage in Buckinghamshire, whose solution is given below. (Do any other readers live at addresses that are particularly appropriate for adventures? If so, let's hear from you.)

D. Edwards of Crosby, Liverpool has written in with the method to get past the trapdoor in Wamworts. This problem has been troubling several readers, among them J.D. Aythorn and G. Bell of Gorton. What you have to do is go to trapdoor in the roof and

#### HINTS 'N' TIPS

##### MORDON'S QUEST

Pygmy proving a pest?  
END WOLBHTW YADY PLUWAKH  
TSEI KNEG DAWN ATONT ODORH  
AHT WEP WYD LARK AM

##### ADVENTURELAND

Stuck in the plot?  
TAKHAYK SSKA GAWY OTS

##### GOLDEN SATON

Have you got a light, mate?  
AWAL LON EPON PAWE GOTE  
LTHA CHYT OTTA OMKH TAWY  
STSU MUDY

##### RED MOON

Can't breathe underwater?

GRUH UTON AKKA MPAG KKA  
HAY DEEN LON

##### HITCHHIKERS' GUIDE

Beast baffling you?  
1. LAR OWAK ENOT SOKA SENT  
TARD CL  
2. TOSK AWLO WROF LOHK SATS  
AKSE AKSE ODON W  
3. DROD YOSE ALAR RAUD HTAU  
TAW WOP WOC

##### THE PAWN

Dragon blocking your way?  
1. SHOD AWST AKOP L  
2. SHPA NSTH WTH WTH W  
3. SHPA NSTH WTH W  
4. ATRO NOG

#### LIFELINE

THESE readers would like their names to be added to the Lifeline postal contact list:

Alan J. Palmer, 87 Askeham Road, Bevington, Hants RG21 7TA; Adventureland, Poole Adventure, Mission Impossible, Voodoo Seafish, The Cairns, Strange Odyssey, Mystery Fashions, Pyramid Of Doom, Ghost Town, Savage Island I, Zork I, Zork II, Zork III, Deadline.

Andrew Lewis, 26A Hanover Square, Leeds LS2 1AW; Jewels Of Darkness trilogy, Billion Dollars trilogy, Missionary I and II.

Mr C. Leighton, 34 Birmingham Crescent, Sherwood, Nottingham NG8 3B; The Price Of Magic, Red Moon, Lords Of Time, Dungeons Adventure.

simply fix Beem. You return and just walk over it. Easy when you know how.

The diaphanous adventurers among you might be interested in a sample magazine I've been sent called Adventure Probe, privately published and aimed solely at adventuring players.

This monthly publication features reviews, tips, articles, maps and sundry other adventure-related material. By the looks of the issue sent to me, Adventure Probe is well worth buying. If you're interested in getting a copy, or taking out a subscription, you can contact the editor, Barrie Shillies, at 78 Morton Road, Highfield, Wigan, WNG 5AT.

Following my Christmas declaration of my favourite top twenty adventures, Allan Palmer of Bevington wondered why Infocom's Deadline wasn't included. He says that although it is one of Infocom's earlier games, he still finds it a well-executed implementation which has paved the way for greater interaction with other characters in an adventure.

I'm inclined to agree with him and

think that I must have left it out by oversight. Of all the unadorned adventures, Deadline and Sargaid are the best, and the interaction of the player with the characters is superbly done. Trouble is, what adventure can I drop out if I am to substitute Deadline? An embarrassment of riches, that's the problem.

While we're on the subject, why not write in with your own top ten adventure lists? I'd be fascinated to find out what other people enjoy playing and who, and might publish some of the lists in a future issue.

On the subject of your letters, my mailing grows ever larger each month and although I can't guarantee a personal reply to everyone, your chances of getting one are much improved if you can enclose a stamped self-addressed envelope with your query.

Brill can turn base metal into gold, but unfortunately my local Post Office steadfastly refuses to take 100 ton gold nuggets!

Till next time... exciting adventuring!

#### CLITCHES OF THE MONTH

Martin Hinch of Ripon has found one nice glitch in *The Pawn*. He has found that it is possible to tear the paper wall with the immovable hand in the cupboard. He has also discovered that although you can't normally take the pedestal, you can if you put something on it. Good work, Martin!

Mr A. Phule of Berkeley has discovered an amazing hidden backdoor which, it seems, is resident in all recent Infocom

adventures. Starting with the *Enchanter* trilogy, if you type in the command *SAP LHMH* at the input prompt the entire text will be dumped on to the screen page by page.

If you have a printer you can direct the output to it instead by using the command *SAP LOOP*, or *SAP LOOP* (and so dump to both screen and printer).

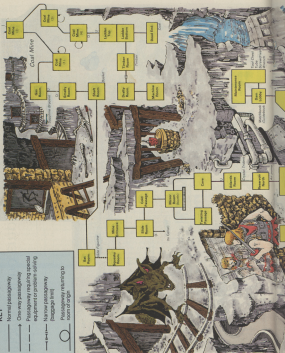
This was discovered by using a machine code disassembler pro-

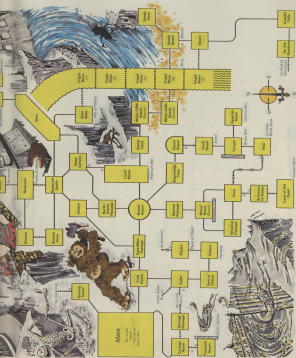
gram, and it is likely that this Open Sesame-style code was left in by the developers to assist with speedy debugging of *Assured* faulty or corrupt discs.

