A Database Publication

Vol. 2 No. 11

ATARI MSER

March 1987

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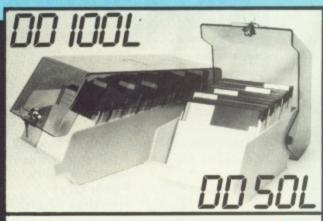


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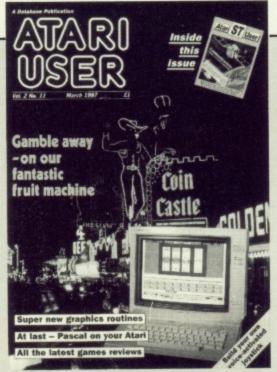
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News

Our news team reports on all that's new in the Atari community and 8 bit world.



Gadgets

Len Golding shows you how to control your Atari by sound with his hardware switch project.



Reviews

Among the games played by our reviewers are Shoot 'Em Ups, BMX Simulator and Red Max.





Adventuring

Dungeon master Brillig helps more of you escape from your adventure related problems.



I/O Channel

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Languages

Andre Willey examines OSS's Action compiler.



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Five-Liners

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



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

Star of the show will be Atari's IBM PC compatible, offering a radically new design at a price that will revolutionise the PC marketplace. There, too, will be the latest models in the ST range - the Mega ST workstations. Plus the remarkable Atari laser printer, the machine that has broken the price barrier in desktop publishing.

All of these - along with breakthroughs for the ever-popular 8-bit range and hundreds of new software packages - will be on display at the April Atari Computer Show.

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Atari Show launch for new PC model

IT has now been confirmed that the April Atari Computer Show has been selected as the UK launch pad for the company's IBM PC compatible machine.

At the same time it was made official that the event has been chosen for the official unveiling of the revolutionary priced laser printer and the latest in the ST range – the Mega ST workstations.

Company officials had previously considered releasing all these breakthroughs at the Which? Computer Show.

However it was subsequently decided to hold over until the April event, so providing Atari users with the opportunity to see the machines first.

"We felt we owed it to our faithful army of Atari fans out there", said a company spokesman.

"This will transform the event into a never to be forgotten occasion".

Such is the importance now being placed on the show that chairman Jack Tramiel and a party of VIPs will be jetting across the Atlantic to attend.

But even long before it was known that there would be major launches at the show, demand from exhibitors had been at an all-time high.

And a large number of these are reported to be preparing to release further new products.

While most companies involved would not divulge details before the show, *Atari User* managed to unearth several who would.

On the ST front, Precision Software is to introduce a multi-file relational database. Known as Superbase Personal, it is designed for use with Gem and is likely to carry a price tag of around £100.

Highsoft also has a new package for the ST in the form



Atari boss Jack Tramiel will be there

of a basic compiler. Compatible with Microsoft Basic, the price has yet to be decided.

Nor will 8 bit users be overlooked. In fact it would appear that on the software front new titles for this range will overshadow those for the ST. Red Rat Software has three new games – Asteroid, Death Racers and Forbidden Island – all costing £7.95 on tape, £9.95 on disc.

And on the budget title scene, Tynesoft will be offering a range under its new Micro Value label all priced at less than a £1.

"This show is shaping up to be the most significant event ever in the Atari calendar", says Derek Meakin, head of organisers Database Exhibitions.

The Atari Computer Show takes place at the Novotel, Hammersmith, London from April 24 to 26.

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

A money saving advance ticket order form can be found on Page 53 of this issue of *Atari User*.

65XE makes its bow

WITHIN 48 hours of Atari UK's new 8 bit level entry machine taking its bow, it attracted advance orders for 75,000 units.

Known as the 65XE, it was shipped from America to make its spectacular sales debut at the London Toy Fair.

In its basic form it is a games machine but can be upgraded to a 130XE compatible computer.

Offered in a grey case like the ST range, the 65XE is to be sold for £89.95, the price including a joystick and a games cartridge.

Interface

However it does not have a built-in cassette as previous reports from the States indicated, but simply a cassette interface.

The upgrade kit, which costs £40, adds a keyboard, lightgun and cassette recorder to convert it into a true 8 bit micro.

Atari had previously planned to replace the successful 2600VCS games machine over here with the 7800VCS.

However officials at Atari UK persuaded their American cousins that the British market would benefit from a machine that could run cassettes – not just cartridges as in the case of the 7800.

"We feel that this offers the users over here the best of both worlds", said an Atari spokesman.

In-depth manuals plan

FULL operations manuals – many in excess of 100 pages – are now to be offered with the Atari 8 bit range of packages from MicroProse.

The in-depth publications are already the hallmark of the giant American software house's 16 bit simulations.

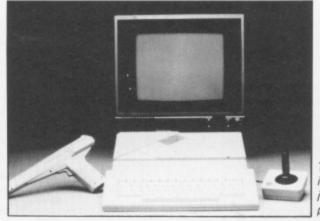
But in a move to strengthen its position as the market leader MicroProse will now issue the extensively researched booklets with its lower priced packages – including those costing just £9.95.

The glossy covered works contain not only detailed operational instructions, but also historical background information, notes from the designer and advice on further reading material on the subject.

"We pride ourselves on

authentic and accurate simulations that provide not just a few hours of enjoyment but hundreds", says Stewart Bell, managing director of Micro-Prose in the UK.

"So that every player can get the most out of our simulations, we've decided to issue manuals with all our products".



The 65XE system includes keyboard, joystick and light pen

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News



Roy Goring

Problem solving service

A HAMPSHIRE man has started running a correspondence course specially devised and priced for young Atari users who want to learn how to write programs.

Roy Goring bought an 800XL four years ago to teach himself Basic and machine code.

He is now an expert in Atari Basic and has devised his own style of structured programming which is simple to write and debug.

"My correspondence course is run on a very personal basis", Goring told Atari User. "Each lesson is tailored to the needs of the individual because no two people learn at the same speed.

"I sell only one lesson at a time – priced £2 – because this allows schoolchildren who follow the course to save up and buy each stage when they can afford it.

"I've also included a problem-solving service because when I was programming and got stuck I had no one to turn to for help.

"I deal with people's problems on a personal basis for a minimum fee of £1, rising in accordance with the amount of work I have to do in order to help them.

"Although my correspondence course is relatively new it has already proved popular".

Atari keeps eye on Parliament

A NEW publication which monitors Parliament's activities in relation to health is being produced with the aid of an Atari 1040STF.

Healthcare Parliamentary Monitor appears fortnightly while Parliament sits.

It aims to provide a nonpartisan account of all health care developments at Westminster and at the DHSS.

The newsletter is distributed to companies and individuals with a specific interest in healthcare – health authority managers, family planning clinics, community health councils, pharmaceutical companies, pharmacists, medical equipment manufacturers and suppliers, and medical academics.

It covers debates in both Houses, parliamentary questions and answers, government and Private Members' Bills, and select committee meetings among other topics.

Editor Rodney Deitch told Atari User: "The most important criteria for me when I was evaluating different micro systems was to get the right balance between price and performance.

"The best value for money was definitely supplied by the Atari ST. It is important for me to upgrade the system shortly, and I am already looking into different desktop publishing packages as well as laser jet printers.

"I've found the ST indispensible in the task of putting the newsletter together. At the moment I'm using HabaWriter, HabaView and HabaMerge and find them extremely easy to use".



New option

ATARI 8 bit users have a new joystick option available to them – the Phasor One from Britannia Software.

Its design incorporates a pistol grip trigger action, with the joystick placed on top of the device to permit equal dexterity by both left and right handed users. Price £12.95.

Adventure for all

AMERICAN publisher Strategic Simulations has converted Phantasie for the Atari 8 bit machines and Phantasie II for the ST.

Phantasie is a multiple roleplaying game where a party of up to six characters is assembled to search the Isle of Gelnor for nine rings that will rid the land of the Dark Lord.

Players can create an elf who is a wizard, a dwarf who is a fighter, or combine in creative ways the eight races and six classes of characters which include humans, elves, dwarves, thieves, warriors and wizards.

More than 80 types of monsters oppose the player in a total of 10 dungeons.

Phantasie II takes players to the Isle of Ferronrah, a place of beauty and magic beset by evil power from an enchanted orb controlled by Nikademus, the Dark Lord.

Players gather a group of adventurers to sail to the island, use spells and weapons to invade it, escape dungeons and destroy the demons. Travel by rail to London for the Atari Computer Show, then visit the theatre, stay the night at a top hotel and all for an incredibly low price!

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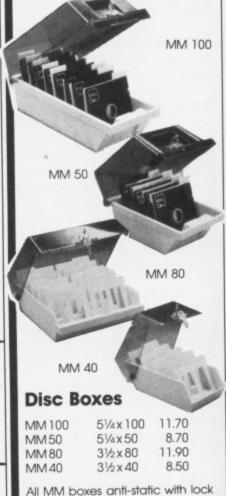
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The parting of the ways...

FOLLOWING an overwhelming reponse from our readers after the recent survey in *Atari User*, it has been decided that the magazine will say goodbye to its younger cousin – *Atari ST User* – which from now on will be published as a magazine in its own right.

Starting with the April issues, Atari User will return to being wholly aimed at owners of 8 bit Atari computers. There will be lots of room for more utilities, games listings and tutorial series.

Atari ST User will at least double in size and this extra space will allow us to support ST users better than ever before. Forthcoming

features include detailed reviews of all the latest software and hardware and a major new series on Gem programming which will include details of everything from dialogs to windows.

Publishing two Atari magazines every month will allow us to give much greater coverage to all that's happening in the rapidly expanding world of Atari.

Whether you own an 8 bit, ST or both, we're sure that you will welcome both magazines and we look forward to your comments and suggestions on ways you would like to see them develop in the future.

● To take out an annual subscription to Atari User or Atari ST User please use the subscription form on Page 53. If you are already a subscriber to Atari User and wish to transfer your subscription to Atari ST User, please write (giving the name and address to which we send the magazine) to: Subscriptions Dept, Atari User, Europa House, 68 Chester Road, Hazel Grove, Stockport SK7 5NY.

CURE those trigger-finger blisters by adding a voice-operated fire button to your favourite joystick. Astonish your friends with a talking head, whose lips move when you speak into a microphone.

Or keep track of vibration from any source - fridges, washing machines, TV speakers or even major earthquakes. Or just train your computer to do tricks when you whistle. This

gadget can do it all.

Since you can trigger it by touch or by blowing gently across the mike, it could find a less frivolous use in Possum-type systems to help severely disabled people open curtains, answer the door or switch the TV on and off.

It can also be easily adapted to accept inputs other than sound, but more about that later.

You can't connect a microphone directly to the joystick port for two main reasons. Firstly, the output from most mikes is very small - a few thousandths of a volt at best - and the computer isn't sensitive enough to detect it. Secondly the signal is AC, which the internal hardware can't

We need to amplify the mike's output and convert it into a DC signal

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which switches cleanly between 5V and 0V. Then it can be connected to any of the five on/off input lines on your joystick port.

Figure I shows the circuit. It's not the simplest possible design, but it is very versatile and costs only a few pence more than a rudimentary sound switch.

Stage 1 is a fairly conventional AC amplifier which converts the microphone output into a respectable voltage swing at C3.

Stage 2 is less conventional, built around an ordinary quad 2-input NOR gate chip. Two of the gates are wired as a monostable, which converts brief input pulses into output pulses long enough for the computer to detect.

The remaining two gates form a Schmidt trigger, which ensures a clean on/off transition at the output. Stage 2 is in fact a self-contained analogue-to-digital switch which behaves in the following way:

The input (point A) is normally held above 2.7V, by the action of VR1 and R5. In this state the output is held at +5V (logic 1).

When a brief negative-going pulse is received from C3, point A falls below 2.3V and the output then switches very rapidly to 0V (logic 0). The Schmidt trigger action ensures that

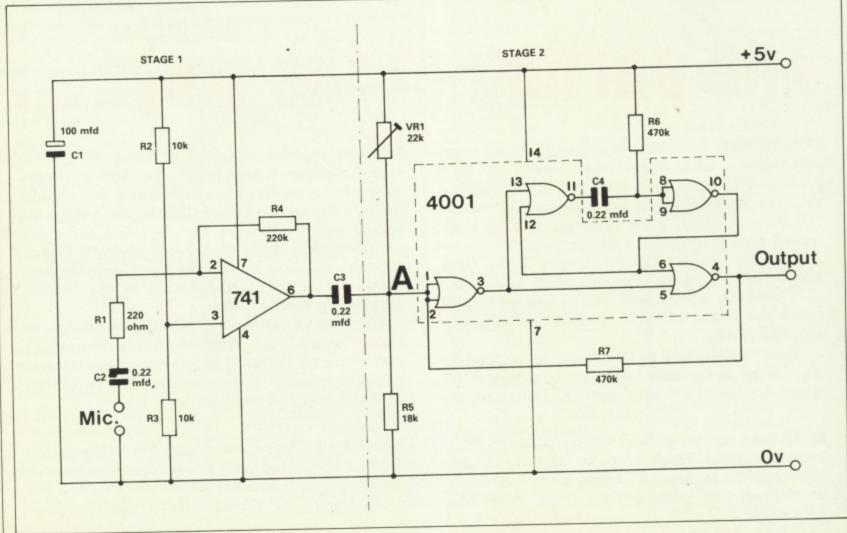


Figure I: Circuit diagram for the sound-activated switch

the gadget can't send out any intermediate voltage which might confuse the computer.

The monostable holds the output low for about one tenth of a second, no matter what happens at the input. If at the end of this period point A has gone back to 2.7V or more, the output returns to its high state.

Otherwise it remains low until the input voltage rises above the 2.7V threshold. This gap of 0.4V between rising and falling thresholds ensures that the output won't chatter on and off when the input is exactly at one or other of the trigger voltages.

Now let's look at practical construction. If you like to etch your own PCBs, the foil pattern is shown at Figure II.

Alternatively you can buy a readyetched and drilled board from RH Design. Use the board as a template for drilling the case before you solder any components.

At the same time, it's a good idea to drill a small access hole so that VR1 can be adjusted when the case is assembled. Dimensions are given in Figure IV.

Figure III shows the component layout for the basic sound-operated switch. Notice that the 741 IC is inserted "upside down", with pin 1 in the top right position.

This IC needs no special handling precautions, but the 4001 chip is a CMOS device, so treat it with care. Avoid handling it unduly and get rid of any static charge on your hands by gripping an earthed metal appliance before touching the IC pins.

The amplifier (Stage 1) is matched to a microphone impedance of around

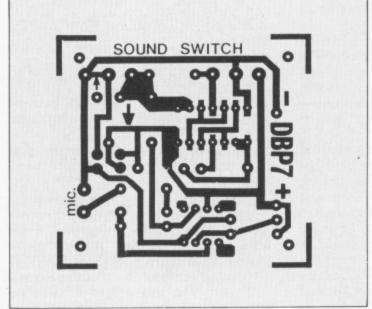


Figure II: PCB layout exact size

200 ohms, so a standard cassette mike will work very well.

Telephone inserts also give good results and these are cheaper and more robust, especially for applications which involve tapping or blowing. Crystal and other high-impedance microphones are not suitable.

Connect the microphone and joystick leads to their respective terminal blocks as shown in Figure III. If the mike has a screened lead, its outer braiding should go to the pin nearest VR1.

We've assumed you will connect the gadget's output to the fire button line at joystick pin 6, but any of the other four on/off input lines (pins 1,2,3 and 4) will work, provided you modify the software.

If you use joystick Port 1, these pins return a four-bit word at address 632, as we have explained in previous articles.

Plug the gadget into Port 1 and run Program I. Adjust the variable resistor until the number on screen is 0, then advance it until the number changes to 1 and holds there reliably. The text window will also change colour, so it's easy to spot the transition.

Now clap your hands near the mike. The number should change momentarily to 0, then return to 1. Fine adjustment of the variable resistor will set the sensitivity to suit your application.

