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ATARI USER

Vol. 2 No. 12

April 1987

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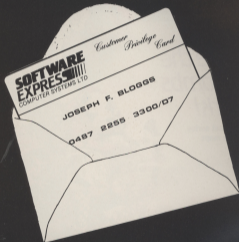
Gauntlet: The
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AN Atari 8-bit software revolution has begun, prompted by a bridge-building exercise from the company to developers and the arrival of the video games machine, the 8088.

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 Winehouse 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 8088.

"The 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 programs from developers, and is aiming to cater for the growing demand for better career education 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 to move into the market with two more games.

Winger Olympia is a multi-level simulation combining five sports, each of which uses 60k of code, and Who Does 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 series is promised for the Atari 8 bit by the end of the year.

In something of a coup, Demtek 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 Demtek the rights through their licensing company, the International Development Group.

All the more for us...

A NEW wave welcome to the first exclusively 8-bit edition of Atari User. Now that our ST recycling has flown the coop we will be devoting all of our paper to you, the Atari 8-bit owner.

Don't take an 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 for

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

Top 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 (Gawth), the massive Atari arcade hit of 1989. In addition, Brilly's advertising column has had a complete face lift and boasts a massive monthly adventure map.

All of our regular features are

here 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 Commodore printer without spending a small fortune on the extra hardware.

André Hilley will be continuing to look at the workings of the central microchip 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 82 for some useful tips on how best to go about it.

Atari 8-bit business booming - Sam Tramiel

A CLAIM that the Atari 8-bit range is coming back to life in a very big way was made by company president Sam Tramiel at the Hannover Show recently.

He singled out Atari's new 8-bit video games machine, the 8500, as being the new flagship of the games machine range.

"We are particularly happy about the initial response, and now have the financial results to ensure that Atari becomes once again the leader in the 8-bit computer world", he said.

Atari is indeed in the best of financial health. The corporation's latest results show a remarkable

turn around with sales up 82 per cent.

The major part of this came in the last quarter of 1986 when the company broke all records, in those three months they notched up sales of \$80,667,000 against \$88,360,000 for the same period in 1985.

The year's sales totalled just over \$250 million against almost \$142 million, an increase of 81.8 per cent. This left the net income for 1986 at about \$23 million.

"We are now in a healthier financial position than Commodore ever was", said Jack Tramiel, the man who built Commodore into a billion dollar

company and has now dragged Atari off its knees.

"Our strong performance in 1986 is the result of a resurgence in demand for video games systems and a growing consumer awareness of the value of the rest of our products.

"We are operating from a position of strength now. We are not only virtually debt-free, having paid off everybody, but we have \$70 million in the bank", he said.

The introduction of the XE video-game system and other major Atari products would drive the company's growth in 1987, said Tramiel.

Software shake-up

From Page 5

claiming that it has to be a winner.

"We have therefore decided to support the machine. It seems the way to go."

"The demand for our Atari games has actually taken us by surprise."

And Mastertronic reports that it is increasing its range of 8-bit products.

"The Atari games we have published have done very well", said a spokesman. "We feel happy continuing to support the 8-bit, especially with the arrival of the 8500".

Pat Wilson of Minnesota, which has published a conversion for the 8-bit, said that for company was talking to Atari about more games. The situation is "under consideration".

Code Masters' David Darling said conversions for the 8500 had sold well. "We feel there is a good market in Britain for 8-bit games - and this can lead into the world market", he said.

Publishing drive

ATARI plans to get back into software publishing in a big way. The company believes that British software is equally as good as anything which can be produced in the US.

"We are looking for British programmes which we can market around the world", a spokesman said. Star Trek with its digitised sound and impressive graphics was cited as a perfect example of homegrown programming.

Atari is also looking to market British-written business software.

Multiples move Atari's way

STAND by for an Atari explosion in the High Street this year. The company is at an advanced stage of discussions with several leading chain stores about putting its 8-bit and ST machines on their shelves.

Among the multiples Atari has targeted are W H Smith, Dixons, Boots, Laskys, Comet and Woolworths.

There are plans to test market the ST range at those of them in May and this will be followed by the games machines - the new 8500, 2606PCS and ever-popular 1080E - in September.

Atari spokesman Peter Walker said the company is confident it can place its machines in the Big Six multiples, some of which handled its early 8-bit models.

"Regulations are making completion but we don't want to jump the gun by announcing deals before they are fully signed, sealed and delivered", he told Atari User.

"The people we are dealing with are well aware that the ST range is a sure seller and that our 8-bit machines have no competition where software availability is concerned".

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Don't
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How to make
your Atari ST
work as a
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From our reader survey we know that many dedicated 8 bit owners also have a strong interest in the exciting new world of 16 bit computing with the Atari ST range. Whether you are thinking of buying an ST, or curious to know much more about Atari's pioneering role in the 16-bit world, make sure you don't miss reading your copy of our comprehensive publication, Atari ST User.

The April issue, not now, includes the following features:

- **Mac Emulation** - We send a critical eye over the latest (and) which turns your ST into a Macintosh - or does it?
- **Tip of the minute** news from the Hardware Mail - including information on the new Mega STs, the Atari 16, the desktop publishing package and all the latest software.
- **First part** of a fascinating new tutorial series on programming in the C++ environment. This first installment helps you to make the best use of Atari and the Turbo C++.
- **We get CAD-80** by the test in an unusual software test. Is it capable of helping to design the new headquarters for Atari ST User?
- **First Word** journal drivers explained. At last you can overcome the first WORD package to make the most of your own type of printer.
- **Atari table desk accessories**. This useful little program for you to type in will create a desk accessory to help to to work out these important Atari codes.
- **Software reviews**, including The Alternative, Windows, Transplicing Visualizer, Starbox, and Adventure Reality.
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Available NOW from your newspaper or larger computer dealer. Or only for £6 in the subscription form below to be sure of always keeping yourself up to date with all the latest developments in the Atari ST world.

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Show features games arcade

A HELL of a scene 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 installations the three-day show opens at London's favoured in Hammersmith 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 Real Fun Software - Asteroid, Death Racers and Forbidden Island - all costing £7.95 on tape, £9.95 on disc.

Typesoft 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 Novotel, Hammersmith, London from April 24 to 26.

Doors open at 11am 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 Hammersmith, 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,

codes, power supply and interface unit, the drive plugs into the parallel bus at the rear of the 800X2 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

five to one.

All the drives supplied by Frontier 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 game 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 100,000-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 MicroLink.

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

has already attracted customers worldwide.

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TORPEDO!

By GARY TINSLEY

"ENEMY boats on radar Captain!"

"OK, Battle stations! Torpedo bay, Load torpedoes... 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! checklist 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 sub 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	28 points
Boat mid sea	18 points
Boats put off shore	6 points

PROGRAM BREAKDOWN

Lines 48-208

Set up player missile graphics, create the boat shapes, clear sound registers, change each Graphics 0 line to read 130 (ANTIC 2 = 128, for D.L.H.). The CPU routine and its colours are PCB4 into Page 6. This routine first appeared in *Analog* magazine and it enables each screen line of ANTIC 2 mode (Graphics 0) to be a different colour, and the text a different luminance. Try changing some of the numbers in lines 123 & 124.