Obviously no one playing the games was ever expected to type such odd words, so now if you're really stuck on an Infocom offering you can actually find the complete solution. Wear a bonnet for solving those really tricky puzzles like the Babelfish.



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Narrow passivity (single task)  
Passivity relating to part of object





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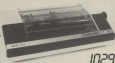
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# Build your own Epson interface

## Part 10 of LEN GOLDING's series on using your Atari to control devices

EPSON printers have always been recommended by Atari as an alternative to their own own low-cost and relatively limited machines. But they, together with Epson-compatible types produced by other manufacturers, all suffer from one big disadvantage - you can't plug them into the Atari's serial port with your other peripherals.

If you want to drive this kind of printer you will need some form of interface which can send out data in parallel form.

You could pay out £58 for an Atari 850 interface module (plus a further £28 for the printer cable), or around £80 for a third party hardware interface such as the Graphix.

Alternatively this software-driven gadget can be built for under £12 complete.

It will handle all printer commands (LPRINT, LIST "P:") and so on just like a hardware interface, but it needs no separate power supply and very little can go wrong with it.

The driver program, written entirely

in machine code, loads and runs automatically on power-up and it is System Reset proof so you can forget all about it once it's loaded into ram.

Unlike some commercially available joystick printer interfaces, this one takes page-6 free and it will work with any language cartridge, including AtariWriter.

Let's look at the hardware first. You will need two joystick extension cables and a 26-way Centronics-type plug with solder terminals - not the

insulation displacement (IDC) type. Test the cables first, using a standard joystick, then cut them to a length of 1.5 metres or less, and discard the socket ends.

Table 1 shows how everything should be connected together to suit Epson and other compatible printers. Remember to link Centronics pin 6 to pin 20 inside the plug.

Soldering this type of connector can be a bit fiddly, and it is a good test of soldering skill. If you don't fancy doing it yourself you can buy a ready built and tested cable assembly from Bit Design for not much more than its component parts would cost.

The software is less than 75k bytes long but is quite complicated to understand, so unless you're happy with machine code you can ignore programs 1A and 1B, and skip straight to our discussion of the Basic listings.

Still with us? OK, the interface works by inserting a new printer handler, by which intercepts the normal OS routine and diverts all output to the joystick pins, where it appears in parallel form.

Adding a new handler is fairly straightforward and is being covered in more detail in Andre Milley's series on using OS - See page 14.

When the computer is instructed to print a block of data to the printer, OS sends out one byte at a time via the BASIC Accumulator. Thus at the start of the PUTBYTE routine, register A will contain the next character to be printed, as provided by OS.

PUTBYTE first checks that the printer is ready to receive data, by looking at the Busy line (STRGB). If it is high it would mean the printer is working on some other task, so the routine pauses until STRGB goes low again.

Then it checks to see whether the character in register A is an Atari end-of-line (EOL), and if so translates it into the normal ASCII Carriage Return code 13. This code instructs the printer to start printing the characters in its buffer and also produces a line

	Joystick pin	Joystick function	Centronics pin	Printer function
JOYSTICK C	1	BIT 0	2	DATA 1
	2	BIT 1	3	DATA 2
	3	BIT 2	4	DATA 3
	4	BIT 3	5	DATA 4
	5	POT B	—	—
	6	STRGB	11	BUSY
	7	+SW *	—	—
	8	OV	16	GROUND
	9	POT A	—	—
JOYSTICK C	1	BIT 4	6	DATA 5
	2	BIT 5	7	DATA 6
	3	BIT 6	8	DATA 7
	4	BIT 7	9	STROBE
	5	POT B	—	—
	6	STRGB	32	FAULT
	7	+SW *	—	—
	8	OV	33	GROUND
	9	POT A	—	—
P	—	—	9 **	DATA 8
	—	—	36	GROUND

Table 1: Connecting the joystick leads to the printer's Centronics plug

\* Not used unless buffer board fitted

\*\* Connect permanently to ground at pin 36







## Gadgets

However, the immediate need was

Alternatively you can easily convert the lead for permanent use with an ISO by fitting a 16 pin D-type plug into

A ready built and tested cable assembly is available, price £12.95 inc. VAT and postage from: R H Design, 152 Seaford Avenue, Harrogate, North Yorkshire. Tel: 01223 800150

† Printed circuit board (D9P13), available from RM Design, price \$25 (plus \$15 postage if not ordered with joystick cable assembly).



**Figure 6**

**E.I. DuPont de Nemours and Company**











HAVE you ever wanted to create Cide Worlds script to add atmosphere to your adventures? Or design graphics characters for games (the popular wargame Eastern Front uses a map made up entirely from redefined characters)?