At its best, the gadget will respond to a snap of the fingers at up to three

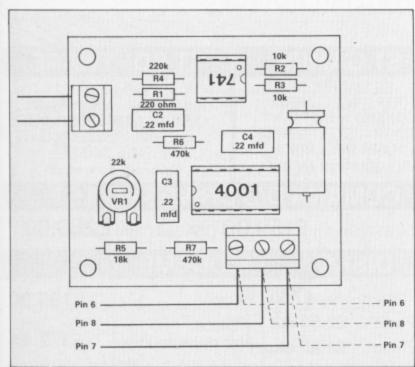


Figure III: Component layout for the switch circuit

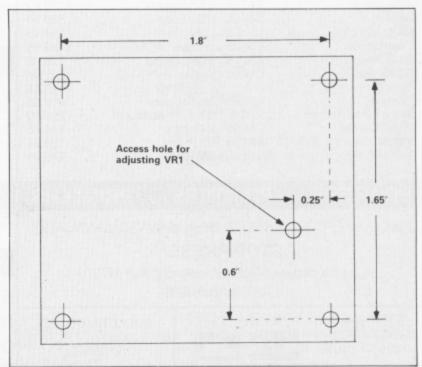


Figure IV: Case drilling template (view from outside case)

metres distance, or a pin dropping on a hard surface close to the microphone.

To give your joystick a voice operated fire button, use both ends of the extension cable. Cut the cable to remove a section from the middle leaving you with suitable lengths about six inches in from each end of the cable is best.

Strip back the black outer sheath to expose the nine internal wires and join each wire back to its partner, matching the colours. Solder the joints and insulate all except the ones to pins 6, 7 and 8, then connect those three joints to the terminal block as shown in Figure III.

If you want to disable the joystick's own fire button, leave the socket end of wire 6 disconnected.

Plug your joystick into the extension socket, load up a game and set the gadget's sensitivity low enough to eliminate spurious triggering. Then shout, clap or whistle to blast away.

There's scope here for some simple fund-raising games if you can stand

the racket. You may need to position the mike fairly carefully, so that it doesn't pick up sound from the TV speaker or other inappropriate sources.

If you would like the output pulse to last longer than one tenth of a second, there are two options. You can increase the value of R6 (10 megohms will give a delay of around three seconds) or you can build a delay loop into your software, as shown in Program II.

Program III is the "talking head" I mentioned earlier. Lines 10 to 50 put a simple face shape on screen, then lines 60 and 70 use the gadget's output to modify addresses 709 and 710, which control the mouth colours.

This gives the effect (if you're imaginative enough) of lips opening and closing. OK it's a primitive program - but you could use the same principle for a much more impressive multi-coloured display, say in graphics mode 7.

Remember though that inexpensive mikes respond best to high frequen-

cies. The gadget will pick up most consonants without difficulty, but it may not detect vowels unless you're very close.

The gadget can easily be modified to accept other types of input - for example, you can trigger it by touching the microphone input, even if there is no mike connected.

It's easy to make a touch-sensitive switch by attaching a wire, or metal pad (for example Maplin type HY01B), to the terminal pin nearest the mounting hole.

Many types of sensor - such as thermistors, pressure transducers and moisture detectors - change state slowly, so can't be connected directly to the on/off input lines.

Others (like photodiodes), can switch on and off so rapidly that the trigger pulse may be long gone by the time your computer gets around to looking for it. This gadget can be used as an interface for both types of signal.

To modify the board, leave out all the amplifier components and fit a two-way terminal block in place of R5,

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10 GRAPHICS 2
20 S=PEEK(644):POSITION 9,4:? #6;5
30 POKE 710,6*5:GOTO 20

LINE CHSUM LINE CHSUM LINE CHSUM
10 2041 20 5716 30 3659

Program 1

10	GRAP	HICS 2				
20	5=PE	EK (644)	:P05I	TION 9	,4:? II	6;5
	IF S	=0 THE	N FOR	DELAY=	1 10 5	80:NEX
3.77	60TO	20				
48	6010		LINE	CHSUM	LINE	CHSUM

Program II

as shown in Figure V.

Connect your sensor to this terminal block — if it's polarised, such as a photodiode, make sure the negative end goes to the left-hand terminal. Adjust VR1 as before so that the gadget triggers at your chosen threshold.

If you want to use a thermistor choose one whose resistance is between 5k and 20k at the desired trigger temperature – type VA1055S is suitable for most purposes.

A rise in temperature will send the output low and it will stay that way until the temperature falls a degree or two below your pre-set threshold.

Any commonly-available photo: diode or phototransistor will work and a very brief flash of light will trigger the output pulse. Steady illumination will hold the output low until the light level falls back below your threshold value.

10 GRAPHICS 19	:POKE 7	09.40:P	OKE	710.0
20 COLOR 1:PLO				
0 26,16:DRANTO				
30 PLOT 17,7:P	LOT 23,	7:PLOT	20,5	,
40 COLOR 2:PLO	T 17,12	: DRAHTO	23,	12
50 COLOR 3:PLO	T 17,13	: DRAHTO	18,	13:PL
T 23,13: DRAHTO	22,13:	DRAWTO	22,1	4:DRA
TO 18,14				
60 S=PEEK (644)	:IF 5=1	THEN P	OKE	710,0
GOTO 60				
70 IF 5=0 THEM	POKE 7	10,40		
88 GOTO 68				
LINE CHSUM	I THE C	ISIIM I	NE	CHSUK
10 6207		2595	30	7519
78 4174		1426	40	

Program III

Now suppose you want it to work the other way round – to make a counting device which increments when a light beam is momentarily broken, for example. That's easily achieved, but it requires a bit of engineering.

Look at the track side of the PCB. Just above VR1 you'll see a pattern of four pads which have not been drilled and below them two arrows.

Break the tracks at the two arrows, drill the four new pads and fit a wire link horizontally – parallel to the terminal blocks – across each pair of holes.

This reverses the positions of VR1 and R5, so the terminal block will now be connected between point A and +5V instead of point A and 0V.

If your sensor is polarised, make sure its positive lead now goes to the left-hand pin. In all other respects, the gadget will perform exactly as before.

0	
	•••••
	R6C4
	• C1
(C)	9 4001
. 98	
0	R7 0 0 0
	•
To Sensor	Pin 6 Pin 8 Pin 7

Figure V: Modified board layout for use with alternative input devices

PARTS REQUIRED FOR SOUND-ACTIVATED SWITCH

Maplin codes

1	uA741	8-pin Op Amp	QL22Y
200	The second second		

1 4001 Quad 2-input NOR gate QX01B

1 8-pin DIL IC socket BL17T 1 14-pin DIL IC socket BL18U

1 2-way PC terminal block FT38R 1 3-way PC terminal block RK72P

1 3-way PC terminal block RK72P 2 Cable 'P' clips 3/16" LR44X

3 0.22 mfd Polyester layer capacitors WW45Y

1 100 mfd 10v Axial
Electrolytic FB48C
1 Small plastic box LH14Q

1 200 ohm cassette microphone (eg Maplin YB31J), or tele phone insert

Miniature resistors:

1 220 ohm (red, red, brown)

M220R

2 10k (brown, black, orange)

M10K

1 18k (brown, grey, orange) M18K 1 220k (red, red, yellow) M220K

2 470k (yellow, violet,

yellow) M470K

1 22k Horizontal sub-miniature preset WR59P

Approximate cost £3.20 plus microphone

All components, including all sensor devices mentioned in the text, are available from:

Maplin Electronic Supplies P.O. Box 3 Rayleigh Essex SS6 8LR Tel: 0702 552911

Printed circuit board (order code DBP7) available from:

R.H. Design
137 Stonefall Avenue
Harrogate
North Yorkshire
HG2 7NS
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Joystick extension lead available from Tandy stores (code 276-1978) or from large computer shops. Price around £3.30.

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On your bike

Program: BMX Simulator Price: £1.99 (cassette) Supplier: Code Masters, 1 Beaumont Business Centre, Beaumont Close, Banbury, Oxon OX16 7RT. Tel: 0295 68426.

THIS is another actionpacked game involving healthy competition against the computer or a friend.

The title is a little misleading – it's not a true simulator since the view is from above, but that shouldn't detract from what is a fairly good game at the price.

Your task is to race your BMX bike round a track, avoiding various obstacles. There are seven different courses, each more difficult than the last, and with less time allowed to complete

each race.

A steady hand and a level head are needed here. The courses can be learnt gradually over a period of time, so even the worst games player sees a marked improvement as he plays.

Richard Darling, author of the Commodore 64 original, has also incorporated an action replay feature, complete with slow motion, which is unique for a game of this type.

The graphics aren't bad, but I've seen better. The courses are appropriately laid out, and the "Burms", as they're called, slow you down on the way up and help you speed up and turn on the way down.

There are ramps and rough ground to traverse, and obstacles which stop you getting back on the



course if you wander off

As the view is from above, the bikes appear quite small, but if you crash the rider flies over the handlebars and bike and rider are revealed quite realistically.

The music, written by David Whittaker, is catchy and pleasant, and includes a short fanfare at the end of each round. Sound effects include pedalling and thuds as you crash.

If you're a BMX fanatic, or prefer racing to spaceing, then this game is right up your street – and it's cheap enough to buy without leaving too great a dent in your pocket money.

Rob Anthony

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

Fine quartet

Program: Shoot 'Em Ups Price: £9.99 Supplier: US Gold, Units 2/3, Holford Way, Holford, Birmingham B6 7AX. Tel: 021-356 3388

COMPILATION packages abound these days, and that is generally good news for both software houses (who get extra mileage from ageing games), and Joe Public (who gets the benefit of buying games at very much reduced prices).

Cynics might say that they are an excuse for jobbing out otherwise unsaleable games on the back of one big seller.

While that may well be true in some instances, it is definitely not so with this latest offering from US Gold.

The four games in the package are Super Zaxxon, Blue Max 2001, Fort Apocalypse and Dropzone. Instructions in compilations

are sometimes a little skimpy, but US Gold has provided a comprehensive and well detailed set for all four.

Super Zaxxon is a fair representation of an old arcade favourite. You fly over enemy fortresses and through tunnels in glorious 3D, dodging force fields, shooting, bombing and battling with fire-breathing dragons along the way. Graphics and sound are both satisfactory, and although the pace is a little slow it remains very playable.

Blue Max 2001 owes much to Zaxxon for its style, there being many similarities in the gameplay and appearance.

Again you must bomb or shoot anything that does or doesn't move, progressing to the next level after a precision bomb run on a special target.

While Fort Apocalypse is let down to a certain extent



by blocky graphics, the game itself is excellent and thoroughly addictive.

Your task is to rescue stranded prisoners in your helicopter, dodging and shooting floating mines, tanks and robocopters, ultimately blasting the very heart of the fortress.

Dropzone is to my mind the best of the collection, and perhaps the best all-out blaster I have seen for the Atari.

The graphics are superb, the sound excellent and the action smooth, fast and furious.

Your moon base is attacked by aliens and you

must gather in your comrades to the relative safety of the base.

Apart from the aliens you'll have to watch out for molecular acid clouds, proton lightning bolts and erupting volcanoes. This game is sheer chaos and destruction from start to finish

All in all, Shoot 'Em Ups lives up to its name

Niels Reynolds

Sound	3
Graphics &	3
Playability	,
Value for money 10)
Overall	,

Rambo rampage

Program: Gun Law Price: £1.99 (cassette) Supplier: Mastertronic, 8-10 Paul Street, London EC2A

Tel: 01-377 6880

THE sales hype on the Gun Law pack starts off: 'Four months of bloody alien attacks have taken their toll...'.

However anyone buying this game and expecting to see aliens is going to be in for a surprise and possibly a disappointment.

There you are in your smart blue army uniform at the bottom of the screen, brandishing your machine gun, ready to sort out the invaders from outer space. But hold on, those are soldiers shooting at you. In fact they are identical to you in every respect, but for the fact they are wearing green

instead of blue. Whatever happened to the aliens? I certainly never saw any.

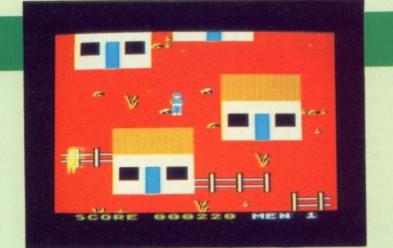
Anyway, the aim is to run up the screen with the background scrolling vertically downwards, fending off your attackers.

Various objects can be used as cover from enemy fire, such as trees, fences, rocks and buildings.

Due to some programming laziness, grass, ponds and small pebbles will also stop speeding bullets.

Once you reach the end of the zone (no easy feat) you must negotiate a flashing electric fence and then go through the same exercise in the next zone. Naturally your enemies are better armed and there are more hazards to contend with. So it goes on until you reach the fifth and final level.

The graphics in Gun Law are adequate, though they



do have some oddities.

For example, an alien walking in front of your Ramboid character is masked out as if it had gone behind

The animation of the figures is minimal and movement is limited to up, down, left and right. The game would have been improved by the inclusion of diagonal movement.

With the high standards attained by many of the budget games around these days, I had expected a little more from this game.

It has nothing to particularly recommend it, but neither does it have any serious faults.

Gun Law is a no-frills budget shoot-'em-up and as such still represents fair value at under £2.

Paul Mills

Sound	6
Graphics	7
Playability	7
Value for money	7
Overall	7

Bandits ahead

Program: Spitfire 40 Price: £9.95 (cassette) £12.95 (disc)

Supplier: Mirrorsoft, Maxwell House, 74 Worship Street, London EC2A 2EN.

Tel: 01-377 4600

"SCRAMBLE! Scramble! Bandit coming out of the sun at one o'clock."

"He's all yours, Ginger, and try not to prang it in the briny this time."

Now that's the sort of gung-ho atmosphere I was hoping would be generated by this Spitfire flight and combat simulation program. Alas, it was not to be.

While Spitfire 40 is quite a good little simulation it didn't quite have the zip and excitement I had anticipated. Perhaps it was because I felt that much better use could have been made of the sound potential of the Atari.

The main screen is, as you would expect, a view straight ahead from your seat in the cockpit.

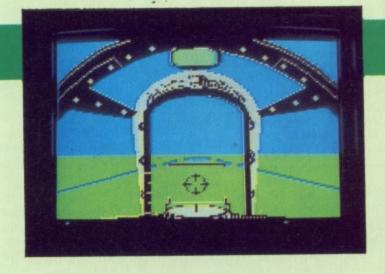
Not much to see, really, except acres of green grass and miles of the wild blue younder.

Pressing the spacebar toggles you to and from the instrument screen. This shows fuel gauge, airspeed indicator, artificial horizon, VSI, engine rev indicator, slip and turn indicator, compass, altimeter, rudder and pitch indicator.

A further screen provides a map of South-East England showing your position and three areas which can be examined in more detail by a zoom feature.

You control the Spitfire using either a combination of joystick and keyboard or keyboard only.

Spitfire 40 lets you choose a practice flying session or to go straight into combat.



Unlike many simulators, getting the plane off the ground and keeping it up there is pretty easy.

In combat mode a number of enemy craft will appear, sometimes ahead, sometimes in your rear view mirror.

You give chase and manoeuvre your Spitfire to line the enemy up in your sights.

When you fire you hear the rat-a-tat-tat of your eight Browning machine guns and see the bullets spraying out from below both sides of your cockpit.

If the enemy craft is hit it

immediately but silently disintegrates and disappears.

Response to joystick and keyboard is a fraction slow but not so much that it spoils the gameplay.

Not quite the spiffing show I'd hoped for, old bean, but jolly fair nonetheless. Chocks away!

Bob Chappell

Sound	6
Graphics	7
Playability	7
Value for money	6
Overall	7

Fight to survive

Program: Red Max

Price: £1.99

Supplier: Code Masters, 1 Beaumont Business Centre, Beaumont Close, Banbury, Oxon OX16 7RT.

Tel: 0295 68426

THE screen shots on the inlay card looked promising and I had high hopes for Red Max. After 22 minutes loading my enthusiasm was beginning to wane slightly, but thankfully it loaded first time.

The storyline revolves around the survivors of Earth's Global War who have colonised the moon.

They become a little concerned on discovering that the sun is about to explode, so they fit the moon with a few antigravity orbs, catapult it from the solar system, and kip down for 1,200 years - planning on waking up long after the sun has gone nova.