Lines 208-212

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 238-238

Set air deterioration rate (LV), read scores and boats hit, choose random FOG duration, choose initial boat positions, set numbers of boats hit. Done the game scores.

Lines 240-288

Lines 308-418

Main game loop - adjust air level ML, check for joystick movement and

Lines 508-528

Lines 738-748

Lines 808-891

Lines 908-938

miss submarine, move boats and check positions. If boats move off-screen then read, check for fire button and if no fire torpedos. If ML reaches FOG then darken boat colours and set fog flag.

Test for a hit - check player collision registers (PCB 50750 - 50755) and if any of these contain 8 then a torpedo has hit a boat. Add to score, set hit score, set score, set boats hit (BT), set NBI NBO NBO, flash screen and make explosion noise.

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

End of game. Clear screen, disable D.L.H. (64284), print scores, print number of boats hit and individual boats hit, print new rank, make sound type noise, return to title screen. Air low warning. Print Air low and continue with game.

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TO ORDER TURN TO THE FORM ON PAGE 61

Over the next three months we'll be explaining how to make your Basic and machine code programs load and run automatically, just like commercial machine code software. We'll start by examining cassette systems, then move on to the various disk techniques.

The most obvious reason for using autoboot files is cosmetic — programs look more professional if they load and run automatically — but they have many other advantages which are less apparent.

You can change the screen colour, alter the margins, set new Tab stops, select lower case letters or insert a flashing cursor, all before the READY prompt appears.

You can load new character sets, ready-drawn screen images, or other large blocks of data before Basic takes control. And the autoboot system is the only way of changing MEMLO, which tells Basic where to find its lowest available memory.

Re-setting this pointer to a higher value will contain off an area at the low end of ram which Basic can't touch, and which will be in the same place regardless of the host computer's memory size.

The bad news is that autoboot files must be written in machine code. The entire load and run process happens before Basic gets control, so there's no direct way of autobooting a Basic program. However, it is possible to create a machine code file which initiates Basic then calls and runs a Basic program, and the end result is hard to distinguish from a single-stage autoboot operation. We will be giving you several suitable programs as we go along.

The easiest way of explaining how an autoboot file works is to construct one. Program 1 contains the simplest we can think of — it just changes the screen border to the same colour as the text area and resets MEMLO to protect itself from Basic.

You will need some kind of

Just like the real thing

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assembler, such as the Atari Assembler/Editor cartridge, to make it work in this form, of course. Although it's short, it embodies all the features of a cassette autoboot file, so if you can make this work then there's nothing to stop you writing much more interesting routines.

Let's look at the format step-by-step. The first six bytes (lines 80 to 150) are a header, containing information which the operating system needs to carry out the autoboot process.

The first byte is always zero, though it isn't used by the OS. The second is the file length, in blocks of 128 bytes, rounded up if necessary.

Next comes a two-byte address which tells the OS where in ram it has to start loading the file.

Finally the last two bytes hold the initialisation address. Control will pass to this address during power-up, and whenever System Reset is pressed. The rest of the file, from COLDST to FINISH, contains all the machine code instructions which we want carried out before Basic gets control.

Here's how the cassette autoboot system works. When you switch the power on with the Start key held down a single beep tells you to press Play on your cassette recorder, then

hit any key. The computer begins by reading the first 128 byte record from tape into the cassette buffer starting at 1001 (\$0FD).

It extracts the information from the first six bytes, stores the load address in BOOTAD (\$768 (\$2428)), stores the initialisation address in CASINI (\$201) and makes a note that it's using a cassette-based program by storing 2 in the BOOTF flag (address \$).

It then copies the entire first record (including the header) from the cassette buffer to the load address and works out how many more blocks are needed, then loads them directly from tape to the load area.

When loading is complete, the OS performs a sequence of jumps to various subroutines. First it does a JBR to BOOTAD+8 straight after the header. Because it's a JBR, not a JMP, this section of code must end with an RTS instruction (line 178).

When it returns via the RTS statement the OS checks the BERR carry flag. If it's set, the autoboot process terminates with an error message, but if it's clear the process can go on to stage two.

This first section must always switch off the cassette motor, clear the carry flag (with a CLC command) and

80	MEMLOA = 1, MEMLO (\$0000) (\$07800) (\$11)	010	END PAGE	
81	CALLS=1023	010	00	Define success
82	LOADADR=1024	010	010	
83	MEMLO=0207	010	010	
84	CALL=0000	010	010	
85	MEMLO=0000	010	001	Change screen
86		010	001	border colour
87	MEMLO=0000	010	001	Set MEMLO to 0000H
88	RTS 0	010	010	the autoboot file line
89	RTS (\$0000) (\$0000) (\$07800) (\$11)	010	010	instruction line 178H.
90	CALL LOADADR	010	010	
91	CALL CALL	010	010	Call to Basic
92		010	010	
93	CALL CALL	010	010	
94	CALL CALL	010	010	

Program 1

Autoboot

of Program 1. When you have typed everything in, assemble it then enter DEBUG mode and type D 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 1B 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 Option). Press Play when the beep sounds and hit any key. After the usual leader delay, you'll hear the autoboot file being loaded, then if all

```

5 REM PROGRAM 1 - BASIC version of Pro
  1000 2
  10 REM Writes the data at line 700 to
  1010 a an autoboot cassette FILE.
  1020 OPEN OUTPUT:800-30000:800 reverse
  1030 LOCATE 10:GOTO 1000 as a the
  1040 format
  1050 FOR I=0 TO 255:PRINT I:GOTO 1000
  1060 NEXT I:GOTO 1000
  1070 LOCATE 10:PRINT "Autoboot"
  1080 GOTO 1000
  1090 DATA 84,84,131,204,84,131,201,8
  1100 4,131,204,84,131,201,84,8,84,11,11
  1110 1,44,1
  1120 DATA 101,201,131,84,1,101,204,131,1
  1130 1,1,101,201,111,13,1,1,101,201,111,1,1
  1140 DATA 11,24,24,24,27,31,31
  
```

Program 1B

```

10 REM Load the program (assumes it's
  11 100 1000000:GOTO 1000
  12 DATA 1000000:100
  13 DATA 101,101-1:1000:100
  140 1001:101,1,1,101-1:1010:10
  150 REM Now read the data from the
  160 program buffer into an autoboot cassette
  170 FILE
  180 OPEN FILE:CLOSE
  190 LOCATE 10:PRINT "Autoboot"
  200 GOTO
  210 DATA 84,84,131,204,84,131,201,8
  220 4,131,204,84,131,201,84,8,84,11,11
  230 1,44,1
  240 DATA 101,201,131,84,1,101,204,131,1
  250 1,1,101,201,111,13,1,1,101,201,111,1,1
  260 DATA 11,24,24,24,27,31,31
  270
  280
  
```

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 712,0. Now press System Reset, and you'll see the new colour is restored as the OS performs its JSR through CASINI.

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



LINE	FROM	LINE	TO	LINE	GROUP
1	8437	50	14710	100	27131
50	14746	40	14819	50	14902
40	2462	70	17134	100	20948
70	4111	100	10000	110	21671
110	5410	130	17150	140	834
130	9512	160	1011		

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Crafty plotter

Program: Super 3D Plotter II
Price: £29.95 (inc. vat)
Supplier: Damon Roberts,
31 Freshford Avenue,
Newport, Gwent NP23 5JF
Tel: 0757 333057

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.