Now you can, both quickly and easily, with the Advanced Character Editor (ACE) program - a comprehensive tool for redefining all or part of the Atari character set.

ACE is in three parts. Part 1, the main program section, is listed this month and will run as it stands. It provides a set of basic options for editing characters.

Parts 2 and 3 will be published over the next two months. These sections are in the form of subroutines to be added to the main program. The full three part program uses most of the Atari's available ram, so will only operate on machines with a minimum of 48k.

If you are typing in the listing it is essential to use the exact line numbers as they appear in the listing, as well as entering all IBM statement lines, otherwise you may experience problems when adding the next two sections.

When you have typed in the program, save it to tape with the command `UST "C"` or to disc with `UST "0:ACE1"`. Do not use the `SAVE` command as this will prevent the merging of the other sections with the main program.

List ACE1 to tape or disc before running it. The Character Editor Program (CEP) is a misnamed FORTRAN could crash the whole machine and ruin all your hard typed work.

Part 2 will add a data command that lists the bit-mapped numbers that represent characters, as well as the facility to save and load character set data to tape, disc or printer for later inclusion in your own programs.

Part 3 is a graphic designer and animator module used to design large shapes made up of more than one redefined character. The animation section is used to create cartoon "movies" and animation sequences.

The Character Editor screen display is split into four sections called Menu, Character Set, Graphics and Pad.

The top of the screen displays the menu of valid commands. The Gaps, Save, Load, Animate, Colors, and Pad commands are listed in ACE Part 1, but are only used in Parts 2 and 3 of the program. If you try to access any of these commands you will not crash the program but hear a buzzer sound which is used by ACE to indicate that

# The ACE way to design your own characters

START  
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shows how to create  
your own custom-built  
character set

an invalid key has been pressed.

Commands are accessed by pressing a single key, as indicated by the inverse character at the beginning of each option.

The option currently being accessed is highlighted in inverse letters on the menu.

All prompts, information or additional commands associated with each option appear at the right hand side of the menu screen.

To exit an option press the Esc key. There are one or two exceptions to this rule, but they only occur in the Pad and Animation sections.

The next part of the screen display shows the character set. When the program is first run the character set is the standard Atari set which includes letters, numbers, punctuation, graphic symbols and other symbols such as \* and ~. The display does not include inverse characters.

The one exception to the standard Atari set is the symbol \* which has been redefined by the program as a rectangle that acts as a cursor during the Pad module. In Part 3 of this series, because of this it is not recommended that you edit this symbol.

ACE supports three text modes - Graphics 0, 1 and 2. The display shows the current character in all three modes. Graphics 0 is the normal text mode on powers with 40 characters to the line. Graphics 1 and 2 each use larger text on 20 character lines.

Graphics 1 and 2 normally support only 64 characters and exclude the lowercase and graphic symbols.

Because of this, if you choose to edit a symbol excluded from Graphics 1 or 2 then that part of the display will be blank.

Graphics 0 is a one colour mode while Graphics 1 and 2 are five colour modes (four character colours and the background). The Graphics 1 and 2 characters are therefore displayed in four colours. A subroutine will be added next month to alter these colours.

The bottom section of the screen display is used in conjunction with the Pad and Animation options (in Part 3) to create multi-character designs and animated sequences.

## EDITING COMMANDS E: EDIT

The Edit command is the default mode, and when exiting from other options the program will return to Edit mode.

The current character is displayed on the right hand side of the Menu screen, with the CHR\$ code shown as the Atari\$ character code. When the program is first run the current character is A with an Atari\$ code of 66. If you use the statement:

`PRINT CHR$66;`

then the letter A will be displayed on the screen. The Atari\$ code is a slight variation on the normal font codes used by most computers and communications technology.

The BG Code shown in the screen

code that is associated with the PEK and POKE commands. If you POKE this number into screen ram the appropriate character will appear. For example, switch on your Atari and type in direct mode:

POKE 40180,33

The letter A will again be displayed on the screen, since address 40180 is a location within the screen ram of a 486 machine.

There is actually another set of codes – the key handler codes – which are used solely by the keyboard handler routines, and are thus not listed here.

The edit grid is the centre of the Menu display in an enlarged version of the current character. A cursor is moved around the grid by the joystick. To add a character, press the fire button to plot or smoot single pixel blocks on the grid.

Any changes made on the edit grid are reflected in the current character. The standard Atari design for the current character remains fixed on the

menu display but the character as displayed in the character set, the graphics ram, if appropriate, the Pad display will be altered.

To change the current character press key E and, when prompted, enter another character by passing the chosen key. All characters except inverse ones will be accepted, though lowercase and control key graphic characters will not be displayed in Graphics 1 or 2.

## F: FETCH

Fetch changes the current character shape to that of another character. For example, if the current character is B, then choosing character C when prompted during the Fetch option makes the shape of character B a duplicate of character C, but leaves character C intact.

## I: INVERT

This option inverts the current character.

## M: MIRROR

Provides a mirror image of the current character.

## R: RESHOW

Restores the current character to the original Atari character set design.