Things start off well enough for the fugitives, but unfortunately a band of renegade Death Lords hitch a ride in order to sabotage the power plants.

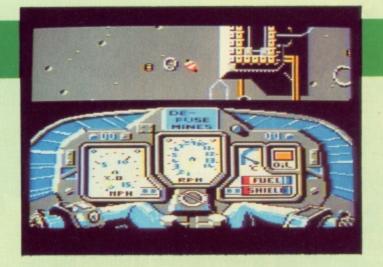
It is your job to get on your lunar motorbike, find the mines they have planted and de-activate them.

Having disabled mines you progress to the engineering level, turn on the back-up nuclear cooling systems and shut down the main power plants.

Lastly you must descend to the hibernation complex and wake up nine crew members. You have an aerial view of the whole operation.

Controlling the bike with the joystick is simple. The only controls, apart from left and right, are acceleration and deceleration, achieved by pressing and releasing the fire button.

You must avoid collisions with buildings and walls



while negotiating flashing laser fences and gates.

To neutralise the mines, collect fuel, temporarily disable laser fences and switch off reactors, you'll have to ride over certain key objects.

I found the game very pleasing visually, with smooth movement and detailed graphics.

There are complaints, however. In particular the bottom two thirds of the screen is taken up by the motorcycle console which shows speed, revs, fuel level and the state of your shields.

There is also a small prompt screen that tells you what to do next and warns of low fuel levels.

The console looks very pretty, but actually contributes little to the game.

Despite this, Red Max is one of the best budget games I've seen

Paul Mills

Cound	0
Sound	0
Graphics	8
Playability	9
Value for money	9
Overall	9

Trickier Willie

Program: Jet Set Willy Price: £7.95 (cassette) £12.95 (disc)

Supplier: Tynesoft, Unit 3, Addison Industrial Estate, Blaydon, Tyne and Wear NE21 4TE.

Tel: 091-4144611

JET Set Willy was originally written for the Spectrum and remains one of the alltime greats of computer gaming.

Tynesoft have now produced it under licence for the Atari, nearly three years after it was originally published by Software Projects.

The story so far: Miner Willy has returned home from his adventures and throws a party to celebrate.

Maria However housekeeper won't allow him into bed until he has gone around the mansion and collected all the glasses.

You move Willy through

the house and grounds, down stairways, up trees, swinging over obstacles on ropes, making jumps that require great precision and avoiding the many and various creatures that are out to

The game remains faithful to the layout of the original, but unfortunately loses in the translation.

The graphics on the Spectrum are bright, lively and have a great deal of humour and charm.

Tynesoft seems to have made the conversion too literally. With the Atari's far superior graphics capabilities I had expected a riot of colour and fast moving

I got neither, the graphics being lacklustre, controls sluggish and the movement too slow.

Tynesoft has very defi-



nitely improved one part of the game - the music is superb. It can be switched off if necessary, but I really enjoyed it and kept it on.

If the music is switched off you are left in total silence, with none of the trills, bleeps and burblings that denote jumping, falling or whatever.

No great loss perhaps, but I do feel they would have added to the atmosphere. In its own right, the game is playable and more tricky to

get through than original.

The coordination and accuracy required to clear the gremlins and obstacles is considerable and the game will still appeal to those who like this sort of pixel-scraping challenge.

Niels Reynolds

Sound	3
Graphics	5
Playability	5
Value for money	7
Overall	5

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How do I turn my Atari into a Telex machine?

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MicroLink application form: Page 8

By Brillig

JUDGING by the number of letters received on the subject, one of the most frequently played adventures seems to be The Payoff, so it's not surprising that I should get more requests for assistance with this than with most others.

Conrad Wilson of Llangollen knows that you have to change the bit in the drill but cannot find the exact combination of words to do it.

He is also having some difficulty getting the hoist and wonders who has the key to the car.

On the same adventure, Domhnall Dods from West Lothian has almost finished but cannot help triggering the alarm when he drills through the door of the vault.

GLITCH OF THE MONTH

Stewart Parsons from the Isle of Wight has spotted a cracking glitch in, of all things, Infocom's Spellbreaker. To get the cube from the hermit's hut, you're supposed to collapse the hut by using the Caskly spell.

However, if instead you CAST - FROTZ AT CUBE then EXTINGUISH CUBE, the response begins "(taking the cube first)" . . . which leaves you nicely in possession of the cube. Well done, Stewart, that's a smasher.

The Payoff goes something like this

Perhaps you're trying to get in the wrong way, Domhnall – have a look at the hoist hints.

Staying with The Payoff, Stewart Parsons from Cowes would like to know the exact words for getting through the window.

Stewart would also like some advice on how to get the cube from the Roc's nest in Infocom's Spellbreaker and how to get the alloy wheel in Level 9's The Price of Magik.

Finally, F. Chessell of Brighton is anxious to know how to solve a couple of problems with Lords of Time from Level 9.

He wants to know how to overcome the troublesome Pirate Pete and what to do in the colossal Habidrome.

That's all the help for this month. Be sure my YTS gnomes stay busy by keeping those letters rolling in. After all, they are being paid two ounces of Troll's gold a week and must have something to do besides plagiarise all my best spells. Exciting adventuring!



CLUES CORNER

Read these clues backwords if you're really stuck

THE PAYOFF

Want to use a new bit in the drill? TIBT IF

Is the hoist causing you to despair?

TLUA AVEH TRET NEOT TIES U

TSIO HOGN EHTT SIOH GIR

How do you get the key to the car?

KRAP RACE HTNI YEKE HTSA HECN EFEH T

XOBT ISOP EDEF ASEH TMOR FMEG EHTM IHEV IG

Window smashing causing you pane?

PMUJ NEHT REPA PSWE NKCI TSEL CAER TDAE RPS

SPELLBREAKER

Cube in the roc's nest immovable?

TNES BASI CORR EHTO MNEH WTSE NEHT OTOG

TSEN EHTO TETU ORWE NARO FMOO RRIA EHTN IRAA ZABE HTOT OG

PRICE OF MAGIK

Need the alloy wheel? YRFL EBEH TMOR FTAB EHTD EENU OY SSOR CEHT GNIS UTIE SITO NPYH

LORDS OF TIME

Pirate Pete a pest?

RULT EGOT GNIK IVOT TAOC RUFE VIG

SGNI KIVN OMMU SOTR ULWO LB

Unhappy in the Habidrome?

LLAH GNIC NEFN INAM REBY CTHG IF

REVI RDWE RCSH TIWS TOBO RNEP O

SNEL YBUR HTIW STOB OREN IMAX E

CIO devices:

Easier file handling

IN the first two parts of this series we looked at the theory behind data input and output on the 8 bit Atari, and at the operation of the Central Input/Output system. We've also tried out a simple program which used CIO from machine code. Now it's time to look at the other facilities that CIO has to offer.

We have so far seen three CIO commands in use – Open, Put Text and Close – but we didn't go into any real depth on how they worked, or look at the other options available.

There are actually seven general commands available to CIO, plus a whole host of other device-specific instructions. The main commands are: Open, Get Text Record, Get Binary Record, Put Text Record, Put Binary Record, Status and Close.

They all have different uses with different types of device, and not all are applicable for all devices. For example, it is nonsensical to try to Get data from a printer or Put data to the keyboard.

Some commands, most notably Open and Status, may need to operate very differently each time you call them.

With Open, for example, you may wish to create a new disc file, open a long-gap mode cassette file for reading or even set up a channel to a particular graphics screen.

If you remember from last time, we said that each channel has its own control block of data – known as an IOCB – which you must set up before calling the CIO system (See Figures I and II).

Thus each time you use the Open command you need to set the relevant ICCOM byte to 3 and the buffer address (ICBAL and ICBAH) to point to the string containing the device name (such as "D:FRED" or "C:").

Part 3 of André Willey's series on the Atari's input/ output facilities

The buffer length pointer (ICBLL and ICBLH) is rarely used with Open, but in order to handle such a wide variety of functions the command does make full use of the first two auxiliary data bytes.

ICAX1 is used to specify the mode you want the device to adopt: If you

require input, for example, you would use 4 and output would be 8.

Some devices are capable of doing both at the same time, so the two are added together to give a value of 12 for use with an input/output file.

Sometimes a device is capable of much more – such as the screen handler, which must know what graphics mode you want, and the disc and RS232 handlers which both allow various special options. These facilities are selected by using both ICAX1 and ICAX2: A full list of the options is given in Figure III.

If you examine the screen handler entries very carefully you will spot the answer to last month's puzzle – remember, the two numbers after the channel number in an OPEN statement are stored as ICAX1 and ICAX2 – so all the line did was to simulate the GRAPHICS 7 command using CIO.

After Open, the next four CIO operations control the actual transfer of data to and from the channel, with two commands for input and two for output. Obviously, if you try to output to a channel you've only set up for reading you will get an error.

The two modes of input and output are Line (or Text) and Binary, both of which actually operate in a very similar manner.

A binary record is a block of characters or data of fixed length, while a text record is a set of characters terminated by a Carriage Return byte (Ascii code 155). Text is normally dealt with in line mode – as Basic does with its strings, for example – whereas raw data is often processed as a binary record.

Command 9 will output a text string

Address	Label	Bytes	Description
IOCB + 0	ICHID	1	Index into HATABS
IOCB + 1	ICDNO	1	Device number (eg: D1:, D2:)
IOCB + 2	ICCOM	1	Command type (eg: OPEN, CLOSE)
IOCB + 3	ICSTA	1	Current Status of Device
IOCB + 4, 5	ICBAL/H	2	Buffer or filespec address
IOCB + 6, 7	ICPTL/H	2	Address of Put-Byte routine (-1)
IOCB + 8, 9	ICBLL/H	2	Buffer data length sent/ returned
IOCB + 10	ICAX1	1	Auxiliary byte 1
IOCB + 11	ICAX2	1	Auxiliary byte 2
IOCB + 12	ICAX3	1	Auxiliary byte 3
IOCB + 13	ICAX4	1	Auxiliary byte 4
IOCB + 14	ICAX5	1	Auxiliary byte 5
IOCB + 15	ICAX6	1	Auxiliary byte 6

Figure 1: IOCB structure

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

Figure II: IOCB start addresses

Device	ICAX1	Description/Notes	Device	ICAX1	Description/Notes
Cass "C:"	4	Input data (Set ICAX2=128 for short IRG mode)	Keyboard "K:"	4	Read keyboard
	8	Output data (Set ICAX2=128 for short IRG mode)	Printer "P:"	8	Output (ICAX2=83 for sideways print on 820, ICAXC2=70 for normal,
Disc	4	Open file for read			ICAX2=40 for wide)
"D:"	8	Open for write (overwrite any existing file)	RS232	5	Concurrent read only *
	12	Read/Write (start at first byte of old file)	"R:"	8 9	Block output mode * Concurrent write mode *
	9	Append (add data to end of existing		12	Concurrent read/write mode *
		file)	Screen	8	Open for graphics output
	6	Read directory (read lines of directory info.)	"S:"	12	Open for graphics AND screen read mode
Editor	8	Screen output only			(Set ICAX2 = Graphics mode number)
"E:"	12	Keyboard input, screen output			ICAX1 + 16 to enable a text window
	13	Screen input and output (Return key mode)			ICAX1 + 32 to prevent initial clear screen

^{*} Some of the RS232 functions are very complex and are beyond the scope of this series. However, once enabled, concurrent I/O mode will prevent the use of any other peripheral I/O.

Figure III: OPEN command parameters

starting at the address in ICBAL/H and will keep sending characters until it comes to a Carriage Return.

Don't forget that whole numbers which need to be stored in two bytes — such as the buffer address in ICBAL and ICBAH — are always stored in the low-high format we talked about last time.

Command 5 is the input option for use with text strings. This will continue reading characters from the I/O channel and storing them in your buffer area (again given by ICBAL/H) until it finds a Carriage Return.

If you are worried that this might overflow your buffer area you can also specify a maximum number of characters by storing the size in the ICBLL/H length count.

Command 11 is the Binary Put command, which will send a specific number of bytes to the file. The start of the buffer is given as ICBAL/H and the length is given by ICBLL/H.

Command 7 is the input command for binary data, which will input a given number of bytes of data and place them into your buffer area. As with Binary Put, the buffer address is given as ICBAL/H and the number of bytes to transfer by ICBLL/H.

It is quite common practice to use Binary Get mode to read a whole file into memory and to this end CIO will return the actual number of bytes which were transferred before the end of the file was reached. This number can be found in the length counter (ICBLL/H) upon completion.

In addition, there is a special form of the Binary Put and Get commands. If you select a length of zero – by placing a zero in both ICBLL and ICBLH – then a single byte of data will be transferred to or from the 6502's main A register.

No data is placed into or read from

10 REM BINARY PUT/GET	ROUTINE
20 REM ATARI USER, MAS	CH 1987
38 REM BY ANDRE MILLEY	
40 REM	
50 REM ROUTINE MY BE I	ELOCATED, OR
PLACED IN A STE	RING IF REQUIRED
68 DIM BUF\$ (188) : FOR 1	=1 TO 100:BUF\$CI
)=CHR\$(I+32):MEXT I	
70 REM	
80 REM ***********	********
90 REM -	
100 REM POKE M/CODE II	ITO PAGE 6
110 FOR MEM=1536 TO 15	36+51:READ A:POK
E MEM, A: NEXT MEM	
120 REM	
138 REM **********	*******
140 REM	
1000 GRAPHICS 8:PRINT	
NO PLAY, THEN REALISTY	
1010 CHAN=1:OPEN BCHAN	
1020 CMD=11:REM **** 7	FOR INPUT ****
1030 BUFFER=ADR (BUF\$)	
1040 SIZE=50	
1050 BYTES=USR (1536, CI	IAN, CMD, BUFFER, SI
ZE)	
1060 CLOSE MCHAN	
1070 PRINT :PRINT "	
WRITTEN TO CHANNEL #"	CHAN
1888 REM ***********************************	
1100 REM ***********************************	***************************************
1110 PRINT :PRINT :PR	THE HEELTHE TARE
PRESS PLAY - HIT TAI	
1120 CHAN=2:OPEN #CHAN	
1130 CMD=7:REM *** 11	
1140 BUFFER=ADR (BUF\$)	TOR OUTFUL MARK
1150 SIZE=100:BUF\$(1,	SA)="EMPTYIII"
1160 BYTES=USR(1536,CI	
2200 01122-03812000)01	, , , ,

1170 CLOSE MCHAN
1180 PRINT :PRINT " ";BYTES;" BYTES
READ FROM CHANNEL #"; CHAN
1190 PRINT :PRINT :PRINT "DATA READ =
";BUF\$(1,BYTE5)
1200 END
1500 REM
1518 REM ******************
1520 REM
2000 REM DATA FOR USR ROUTINE TO READ
n BYTES FROM A DATA CHANNEL
2010 DATA 32,68,218,104,201,4,208,43
2020 DATA 104,104,10,10,10,10,170,104
2030 DATA 104,157,66,3,104,157,69,3
2040 DATA 104,157,68,3,104,157,73,3
2050 DATA 104,157,72,3,32,86,228,132
2060 DATA 203,189,72,3,133,212,189,73
2870 DATA 3,133,213,96
Get it
Y right!
LINE CHSUM LINE CHSUM LINE CHSUM
10 5444 20 5092 30 4037
40 871 50 13001 60 9520 70 871 80 4651 90 871
100 5175 110 9310 120 871
130 4441 140 871 1000 13391 1010 4638 1020 5475 1030 3233
1848 1433 1858 7413 1868 2212
1070 11552 1080 871 1090 4273 1100 871 1110 14574 1120 4620
1130 5775 1140 3233 1150 5126
1 1160 7413 1170 2212 1180 10877

Program I.

ZE)

the normal buffer area and it is up to you to store the A register correctly afterwards.