Disk based, the program auto-boots without Basic. It can display complete drawings in low, medium and high resolutions. Menu driven, the first options available are Load or Create.

Luckily the program has plenty of images stored on disc. Until you get used to the compact array of instructions for creating your images, 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 3D-mapped objects.

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 — see 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 1024 Dot Matrix printer. More comprehensive dumps can be obtained by displaying the image in lines mode.

Other useful facilities are screen-saves, which will save the entire screen in a 52-sector MicroPainter format called Picture.

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

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 tracing instead of lines being erased and redrawn when your image is moving, you can alter the functions to freeze 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 move the joy-

stick 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 rotate positions before saving the image to disc.

Using the joystick input routine I prepared the capabilities for the video image material and within 10 minutes had the design rotating around the screen.

I was attracted 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 graphic artist or just a plain doodler, this program wouldn't go amiss in anybody's collection.

Alan Goldshire

Performance	9
Graphics	10
Ease of use	7
Value for money	7
Overall	8



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 Save 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 set up the printer con-

Fuzzy problems

Program: Crumbles' Crisis
Price: £7.95 (recommended) £3.95 (retail)
Supplier: Red Hat, 11-13
Farnal Street, Manchester
M4 3DZ
Tel: 061-639 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 get the time locks on the Fuzzies cages properly.

During the night they all escaped into the depths of the Multiverse and you are going to have to track them 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 prisoners you've caught, so even you won't lose count.

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

No chasing now Crumble. Time Lightning starts sparking 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 Racks. 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 dogs along the way that is.

More fun than I'm going to have now – I've been lumbered with making out the Megagalactic' cage while you're away!

Niles Reynolds

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

Platform for two

Program: Robot Knight
Price: £7.95 (recommended) £3.95 (retail)
Supplier: Red Hat, 11-13
Farnal Street, Manchester
M4 3DZ
Tel: 061-639 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 Ozo. Living in a serene and easy-going Futaworld, 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 Futaworld, he resolved to go

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

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

Finding an isolated shire, he built a laboratory in which to perfect the ultimate being, to smash it on an unsuspecting Futaworld.

So far he's met with only limited success and zombie-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 Ozo 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 zombies and their



fireballs, collecting energy packs on the way.

The ultimate goal is Ozo'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?

Robot Knight can be used in a one-player game, it is a two-player game (but use wares simultaneously and you can choose to act as

allies or enemies.

It is the rather fun two-player option that lifts 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 interesting to appeal to gamers.

Niles Reynolds

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

Real high flyer

Program: Tomahawk
 Price: £9.95 (retailer)
 £14.95 (direct) minimum
 £45
 Supplier: Digital Integration,
 Watchmoor Trade Centre,
 Watchmoor Road,
 Camberley, Surrey GU24
 3JA
 Tel: 0275 843352

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 64k, 8 bit 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 heading simulation for the P7B Eagle, Tomahawk is a simulation of the McDonnell Douglas (Hughes) AH-64A 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 whosh.

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 depen-

ding 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 50 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 heliine 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 knock out an enemy helicopter, but won't even dent 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.

Bases and helipads are also shown, and facilities exist to help you find these 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 one distinguish between allied and enemy forces.

The normal digital instruments are all there, including altitude, airspeed, 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 rather lacking 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 RAF's Jaguar simulator which uses three targets full of relief map and a very expensive ranging camera technique to achieve exceptionally realistic visuals, I can understand the limitations imposed by a 64k home micro.

My only negative comment is that ground features - mountains, buildings and targets - are all line drawings. These are fast to replot, 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.

Rob Anthony



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

Thoughtful warfare

Program: Vietnam
Price: £14.99 (hard)
Supplier: US Games, Units 203
Moffatt Way, Birmingham
B9 7SA
Tel: 021-336 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 US Gold.

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 Gold) 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 randomized 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 identify 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 loses 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 artillery fall phase in which the earlier plotted targets are struck.

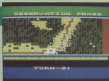
The final phase shows the comparative state of both sides, with points being gained for the number of units eliminated. A victory indication is also given - questionable, minor, major or decisive. At the end of each complete turn, an opportunity is given to save the game.

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 dedicated wargamer and any one who likes games that require a liberal dose of strategic planning and thinking.

Bob Chappell



Ze fly be on ye turnip

Program: The Archers
Price: £9.99
Supplier: Mosaic, 187 Cooper
Street, London W9 1AQ
Tel: 01-276 0658

Bumpy-tumpy-tumpy-tum,
Bumpy-tumpy-tum-tee,
Bumpy-tumpy-tumpy-tum,
Bumpy-tum-tee,
Bumpy-tumpy-tum.

Do, ah, me old pals, me old beauties. Now just you put down them three rangelovers and harken to old Walter Gabriel 'ee. Mine's a pair of Shires while you're at.

Our scribes and their three player-attics down at Level 3 have gone and taken the story of our everyday country folk, the Archers, and stuck it on one of their new-fangled com-

puter machines.

Seems the idea is that you be a brains scribbler and have to plot divisions about four of our lovable folk here at Amberidge: Jack Woods, Elizabeth Archer, Eddie Quarity and Nelson Gabriel.

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

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

What you get on your TV 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 remember the sorta thing from way back in another Mosaic game about a dairy and a mole called Adrian.

Now, me old turnips, don't go thinking that the game is the same every time you play it 'cos it isn't be so. Like Sir Peric' Shires (don't marvel if I do, Jack), it's a little different every time you try it.

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

Well, me old cabbages, if you be a fan of us old coolers down here in Amberidge, then here's a compost it compost, you going to love this here game.

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

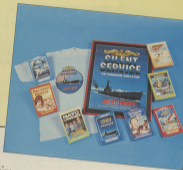
Each to his own tastes, is what I say - and speaking of tastes, my glass is empty, Jack, the old beauty.

Billig

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

Sound	8/10
Graphics	8
Playability	8
Value for money	7
Overall	7

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70
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3rd prize: A copy of Silent Service, a framed Silent Service poster, plus a T shirt.

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 *Amiga 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 *F-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.

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Send to: MicroProse Competition, Amiga User, Empire House, 88 Chester Road, Manly Grove, Bishops Cleeve, Shropshire ST2 8NY.

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Form

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Address _____

Age _____

Number of words found:

(Please list on separate sheet)

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Preferred format for prize: cassette disc



GAUNTLET

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 run-and-gun genre which seems to dominate the arcades, this unlikely success was a multi-player graphic strategy affair based on the dungeons and dragons theme.

At 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 number one chart hits with every new edition they've completed.

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

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

I'd often seen crowds of people huddled over these strangely designed machines, but I 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 heroes - for you to choose from, each with their own special powers and abilities.

There's Thor 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 Questor the Elf, but what he loses in magic he gains in weapons.

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 Gauntlet, 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 Startrack, 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 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 conversion goes still further, because the whole Gauntlet concept was based on an old 8 bit



The main 87c screen as seen on an 800XE

Atari AXE title called *Dandy Dungeons*, written by John Palevitch, 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 Gavin Sulzer, 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.

Bill 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 serial TDI Pleco multi-user 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 Pleco to transfer its data via the second joystick port – considerably faster than a disc drive could. An entire 32k block of program data could be transferred in about 10 seconds.