## W: WPE

Closes the edit grid and erases the current character design.

## Cursor keys: MOVE

Simply use the cursor keys – without pressing Control or Shift – to move the current character shape one pixel up, down, left or right.

Now you know how to use the basic editor functions you can type in the program and start using it.

■ Next month we'll be giving you extra goodies to allow you to load and save your new character sets, and also to create D474 data for inclusion within your own Basic programs. Don't forget to order your copy of the May issue now to avoid disappointment.

Full listing starts on Page 40

ATARI OWNERS

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"Excellent!"

"Excellent Atari magazine!"

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"Page 6 is very interesting and informative!"

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– Anthony Ginn, writing about the Atari ST version in the May 1988 issue of the Atari User

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# So you want to write for...

## ATARI USER

WANT to see your name in print? If you would like to write for us here are a few hints and tips which will give you a better chance of being accepted.

● *Whether you send us should be of general interest to other Atari users. You may find a program to tell you when your rabbit needs feeding of use, but it's doubtful that there will be a mass market for such a piece of software.*

● *When submitting anything always send both your article and/or program on tape or disc, rather than just on paper. If you have a printer a listed output would be preferable to a typed one. We can't accept handwritten programs, no matter how good they might be.*

● *Don't forget that the same applies to articles. Please send a copy of the text on tape or disc, as we use a method of typesetting directly from Atari micros.*

● *Avoid using non-standard tape or disc formats such as Dos 3.1, Spotteddos or increased head rate tapes. If there is absolutely no way you can send a disc or tape of your text, you should type it clearly, double spaced on white paper. If your word stands out as being good enough we could then get it transcribed on to computer.*

● *While we can't guarantee the return of material sent in to us, if you enclose a stamped self-addressed envelope we will endeavour to put that your name is returned.*

● *Make sure that your name and address and the title of the article or program is on everything you send. Including the tape or disc and each sheet of text. A phone number - preferably daytime as well as evening - would also be useful.*

● *Please state clearly that the submission is your own work, and that it is being offered for publication in Atari User and has not been previously submitted elsewhere.*

● *We prefer articles to run in between two and four pages (at about 1,000 words a page, less with diagrams and listings), or to be broken down into separate parts if they are much longer. Retos are paid per final printed word, not by how much material you actually send, so make your article clear and concise.*

● *If you are submitting a program you should explain fully how it works, preferably with a rough flowchartable breakdown. Point out any problems which may occur during typing, and how they can be overcome.*

● *Don't make your programs readable, with plenty of REMs to indicate what is going on. However, never jump in a REM statement, as many people like to leave them out when typing in a listing.*

● *Try your program out on an unsuspecting friend. This will often throw up a problem you hadn't even considered.*

● *Try to avoid graphics and machine code played in strings. Unless there is no alternative, put your machine code into data statements since Control key graphics are very hard to enter correctly.*

● *Above all, remember that your submission should be interesting, informative, useful or fun, and clearly laid out.*

The address to write to is: Features Editor, Atari User, Europa House, 68 Charter Road, Marnell Green, Stockport SK7 9AY.

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# A technicolour dream come true

CAN you set the GTM graphics modes, such as modes 8 and 11, on one screen? This is a problem for me, as they all have the same Display List code - 15. Do I have to use a Display List Interrupt to change modes, and if so what location do I have to write to to tell Amiga that I have changed modes?

*I am looking for a mixed mode display like the one in Technicolour Dreams.* — Paul Gower, Littlehampton, West Sussex.

■ As you have correctly guessed, the GTM modes are all represented by the same Display List number — that for a Graphics 8 line.

The change in mode is effected by using location 623. If this is zero the screen will show as Graphics 8. If you POKE it with 1 you will get a Graphics 9 screen, 128 will give Graphics 10 and 192 gives Graphics 11.

This address is a "shadow" location, meaning that its value is read 58 times a second by the OS and placed into the relevant hardware register.

This means that the mode will only change between successive TV frames, thus avoiding messy glitches in the display.

To change the display "on the fly", as you want to do, you must obviously use the hardware register direct —

you want to alter the mode more often than 50 times a second.

This register is located at 53376 (D0018), and takes the same range of values.

You can alter it during a DL1 if you wish, generating the kind of mixed mode screen you want.

Don't forget that the OS will place the shadow value from 623 into this hardware register during the Vertical Blank, so each screen will begin with the mode specified in 623 until it reaches your DL1.

## Broken joysticks

DO you know anyone that sells spare parts for joysticks? I have had a number of these and it seems to be the same part that goes on all of them.

It's a shame to throw a joystick away if it can be repaired.

I would also like to know if any readers have had the same problem as me in

trying to join the US Gold club. I wrote to the address given on one of the games boxes, but have never had a reply.

It seems a complete waste of time to join the club if they aren't going to bother to reply to your letters. — J.J. Smith, Leeds.

■ Also used to sell joystick repair kits, but we don't think that they are available any more.

Try contacting either Atari or one of their service centres for the part you require, which we suggest is the white plastic insert which goes between the stick itself and the printed circuit board.