For some reason, only this special case of binary data transfer is supported by Basic, making fast handling of large blocks of memory almost im-

possible without resorting to machine

2000

Program I will solve this little problem for you. The machine code routine is poked into page 6, though there is no

I/O Channels

ICCOM	Command	Notes	ICCOM	Command	Notes
3	Open	ICBAL/H = Pointer to file spec.	35	Lock (D:)	ICBAL/H = Pointer to filespec
3	Open	See Figure III.	36	Unlock (D:)	ICBAL/H = Pointer to filespec
5	Get Text	ICBAL/H = Buffer address; ICBLL/H = max. length	37	Point (D:)	ICAX3=Sector LSB, ICAX4= Sector MSB, ICAX5=Byte no.
7	Get Binary	ICBAL/H = Buffer address; ICBLL/H = length	38	Note (D:)	ICAX3=Sector LSB, ICAX4= Sector MSB, ICAX5=Byte no
		If ICBLL/H = 0, use single-byte	254	Format(D:)	ICBAL/H = Pointer to drive spec (eg: "D1:")
9	Put Text	A-register mode ICBAL/H = Buffer address;	17	Drawto (S:)	Draws line to ROWCRS (\$54) COLCRS (\$55/6)
11	Put Binary	ICBLL/H = max. length ICBAL/H = Buffer address;	18	Fill (S:)	Fills from ROWCRS, COLCRS with FILDAT (\$2FD)
		ICBLL/H = length If ICBLL/H = 0, use single-byte	32	Special (R:)	Output partial block: See Atar 850 manual
12	Close	A-register mode No parameters needed	34	Special (R:)	Control RTS, XMT, DTR: See Atari 850 manual
13	Status	ICBAL/H = Pointer to filespec (if not open)	36	Special (R:)	Set baud, stop bits & word size: See Atari 850 manual
		Results in ICSTA, plus optional DVSTAT (\$2EA)	38	Special (R:)	Set Ascii/AtAscii mode: Set Atari 850 manual
32	Rename (D:)	ICBAL/H = Pointer to filespecs (eg: "D:OLD,NEW")	40	Special (R:)	Enable concurrent I/O mode See Atari 850 manual
33	Delete (D:)	ICBAL/H = Pointer to filespec			See Atan 650 manuar

Figure IV: CIO command options

reason why you shouldn't place it into a string just as easily. The run address is 1536 and the parameters are as follows:

- 1. Address of machine code (1536)
- The channel number (which you should have already OPENed for input or output)
- The command number (7 for input,
 for output used by ICCOM)
- 4. The buffer address in memory (ICBAL/H)
- 5. The number of bytes to transfer (ICBLL/H)

The USR routine will also return the actual number of bytes transferred. This might be different to the number you actually asked for if the file ended early or the disc was full.

There are just two more major commands to cover now, the first of these being the Status routine. When called, this will return a value to ICSTA for the device in question.

Most devices do little with this facility, but it is especially useful for the printer and the RS232 driver.

The cassette, keyboard, screen handler and editor simply return a token value of 1 to the ICSTA register. The disc system returns a simple set of codes – 1 for normal file, 167 for locked file and 170 for file not found.

Both the printer and the RS232 driver return a block of four bytes of status data and store it in a special location called DVSTAT (Device Status) which is located at \$2EA (746)

decimal). For more information on its contents, consult your RS232 manual.

Finally we have the Close command, the simplest of them all. All you need do is place the value 12 into the ICCOM register and call ClOV. No other parameters or data are needed.

Some devices – such as the disc, screen and RS232 handler – also have their own unique commands. These are not normal CIO commands but are designed to handle the extra functions supported by that particular piece of hardware or software.

For disc files, command 32 does a Rename, 33 is Delete file, 35 and 36 Lock and Unlock files, 37 and 38 are Note and Point and 254 will format the disc.

Some of these do not need the channel to be previously Opened as they contain the full filespec themselves, pointed to by ICBAL and ICBAH. The Dos manual gives more information on these commands.

For the screen handler ('S:') you can use command 17 to draw a line and 18 to fill part of the screen – again, more information is available in the manuals.

The RS232 driver supports command 32 for sending an incomplete block of data, 34 to control the handshake lines, 36 to alter the baud rates, word size and number of stop bits, 38 to change the Ascii translation mode and finally 40 to start the concurrent I/O mode.

Those of you who have used the XIO command from Basic will by now have realised that XIO is in fact a simple way of calling the CIO system.

The normal format of the XIO command is:

XIO cmd, #channel, aux1, aux2, filespec

The first parameter is the command number (stored in ICCOM). Next comes the channel number (which is converted to the IOCB number).

The two auxiliary data bytes are stored in ICAX1 and ICAX2 and the filespec is accessed by setting ICBAL and ICBAH to point to it.

All the CIO commands we have been discussing are listed in full in Figure IV, but if you want to read up some more on the subject take a look at the Operating System User's Manual, which is part of Atari's Technical User Notes.

This month's I/O question is: Why can't we use the very useful XIO command to access the Binary Put and Get functions from Basic, rather than using a special machine code routine to do the job?

● I'll let you know the answer to that one next time, when we'll start looking at how to make up your own machine code device driver programs, how to patch them into the CIO system and what rules to follow to make them Reset-proof.

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2.8

7.7

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SHA



HAVE you ever sat at your keyboard, gazing at a blank screen, and cursed the snail-like pace with which Basic runs your programs? I doubt if you're alone in this activity – most of us go through it from time to time.

The obvious solution is to write your programs in machine code instead, as this runs hundreds of times faster than Basic and is very much more flexible.

However, machine code is not as easily mastered as Basic and it requires considerable time and effort to create quite small sections of code—you only need to look at the 80 line machine code equivalent to the Basic LPRINT statement last issue to see the problem.

Let's take a look at the reason for the speed differences, and at one possible solution.

Firstly, you must understand that the computer always does its internal work in machine code, no matter what language you decide to write your programs in. So if you use machine code too the computer is given the job in an easily digestible form and can thus function that much faster.

Basic is itself a very sophisticated machine code program which takes your input in simple English-like words and converts them into machine code that the computer can understand.

However, because you will often be adding and deleting parts of your program, Basic only does this conversion when you finally RUN your new masterpiece.

Each line the computer comes to is translated into a machine code form and then executed, then the process starts all over again for the next line.

While the machine code itself is very fast, the conversion process takes time – and this is where the speed problem lies.

The ideal situation would be to write your program in a straightforward English-like language and then have the computer convert the whole lot into machine code in one go.

The result would execute almost as

A compiler's the if you want fast

quickly as it would if you had written it in machine code in the first place, because no more complex conversions need be carried out at run time.

Is there an answer to this pipedream? Luckily, there are quite a number of these type of languages – known as Compilers because they compile your program into its machine code equivalent.

These include C, which is also very popular on the ST range, Pascal, Forth, Lisp and many others.

These are all languages which were designed with much larger machines

one of the simplest but nonetheless most powerful alternatives to Basic.

The language comes on a special type of cartridge known as a Super-Cartridge, which is a way of packing 16k of information into an 8k slot in memory using a technique called bank switching.

It consists of four main segments – the Editor, Monitor, Compiler and Library.

The Editor is rather like a word processor and is in itself very flexible. It is here that you create your Action! programs in the same way as you

ANDRÉ WILLEY considers Action! a fine second language for the advanced Basic programmer

in mind and can thus be quite unwieldy to use on an 8 bit micro such as the Atari. They also tend to produce much larger files than a pure machine code author would generate.

A few years ago, a Californian firm called Optimised Systems Software decided to produce a compiler written especially for the 8 bit Atari.

Unlike Forth, Lisp and the others this would have the advantage of being similar in style to Atari Basic but should also be able to create very fast, compact machine code.

Thus Action! was born.

Written by Clinton Parker, Action! is the result of many months of hard work and is now widely regarded as would type a letter into AtariWriter.

There are no line numbers, and no LIST command – you simply use the cursor keys to move about your whole program at will.

Full search and replace options are available, and any line may be up to 128 characters long – and each line (or the whole screen) can be scrolled across the normal 40 column screen.

Two windows containing completely separate programs are available and you may cut and paste between them with ease.

Once your program is complete you can return to the Monitor, which allows you to control the system. From here you can select the various options and compile and/or run programs.

The Complier itself is extremely fast

often completing programs many
hundreds of lines long in less than a

This is the business end of the language and it turns your program text into very compact machine code ready for the 6502 to execute. This code may then be run or saved to disc for later use.

The final module, the Library,

Basic	Basic XL	Action	
2.02	1.06	0.02	
6.56	2.02	0.026	
18.88	7.52	0.82	
22.14	7.84	0.86	
25.74	8.60	0.88	
39.74	15.52	1.00	
60.38	23.80	1.06	
25.07	9.48	0.66	
	2.02 6.56 18.88 22.14 25.74 39.74 60.38	2.02 1.06 6.56 2.02 18.88 7.52 22.14 7.84 25.74 8.60 39.74 15.52 60.38 23.80	

Note: Benchmark 8 is not applicable since Action does not support floating point.

answer

contains pre-written routines to take the hard work out of programming.

It provides all the features you are used to having at your disposal from Basic, such as input/output operations, graphics and sound, string handling and so on.

This is one way in which Action! manages to create such tiny machine code files (otherwise known as object files) – all these space consuming functions are contained within the cartridge instead of cluttering up your final program.

This does have the drawback that your programs may only be run with the Action! cartridge present, although it is possible to buy a Run-Time Library, which effectively adds this set of routines on to your final object file.

Once this has been done, your program is completely free-standing and may be run on any Atari with ar without the cartridge.

Since there are no line numbers, structuring your work carefully is most important. You write your programs as a set of small modules – called Procedures – which may call each other at will.

Each time you call up a procedure you may pass information and variables to it in the form of parameters, which are illustrated in Program I.

There are limits to the ways in which you may use procedures, however — the most important being that you can't forward reference them, meaning that a given procedure must be defined before you try to access it.

Variables must also be defined before you use them, either at the start of the whole program (global variables) or at the start of a procedure (local variables).

Globals may be used anywhere in the program but a local variable may only be called from within its own procedure.

To speed up the computer's job, variables are stored only as whole numbers since fractions take a lot of

```
; flow control
 Program I
                                           PROC MAIN()
 Demonstration of Action! Procedures
; N.B. Comments after a ';' are
                                           BYTE VALUE,
; ignored by Action!
                                                COUNTER
: *************
                                           PRINT("Enter a number: ")
                                           VALUE=INPUTB()
BYTE FUNC Get_Number()
BYTE TEMP; Define TEMP as a byte value
                                           IF VALUE< 100 THEN
                                              PRINTE("That's a small number")
                                              ELSEIF VALUE=100 THEN
PRINT("Please enter a number: ")
                                              PRINTE("That's exactly 100!")
TEMP=INPUTB()
                                              PRINTE("That's a big number!")
; INPUTB simply takes in a BYTE value
; from the keyboard
                                           ; Note: FI tells Action that the IF
                                           ; statement is ended
; Now return the value to the part
; of the program which called this
; routine, with ...
                                           ; Now three ways to print all numbers
                                             up to the one typed...
RETURN(TEMP)
                                           ; Note that ALL Action! loops are
                                           ; contained within DO ... OD lines,
;***********
                                           ; which makes a loop very easy to
                                            ; identify
PROC Print_Number(BYTE Numb)
; Routine to print a byte number and
; some text
                                           ; *** 1 ***
                                           PUTE(); Print a Blank line
PRINT("The number you typed was ")
                                           PRINTE("Using FOR ... NEXT Loop")
                                            FOR COUNTER = 1 TO VALUE
; The BE after the PRINT statement
 tells Action! to print a byte (B)
                                              PRINTB(COUNTER)
  followed by a Carriage Return - or
                                              00
; End-Of-Line (E)
RETURN
                                            ; *** 2 ***
;*********************
                                            PUTE()
                                            PRINTE("Now using WHILE loop")
PROC MAIN()
                                            COUNTER=1
;Main routine which will be run first
                                            WHILE COUNTER<=VALUE
BYTE VALUE,
                                               DO
     COLBACK=710
                                               PRINTB(COUNTER)
                                               COUNTER=COUNTER+1
GRAPHICS (Ø)
COLBACK=0 ; Make a black background...
                                            ; *** 3 ***
VALUE=Get_Number()
; Rather like a GOSUB to Get_Number
                                            PRINTE("Now using DO ... UNTIL loop")
Print Number (VALUE)
                                            COUNTER=1
; Prints the number we typed in
                                               PRINTB(COUNTER)
RETURN; End of progam
                                               COUNTER=COUNTER+1
                                               UNTIL COUNTER>VALUE
  Program II
 ; Demonstration of Action! program
                                            RETURN ; End of program
```

time to calculate - and besides, most programs simply don't use them.

If you do need to use real numbers then a floating point package is available as a set of procedures to include within your programs.

Variables may be defined as BYTE (a value between 0 and 255), CARD (two bytes, a value between 0 and 65535) and INT (two bytes again, but also allowing for negative numbers, -32768 to +32767).

It is also possible to set up arrays of any of these types, or indeed arrays of arrays. A string is defined as an array of characters - or an array of BYTEs to be more accurate.

One of the most powerful features of the Action! language is that variables may be set to point to any location in memory.

You could, for example, define the variable BACKGROUND to be stored at memory location 710, the background colour register. This would be achieved very simply with:

BYTE BACKGROUND = 710

Programs are mainly made up of loops and conditional statements. These are the equivalent of Basic's FOR ... NEXT and IF ... THEN commands, but you have a lot more flexibility in Action!

Loops may be controlled by the FOR ... NEXT, WHILE and UNTIL statements. Conditional operations are likewise improved with the fundamental IF ... THEN being supplemented by ELSE and ELSEIF. All of these control operations are demonstrated by Program II.

It is interesting to note that there is no direct equivalent to the GOTO statement since all flow control is handled by loops and procedures. This encouranges you to write good, readable software.

If you compare the listing in Program II with a normal Basic program you will probably find the former much easier to read and understand, even though you have probably never seen the language before.

The real power of Action! comes in everyday usage. Things which were complex and unwieldy in Basic can be accomplished with ease and speed in an environment which also encourages you to explore the system's potential in ways that Basic's PEEKs and POKEs prevent.

So powerful is the language that many commercial programs have been written in it - the obvious example being Home Pak, the integrated word processor, database and comms package.

The Action! editor is so flexible and simple to use that it has been used as the core of a number of word

In short, Action! is probably the nearest thing to a perfect programming environment that you are likely to find on the 8 bit Atari, though it is perhaps a little pricey for the pocket money programmer.

It is extremely fast, yet simple to learn and use for everyday applications - though complete mastery will obviously take a little time.

In fact, it is probably a better second language for the advanced Basic programmer than machine code.

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KYAN Pascal from Kyan Software gives you a full Pascal compiler and programming environment which could easily replace Basic as the main language on the 8 bit Ataris.

This implementation of the famous language opens a wide new world to the Atari programmer. Complex data structures, recursion and a host of powerful commands provide you with capabilities Basic could never hope to match.

Pascal was written by Kathleen Jensen and Niklaus Wirth of the Institut fuer Informatik in Zurich and was named after the 17th century mathematician Blaise Pascal.

It was first published in 1971 and then ran only on the Control Data 6000 series of computers, the most powerful of their day.

Jensen and Wirth had as their goal the creation of a new structured general purpose language that would be ideal to teach the concepts of programming as well as suitable for use in commercial software houses.

A structured language, Pascal allows the programmer to write his code in separate building blocks that can be linked together to accomplish a set task. Because of this approach, Pascal programs are also self-documenting.

Anyone knowledgeable in the lan-

A language that offers far more than bare Basic

JOHN ALSBROOKS reviews Kyan Pascal, a package that enables Atari users to greatly broaden their scope

considerably more powerful in that they allow the use of local variables and recursion.

Local variables have meaning only within a procedure or function, unlike Basic where all variables are global and so can be used anywhere in the code.

Recursion is the ability for a subroutine to call itself repeatedly – a valuable ability in many mathematical problems. Pascal excels at this as its

IF-THEN-ELSE, WHILE, CASE, REPEAT and FOR-TO and the option to define variables and records beyond the character string options of Atari Basic, poor old Basic seems hopelessly limited.

As an example of Kyan Pascal, Program I is a solution to the famous Towers of Hanoi puzzle:

What exactly do you get when you buy a copy of Kyan Pascal? First of all, you get a standard Pascal, not some unique dialect.