Logically enough then, it was Bob who took care 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 – Quantel 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 16 colour high resolution screen on the 8-bit machine.

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

think the palette affected the user. Dungeons for instance, using lots to open up new sections.



It would be odd to be playing dungeons. Right, yes, the color palette which adds 100 points to your Asahi 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 Pleco 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 112 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 612 rooms...

Some of these complicated 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 wherever possible.

Dandy 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 Merle, where's that amulet got to...



The Atari programming team. Ken Palmer 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 double.

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 ICAX1 and ICAX2 (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 OS's 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 \$10116 in decimal, which is

ICDB Zero	\$340	(\$321)
ICDB One	\$350	(\$349)
ICDB Two	\$360	(\$344)
ICDB Three	\$370	(\$381)
ICDB Four	\$380	(\$369)
ICDB Five	\$390	(\$412)
ICDB Six	\$3A0	(\$338)
ICDB Seven	\$3B0	(\$444)

Figure 1: ICDB Block 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 ZOCB, it sits at \$2C02 (decimal), and needs to contain the same information as ICDB one did. ICDBM becomes ICDBM\$, ICAX1 becomes ICAX1\$, 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, F, S) and so forth.

Once it has this device specifier (the argument's sake, let's say it was F) 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 F at the end of HATA8S rather than the beginning. This rather useful fact means that adding a new handler is take over from an existing one 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

HATA8S + 0	F	\$E430	(\$8416)
HATA8S + 3	C	\$E440	(\$8432)
HATA8S + 6	E	\$E400	(\$8368)
HATA8S + 9	S	\$E410	(\$8384)
HATA8S + 12	R	\$E420	(\$8400)
HATA8S + 15	D	\$C0C8	(\$C094)
HATA8S + 18	K	\$C380	(\$87C0)
HATA8S + 21	-	\$0000	
HATA8S + 24	-	\$0000	
HATA8S + 27	-	\$0000	
HATA8S + 30	-	\$0000	
HATA8S + 33	-	\$0000	

NE: Apparent Dos 2.0 and \$50 P5-237 handler present. Unlisted entries are filled with zeros.

Figure 8: The Handler Address Table at \$2A (254)

handlers associated with it, as shown in Figure 8. In the case of our P, for example this would be \$E430 (\$E470) - 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 \$E430 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 Bytes(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 JMP 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 \$E408 (\$E008), 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 for use anyway!

The last three of these contain a machine code jump instruction to the initialization 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 MD 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 P2322 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 XLUX, usage it moved a lot of the machine code around in memory.

	Device	Open	Close	Get	Put	Status	Special	JMP to
\$E408	E:	F3F8	F628	F8D8	F8A3	F633	F63C	F3E4
\$E410	S:	F3F8	F628	F8D8	F8B6	F633	F62B	F3E4
\$E420	K:	F633	F633	F8E1	F83C	F633	F63C	F3E4
\$E430	P:	E05E	E05E	E090	E0A6	E090	E090	E076
\$E440	C:	E74B	F02A	E706	F8F7	F027	E74A	E741

Figure 8: The open based Handler Vector Tables (old XL080 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 XL when compared to those of a 408 or 800.

Figures 8 and 9 show the values in both cases, but should Atari do another major rewrite of the OS for a future machine, they could all change again.

You will notice that neither Figure 8 nor 9 contains any vectors for the disc or P2322 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 disk. 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 (\$ATABLE) 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 rom, we'll be using the same technique next time to add our own device driver.

Now the OS has at last found the actual address of the routine it requires, it does a JMP 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 MD 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 IOCBs, 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 OS.

OS 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 one.

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 JMP 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 think about the difference in execution times and see if you can explain it - it'll let you know the answer just in case, when we'll begin to put together our own device driver program.

	Device	Open	Close	Get	Put	Status	Special	JMP to
\$E400	E:	E780	F220	F248	F2AF	F210	F22C	E75E
\$E410	S:	E780	F220	F17F	F1A3	F210	F24E	E75E
\$E420	K:	F210	F210	F2FC	F23C	F210	F23C	E76E
\$E430	P:	FEC1	F8B6	F8C0	F8CA	F8A3	F8C0	F899
\$E440	C:	FCE5	F0CE	F009	F060	F0C3	F0E4	F0D6

Figure 9: The rom based Handler Vector Tables (Current XL080 OS)

MEGAPAC

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Software hotline fills the gap

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

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

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

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

"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.

"Intercom 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 Intercom bulletin board on MicroLink to extend the service to remote users."

MicroLink on the rates

BRITAIN'S 100-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, contacting 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 Duncan Baker's latest venture - teaching Japanese to British business people.

The new addition to the curriculum at Lydford English Centre in Shropshire developed from a world-wide electronic mail exchange on MicroLink

with antiquarian bookseller Tom Swain.

Swain 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 unclimbed peak of Mawqoge to his own collection of Himalayan "conquers".

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 some while I'm in Tibet. Where I'm going is so remote that my messages will have to be carried by mules for three days before they reach the nearest road".

By Brillig

One way to make The Payoff

The pasting continues to beige, and still the greatest number of cries for help are regarding The Payoff. In many shops The Payoff was thrown in as an extra goodie 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 Marc Jones of the Winal, Mansfield shortened the somewhat "Break Window" to "Break Wind" and received the cheeky

response, "That's better!"

Note to some more of your worries. Among others, Jason Kinman of Hackney and Richard Coughlin of Luton are having trouble with the decoder listing in Basic that comes with Level 2'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 one for the letter O and vice-versa.

Perhaps someone can help Garren Annis of Leicester, who is experiencing a little difficulty with the pygmy in Marlane's Quest and the maze in Adventureland.

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

K. Ransome wanders how to sur-



THE PAYOFF

Read note : Go counter : Place bet : Drop all : Drink pipe : Go up : Get hold : Go stairs : Go ledge : Open window : Go window : Go down until you reach the street door Go East : Go tent : Get alcohohammer : Go North, West, North, North : Smash door : Go office : Get ashtray : Rub ashtray : Feed painting : Open safe : Look safe : Get control : Drop alcohohammer : Go to bathroom : Get can, 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 restaurant : Get newspaper : Go to garage : Go pit : Get bits : Go to washrooms : Hit consumer : Go East : Drink wine : Drop all : Drink fence and return to office here solution : Look fridge : Get meat :

Look cupboard : Get trash : Get hold : Return to courtyard and stand fence again : Get pills : Drop meat : Give meat : Get can, newspaper and control : Up to the fire escape : Go ledge : Spread trash and stick newspaper on the window : Jump : Drop all : Down : Go shed : Look toolbox : Get stool, hammer, sawwhire and drill : Go East : Get bits : Up to fire escape : Drop stool : Get can : Stand stool : Open and then spray alarm : Go ledge : Smash window : Go window : Move cabinet : Unhook, open and go bedroom : Get pills and control : Go to security desk and drug coffee : Go to secretary's office and get umbrella : Go North and drop umbrella : Phone guard the pill water and drink the straggled drink : Get guard : Go lit :

Press button : Keys control : Go chamber : Press guard lot guard : Get hat from desk Return to secretary's office, Look typewriter : Look pig : Get East : Fit fuse into shell : Go to storeroom : Go bedroom : Down : Get hold : Return to manager's office : Drill floor : Get umbrella and put it in hole (put umbrella) : Open umbrella : Drill floor again : Rig hold : Get beer : Get box number found on list : Open box : Get gem : Go hole : Return to storeroom : Go bedroom : Open : Drink fence : Go to carpenter : Give gem (and receive key) : Unhook car : Go car : Get avalanche : Go carpenter : Go West, West, West, North, North, North and up : Drink gutter : Go down and West : Give bracelets : Yo! Yo! The game is finished!

vive underwater in Red Moon.