Have you tried phoning US Gold about their seeming lack of response? If you haven't had any return for your 186 a quick phone call may well sort the problem out.

## Thwarting cousins . . .

I HAVE written my own text adventure game. To load it I use the CDAD command. When my cousin comes round, he likes to play my games but he can't do the program and change everything, and this annoys me.

I would like to load my games using the Start and Option keys so that they will autostart.

You have printed a program in your February 1987 issue which makes autostart, drive and 1 worded. If you could print one for autostarting cartridges? — Gerry Higate, Covingham, Essex.

■ To restore family peace in Essex, just take a look at

page 14. This is the first of a three part series tackling exactly the problem you outline.

You could also encode the data in your adventure programs so that your cousin won't be able to alter them as easily, or encrypt the whole program using the methods described in *Amiga* Willey's article in the August 1986 *Amiga User*.

## Assembly snags

I AM learning assembly language, and surprisingly finding it not as difficult as I thought. However, there are a few things which I don't understand. For example:

```
288 LDA #0
289 LDY #0
300 LOOP STA COURAGELY
310 DECY
320 BNC LOOP
```

These few lines were taken from a program which clears several pages of memory. Could you please explain line 300?

Also the Y register is decremented below zero, so how will this clear 326 locations?

Lastly, how about a series on advanced sound techniques. All your topics covering Atari computers have been excellent, but you only covered sound very briefly in the early issues.

Incidentally, anyone learning assembly language should read *Assembly Language Programming for the Atari Computers* by Steve Chasin. It is an excellent book. Keep up the high standards. — B. Fowler, Pen Tui, Glamorgan.

■ If you used the command

## Short of loose change

I RECENTLY bought a cassette version of *Agatha's Ghostbusters*. Although the game loads and plays to a certain extent on my 80881, there seem to be one or two abnormalities.

For instance, I am not given an account number at any stage of the game, or even when I manage to make more money than I started with. I lose it all.

Also there does not seem to be any way of getting back to the equipment section without restarting the

game, and hence losing your money? — L.R. Gorton, Eps.

■ You must make more than 10,000 dollars profit before you are given an account number, so perhaps you haven't got that far yet!

Once you have an account number you may use it each time you start a game to allow you to buy more equipment.

The number is personalised to your name, so make sure you type both correctly each time.

STA 710 the contents of the A register are stored at memory location 710.

You could, of course, replace this number 710 with a label, such as COLBACK for example. Thus, STA COLBACK could mean the same as STA 710.

The STA command can be realified in a number of ways, and indexing – which you mention – is just one of them.

This simply means that before the store command is executed, the value in the Y register is added to the address you've given.

If Y contained the number 10, for example, then STA COLBACK,Y would mean store the A register in location 720 – or 710 plus 10. In the case you mention, Y is set to a value of zero, and as it can only contain numbers between 0 and 255 it must become 256 when it is decremented by one with the DEY command.

This means that the page of memory is cleared in the order 0, 256, 256, 256 and so on until Y is zero again and the program drops out of the loop at the branch if Not Equal to zero (BNEQ) statement.

In this particular case, the address CURPAG is enclosed in brackets, which simply means that the location CURPAG itself contains a further address which the command will then use.

If we tried it with our COLBACK example, then the A register would not be stored in location 710, but rather in an address plus at location 710.

If 710 contained the address \$7000, for example, then that location would have the value of A stored in it.

Don't forget that addresses are always stored in two bytes using the 8002's normal lo-hi format, so both CURPAG and CURPAG+1 will contain part of the address value to use.

Thanks for the book suggestion. Now that we have more editorial space, we'll certainly look into the possibility of running more articles on sound commands,

## ATARI USER Mailbag

*WE welcome letters from readers – about your experiences using the Atari machines, about tips you would like to pass on to other users... and about what you would like to see in future issues.*

*The address to write to is:*

**Mailbag Editor  
Atari User  
Europe House  
68 Chester Road  
Hazel Grove  
Stockport SK7 5NY**

### Freezing colour

*I HAVE just bought an Atari 800X, and I am not sure how to stop the colours from changing when I leave the machine alone for a while.*

*I am also looking for a program to store names and addresses along with phone numbers. Is such a program available on cassette? – L.J. Golechowski, Aldershot, Hants.*

■ The colour change you mention is a feature called Aspect Mode, and can be halted by pressing any key.

The database is more difficult, as there aren't any such items on cassette – mainly because the cassette system is too slow to make the idea really feasible.

That said, keep looking through the small ads in Atari User and other publications – there are some enterprising programmer devices out.

### Pictures off screen

*I WANT an Atari 800X, and a 1024 printer. Please could you tell me how to take screen shots or to make screen dumps.*

*I have tried taking pictures of games from the TV, but it never works as there is*

*always a reflection when I use a flash and it's too dark if I don't use a flash. – Neil Richardson, Camberley, Surrey.*

■ You can do screen dumps onto a 1024, but most of the programs that enable this (including the one we published in the September 1985 issue) work from Basic, and thus are only useful to dump your own screens and pictures.