This means that any programs you write, with the exception of those that make use of sound or graphics, should run on any other Pascal system from micro to mainframe.

Perhaps more importantly, the fact that Kyan has produced a package that conforms to the International Standards Organisation (ISO) standard for Pascal means that the vast amount of Pascal code already in existence can be used on your Atari with little or no modification.

You also get a complete Pascal environment, including compiler, editor and macro assembler.

The editor is a very capable part of the package. All the standard cursor controls used in Basic still apply, along with the addition of control codes to allow search and replace, cut and paste and full file manipulation.

If, however, you prefer AtariWriter or some other word processor, you may write your code on that system for compilation later.

At the heart of Kyan Pascal are the Pascal compiler and the 6502 assembler. The former takes the Pascal source code you write and produces assembly language source

```
program Hanoi (input, output);
    (*Recursively solves the Towers of Hanoi problem. Moves disks
from A to C.*)

var Height: integer; (*All variables must be defined*)

procedure Move (Height: integer; FromPeg, ToPeg, UsingPeg: char); (*More variable definitions*)
    (*Recursive procedure for determining moves.*)
    begin
    if Height = 1
        then writeln ('Move a disk from ',FromPeg,' to ',ToPeg)
        else begin
        Move (Height-1,FromPeg,UsingPeg,ToPeg);
        writeln ('Move a disk from ',FromPeg,' to ',ToPeg);
        Move (Height-1,UsingPeg,ToPeg,FromPeg)
    end (*else*)
end; (*Move*)

begin (*Main Program*)
    writeln ('How many disks are you going to start with?');
    readln (Height);
    Move (Height,'A','C','B')
end. (*Hanoi*)
```

Program I: Kyan Pascal listing

guage should be able to pick up a piece of code and understand what is going on relatively quickly. And the compartmentalisation of tasks reduces the likelihood of changes to one section of code adversely affecting another.

The two keys to Pascal's building block approach are procedures and functions. Both are roughly analogous to the subroutine in Atari Basic but are use of local variables allows it to keep track of how deeply it is layered on itself.

By defining your own procedures and functions, you can tailor the language to your specific applications and at the same time build a library of functions and procedures for use in other projects.

When you have Pascal's powerful program control statements such as

code: The assembler then takes the compiler output and produces an executable machine code file.

As a bonus, Kyan has added extensions to the compiler for both sound and graphics, as well as random file access - capabilities not normally supported in other Pascals.

Nothing is perfect, but my only complaint is that the compiler is painfully slow. Program I takes 95 seconds to compile and makes the disc drive whir and grind like a 1961 Morris Minor running without oil. Even loading the compiler takes over 25 seconds.

There is some respite, however, if you own a 130XE. You may load the compiler, source code, standard library and so on into the ramdisc. Loading now takes less than three seconds and compile times are cut in

There is nothing wrong with the code the compiler produces though. Unlike some other versions of Pascal for micros (which produce an interpreted language known as p-code), the Kyan package produces native 6502 machine code which runs extremely quickly - some five to ten times faster than Atari Basic.

If this increase isn't enough for you, Kyan has thoughtfully allowed the programmer to place assembly language routines right in the middle of his program. I found this feature a lot easier to use than thrashing about with the Assembler/Editor cartridge.

A little bit less than 27k of ram is available for your program and so far nothing I have written has come close to using up even half the available memory.

In the event that you need to write a program that would exceed the size of your computer's memory, you can chain two or more programs together and allow them to share variables between them as they execute.

The documentation that comes with Kyan Pascal is extremely good. The 274 page manual contains sections on using the package, assembly language programming and an excellent tutorial that leads you by the hand as

you explore the capabilities of Pascal. Additionally, there is a comprehensive index, something all too rare nowadays.

There is also an optional bi-monthly newsletter available from Kyan with articles on Pascal and assembler programming, handy procedures and functions to add to your own library, and a forum for users' letters and questions.

Kyan Pascal comes on both sides of a single density, unprotected disc. Included with the compiler, editor and assembler are Dos 2.5, utility files and a few example Pascal programs (both source and object). It will run on all 8 bit Ataris with 48k or more ram.

Kyan Pascal is a real Pascal. It puts you on a par with every other Pascal user and broadens your scope beyond Atari Basic. I highly recommend it.

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TEXT and graphics cannot be easily mixed on an 8 bit Atari. This is because, unlike the ST range, it does not have a bit mapped text screen.

Display lists can be used to good effect, but this puts certain constraints on the programmer as they cannot be displayed on the same horizontal line – only farther down the screen.

To overcome these problems I have written a machine code routine which also has two additional features – Different text sizes and the ability to have the foreground and background in any colour.

The Write routine is called by using:

A=USR(ADR(WRITE\$),XPOS, YPOS,INK,PAPER,XSCALE, YSCALE,ADR("TEXT"),NUMCHS)

WRITE\$ contains the machine code program.

XPOS and YPOS are the x and y coordinates of where to start printing the text

INK is the text colour and PAPER is the background colour of the characters.

XSCALE and YSCALE define the size of the characters. These have a

Mixing it with text and graphics

RICHARD PARKES gets round that bit mapped text screen snag

maximum value of 255 but are limited by the number of pixels on the screen. **NUMCHS** is the number of characters to be displayed.

The text between the quotes is printed in the desired colour and size at the requested position.

Type in the program up to and including line 140 and then LIST it to disc or tape. You can then easily

merge the Write routine into your own programs using the ENTER command.

Now type in the rest of the listing which is a demonstration program to show you what the Write routine can do.

If you have any difficulty typing Write in, you can check it using Get It Right!, our checksum program or you can download it from MicroLink.

710 GOSUB 6000

5 REM BASIC MRITES DATA PROGRAM 10 DIM WRITE\$ (340) : FOR J=1 TO 340 : READ A: WRITES (J) = CHR\$ (A) : NEXT J 20 DATA 169, 8, 141, 255, 6, 104, 201, 8, 240, 14,168,1,18,178,248,4,184,202,288,252, 140,255,6,96,160,141,104,141 30 DATA 243,6,104,141,242,6,104,240,4, 169,13,208,228,104,141,244.6,104,104,1 41,245,6,104,104.141,246,6 40 DATA 104,240,4,169,7,208,207,104,14 1,247,6,104,240,4,169,5,208,196,104,20 8,5,168,169,4,208,188,141,248 50 DATA 6,104,133,206,104,133,205,104, 141,249,6,184,141,250,6,173,244,6,141, 252,6,173,249,6,13,250,6,208 60 DATA 1,96,169,255,141,251,6,173,250 ,6,56,233,1,141,250,6,176,3,206,249,6, 160, 0, 177, 205, 10, 144, 3, 140 70 DATA 251,6,74,201,96,176,10,201,32. 144,4,233,32,176,2,105,64,172,244,2,13 2,284,162,3,10,144,8,72,138 80 DATA 24,101,204,133,204,104,202,208 ,242,133,203,160,0,152,72,173,242,6,14 1,253,6,173,243,6,141,254,6 90 DATA 173,252,6,141,241,6,177,203,77 ,251,6,162,8,240,143,10,72,169,0,208,2 21,42,168,185,245,6,141,251 100 DATA 2,138,72,24,173,253.6,133.85. 109, 247, 6, 141, 253, 6, 173, 254, 6, 133, 86, 1 05, 0, 141, 254, 6, 172, 248, 6, 162 110 DATA 2,189,252,6,149,98,202,16,248 ,133,84,152.72,162,96,169,17,157,66,3, 240,190,32,86,228,48,52,238 120 DATA 252,6,104,168,136,208,220,104 ,170,104,202,240,9,172,241,6,140,252,6 ,24,144,164,104,168,200,192 130 DATA 8,208,161,230,205,208,2,230,2 86,173,253,6,141,242,6,173,254,6,141,2 43,6,169,0,240,197,140,255,6

140 DATA 104, 104, 104, 104, 96 488 REM WRITES EXAMPLE PROGRAM 490 REM CTO BE TYPED IN AFTER WRITES DATA PROGRAM 500 TRAP 32760:GRAPHICS 11:SETCOLOR 4, 510 DIM A\$(15):A\$="ATARI USER" 520 FOR J=1 TO 10 550 A=USR (ADR (WRITES) , (J-1)*8.6. J. J+4. 1,4,ADR(AS(J)),1):IF PEEK(1791) (>0 THE N A=LOG(8) 560 NEXT J 570 FOR J=1 TO 500: NEXT J 580 FOR J=0 TO 14: SETCOLOR 4.0. J: FOR I =1 TO 100: NEXT I: NEXT J 590 GRAPHICS 9+32:FOR J=0 TO 15:SETCOL OR 4, J, 0: FOR I=0 TO 200: NEXT I: NEXT J: SETCOLOR 4,12,0 600 FOR J=1 TO 500: NEXT J 610 FOR J=2 TO 5 620 FOR Y=6 TO 6+(J-1)*8 STEP 2 638 A=USR(ADR(WRITE\$), (J-1)*8, Y, J, J+4, 1,4,ADR(A\$(J)),1):IF PEEK(1791) (>0 THE M 4=1.06 (8) 640 NEXT Y: NEXT J 650 A=USR (ADR (MRITE\$), 40.6, 0.0, 1, 4, ADR (" "),5):IF PEEK(1791) ()0 THEN A=L 660 FOR J=7 TO 10 678 A=USR(ADR(MRITE\$), (J-6.5)*8,8*J+8, J, J+4,1,4, ADR (A\$ (J)) . 1) : IF PEEK (1791) (>0 THEN 4=LOG(0) 680 NEXT J 690 A=USR(ADR(WRITE\$),44,78,8,15,1.3.4 DR ("DEMO") ,4) : IF PEEK (1791) ()0 THEN A= 700 A-USR (ADR (MRITE\$),4,140,2,6,1,2,40 R("PRESS ESC"),9):IF PEEK(1791) (>8 THE N A=L06(8)

720 GRAPHICS 8+16+32: SETCOLOR 2,0,0:FO R J=1 TO 400: NEXT J -730 GOSUB 6000 740 GRAPHICS 7+16 750 DIM TEXTS (50) : TEXTS="The routine c an be used for labelling graphs" 760 CPL=19:X=4:Y=4:IMK=1:PAPER=2:XSCAL E=1:Y5CALE=2:G05UB 7000 770 TEXTS="An example follows":CPL=18: X=4:Y=55:INK=3:PAPER=4:XSCALE=1:YSCALE =1:605UB 7000 780 TEXT\$="Press 'Esc'":CPL=11:X=32:Y= 70:INK=2:PAPER=1:XSCALE=1:YSCALE=1:GOS UB 7000 790 GOSUB 6000 800 GRAPHICS 8+16:COLOR 1:PLOT 17,10:D RAHTO 17,170:PLOT 17,95:DRAHTO 313,95 810 DEG :PLOT 17,95:FOR J=0 TO 452 STE P 10:DRAWTO J*2/3+16,95-5IN(J)*75:NEXT 820 A=USR(ADR(WRITE\$),3,10,1,0,1,1,ADR ("1"),1):IF PEEK (1791) (>0 THEN A=LOG(0 830 A\$="y axis": FOR J=1 TO LEN(A\$) 840 A=USR (ADR (HRITE\$),3, J*8+54,1,0,1,1 ,ADR (A\$ (J)) , 1) : IF PEEK (1791) (>0 THEN A 850 NEXT J 868 A=USR(ADR(MRITE\$),8,163.1,8,1,1,AD R("-1"),2):IF PEEK(1791) (>0 THEM A=LOG 878 A=USR(ADR(MRITE\$),67,98,1.8,1,1,AD R("90"),2):IF PEEK(1791) (>0 THEN A=LOG 880 A=USR(ADR(WRITE\$),191,98,1,0,1.1,A DR ("278") , 3) : IF PEEK (1791) () 0 THEM A=L

Utility

900 A=USR(ADR(WRITE\$),270,100,1,0,1,1,
ADR("x axis"),6):IF PEEK(1791) <>0 THEN
A=LOG(0)

910 A=USR(ADR(WRITE\$),40,0,1,0,3,2,ADR ("SINE CURVE"),10):IF PEEK(1791) <>0 TH EN A=LOG(0)

920 A=USR(ADR(WRITE\$),30,140,1,0,1,1.A DR("y=sin(x)"),8):IF PEEK(1791)<>0 THE N A=LOG(0)

930 A=USR(ADR(HRITE\$),200,180,0,1,1,1.
ADR("Press 'Esc'"),11):IF PEEK(1791) (>
0 THEN A=LOG(0)

940 60508 6000

950 FOR J=9 TO 11:GRAPHICS 32+J:GOSUB 6000:NEXT J

960 GRAPHICS 8+16:TEXT\$="FULL ATASCII CHARACTER SET":CPL=40:X=52:Y=0:XSCALE=

970 INK=1:PAPER=2:G0588 7000

988 FOR J=0 TO 7:FOR X=0 TO 31

990 A=USR(ADR(WRITE\$), X*10+1, 24+J*10, 1
,0,1,1, ADR(CHR\$(J*32+X)), 1):IF PEEK(17

,0,1,1,ADR(CHR\$(J*32*X)),1):1F PE 91)()0 THEN A=LOG(0)

1000 NEXT X:NEXT J

1010 REM XE ONLY LINES 1020 TO 1040

1020 POKE 756,204:FOR J=0 TO 7:FOR X=0

1030 A=USR(ADR(WRITE\$), X*10+1,104+J*10,1,0,1,1,ADR(CHR\$(J*32+X)),1):IF PEEK(1791) <>0 THEN A=LOG(0)

1848 NEXT X: NEXT J

1050 FOR J=1 TO 1000: NEXT J

1060 GRAPHICS 8+16

1070 A=USR(ADR(WRITE\$),40,10,10,10,10, ADR("THE"),3):IF PEEK(1791) <>0 THEM A =LOG(0)

1080 A=USR{ADR(WRITE\$),40,100,1,0,10,1 0,ADR("END"),3):IF PEEK(1791) <>0 THEN

1090 GRAPHICS 10+32

1100 GOTO 1100

5999 END

6000 POKE 764,255

6010 IF PEEK (764) (>28 THEN GOTO 6010

6020 RETURN

7000 FC=1:FOR J=1 TO LEM(TEXT\$)

7010 IF TEXT\$(J, J)=" " THEN TS=J

7020 IF J-FC()CPL THEN 7050

7030 A=USR(ADR(MRITE\$),X,Y,INK,PAPER,X SCALE,YSCALE,ADR(TEXT\$(FC)),TS-FC):IF

PEEK(1791) (>0 THEN A=LOG(0)

7848 FC=T5+1:Y=Y+Y5CALE*8

7050 NEXT J

762

7060 A=USR(ADR(WRITE\$),X,Y,INK,PAPER,X SCALE,YSCALE,ADR(TEXT\$(FC)),J-FC):IF P

EEK(1791) (>0 THEN A=LOG(0) 7070 RETURN

32760 GRAPHICS 0:? :? "Error- ";:IF PE EK(1791)()0 THEM ? PEEK(1791);:GOTO 32 32761 ? PEEK(195); 32762 ? " at line "; PEEK(186) + PEEK(187



		The state of the s	40000000		
LINE	CHSUM	LINE	CHSUM	LINE	CHSUM
5	6093	10	11474	20	15968
30	14959	40	15405	50	15044
60	15030	78	15011	80	14965
90	15062	100	15163		15290
120	15000	130	15125		3695
480	5301	. 498	9684	500	7344
510	4679	520	2270	550	14242
560	1347	570	3895	580	19629
598	16519		3895	610	2093
	4524		14347		2856
620			2288	670	15443
650	13232	660	13917	700	14704
680	1347	690 720	9873		1940
710	1940	750	16340		11289
740	2495		16142		1940
770	18719	780 810	13617	820	13059
800	13361	848	13874		1347
838	5825		13023		13363
860	12920	870	15307		14966
900	14427				8232
930	16214	940	1940		
960	15828	979		980	4660
990	16257		2854	1010	5386
1020	7112		16533	1040	2854
1050	3994	1060	2496	1070	13708
1080	13923	1090	2719	1100	1851
5999	836		2121	6010	5507
6020	1498		5018		4797
7020	3970		19507	7040	
7050	1347		19082	7070	
32760	13334	32761	2051	32762	7228

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AUTO BOOT CASSETTE from STEPHEN HILL

winners!