The Bugblatter Beast from Tralal in High-Advent's Guide to the Galaxy is causing Ken Wilkie and many others to come to grief. Some relief is afforded to all these woes in this month's Hints 'n' Tips section.

Laura Hester 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 Barnabe Tewkeshead, 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 Wazooz. This problem has been troubling several readers, among them J.D. Ashburn and G. Neil of Scorton. What you have to do is go to trapdoor in the roof and

HINTS 'N' TIPS

MORDON'S QUEST

Pygmy proving a pest?
END WOL BHTW YNDY PLUKHNDY
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4847 WEP (P)W LARK AM

ADVENTURELAND

Stuck in the pits?
*PAIR*Y*MS*SDNA*GLRW*OTS

GOLDEN SADDLE

Have you got a light, mate?
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RED MOON

Can't breathe underwater?

GRW (T)W ARKA MSAQ ASAL
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HITCHHIKERS' GUIDE

Reet barfing you?
P LAR OWRN ENOT SDNA SDW
MAD CL

P. 7084 AWLQ WROF LORR SATE
455E AYSE ODMM W

P. 0462 YQAE ASAL PAUQ WYAN
TBAI WCAI WYDC

THE PAWN

Dragon blocking your way?
P. 3840D AWST AKOOL
P. 3844 WSTA WTH WYD WQ
P. 3844 WSTA WYD WYD P
P. 479D NQD

sleep the Reem. You return and just walk over it. Easy when you know how.

The diehard adventurers among you might be interested in a sample magazine I've been sent called *Adventure Probe*, privately published and aimed mainly at adventur 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 Shillbee, at 78 Merton Road, Highfield, Wigan, WNG 6AT.

Following my Christmas declaration of my favourite top twenty adventures, Allan Palmer of Basingstoke 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 whodunnit adventures, *Deadline* and *Berserk* are the best, and the interaction of the player with the characters is superbly done. Trouble is, what adventures 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.

Billing 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!

LIFELINE

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

Allan J. Palmer, 87 Aachenham Road, Basingstoke, Hants RG21 7RL; Adventureland, Poole Adventure, Mission Impossible, Voodoo Castle, The Curse, Strange Odyssey, Mystery Fantasies, Pyramid Of Doom, Ghost Town, Savage Island I, Zerk 1, Zerk II, Zerk III, *Deadline*.

Andrew Lewis, 286 Hanover Square, Leeds LS2 1AW; *Jewels Of Darkness* trilogy, *Silence Dreams* trilogy, *Missionary I* and *II*.

Mr C. Leighton, 34 Boringham Crescent, Sherwood, Nottingham NG4 8JY; *The Price Of Magic*, *Red Moon*, *Lords Of Time*, *Dungeons Adventure*.

GLITCHES OF THE MONTH

Mark Hatch of Ripon has found two nice glitches in *The Pawn*. He has found that it is possible to tear the paper wall with the irresistible force 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, Mark!

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

adventures. Starting with the *Dragonheart* trilogy, if you type in the command *SAP LEMM* 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 LOPF*, or *SAP LOPF LEMM* to 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 to the developers to assist with speedy debugging of assumed 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 virtually find the computer solution. What a boon for solving those really tricky puzzles like the *Golden Fish*.

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KEY

- Normal passageway
- One-way passageway
- - - Passageway requiring special equipment or problem-solving
- ~ ~ ~ Narrow passageway
- ~ ~ ~ Passage level
- Passageway returning to room of origin



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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 £28 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 leaves page 8 free and it will work with any language cartridge, including AtariBASIC.

Let's look at the hardware first. You will need two joystick extension cables and a 25-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 11 to pin 30 inside the plug.

Soldering this type of connector can be a bit fiddly, and it is a good test of soldering skills. 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 150 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 an discussion of the Basic listings.

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

Adding a new handler is fairly straightforward and is being covered in more detail in Andre Miller'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 BNDZ 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 (STRGB0). If it is high (1) that means the printer is waiting on some other task, so the routine pauses until STRGB0 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
J O Y S T I C K	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	STROBE	11	BUSY
	7	+5V *	—	—
	8	0V	16	GROUND
	9	POT A	—	—
J O Y S T I C K	1	BIT 4	6	DATA 5
	2	BIT 5	7	DATA 6
	3	BIT 6	8	DATA 7
	4	BIT 7	1	STROBE
	5	POT B	—	—
	6	STRGB1	32	FAULT
	7	+5V *	—	—
	8	0V	33	GROUND
	9	POT A	—	—
1	—	—	9 **	DATA 8
	—	—	30	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 30

```

01 [PROGRAM TO HANDLE DATA] - 32K VERSION
02 ORG 0
03 ORG 1000
04 ORG 1000+100
05 ORG 1000
06 ORG 1000+100
07 ORG 1000
08 ORG 1000+100
09 ORG 1000
10 ORG 1000+100
11 ORG 1000
12 ORG 1000+100
13 ORG 1000
14 ORG 1000+100
15 ORG 1000
16 ORG 1000+100
17 ORG 1000
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30 ORG 1000+100
31 ORG 1000
32 ORG 1000+100
33 ORG 1000
34 ORG 1000+100
35 ORG 1000
36 ORG 1000+100
37 ORG 1000
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87 ORG 1000
88 ORG 1000+100
89 ORG 1000
90 ORG 1000+100
91 ORG 1000
92 ORG 1000+100
93 ORG 1000
94 ORG 1000+100
95 ORG 1000
96 ORG 1000+100
97 ORG 1000
98 ORG 1000+100
99 ORG 1000
100 ORG 1000+100

```

Program 16: Printer Interface, 32K version

feed, provided you have selected 'automatic line feed' on its internal DIP switches.

Sending the character to the joystick ports is easy - we just store it at PORTA (\$2000), whenever bits 0 to 3 equal a port line, and bits 4 to 7 at port low, as shown in Table 1.

The printer won't actually do anything with the data until its strobe line goes low, and here we have a problem. Only eight output lines are available from the two joystick ports, and we need them all to carry an eight-bit character. So what can we connect

the strobe line to?

The answer is that we cheat by stealing the eighth bit (bit 7) from the character, and connecting it to the strobe line. Since normal characters use only bits 0 to 6 (ASCII codes 0 to 127), this doesn't matter for most purposes.