Your best bet if you want to record your high scores, or just take pictures of the game screens to study at your leisure, is to take screen photographs. These can work very well as you can see from our games review section), but you must follow a few simple rules.

Firstly, don't use a flash – you want to capture the images on the screen, not the glare of glass in front of it.

Secondly, remove as much outside light as possible. This means closing all the curtains and turning off all the lights.

Set up your camera on a tripod or a steady table top and line up the TV screen in the centre. Try to keep your camera the same height as the TV set and square on to the screen.

If you can freeze the game screen you should use an exposure time of between half a second and a second, but if you can't you must try to use a time of 1/125th, or better still 1/250th if your camera has that speed.

Adjust the exposure (if using) according to the camera's light meter, or leave it on automatic.

Once you've done all that, focus the camera accurately and use a cable release to avoid any camera shake when you take the picture. You will find that practice quickly makes perfect.

### Printer comparison

*I HAVE, hopefully by getting a printer soon. Could you tell me the difference between the 1024 and 1027 printers?*

*Also I would like to congratulate you on Atari User. I haven't missed one issue. – Andrew Fellows, Harrocks, Sussex.*

■ The 1024 is a dot matrix machine, which means that its characters are made up of bits of tiny dots. The 1027, on the other hand, is a letter quality printer which works more like a typewriter – its characters are printed by an impact barrel.

The 1027 is great for sending correspondence, but is very slow (about 18 characters a second), while the 1024 is much faster but has a much poorer text quality. Also the 1024 can print graphics, which the 1027 can't.

### Monthly discs

*I HAVE noticed that you no longer advertise or indeed supply discs or cassettes of programs published in Atari User. I do not subscribe to MicroLink so I cannot afford a modem at present.*

*Is there any way that I might obtain the discs? I am kind of typing! – H.Crowell, Hazel Hengstead, Herts.*

■ We stopped producing the monthly discs and tapes because there was not enough demand for them.

We might consider bringing them back if enough of you write in and ask for them. What do other readers think?

## YOUR HINTS AND TIPS

## CHIMERA

**I THINK** I can help James Kelly at Seattle, who had a problem with the game Chimera where he was not able to open the doors.

It's quite easy. After having disposed of the first warchief you must push the robot down the two parallel passages leading in a long straight line downwards, past the fireplace in a grey room.

You will eventually reach a wall at the bottom with a barrier blocking an entrance in it. Follow the passageway around until you get to a gap joining the two parallel passages.

There, if you have not already seen it, you will find a loaf of bread. Take the loaf (do not eat it) and make your way back to the router.

Stand against the router and activate it. In the router's place a life-saving drink will appear. Leave this and carry on along the passage until you come to another router. Eliminate it and this time press the button to eat the bread. Take and drink the

life-saving drink that appears there.

Go back to the other life-saving drink and drink it. Enter the room and you will find a key, with which you can eliminate all four doors.

When you have finished with the key the second warchief can be made by taking the key to the padlock and picking up the padlock. It must then be taken to one of the four blue rooms. — Robert Lane, Gladstone, Dorset.

## CRYSTAL RAIDER

I DISCOVERED a trick when playing Crystal Raider. If you hold down the joystick button and press Start, you can go around the screens and play your route without getting killed by the natives. — Mark Hodge, Slough, Berkshire.

## STAROUAKE

I THOUGHT that your readers might be interested in the following game tips.

The nearest teleport to

the planet's core is Starouake. It is called Whole. If a key-shaped object can be found, it will allow Starb to open the vertical doors.

The credit card allows Starb to enter Chap's pyramid and also allows access to part of the game beyond the security doors.

Many people seem to be stuck at the point in Mesluter where the skeletal horse appears, but I have finally made it past this screen.

The easier solution is almost impossible to explain, but it involves a lot of doubling back and moving sideways, until a horse is lined up correctly with the tree.

Here are some spells to help those stuck in Scrolls of Abaddon:

**Walk:** Allows the player to walk against the arrows.

**Ice:** Freezes the natives momentarily.

**Remember:** This will give one extra life when the "game over" message is displayed.

**Sparks:** This surrounds the player with an energy field which is fatal to the natives.

**Flight:** Jump to the next level.

**Warp:** Highlights the magic elf.

**Map:** Type this then press the space bar to view the map of the whole area. — Danny Platt, Sutton, Lancs.

## MERCENARY

I HAVE just been playing Mercenary on my 80086. I went into the elevator cage at 2:05, got the poweramp and went through a two-way transporter and arrived in a yellow hangar with two doors.

I went through the transporter again, went into the hangar and took off. I then took the gold to the archangel and got a big reward.

Then I had a look around in the desert outside the city and found an elevator cage with a craft inside. I kept the poweramp and went off to the air.

After 108,000 feet on the altimeter it wouldn't go any higher. Did I escape from Tang? — Andrew Whitlock, Preston, Lancs.

## Function keys

FOR some months now I have been reading your excellent magazine and sometimes I am finding it very helpful and full of information. I have one slight enquiry.

The space dedicated to 8 bit users appears to be being almost eroded by the 16 bit section. I know that this is also a concern of other 8 bit users who subscribe to Atari User.