IF you've ever wanted to create autorun cassettes or discs, then this fiveliner could be the answer. It will create a file from a machine code program which will load on power up. To create an auto-run disc, you will have to change the OPEN command in line 40 to:

OPEN #1,8,128,"D:AUTORUN.SYS"

and change the second PUT command to:

PUT #1,255

If you are using a cassette, you must press the Start key as you turn the computer on so that the program will auto-run.

Line Breakdown

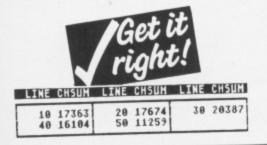
- 10 Sets up screen.
- 20 Inputs the start and end addresses and calculates the header bytes.
- 30 The start and end addresses are converted in their high and low components.
- 40 A save file is created and the header bytes are written to it.
- 50 The contents of the memory block are written to the cassette or disc.

10 GRAPHICS 0:POKE 752,1:POKE 710,50:P OKE 712,100:POSITION 6,3:? "MEMORY TO AUTO-BOOT CASSETTE"

20 ? :? "START ADDRESS:";: INPUT START: ? :? "END ADDRESS:";:IMPUT EDA:START=S TART-6:X=START

30 SHI=INT(X/256):SLO=(X-(SHI*256)):X= EDA: EHI=INT (X/256) : ELO= (X-(EHI*256)) : P =(INT(EDA-START)/128):IF P(1 THEN P=1 40 CLOSE #1:0PEN #1,8,128,"C:":PUT #1, 255:PUT #1,P:PUT #1,SL0:PUT #1,SHI:PUT #1.ELO:PUT #1,EHI

50 FOR X=START TO EDA:Q=PEEK(X):PUT #1 , Q:MEXT X:CLOSE #1:END



256 COLOURS from MARK RILEY

THIS clever program produces 256 colours on the screen without using the usual Display List Interrupts. It merges colours to produce the large number displayed.

Line Breakdown

- 10 Sets the screen to graphics mode 11 and starts the main loop.
- 20 Draws the horizontal lines.
- 30 Sets the colours of the vertical
- 40 Draws the vertical lines.
- 50 Loops back to line 50 so that the screen remains unaltered.

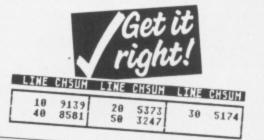
10 GRAPHICS 11:FOR A=8 TO 160 STEP 2:C OLOR A*(16/168)

20 PLOT 9, A: DRAWTO 70, A: NEXT A

30 FOR A=9 TO 70:COLOR A*(15/70)

40 FOR 8=9 TO 156 STEP 2:PLOT A, B: NEXT

50 POKE 77,0:GOTO 50



CONTROL LINE from HASSAN MEHMET

THIS small routine adds a 25th line at the top of the screen using display list interrupts. Even if you don't know anything about DLIs, you can easily incorporate Control Line in your own programs.

Line Breakdown

- 10 Gets the DLI address and the low and high screen pointers.
- 20 Reads the data for the DLI and 30 Puts the text into the control line. POKEs it in.
- 40 Repositions cursor and screen pointer.
- 50 DLI data.

18 GRAPHICS 8:DL=PEEK(568)+256*PEEK(56 1):5LO=PEEK(88):5HI=PEEK(89):PH=PEEK(8 4) :PU=PEEK (85) :POKE 559,0 20 FOR I=DL-3 TO DL+2:READ DAT:POKE I, DAT:NEXT I:DL=DL-3:HI=INT(DL/256):L0=D 30 POKE 560, LO: POKE 561, HI: POKE 559, 34 :POKE 88,0:POKE 89,6:POSITION 0,8:? "5 PLAYER 2" HI 5000 CORE 8888 48 POKE 84, PH: POKE 85, PU: POKE 88, 5L0: P OKE 89, SHI 50 DATA 112,80,66,0,6,16



MAGIC NUMBERS from ROGER WILLIAMS

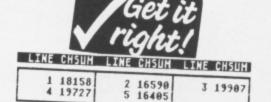
MAGIC squares have been of interest to mathematicians for centuries. The magical property of a magic square is that each column, row and diagonal adds up to the same number. This small program creates magic number squares quickly and simply.

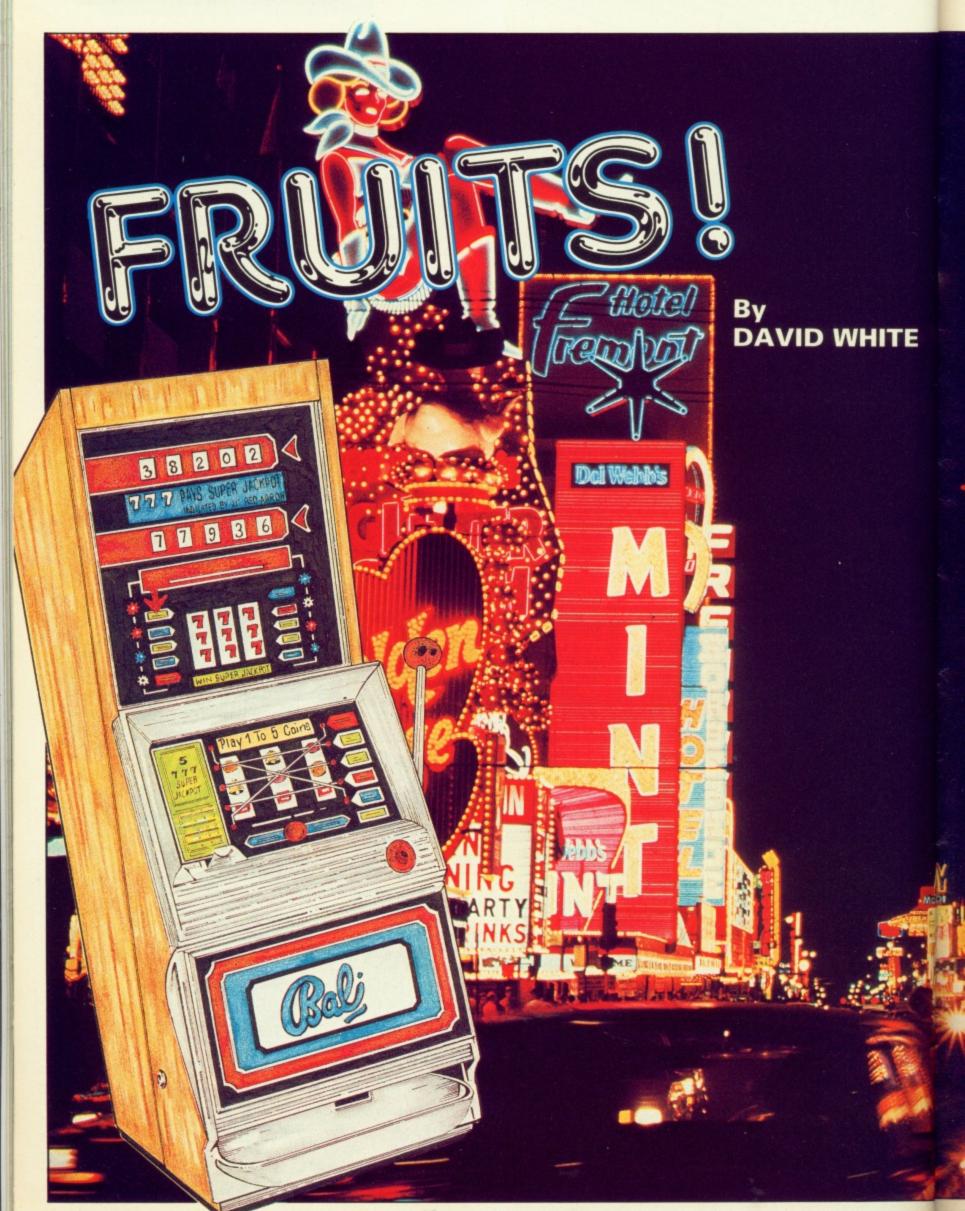
Line Breakdown

- 1 Inputs the number of rows in the square and initialises the main array.
- 2 Sets up the main loop for row by row calculation and calculates the elements on the diagonals of the square.
- 3 Calculates column elements adjacent to the top left/bottom right diagonal.
- 4 Calculates column elements adjacent to the top right/ bottom left diagonal.
- 5 Increments the main loop until

completion and then displays the square.

- 1 ? "ENTER EVEN ORDER OF SQUARE";:IMPU T N:DIM A(N*N):FOR I=1 TO N*N:A(I)=I:N EXT I:B=N/2:C=INT(N/4)
- 2 FOR I=1 TO B:P=(I-1)*(N+1)+1:0=(N-I) *(N+1)+1:R=I*(M-1)+1:S=(N-I)*N+I:A(P)= Q:A(Q)=P:A(R)=5:A(5)=R
- 3 ON M(5 GOTO 5:FOR J=1 TO B-C-1:D=8*((I+J) >B) :E=J-D;F=(J-D)*N:A(P+E)=5+E:A(S+E)=P+E:A(P+F)=R+F:A(R+F)=P+F:MEXT J 4 ON M(7 GOTO 5:FOR J=1 TO C-1:D=B*((I +J)>B):E=J-D:F=(J-D)*N:A(R-E)=Q-E:A(Q-E)=R-E:A(S-F)=Q-F:A(Q-F)=S-F:MEXT J
- S MEXT I:FOR I=1 TO N:PRINT "ROW"; I;"= ";:FOR J=1 TO M:? A((I-1)*N+J);":";:ME XT J:? : NEXT I





FRUIT machine programs will never be the same again once you've seen Fruits. With graphics which would put many an arcade fruit machine to shame, this month's type-in game will let you gamble your time away, but still leave the contents of your wallet intact.

Using an impressively redesigned character set, Fruits turns your 8 bit Atari into a one armed bandit complete with sound effects, nudge

CEL

controls, smooth scrolling windows and a separate score screen.

Type in Listing I. If you use a cassette for storage, then make the changes given in Listing II making sure to delete line 2600. Be sure to save the program to disc or tape before you run it.

Now place a newly formatted disc in the drive or blank cassette in cassette deck and RUN Fruits. An auto-run version will be placed on the

disc or cassette. It will take about 10 minutes to complete, then the normal Ready message will appear on the screen.

If you get an error message, check the offending line. An error message in line 32768 means that you will have to check the DATA statements carefully.

You can now run Fruits by placing the disc in the drive or tape in the cassette deck and booting your computer without Basic.

If you have any problems typing in Fruits, you can check it using our checksum program Get It Right! which was last published in the August 1986 issue of Atari User. Alternatively you can download Fruits from MicroLink.

Happy gambling!



Listing 1

10 REM FRUITS

20 REM ATARI USER - MARCH '87

30 OPEN #1,8,0,"D:AUTORUM.SYS":TRAP 60 :CH=0:XCH=907931

40 READ A: IF A>=0 THEN PUT #1, A: CH=CH+ 4:60TO 48

50 READ B:FOR C=1 TO -4:PUT #1, B:CH=CH +8:NEXT C:60TO 48

60 CLOSE #1: IF CH() XCH THEN ? "DATA ER ROR - LINE ": PEEK (183) +256*PEEK (184)

70 DATA 255,255,128,101,247,138

80 DATA -8,0,-64,255,-39,0,-8,255,-17, 0,-8,255,-24,194,231,-23,194,-8,255,-6

4,0,-8,255,-24,16,57,-23,16,-8,255

90 DATA -64,0,-8,255,-24,195,231,-23,1

95,-8,255,-64,8,-64,255,-39,8,-8,255,-

17,0,3,12,1,21,21,-3,85,192,48,64 100 DATA 84,148,101,89,85,-8,0,1,1,5,5 ,21,21,0,0,-6,85,3,3,-6,85,192,192,64. 64,80,80,84,84,-3,0,255,255,0,63,48 110 DATA 48.63.0,255.255.0.3.204.204.1 5,0,255,255,0,195,51,51,243.0,255,255, 0.240,12,12,240,-3,48,63,0,255,255,8 128 DATA -3,284,12,8,255,255,8,-4,51,8 ,255,255,0,192,48,12,12,0,255,255,-3,0 ,5,16,-4,64,0,85,0,42,42,0,2,10,0,85 130 DATA 0,-3,168,160,128,0,0,80,4,-4, 1,-4,64,16,5,0,0,-4,10,0,0,85,-7,0,85, 0,-4,1,4,80,-21,0,3,3,15,63,63,5,61 148 DATA -5,255,252,-4,8,3,63,255,127, 0,3,15,-4,255,240,-5,255,252,192,0,252 ,240,240,192,-9,0,3,15,63,-4,0,3,-3 150 DATA 255, 3, 0, 63, -5, 255, 240, 28, 28, 2 40,240,-3,252,-5,255,63,63,3,-14,255,2 52,192,240,-4,192,-3,0,3,3,0,0,10,41 160 DATA 37,165,192,248,241,5,161,186, 170, 170, 15, 63, 252, 64, 74, -3, 170, -3, 0, 12 8,160,168,168,170,169,-4,170,42,42,2 170 DATA 106,-20,170,168,168,128,-4,0, -3,3,15,0,15,63,240,-3,192,255,0,255,2 55,-4,0,192,-8,0,15,-4,3,63,63,0,255 180 DATA -4,192,255,255,0,192,-4,0,255 ,255,-18,8,240,252,60,1,1,4,16,0,1,4,1 9,67,64,88,4,8,64,8,192,248,248,-3,8 190 DATA 2,18,41,42,10,2,0,128,168,104 ,170,106,168,160,0,0,2,10,42,42,10,2,0 ,128,160,168,170,170,168,160,-4,0,3 200 DATA 15,15,63,63.0,0,63,252,-4,255 ,0,255,195,15,-4,255,0,252,-6,255,63,-5,255,63,0,-7,255,0,-5,255,252,192,0