By masking bit 7 on or off we can now send the strobe line high or low at will, without affecting the character data. The printer expects to receive eight-bit characters so we can't just ignore its Data-8 line. Instead we connect it permanently to ground via Cen-

```

0000 ORG 1000000
0001 ORG 1000000
0002 ORG 1000000
0003 ORG 1000000
0004 ORG 1000000
0005 ORG 1000000
0006 ORG 1000000
0007 ORG 1000000
0008 ORG 1000000
0009 ORG 1000000
0010 ORG 1000000
0011 ORG 1000000
0012 ORG 1000000
0013 ORG 1000000
0014 ORG 1000000
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0021 ORG 1000000
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0040 ORG 1000000
0041 ORG 1000000
0042 ORG 1000000
0043 ORG 1000000
0044 ORG 1000000
0045 ORG 1000000
0046 ORG 1000000
0047 ORG 1000000
0048 ORG 1000000
0049 ORG 1000000
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0051 ORG 1000000
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0057 ORG 1000000
0058 ORG 1000000
0059 ORG 1000000
0060 ORG 1000000
0061 ORG 1000000
0062 ORG 1000000
0063 ORG 1000000
0064 ORG 1000000
0065 ORG 1000000
0066 ORG 1000000
0067 ORG 1000000
0068 ORG 1000000
0069 ORG 1000000
0070 ORG 1000000
0071 ORG 1000000
0072 ORG 1000000
0073 ORG 1000000
0074 ORG 1000000
0075 ORG 1000000
0076 ORG 1000000
0077 ORG 1000000
0078 ORG 1000000
0079 ORG 1000000
0080 ORG 1000000
0081 ORG 1000000
0082 ORG 1000000
0083 ORG 1000000
0084 ORG 1000000
0085 ORG 1000000
0086 ORG 1000000
0087 ORG 1000000
0088 ORG 1000000
0089 ORG 1000000
0090 ORG 1000000
0091 ORG 1000000
0092 ORG 1000000
0093 ORG 1000000
0094 ORG 1000000
0095 ORG 1000000
0096 ORG 1000000
0097 ORG 1000000
0098 ORG 1000000
0099 ORG 1000000

```

10 PROGRAM TO: PRINTER INTERFACE - CASSETTE VERSION	0150 0017	
10 000000	0150 000000	Stop cassette motor
10 00000100	0170 070 0007	
10 00000150	0150 000	Indicate successful boot
10 00000200	0170 070	
10 00000250	0150 000007	
10 00000300	0150 100 07000000	Reset ROMs to receive
10 00000350	0170 070 0000	a protected area of
10 00000400	0150 100 07000000	the low end of ROM
10 00000450	0170 070 0000-1	
10 00000500	0150 100 07000000	Change the priority decoder
10 00000550	0170 070 0000-2	to allow us to find it printed
10 00000600	0150 100 07000000	to our new list of hardware
10 00000650	0170 070 0000-2	locations at ROM0
10 00000700	0150 070	
10 00000750	0150 000000	
10 00000800	0170 0700 000000 00 000 0100 000000	
10 00000850		
10 00000900		
10 00000950		
10 00001000		
10 00001050		
10 00001100		
10 00001150		
10 00001200		
10 00001250		
10 00001300		

Program 10: Printer Interface, Cassette version

After a further six microseconds the strobe line is sent high again, and the routine exits to CIO, using the Y register to indicate a successful data transfer.

This process continues until all the data has been printed, then CIO calls the CLOSE routine and hands control back to Basic, or whatever other language cartridge is installed.

Program 10 shows the alternative initialisation code for the cassette version. It's different from the disc code because we will be using autoboot format to load the interface program. This ensures that it is invisible to the user, loads rapidly, doesn't need to occupy page 0, has no worries about memory size and can be used with any language cartridge. Also it looks more professional that way.

In both versions, the code ahead of NEWTAB contains initialisation routines which make sure the program loads cleanly into a safe area of ram, and is System Reset proof.

The cassette version uses a standard autoboot format, so the run address is contained in a header, and the Amn's own boot handler protects the code against System Reset.

More information on autobooting in general is contained in the article on automounting Basic programs on page 14.

The disc version loads into an AUTOMOUNT SYS file, which is a lot friendlier and easier to handle than a disc autoboot. With this system the header is different, and extra code is needed to protect the interface program against System Reset.

As the disc version needs to insert a run address during the load process, and this appears as a footer after FINISH. The code from NEWTAB to FINISH is identical in both versions.

The cassette version loads into ram at \$700 (1790 decimal), but the disc version has to leave room for Dos and a few other things, so it starts at \$1500 (7424 decimal).

If you have an assembler you can put the program anywhere you like in ram, but since assembled the code is not re-loadable.

That's the end of our machine code interlude. Basic programmers can re-join us now. Programs 8 and 10 are completely self-contained. They need to be RUN just once to create the appropriate autoboot file, and can then be discarded.

Bear in mind that readable code has to be typed in absolutely correctly or it will probably lock up the computer. Always be sure to SAVE a temporary copy before you try to RUN it.

For the disc version, insert a disc which doesn't already contain an AUTOMOUNT SYS file, then type RUN and hit Return. The file will be created in a few seconds, and it will load and run automatically whenever you switch on with that disc inserted.

To make the cassette version, insert a blank cassette which has been fully rewound, then type RUN and hit

0 000 0000000 : 010007 00000000 - 0	100 0070 00000000,00000000,00000000,
00 00000000	00000000,00000000,00000000,00000000
00 00000000	00000000,00000000,00000000,00000000
00 00000000	00000000,00000000,00000000,00000000
00 00000000	00000000,00000000,00000000,00000000
00 00000000	00000000,00000000,00000000,00000000
00 00000000	00000000,00000000,00000000,00000000
00 00000000	00000000,00000000,00000000,00000000
00 00000000	00000000,00000000,00000000,00000000
00 00000000	00000000,00000000,00000000,00000000
00 00000000	00000000,00000000,00000000,00000000
00 00000000	00000000,00000000,00000000,00000000
00 00000000	00000000,00000000,00000000,00000000
00 00000000	00000000,00000000,00000000,00000000
00 00000000	00000000,00000000,00000000,00000000
00 00000000	00000000,00000000,00000000,00000000
00 00000000	00000000,00000000,00000000,00000000
00 00000000	00000000,00000000,00000000,00000000
00 00000000	00000000,00000000,00000000,00000000
00 00000000	00000000,00000000,00000000,00000000
00 00000000	00000000,00000000,00000000,00000000
00 00000000	00000000,00000000,00000000,00000000
00 00000000	00000000,00000000,00000000,00000000

Program 8: Create an AUTOMOUNT SYS file on disc



LINE FROM	LINE FROM	LINE TO/END
0 0000	10 17770	20 5160
30 7400	40 8440	50 0070
60 0000	70 1000	80 0000
90 0070	100 0000	110 17620
120 10720	130 11540	140 10620
150 10490		

```

C ROM PROGRAM 3, PROGRAM INTERFACE - C
ADDRESS 000000
10 ROM Contents are identical cassette 11
   or from the data address 000011 to line 11
10
20 ROM-00001000-01100000 receive
   a byte into at the top of RAM as a new
   memory buffer.
30 ROM 0001 to 400000 00000 10000,00
   0001 0000 read the current receive p
   rogram into RAM.
40 ROM lines 40 to 60 contain the prog
   ram which will create an outboard data
   area.
50 1010 100,100,100,100,100,100,10
   +,100,000,100,100,000,100,10,100,10,10
   1,00,1
60 1010 100,100,100,100,100,100,100,10
   1,100,000,100,100,100,100,100,100,100
   1,00,1
70 1010 100,100,100,100,100,100,100,10
   1,100,000,100,100,100,100,100,100,100
   1,00,1
80 1010 Load the interface program into
   cassette 100, the received buffer area
   90 100-0000000 100
100 0000 000 0-1 1000 100
110 100 0000,0000,0000 100

```

Program 3: Creates an outboard cassette.