I am also having problems programming the function

keys on the 130XE. According to the Silica Shop literature, this is possible. Can you help? — J. Hayes, Bournemouth, Hants.

As you can see, Atari ST User has this month become a separate magazine, following an overwhelming response from both ST and 8 bit owners who filled in the survey which we printed in February.

We hope that you enjoy the new Atari User and Atari ST User magazines.

As for the function keys, you can check for the Start, Select and Option keys by pressing location 53279 (\$D01F). You will find a

number between 0 and 7 here, with 7 meaning no buttons pressed and 0 all buttons.

Bit 0 represents the Start button, bit 1 the Select and bit 2 the Option. Thus the combinations are as follows:

- 0 Start, Select and Option
- 1 Select and Option
- 2 Start and Option
- 3 Option
- 4 Start and Select
- 5 Select
- 6 Start
- 7 None

The Help key on X1, and X2 machines can be read by pressing 732 (\$1DC). A value of 17 means Help has been pressed, 01 means Shift +

Help and 148 means Control + Help.

As this register holds the last pressed value, you must clear it after checking it by using POKE 732,0.

## Cartridge software

On the 80086, what is the cartridge slot for? Can it be used for games? — R.R. Reed, Bournemouth.

Cartridges have always been an alternative way for developers to provide soft-

were for micros. They simply contain programs in some form rather than on disc or tape.

In fact, on the old Atari 800 there were two cartridge slots, but as this slots are now rarely used the more recent machines have had only one.

Both cartridges have the advantage of loading instantly and being almost indestructible. However they are more expensive to produce.

Most of the early games came on cartridge, including Pac-Man, Star Raiders, Missile Command, Darkie Kong - plus such things as Asteroids, Lode, Asterix and Basic 80.

Recently the cost has proved prohibitive for many games companies, but with the 6800 on the horizon we may once again see an upsurge of cartridge based software.

## Speedy service

WOM about this for service?  
Friday afternoon January 22 I sent for a copy of BASIC Simulator for my Atari 800X. From Mike Better Software.

Imagine my surprise when there it was first post Monday morning January 26th I expected to wait at least week, incidently, BASIC Simulator is excellent. - B.G. King, Christchurch, Dorset.

## Compilations please

WHILE browsing through some very old PCW's I found a Dragon listing in a 1984 issue by one of you, in my opinion, best software

reviews - Bob Chappell. You are forgiven, Mr. Chappell, if this was indeed you!

Why not release a compilation tape and disc with all the best programs from Atari User back issues?

Finally, do you or anyone else know where I can buy copies of those old 16's Friday and Thomas AT - Mark Cunningham, Nottingham.

■ We all have a history in this industry - whether he tries to live it down or not we aren't quite sure. At least he has a good number of years of experience at his keyboard.

What do other readers think of the compilation idea, then?

Shamus it will be out on the American label, or just demand for an old Synapse import copy. As for the other title, we're not too

## PEN PALS

Sharon O'Grady,  
Knockahole 4, 111 Royal  
Juni, Ireland

Jeonida Nicos, Menes-  
thou 879, Thessaloniki,  
54008, Greece.

Raymond D. Swan, 612  
R. 26 Street, Chellicothe,  
Missouri 63522, U.S.A.

(See also Raymond's  
letter elsewhere in these  
pages.)

sure whether it has been released on the Atari. Can any other readers help?

## Keep your secrets

HERE'S a way of disguising your disc files to prevent unauthorized access.

You first have to modify the DOS.SYS file so that you can use control characters in your filenames, then you simply include the Clear Screen and the printer Cancel/Line codes in your file name.

First, boot your Dos disk with Basic and then use:

POKE 1016,  
PORT 1022:127

You may now save the modified version typing DOS, then using I for format and H to write out the new Dos files.

With the new Dos installed, load the file you want to protect and save it using a file name that ends with CHR\$(125) and CHR\$(26). These characters may be produced by the Shift+Char and Control+K.

Now type DOS then A and two returns and see what happens - amazing isn't it if you have a printer then type ^L, when asked for the Altoscap information. Then just watch your printer churn out sector sizes but nothing else for your protected files.

You can still load the files

# PAL is no friend in the USA

I JUST wanted to write and let you know that I think your magazine is excellent.

I have family in Great Britain, so I have been keeping an eye out for anything to do with Atari. I was very excited when I received my first copy of Atari User - Volume I, Issue 8.

After looking at your magazine I knew that I had to see more, I now have a copy of every issue, and I have also started a friend receiving your publication, and we have also shared our copies with other users. In fact, Atari User is fast becoming an American favourite.

I have recently visited Great Britain and was a bit disappointed in the availability of Atari software and magazines, although I must admit that things are not much better in the States.

I did notice that there are imported American Atari magazines available - do you ever plan on Atari User

being available in the United States?

I have experienced a problem with some British software that I bought, and was wondering if you might be able to offer any help or suggestions.

I own an 800, and the programs that I have been having problems with are Zone-K and One Man and His Dog.