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,-5,183,170,247,215,-5,247,42,183 450 DATA 151, -5, 183, 170, 215, 221, 245, 24 7,223,223,245,42,183,151,-5,183,170,21 5,253,247,215,253,253,215,42,183,151 460 DATA -5.183.170.-3.223.221.213.245 .253.42.183.151.-5.183.170.213.223.223 .215,253,247,215,42,183,151,-5,183 470 DATA 170,245,223,223,215,221,221,2 47,42,183,151,-5,183,170,213,253,253,2 47.247.223.223.42.183.151.-5.183.170 480 DATA 247,221,221,247,221,221,247,4 2,183,151,-5,183,170,247,221,221,245,2 53.253.215.42.151.157.181.183.159 490 DATA 159,181,170,247,-5,221,247,17 0,-7,255,160,-7,248,-7,191,42,255,15,3 .12, 15, 15, 255, 170, 255, -3, 195, 3, 195 500 DATA 255,170,-7,248,160,191,131,14 0.131.143.143.191.42.255.243.-3.204.24 3,255,170,255,207,207,204,195,207 510 DATA 255,170,248,-3,280,8,200,248, 160, -7, 191, 42, -7, 255, 170, -7, 248, 160, 0. 56,-4,24,60,-3,0,102,127,127,107,99 520 DATA -3,0,124,-4,102,-3,0,60,-3,10 2.60. -3.0.124.102.102.124.96.96.0.0.62 ,102,102,62,6,6,0,0,124,102,-3,96,-3 530 DATA 0,62,96,60,6,124,0,0,24,126,-3,24,14,-3,0,-4,102,62,-3,0,-3,102,60, 24,-3,6,99,107,127,62,54,-3,0,102,60 540 DATA 24,60,102,-3,0,-3,102,62,12.1 20,0,0,126,12,24,48,126,0,0,24,60,126, 126,24,60,0,-8,24,0,126,120,124,110 550 DATA 102.6.0.8.24.56.120.56.24.8.0 .16.24.28.30.28.24.16.0.33.116.97.114. 105,0,53,115,101,114,0,-5.212,128 560 DATA 166,178,181,169,189,179,128,-5,212,0,36,97,118,101,0,55,104,105,116 ,101,-40,82,-40,0,55,105,110,110,105 570 DATA 110,103,0,35,111,109,98,105,1 10,97,116,105,111,110,115,26,13,-72.0. 50,101,101,108,115,0,17,6,18,0,0,33 580 DATA 108,108,0,19,0,50,101,101,108 ,115,-18,0,-9,82.0.0,-11,82,-44,0,35,4 0.37.50.50.41.37.51.26.-8.0.18.16 590 DATA 112, -9, 0, 20, 16, 112, -8, 0, 51, 52 ,50,33,55,34,37,50,50,41,37,51,26,-4,0 .18.16.112.-9.0.20.16.112.-8.0.33.48 600 DATA 48.44.37.51.26.-10.0.18.16.11 2,-9,0,20,16,112,-8,0,34,37,44,44,51.2 6.-11.0.18.16.112.-9.0.22.16.112.-8 610 DATA 0.34.33.46.33.46.33.51.26.-9. 0,18,16,112,-9,0,22,16,112,-8,0,48,37, 33,50,51,26,-11,8,19,16,112,-9,0,24 620 DATA 16,112,-8,0,34,33,50,51,26,-1 2.0.19.16.112.-8.0.17.16.16.112.-8.0.4 8.44.53.45,51,26,-11,0,19,16.112.-8 630 DATA 0,17,16,16,112,-8,0,48,47.53, 46,36,0,51,41,39,46,51,26,-5,0,20,16,1 12,-6,0,24,16,112,0,13,0,45,105,120 640 DATA 101,100,-28,0,17,21,16,112,0, 13.0.45.97,117,118,101,-28.0.18.16.16. 112,0,13,0,39,114,101,101,110,-43.0 650 DATA 17,16,112.0,51,121.109,98.111 ,108,0,111,110,0,99,101,110,116,114.10 1,0,108,105,110,101,26,13,-10,0,17 660 DATA 16.112.23.7.115.0.111.110.0.1 14,101,101,108,115,0,17,6,18,0,105,110 ,0,97,110,121,0,112,111,115,105,116 670 DATA 105,111,110,26,13,-3,0.18,16, 112,19,0,23,7,115,0,105,110,0,97,110,1 21.0.112.111.115.105.116.105.111.110 680 DATA 26,13,-14,0,20,16,112,-40,0,1

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2000 DATA 240.5.169.0.76.64.132.173.10 ,210,41,15,24,105,13,133,176,141,12.95 ,173,47,95,240,5,169,0,76,87,132,173 2010 DATA 10,210,41,15,24,105,12.133.1 77,141,13,95,173,48,95,240,5,169,0,76, 110.132.173.10.210.41.15.24.105.11 2020 DATA 133,178,141,14,95,173,10,210 ,41,15,105,10,133,179,141,15,95,173,13 ,95,240,6,24,101,176,141,13,95.173 2030 DATA 14,95,240,8,24,101,176.101.1 77,141,14,95,173,15,95,24,101,176,101, 177,101,178,141.15,95,96.162,0,138 2040 DATA 157.46.95.232.224.3.208.248, 173,49,95,208,7,173,10,210,201,37,144, 3,76,220,133,32,225,124,162,0,138 2050 DATA 157,46,95,232,224,3,208.248, 162.20.189.153.119.157.159.95.189.133. 119,157.139,95,202,208,241,169,140 2060 DATA 133,178,169,255,141,252,2,16 6,20,173,252,2,201,255,208,64,173,31,2 08, 201, 6, 208, 3, 76, 179, 133, 138, 56, 229 2070 DATA 20,201,244,208,231,169,196,1 41,1,210,165,178,73,255,133,178,141,0, 210, 201, 140, 208, 14, 169, 140, 133, 176 2080 DATA 169.95.133.177.32.220.131.76 ,226,132,169,160,133,176,169,95,133,17 7, 32, 220, 131, 76, 226, 132, 41, 63, 201, 31 2090 DATA 208.21.169.72.141.145.95.141 ,165,95,169,73,141,146,95,141,166,95,1 60,0,76,156,133,201,30,208,29,169,74 2100 DATA 141,147,95.141,167,95,169,75

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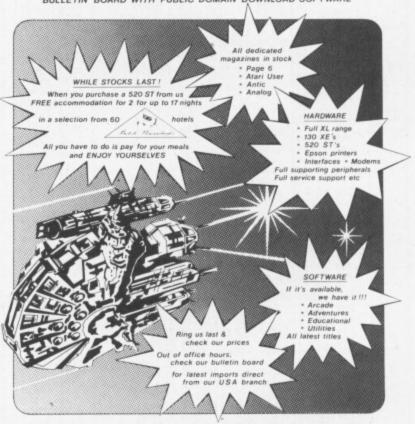


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1270 16907	1250 15992 1280 16120	1260 15920
TT.0 T0001	1280 16120	1290 15843

2310 DATA 3,141,15,210,32,207,129,32.1 47,126,32,239,131,32,159,129,169,203,1 41,28,95,169,135,141,29,95,32,220 2320 DATA 138,32,250,124,76,55,129,162 ,0,138,157,46,95,232,224,3,208,248,141 ,54,95,141,49,95,169,0,133,77,173,10 2330 DATA 210,201,171,144,19,173,54,95 ,240,14,169,70,133,176,169,121,133,177 ,32,165,126,76,5,136,32,147,126,169 2340 DATA 0,141,54,95,32,207,129,32,46 ,132,32,168,128,32,239,131,32,25,123,1 73,40,95,208,60,173,120,95,24,109,54 2350 DATA 95,201,21,144,2,169,20,133,1 82,173,120,95,240,37,172,54,95,192,0,2 40,11,152,162,1,142,34,95,162,0,32 2360 DATA 184,126,200,152,162,128,142, 34,95,162,1,32,184,126,196,182,208,229 ,140,54,95,76,93,136,169,0,141,54,95 2370 DATA 32,207,129,32,227,129,32,173 ,137,173,55,95,240,6,32,153,136,76,128 ,136,173,33,95,208,8,173,32,95,208,3 2380 DATA 76,147,136,32,165,132,169,0, 141,49,95,173,33,95,208,8,173,32,95,20 8,3,76,147,136,32,147,126,76,220,135 2390 DATA 32,207,129,76,76,129,162,19. 189,50,121,157,246,120,202,224,13,208, 245, 169, 246, 133, 176, 169, 120, 133, 177 2400 DATA 32,220,131,169,10,133,176,16 9,121,133,177,32,165,126,169,76,133,17 8,169,255,141,252,2,166,20,173,252,2 2410 DATA 201,255,208,43,173.31,208.20 1,6,208,3,76,96.137,138,56,229,20,201, 244,208,231,169,196,141,1,210,165 2420 DATA 178,73,127,133,178,141,0,210 ,173,6,95,73,128,141,6,95,76,192,136,1 33,179,41,63,201,31,208,5.162,0,76 2430 DATA 27,137,201,30,208,5,162,1,76

	1300	15883	1310	16109	1320	15782
	1330	16027	1340	16246	1350	16160
	1360	15876	1370	16173	1380	15938
	1390	16169	1400	16023	1410	15952
	1420	15839	1430	15807	1440	15943
	1450	15973	1460	16160	1470	15939
	1480	15810	1490	15828	1500	15837
	1510	15752	1520	15948	1530	15963
ì	1540	16067	1550	15848	1560	15791
	1570	15917	1580	15920	1590	15746
H	1600	16084	1610	15834	1620	16142
	1639	15950	1640	16021	1650	15873
	1660	16067	1670	15794		15994
	1690	15644	1700	15922	1710	15819
1	1720	16144	1730	15824	1740	16164
	1750	16055	1760	15983	1770	15992
	1780	15913	1798	16964	1899	15834
1	1810	15783	1820	16026	1830	15937
	1848	15848	1850	16224	1860	15744
1	1870	16055	1889	16200	1890	16004
1	1900	15949	1910	15948	1920	16189
1	1930	15921	1940	15912	1950	16185
1	1960	15897	1970	15899	1980	16191
1	1990	15651	2000	16019	2010	15764
1	2020	15785	2030	15925	2040	15799
1	2050	15996	2060	16119	2070	15834
1	2080	16125	2090	16184	2100	15995
1	2110	15872	2120	15930	2130	15763
1	2140	15908	2150	16214	2160	16184
1	2170	15805	2180	16234	2190	16191
1	2200	15972	2210	15810	2220	15821
1	2230	15881	2248	15948	2250	15963
1	2260	15954	2270	15961	2280	15749
1	2290	15861	2300	16095	2310	15837
1	2320	16241	2330	15960	2348	16143
1	2350	15806	2360	16158	2370	16143
Į	2380	16106	2390	15964	2400	16161
1	2410	15803	2420	15929	2430	15904
1	2448	16079	2450	15983	2468	16070
1	2470	15559	2480	15970	2490	16171
1	2500	15833	2510	16011	2520	15946
1	2530	15748	2548	15720	2550	15913
1	2560	15923	2570	15971	2580	16146
	2590	15248	2600	3988		

,27,137,201,26,208,5,162,2,76,27,137,7 6,192,136,169,128,141,0,210,169,168 2440 DATA 141,1,210,160,3,169,0,153,16 ,95,136,16,250,169,1,157,16,95,165,179 ,41,64,208,6,32,181,123,76,67,137,32 2450 DATA 75,124,169,127,45,6,95,141,6 ,95,206,6,95,32,25,123,173,40,95,208,3 7,173,6,95,201,80,240,56,76,192,136 2460 DATA 169,0,141,0,210,141,1,210,32 ,239,131,173,33,95,208,10,173,32,95,20 8,5,104,104,76,147,136,96,169,255,32 2470 DATA 42,127,169,0,141,0,210,141,1 ,210, 32, 239, 131, 104, 104, 169, 1, 141, 49, 9 5,76,82,136,169,0,141,0,210,141,1 2480 DATA 210,32,239,131,32,147,126,10 4,184,169,1,141,49,95,76,93,136,160,0. 140,55,95,173,54,95,201,4,208,5,162 2490 DATA 0,76,239,137,201,7,208,5,162 ,64,76,239,137,201,11,208,5,162,128,76 ,239,137,201,15,208,5,162,192,76,239 2500 DATA 137, 201, 18, 208, 7, 162, 0, 160, 1 ,76,239,137,201,20,208,6,32,228,133,76 ,203,138,96,24,138,105,192,133,178 2510 DATA 152,105,115,133,179,160,6,16 2,110,142,34,95,162,132,142,5,210,162, 100,142,4,210,162,1,173,54,95,32,184 2520 DATA 126,169,0,141,5,210,141,4,21 0,173,54,95,32,184,126,136,208,221,173 ,54,95,32,184,126,169,255,141,252,2 2530 DATA 160,0,162,0,169,30,133,176,1 69,121,133,177,32,165,126,177,178,133, 182,18,10,24,105.38,105,0,133,180 2540 DATA 169,117,105,0,133,181,161,18 0,9,128,129,180,56,169,38,229,182,10,1 0,141,0,210,169,166,141,1,210,173 2550 DATA 252,2,201,255,208,29,169,32, 32,42,127,161,180,41,127,129,180,169,0 ,141,0,210,141,1,210,200,192,64,208 2568 DATA 2,168,8,76,62,138,41,63,281, 35,240,8,169,255,141,252,2,76,109,138, 32,147,126,169,0,141,0,210,141,1,210 2570 DATA 165,182,141,55,95,201,1,240, 8,169,94,141,69,121,76,185,138,169,79, 141,69,121,165,182,9,80,141,64,121 2580 DATA 169,50,133,176,169,121,133,1 77,32,220,131,162,128,32,225,124,202,2 08,250,32,207,129,169,0,141,54,95,96 2590 DATA 162,0,189,64,118,157,56,95,2 32,224,132,208,245,169,0,141,35,95,141 ,36,95,141,37,95,141,38,95,96 2600 DATA 224,2,225,2,167,135

Listing II

5 REM CHANGES FOR CASSETTE OUTPUT 6 REM DELETE LINE 2600 AND ADD:-30 OPEN #1,8,128,"C:":TRAP 60:CH=0:XCH =909948 70 DATA 0,76,93,101,127,101,169,60,141 ,2,211,169,248,141,231,2,133,14,169,13 8,141,232,2,133,15,169,167,133,10,169 75 DATA 135,133,11,24,96



LINE CHSUM LINE CHSUM LINE CHSUM

5 16544 6 15763 30 7369 70 16589 75 3344 WHEN switching between two screens of the same graphics' mode, some commercial programs use an effect where the displays are mixed so that as the first display disappears, the other starts to appear. Using the Mix utility, you can achieve this in your own programs.

Mix adds the MIX\$ command to your programs which is called using:

A=USR(ADR(MIX\$),SCADDR,BANK)

where MIX\$ is the string containing the machine code data.

SCADDR is the address of the start of the screen memory for the new display which is to be mixed in.

BANK is the bank of memory on the XE where the new screen is stored. The correct values are:

- Normal memory. Use this on 8 bit Ataris other than the XE.
- 1 Memory between 0 to 16383.
- 2 Memory between 16384 and 32767.
- 3 Memory between 32768 and 49151.
- 4 Memory between 49152 and 65535.

Type in Program I up to and including line 310 and then LIST it to disc or cassette. It can then be easily merged with any of your other programs using the ENTER command.

Fade in

Mix it with RICHARD PARKES

Fade out

Now finish typing in Program I. The short example section of the program will not run in 16k, because two graphics 8 screens are set up.

If you have any problems typing in MIX\$, you can check it using the

300 DATA 203,165,207,101,213,133,204,1

,211,24,165,208,101,212,133

checksum table and our Get It Right! program which was last published in the August 1986 issue of Atari User. Alternatively, you can download this and all other Atari User programs from MicroLink.

195 REM BASIC MIXS DATA PROGRAM 200 DIM MIX\$(277):FOR J=1 TO 277:READ A:MIX\$(J)=CHR\$(A):MEXT J 210 DATA 104,160,0,140,255,6,164,18,14 0,234,6,10,201,4,240,13,170,240,4,104, 202,208,252,160,1,140,255,6 220 DATA 96,173,48,2,133,203,173,49,2, 133,204,160,4,177,203,133,212,200,177, 203.133.213.104.141.236.6.104 238 DATA 141.235.6.162.1.104.208.212.1 04,201,5,176,211,170,202,138,42,42,141 ,239,6,173,1,211,141,240,6,41 240 DATA 227,13,239,6,141,239,6,169,32 ,141,238,6,169,0,141,237,6,173,234,6,1 33,203,133,207,173,233,6,133 250 DATA 204,10,133,208,38,207,24,165, 204, 101, 208, 133, 208, 133, 204, 165, 207, 10 1.203.133.207.133.203.6.208 260 DATA 38,207,165,208,133,205,6,208, 38,207,6,208,38,207,24,165,208,101,204 ,133,208,133,204,165,207,101 278 DATA 203,133,207,133,203,165,205,1 33,207,169,41,208,2,208,179,133,208,56 ,165,208,229,204,133,208,141 280 DATA 233,6,165,207,229,203,133,207 ,141,234,6,41,31,133,207,24,165,208,10 9,235,6,133,203,165,207,109 290 DATA 236,6,133,204,160,0,173,239,6 ,141,1,211,177,203,170,173,240,6,141,1

97, 106, 176, 3, 138, 145, 203, 56, 173, 237, 6, 233,1,141,237,6,173,238,6,233 310 DATA 0,141,238,6,13,237,6,208,155, 388 REM MIX\$ EXAMPLE PROGRAM 390 REM CTO BE TYPED IN AFTER BASIC MI KSDATA PROCRAM 400 DEG :DIM 5(90),C(90),B(4):FOR J=0 TO 90:5(J)=AB5(SIN(J)):C(J)=AB5(CO5(J)): WEXT J 410 TRAP 32760:RT=PEEK (106):GRAPHICS 3 1:STL=PEEK (88):STH=PEEK (89) 415 POKE 106. PEEK (106) -32: GRAPHICS 31: POKE 106.RT 416 FOR J=1 TO 4:B(J)=1:WEXT J 420 POKE 88, STL: POKE 89, STH: COLOR 125: PLOT 0.0 450 GOSUB 1888 460 A=USR (ADR (MIX\$), STL+STH*256,0):IF PEEK (1791) (>0 THEN 4=L06(0) 478 B(4) = NOT (B(4)) 488 IF B(4)=1 THEN 688 490 B(3) = NOT (B(3)): IF B(3)=1 THEN 60 500 B(2) = NOT (B(2)): IF B(2)=1 THEN 60 510 B(1) = NOT (B(1))

600 GOTO 420

1000 COLOR 1:FOR J=0 TO 90

1010 Y1=96-90*(C(J)*B(1)+1)*(S(J)*B(2)

+1)+90*(B(1)+B(2))

1020 Y2=96+90*(C(J)*B(3)+1)*(S(J)*B(4)

+1)-90*(B(3)+B(4))

1030 PLOT (10+J*10/3)/2,Y1:DRAHTO (310

-J*10/3)/2,Y2

1050 NEXT J:RETURN

32760 POKE 106,RT:GRAPHICS 0:? :? "Err

Or- ";:IF PEEK(1791) (>0 THEM ? PEEK(1791);:GOTO 32762

32761 ? PEEK(195);

32762 ? " at line ";PEEK(186)+PEEK(187)

>*256:END

			yjrv		
LINE	СН5ИН	LINE	CHSUM	LINE	CHSUM
195	5456	200	10455	210	14879
220	15072	230	14987	240	15110
250	14976	260	15091	270	15077
288	15076	298	14953	360	15161
310	5645	380	4962	390	10025
400	13921	418	11671	415	8154
416	4822	420	8166	450	1925
460	11180	470	2645	480	3160
490	5921	500	5908	510	2618
600	1620	1000	3918	1919	7479
1 1020	7509	1030	7579	1050	3166
32760	15905	32761	2051	32762	7228



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I AM writing to let you and other Atari users know about my experiences recently when I bought a new Atari setup as a result of a nice little win on the pools (nothing dramatic but enough to go to an Atari supplier and say "one of them, two of them, box of them, one of them" and so on). A very nice feeling indeed.