120 ROM may load the data from the ram memory buffer into an outboard cassette as a file.

```

130 0000 1,1,1,100,1
140 00001000,000,0000000-100000
150 000

```

160 000 The following DATA statements contain the printer interface.

170 000 Print 3 bytes into the buffer 1 for byte count, number of positions, 10

```

180 0000001, 101101000100 address

```

```

190 1010 01,01,01,01,01,01,01,01,01

```

```

200 1010 100,100,100,100,100,100,100,100,100

```

```

210 1010 100,100,100,100,100,100,100,100,100

```

```

220 1010 100,100,100,100,100,100,100,100,100

```

```

230 1010 100,100,100,100,100,100,100,100,100

```

```

240 1010 100,100,100,100,100,100,100,100,100

```

```

250 1010 100,100,100,100,100,100,100,100,100

```

```

260 1010 100,100,100,100,100,100,100,100,100

```

```

270 1010 100,100,100,100,100,100,100,100,100

```

```

280 1010 100,100,100,100,100,100,100,100,100

```

```

290 1010 100,100,100,100,100,100,100,100,100

```

```

300 1010 100,100,100,100,100,100,100,100,100

```

Return, Press Play and Record as usual in response to the two beeps, and hit any key. The file will be written in about 20 seconds.

Whenever you want to load the interface, make sure the tape is fully re-wound then switch the computer as while holding down the Start key.

SI and XI owners should not hold down Option since you want Basic to be present for programming. Press Play when you hear the single beep then hit any key. When the READY prompt appears on screen your interface is loaded and ready to use.

A word now about Epson-compatible printers. This description generally means that the control codes are identical, or nearly so, to the Epson range, but the internal hardware may be very different. So occasionally you could come across a printer which won't respond correctly to the raw signal from the joystick port.

This applies mainly to printers which have internal "pull-up"

resistors less than about 3 kohms on their data lines. These can stop the output signals going low enough to be

recognised as logic 0 by the printer.

Most printers use pullup resistors of 3.3 kohms or more, and this type should respond correctly. If you happen to be unlucky it's easy enough to get round the problem by using our buffer board (06P10) to clean up the signals.

Each data line is run through an AND gate, wired as a non-inverting buffer, and this gives an unambiguous logic 1 or logic 0 output. Figure 1 shows the PCB pattern, in case you want to etch your own, but a ready-



Figure 1: PCB Pad pattern for printer interface buffer board.

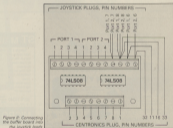


Figure 2: Connecting the buffer board into the joystick feed.

Gadgets

washed and drilled board is available as usual from PH Design.

Figure 11 shows how to construct the buffer and fit it onto the printer lead. You can dispense with the terminal blocks if you don't mind wiring directly to the PCB tracks or using veropins.

A software interface isn't as versatile as its expensive hardware counterpart, and it does have a few drawbacks. It can't handle inverse characters, since they use the slight lag which we have compensated for in the strobe line.

This isn't a great problem because most machines can't print inverse characters anyway, but Atari codes 128 onwards are sometimes used for italics and other special typefaces - so you'll have to sacrifice these facilities.

For the same reason, this interface can't handle graphic image data correctly. Also it won't work with commercial autoboot disc or cassette software, unless that software makes special provision for loading extra code.

However, the simplicity and low

cost of this gadget make it attractive despite its limitations. It will handle the majority of home programming tasks, so you may never need to buy a hardware interface.

Even if you are planning ultimately to get an 855 module, it's worth building this as a stopgap measure, and keeping it as a backup system.

Alternatively you can easily convert the lead for permanent use with an 855 by fitting a 16 pin D-type plug (the

Parts required for Printer Interface

- Joystick extension leads - available from larger Tandy stores, or most computer shops, price around £3.50 each.
- 38 way Centronics plug (solid type) eg Maplin P2518, price around £4.00.

A ready built and tested cable assembly is available, price £12.00 (inc. VAT and postage) from PH Design, 120 Stamford Avenue, Harrogate, North Yorkshire, Tel: 0433 866550.

Parts required for Buffer Board

- Maplin order code
- 27 241008 AND gate chips 174082
 - 24 pin DIL IC sockets 181193
 - 12 way PCB terminal block (optional) 96438
 - 8 way PCB terminal block (optional) 96288
 - Suitable box, eg Ferro 381 LL124

All these parts, or equivalents, are readily available from most suppliers. Cost should be around £1.80 without terminal blocks, or £3.20 with.

- Printed circuit board (DOP15), available from PH Design, price 95p (plus 25p postage if not ordered with joystick cable assembly).



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HAVE you ever wanted to create Old World's script to add atmosphere to your adventures? Or design graphic characters for games like 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 few 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 LIST "G" or to disc with LIST "0:ACE!". 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 lot in the Atari's Operating System — a mistyped FORD could crash the whole machine and ruin all your hard typed work.

Part 2 will add a data command that lists the bio-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 Opto, Save, Load, Animate, Colour, 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



STEPHEN WILLIAMSON
shows how to create
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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 in the line. Graphics 1 and 2 each use larger text on 30 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 subsequence 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 this 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 Ascii codes used by most computers and communications technology.

The Esc Code shown in the screen



code that is associated with the FEED 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 40190,33

The letter A will again be displayed on the screen, since address 40190 is a location within the screen ram of a 48K machine.

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

The edit grid is the center of the Menu display; it is 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 set, if appropriate, the Pad display will be altered.

To change the current character press key E and, when prompted, enter another character by pressing 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 E, then choosing character C when prompted during the Fetch option makes the shape of character E 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: RESUME

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

W: Wipe

Cleans 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 some routines to allow you to load and save your new character sets, and also to create DATA sets for inclusion within your own Atari programs. Don't forget to order your copy of the May issue now to avoid disappointment.

Full listing starts on Page 40

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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.

● **Whatever 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 laser 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 article applies to articles.** Please send a copy of the text on tape or disc, as we use a method of typesetting directly from Atari records.

● **Avoid using non-standard tape or disc formats such as Dev 3, Superdual or increased head rate tapes.** If there is a choice, you should type it clearly, double spaced on white paper. If your work stands out as being good enough we could then get it transcribed on to computers.

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

● **Make sure that your name and address and the title of the article or program is on every thing 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.** Rates are paid per final printed word, not per word material you initially 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 flowchart or flowdown.** Point out any problems which may occur during typing, and how they can be overcome.

● **Aim to make your programs readable, with plenty of ROMs to indicate what is going on.** However, never jump in a ROM 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 placed in strings.** Unless there is no alternative, put your machine code into data statements since Control key graphics are very hard to enter correctly.

● **Always fit, remember that your submission should be amusing, informative, useful or fun, and clearly laid out.**

The address to write to is: Features Editor, Atari User, Empire House, 68 Charter Road, Mansel Green, Stockport SK7 9NY.

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A technicolour dream come true

CAN you mix the OTM 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 Demos* - Paul Gower, Littlehampton, West Sussex.