They both look like good games, and when I load them the title screens are fine - but when I try to play them the graphics bounce up and down, making play impossible.

We have tried them on other Atari but experience the same problem. A friend suggested that the problem is within our television system, rather than in the games themselves.

Otherwise, we have found British software for the most part to be of excellent quality.

I especially enjoy your software reviews and the arrival of space now

provide for readers letters in the mailing section. Thank you, Atari User, and please don't ever stop now - we dedicated it to you. - Raymond D. Swan, USA.

■ It's nice to hear from our overseas readers - keep on enjoying the magazine.

Your problems with the tapes is almost certainly to do with the TV system you use. Some American games don't run over here correctly, as the reverse is found to also be true.

The problem is that in the UK we use a system called PAL which has 50 frames per second with 625 lines per frame.

You use NTSC, which has 60 frames per second, but with only 525 lines.

Thus, although the amount of information displayed per second is roughly the same, any program which relies on the 60 Hz timing signal will work at a different speed in America - and sometimes it won't work at all if the timing is a critical part of the program.

In the normal way yourself, so long as you use the filename complete with the control characters – so keep a note of the names handy.

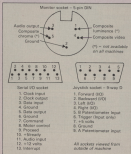
You can't alter the file names DISK1.DOS, DISK2.DOS or AUTOREW.DOS as these are special names that the disc system recognises.

It should be possible to modify other versions of Dos, but the POKEs will probably be different. — David Golding, Harrogate, North Yorkshire.

## Port pin outputs

**PLEASE** could you help me by printing the diagrams for the pin outputs on the Atari 800X1 and 800X2? — Neil Richardson, Camberley, Surrey.

■ Although we have answered this one before, we will get a lot of people asking about these connections. You should have been keeping up with your back issues, because we have covered this issue in the gadgets series. However, just for you, here are the pin-outs (see next page):



## Cartridge capers

In REPLY to L.P. Arnold's letter in the March issue of Atari User concerning software compatibility, I recently upgraded my 800X1 (which cost £799 – yes, a rip-off who bought it 10 days before Atari slashed their price to a £399 (which cost £59 brand new).

I have had no problems with cassettes or discs, but I have had problems with cartridges. Atari's own *Mr. X*, but I also have *Conquest* (Messiah) on loan from Creative Sparks, and this will not fit in the cartridge port.

I would therefore imagine that most if not all Creative Sparks cartridges will be manufactured to the same specifications, and therefore will not fit. I don't know if any other third party cartridges have this problem or not.

Luckily, after visiting the Christmas Atari User Show and discussing this with a representative from Atari, he suggested removing some of the pins (saying which I did and the cartridge

now fits).

However, I cannot understand why Atari changed the location of the cartridge socket on the XT machine. It would be much better above the joystick as in the XL model.

Finally, what is the best method for cleaning the drive head in a disc drive – are the special cleaning discs available any good, or should I get it serviced by a reputable dealer. — N. Henderson, Woking, North.

■ Tackling your cartridge problem first, the casing of the Creative Sparks cartridge are slightly larger than most, certainly, and Atari's suggestion is one way around the problem.

However, all Creative Sparks software is now available on budget cassette rather than cartridge, so you shouldn't have any further problems.

As you say, the port is very inconvenient on the XT, and we can only assume that this was done to clear up the design of the machine – and to make it a little bit cheaper to produce.

Cleaning drive heads is not the easiest job in the world, but the "wet" type of cleaning disc would be best. Otherwise, drop it back into a dealer who can do a full service at the same time.

## Computer courses

I WAS reading in the March issue of Atari User about the Hampshire man, Mr. Roy Goring, who is running a computer correspondence course.

I have a daughter who is eleven years old and I would like her to have lessons in programming. As Atari 800X1 computers. She has had a 14 months now, and has virtually not programmed it to its full extent.

She has tried to type in some of the programs from your magazine but has not had a lot of success. If possible, could you please let us know Mr. Goring's address

as I could write to him about a possible course for her?

Also, we have bought your magazine since January 1986, but we get it delivered from our local newspaper. Does this qualify us as an Atari User subscriber, and thus for the special reader offers? — Robert Courtney, Thongbridge, Huddersfield.

■ Roy Goring can be contacted at R.G. Programming, Brookhampton Road, Havant, PO8 1NT. Tel. 0708 451214. He should be able to help you out with your typing problems too.

Unfortunately, the special offers are only available with our subscription orders, so you don't qualify at the moment.

That said, if you compare the cost of subscribing with the cost of ordering each issue from a newspaper, you will find you have been paying more for each issue than you needed. Subscription copies can also arrive up to a week before many newspapers have theirs on the shelves.

## Running the gauntlet

COULD anyone tell me when Gauntlet is coming out for the 8 bit Atari? — Mark Hodge, Slough, Berkshire.

■ That's simple – by the time you read this Gauntlet should be out. See our feature article on the game elsewhere in this issue.

## MicroLink

All program listings in Atari User are now available for free downloading on MicroLink, the UK's fastest growing electronic mail service. They join hundreds of programs already available on Britain's national on-line database.



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Page 104