As you have correctly guessed, the OTM 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 16 you will get a Graphics 10 screen, 176 will give Graphics 10 and 192 gives Graphics 11.

This address is a "shadow" location, meaning that its value is read 56 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 \$2075 (\$D018), and takes the same range of values.

You can alter it during a DL if you wish, preventing 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 DL.

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.

As an user 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 suspect 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 results for your 96p 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 QUDAD command. When my cousin comes round, he likes to play my game 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 auto-run.

You have printed a program in your February 1987 issue which makes automatic discs and formatted if you could print one for auto-running cassettes? - Gerry Hoagart, Corringham, Essex.

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

page 74. This is the first of a three part series tackling exactly the problem you outline.

You could also encode the date in your adventure programs so that your cousin won't be able to alter them so easily, or encrypt the whole program using the methods described in André 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 /CURSPLG1
310 DEY
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 256 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 Mark Chasin, it is an excellent book. Keep up the high standards - B. Fowler, Pen-3, Glamorgan.

If you used the command

Short of loose change

I RECENTLY bought a cassette version of *Archon's* Goodbye. Although the game loads and plays to a certain extent on my 80081, there seems to be one or two abnormalities.

For instance, I am not given an account number at any stage of the game, so 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.K. 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 COLBAR, for example. Thus, STA COLBAR could mean the same as STA 710.

The STA command can be redefined 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 COLBAR,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, 255, 254, 253 and so on until Y is zero again and the program drops out of the loop at the "Branch if Not Equal to zero" (BNE) 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 COLBAR example, then the A register would still be stored in location 710, but rather in an address given at location 716.

If 716 contained the address \$7080, 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 16-bit 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 forums, 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 Charter 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 often looking for a program to store names and addresses along with phone numbers. Is such a program available on cassette? — **Ed Colquhoun, Aldershot, Hants.**

■ The colour change you mention is a feature called Attack 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) in case some enterprising programmer develops one.

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 been 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. — **Nail Richardson, Canterbury, Surrey.**

■ You can do screen dumps on to 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 plots.

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 image on the screen, not the pane 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 (3-step) 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 WANT, 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 Fellowes, Haverock, 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 better quality printer which works more like a typewriter — its characters are printed by an impact daisy.

The 1027 is great for sending correspondence, but is only 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 them or cassette programs published in Atari User. I do not subscribe to MicroLink as I cannot afford a modem at present.

Is there any way that I might obtain the discs? I am kind of hoping! — **H.Coveill, Hazel Rogitwood, Hants.**

■ 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 warhead you must guide the robot down the two parallel passages leading in a long straight line downwards, past the trapdoors 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 into the next room and make your way back to the toaster.

Stand against the toaster and activate it. In the toaster's place a life-saving drink will appear. Leave this and carry on along the passage until you come to another toaster. Activate 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 warhead 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, Chesham, Dorset.

CRYSTAL RAIDER

I DISCOVERED a trick when playing Crystal Raider if you hold down the crystal button and press Start, you can go around the screens and also enter rooms without getting killed by the monsters. — Mark Hedge, Slough, Berkshire.

STARQUARE

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

The nearest teleport to

the player's core is Starquake is called Probe. If a key-tagged object can be found, it will allow Start to open the vertical doors.

The credit card allows Start to enter Cloaca's system and also allows access to part of the game beyond the security doors.

Many people seem to be stuck at the point in Master where the electrical horror appears, but I have finally made it past this screen.

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

Have someone speak to help while you're in Sculls of Alabaster.

Walk: Allows the player to walk against the arrows.

Ice: Freezes the castle momentarily.

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

Spells: This surrounds the player with an energy field which is fatal to the turtles.

Flight: Jump to the next level.

Wave: Highlights the magic elves.

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

MERCENARY

I HAVE just been playing Mercenary on my 8088. I went into the six-story 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 back to the hangar and took off. I then took the gold to the exchange 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 100,000 feet on the altimeter it wouldn't go any higher. Did I escape from Temp? — Andrew Whitlock, Preston, Lancs.

Function keys

FOR some months now I have been reading your excellent magazine and welcome Tim finding it very helpful and full of information. I have one slight criticism.

The space dedicated to 8 bit users appears to be being already 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 1384E. According to the Sierra Step function, 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 a 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 50270 (\$D51F). 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 XL and XE machines can be used by pressing 732 (\$2D4). 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 CORE 732.0

Cartridge software

On the 8088, 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 ROM form rather than on disc or tape.

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

ROM 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 PacMan, Star Raiders, Missile Command, Donkey Kong — plus such things as AsterWriter, Lega, Action and Basic 80.

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

Speedy service

WOM about this for service? *Atari Adventure January 22* I sent for a copy of BMS Simulator for my Atari 800X. From Miles Better Software.

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

Compilations please

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

reviewers — 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 last 6 Friday and Saturday AT — Mark Kershghan, Nottingham.

■ We all have a history in this industry and Bob's no exception — whether he tries to lie 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?

Stamus it will be out on the American label, or less ideal for an old Synapse reprint copy. As for the other title, we're not too

PEN PALS

Stefan @Raymond, Kricheldorf 4, 111 Heyd-Just, Götting

Arvids Mils, Menzies 378, Thalesholm, 44208, Götting.

Raymond D. Swan, 902 N. 26th Street, Chalkville, Alcoa TN352, 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 Control Line codes in your file name.

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

```
POKE 2016,0  
POKE 2022,127
```

You may now save the modified version typing DOS, then using F for format and M to enter 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\$(24). These characters may be produced by the Shift+Clear 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 "P" when asked for the Attepcop 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 them 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 publications, 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 an 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-X and Line Max and File Drive.

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 amount of space you

provide for readers letters in the mailing section. Thank you, Atari User, and please don't ever stop now — dedicated & bit camp. — Raymond D. Swan, USA.

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

Your problem with the tapes is almost certainly to do with the TV system you use. Some American games don't run over here correctly, so the reverse is loaded 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 50 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 central eye position, so long as you use the Minscan computer with the correct characters — so keep a note of the carrier family.

You can't alter the file names DISK.SYS, CMAP.SYS or AUTOREM.SYS as these are special names that the disk system recognises.

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

Port pin outputs

PLEASE could you help me by printing the diagrams for the pin outputs on the Atari 800X1 HD ports? — Neil Richardson, Cumberley, 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 more text):



Cartridge capers

RE REPLY to J.P. Arnold's letter in the March issue of Atari User concerning software compatibility, I recently upgraded my 800X1 (which cost £769 — yes, a victim who bought it 70 days before Atari started their price to a £692 (which cost £50 brand new).

I have had no problems with cassettes or discs, but I have had problems with cartridges. Atari's own 16 KB, but I also have Creative Missions (a rom 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.

Locally, after visiting the Christmas Atari User Show and discussing this with a representative from Atari, he suggested removing some of the plastic casing which I did and the cartridge

now fits.

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

Tasking 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 XE, 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 "new" 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 Goding, 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 her Atari 800X1 computer. She has had a 14 months' run, and has certainly 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. Goding's address

so 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 manager. Does this qualify us as an Atari User subscriber, and thus for the special reader offers? — Robert Courtney, Thongabry, Huddersfield.

Roy Goding can be contacted at RJG 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 newsagent, 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 newsagents have theirs on the shelves.

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