I decided to stick with 8 bits for a variety of reasons, so the order was for a 130XE, two disc drives, 1027 printer, 1020 plotter, a touch tablet and various other bits and bobs.

According to the advertisements in your magazine, this amounted to around £800 worth.

Acting on advice from a colleague who got a decent discount for cash on a BBC printer, I rang round the four Atari suppliers within a reasonable range of Sheffield asking for a quote for the lot paid for with cash.

Two suppliers made feeble offers and one actually jacked up the price by £70 and offered me a discount which brought the price back to the original. I don't know who they were kidding?

However, there was a firm which made me an offer which I could not refuse.

So it came to pass that I got the setup. The day after I collected it I sat down and started to use it. After about two hours one of the disc drives and the 1027 broke

A WINNER ALL THE WAY ...

Naturally I got in touch with the suppliers at once, with the result that they swopped them straight away, no quibbles. They were friendly people to deal with and even apologised for my inconvenience - I was impressed.

I therefore nominate Compumart of Loughborough for a Pat On The Head award. - J.E. Colley, Sheffield.

Technical queries

COULD you help me in trying to interface a non-Atari printer to an 800XL?

The printer has a serial interface, but during my investigations it appears that the computer is sending out some data and expects a reply from the printer. When it doesn't get one it aborts with a timeout error. What am I doing wrong?

Also, could you tell me the prices and a source of supply for the Atari technical manuals and plugs to fit the serial port. I have a fairly good knowledge of computer systems and electronics generally. - J. Connolly, Redcar.

You need to use an RS232 interface to run your printer, the best being the Atari 850 module, though you might find others that work. The Atari serial port is an internal standard running at 19,200 baud with its own protocol and command frame system.

You would need to be an expert machine code programmer to alter this and it would be far easier to use an

850 anyway.

Don't forget that you would also need to check your software is capable of sending to RS232 rather than the P: printer port. SuperScript does this, but not AtariWriter for example.

Your own home grown software could be easily made to use either port, of

Manual dexterity

I HAVE recently purchased an 800XL, but have found the manuals to be far from helpful. I was awaiting Allrecht, Finkel and Brown's Atari Basic book from my local library, when discovered Atari User.

It is a very good magazine, but I am having problems with the Santa's Grotto game in the December 1986 issue. I keep getting an error 3 at line 20110, but line 20110 seems to be correctly typed in. Can you help? -

T.E. Pottle, Gosport.

 Error 3 simply means that a number the computer has come across is outside the range it expects. In this case it is most likely that the variable CHBASE is the

guilty party, being either too large or too small.

After the error has occurred, try typing PRINT CHBASE, which should give a positive number no greater than 65535. In actual fact, it will be within a much

smaller range.

Since CHBASE is calculated from another variable, RAMTOP, the problem might lie in line 20050 which sets up RAMTOP in the first place. Don't forget to use Get It Right! to check the lines before you run the program.

Loading errors

I HAVE been unsuccessful in loading Football Manager. I keep getting errors 140 and 143. I would be grateful if you could explain these errors and advise me on the correct way to solve them. -P.E. Malone, Preston.

 These are known as checksum errors and occur because data from the tape has been corrupted before it reaches the machine. This may be caused by a bad tape, or a fault in the recorder or the computer.

When a tape is recorded, each block of 128 characters is followed by a special extra digit which is basically a total of all the character numbers preceding it.

When loading the tape back in again, the computer does the same additions on the data bytes as they come in and checks the new value off against the one from the tape.

In much the same way as our Get It Right! checksum, the computer can then tell if the data it has loaded was

8 bit interfacing

I WOULD like to congratulate you on your articles on interfacing the 8 bit Atari computers.

I am interested in interfacing such machines and require information on the bus connections on the XL machines. Unfortunately I have been unable to find such data anywhere.

Do you know of any books which contain this information and where could I obtain them? - Steven Trease, Nottingham.

 The connections you require are listed in the revised edition of Mapping the Atari, from Compute! Books, but from then on you will need a good technical knowledge of electronics to proceed.

Perhaps Atari will soon see fit to update its excellent Technical User notes to cover the XL and XE.

the same as that originally saved. If any discrepancies occur, the computer will signal an error – normally a 140 or a 143 – and stop the load.

Exploring possibilities

FOR the past 12 months my son has had an Atari 800XL. He has only used the machine for games up until now, only occasionally trying other features.

I now think it is time he explored the possibilities of the computer, the graphics and writing simple programs and so on.

If you could pass on any advice on this we would be very grateful. And if you have the name of any book we could buy which defines all the computer jargon this too would be very helpful.

Do you advise us to get a disc drive or stay with cassette type? – David and Michael Burno, Mossley.

● For now a tape will suffice, though a disc is much faster and more reliable. If he takes to programming, he will very quickly find that waiting for a tape to load or save is very frustrating indeed.

We often run articles in Atari User helping new users to find their way around the machine and you will certainly find many of the features and series in our first few issues of benefit. Why not order some from our back issues department?

Increasing word power

I RECENTLY visited the Christmas Atari User show and whilst there I purchased an Atari 1029 dot matrix printer and a copy of AtariWriter Plus for my 800XL.

I had not used a word processing program before, but I found it really quite



ARI Mailbag

WE welcome letters from readers – about your experiences using the Atari micros, 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:

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Atari User
Europa House
68 Chester Road
Hazel Grove
Stockport SK7 5NY

easy to use. This letter is my first full length attempt at using the program and I have found it and the manual to be excellent. My only complaint is that there are only two print modes available — normal and double width.

Would it be possible to review some of the other word processing packages for the 8 bit range? – Mick Smith, Ashford, Kent.

 We have covered some other word processor packages in previous issues – notably the SuperScript program in the March 1986 issue.

80 column cartridges

I WOULD greatly appreciate it if you could tell me of a way I could have 80 column text with my AtariWriter cartridge word processor. I use my 800XL for translations for the Ministry of Foreign Affairs of Greece.

I own an LX-80 Epson printer, 1050 disc drive and a Hantarex Boxer monitor. Although I also have Letter Perfect I find the cartridge based word processor is extremely easy to use and a perfect partner for my work.

The only problem is that with 40 columns I have to preview my documents and make corrections at the cost of valuable time. — J.M.D. Mantheakis, Athens, Greece.

● The answer is simple — you will soon be able to purchase an update of Atari-Writer, called Atari-Writer 80, which will work with the new XEP-80 80 column module. Until then you're stuck with 40 columns I'm afraid.

Getting It Right!

I HAVE just purchased my first copy of Atari User. I have been looking for such a magazine for over a year and find it very informative.

Please could you tell me how I can operate Get It Right! as it is an obvious boon when typing in programs. At the moment the list of numbers don't mean a thing to me. — D.E. Boulter, Salcombe, Devon.

The instructions for our checksum program Get It Right! can be found in the August 1986 issue of Atari User which can be ordered using the form on Page 53.

Software compatibility

FIRST I would like to compliment you on such a great magazine which I have been reading even though I got rid of my 800XL some time ago.

I am now considering a 130XE. Could you please tell me if there are any compatibility problems with games for the 800XL? – L.P. Arnold, Littlehampton, Sussex.

• The 130XE is really just an 800XL with an extra 64k of memory available. This means that you should have no problems at all with software compatibility between the XL and the XE, although you will still have the same problems as you had with the XL in running some of the older software written for the 400 and 800 machines.

Keyboard inputting

I OWN an Atari 800XL and wondered if cartridges for the earlier 400 and 800 are compatible with it. Also could you tell me how to get input without the user having to press Return? – Neil Evans, Avon.

O You can use most 400/800 cartridges with the XL and XE machines, but some badly written code will not work properly. This applies as much to tape and disc software as it does to cartridge, so its always best to check first. That said, the vast majority of software works fine with the XL.

You can get input from the keyboard without requiring the user to press Return by side-stepping the normal INPUT routines.

Use instead the GET command which gets a single character, and build up from there. Don't forget to OPEN a channel to the keyboard first, with:

OPEN#1,4,0,"K:".

For example, to get five characters from the key-board and place them directly into a string, use:

10 OPEN #1,4,0,"K:"
20 DIM TEXT\$(5):TEXT\$="
":REM 5 SPACES
30 FOR CHAR=1 TO 5
40 GET #1,BYTE
50 TEXT\$(CHAR,CHAR)=
CHR\$(BYTE)
60 NEXT CHAR

You could always test BYTE each time in case it was 155 - the code for Return - after which you could drop out of the loop since the user did not want to enter all five characters.

If you wanted the user to enter a number follow the same procedure and take the VAL of the string at the end – for example:

70 NUMBER = VAL(TEXT\$)

Silicon Dream & Jewels of Darkness

I BOUGHT Rainbird's Silicon Dreams and Jewels Of Darkness trilogy at the recent Atari User show, but can't get them working.

I have a 48k Atari 400. PEEK(106) returns 160 and I have no trouble running other 48k software.

I can get to the menu and loading message on both discs, but after the load is finished I get a blank screen full of colourful garbage. I have removed the Basic cartridge and all unnecessary peripherals.

In desperation I visited Rainbird and they were most helpful. They managed to run the discs on a 130XE and told me that they had been successfully tested on an expanded 400. Might my expansion board be at fault? – R.S.L. Gillman, Tiptree, Essex.

 According to Rainbird's technical department, your problem lies with the fact that the program needs at least 64k to run.

Recorder diagnostics

RECENTLY my 1010 data recorder has not been loading my original computer games. I was wondering if a

YOUR HINTS AND TIPS

MEDIATOR

PLEASE could anyone tell me how to get past the first screen of English Software's Mediator?

I have tried bombing the city and landing in various places, but I always get killed. I am on the verge of throwing the disc out of the window! – Brian, Belgium.

Help is at hand from Ben Park of London SE27, who has written in to tell us that you have to land your craft on the pad between the two radars at Xylos and Pholos.

BOUNTY BOB

OVERLOAD the cannon in level 22. When the hat comes down, press F then move your man over a platform and press F again. An option screen will appear which will allow you to move to the level of your choice. — Adam Marshall, Penrith.

MERCENARY -THE SECOND CITY

IF you realised that the Cheese in Mercenary was a fast spaceship, then you might be wondering what has happened to it in The Second City.

Fear not, it hasn't gone at all, it's simply changed into a table, which can be found in the Palyar briefing room. You can then use the ship to get the neutron fuel, which is above the colony craft. – Mark Wilson, Anglesey.

SPELLBOUND

I HAVE been playing Spellbound for days and days and I am absolutely stuck. Can anyone help me get past the tower, the wall and the gas room. — Andy Roberts, Little Sutton, South Wirral.

Our thanks to Ben Halligan for this bumper bundle of tips:

MERCENARY

FIND the aerial and take it to the broken communications room in the underground complex near the hangar at 09-06.

You will be offered an intergalactic craft and if you buy it a rendezvous will be arranged. There is a hangar in the wasteland at location 81-35 which may prove helpful.

RESCUE ON FRACTULUS

IF an alien boards your ship, put the boosters on immediately, try to shut the airlock then turn all systems on.

Pull back on your joystick. The ship's instruments will go haywire, but if you have enough power you might make it into space where the alien will die.

DROPZONE

PICK up all the men and deposit them at the base. Keep the last one and go and kill the enemy. If you are killed, collect the man immediately because he prevents you from being killed by the volcanoes.

ZORRO

DO you keep getting lost in the caves? Always take the nearest exit after collecting the bags of money. When you get to the screen with three flashing icons, go through the top left exit and push the barrels in the wine cellar. Then go back, past the icons and up.

XC12 recorder would be compatible with my 800XL? – Andrew Bolton, Bristol.

The XC12 will run with your 800XL, certainly, but is this your problem? The tapes may not load for a number of reasons, the most likely being simple misalignment of the record/play head.

You may also find that cleaning the tape heads will improve the load reliability. If you take your recorder into your local dealer they will almost certainly be able to arrange for it to be serviced for you.

On the other hand, if you have played the cassettes an awful lot you might have actually worn out the tape itself. This can happen, as the magnetic coating can

gradually wear off the backing material after hundreds of passes though the recorder.

Check them out on a known good tape recorder before parting with your hard earned cash for a new unit.

Keeping in touch

IN reading Atari User I am surprised in that a large number of advertisers do not have Email, MicroLink, Telecom Gold or telex numbers.

To me, a fairly new user, I feel a software and hardware supplier who does not use or is not linked to this new exciting way to communicate is doing a disservice to the micro computer business.

After all, the more users of the system, the more they will sell. But if they do not use the technology themselves how can they convince people like me to use it?

I would often like to send for literature via Email rather than by phone. The micro shops are also badly set up to market this product.

In Edinburgh I went round all the shops to see a demonstration of MicroLink, Prestel or Telecom Gold, but it was on my third visit to one shop before they had the system up and running. I would be interested to know if others feel as I do. – Tom Stark, Edinburgh.

Tom sent this message via MicroLink. Don't forget that as well as the usual Atari User postal address, we can be contacted on MicroLink and Telecom Gold at 72:MAG001 and on Prestel at 614568383.

And don't forget to mark your Email "For the attention of Atari User".

You can even send us your articles by Email, as do most of our regular contributors. The whole editorial team of Atari User use MicroLink to send complete features straight from our word processors at home into the office computers – which are linked direct to the typesetting machines.

We write everything on the ST and can thus send our material straight in for typesetting without a single mistake occurring – well, that's the theory, anyway.

Ribbon recycling

OUR apologies to anyone who wishes to contact Aladdink about their printer ribbon reinking service. The address which we gave for them in the January 1987 issue of Atari User was incorrect: It is in fact 4 Hurkur Crescent, Eyemouth, Berkshire TD14 5AP.

Trak-ball or joystick?

I HAVE been a joystick addict for about four years but as a Christmas present I was given a trak-ball which I prefer for most games.

The only problem is I do not know which games will run in trak-ball mode. Could you give me a list of games which will.

Also, could you give me a short routine which would allow me to read the trakball from Basic? - Richard Taylor, Prestwick.

● The only game which has a specific trak-ball mode — as opposed to those which can use the trak-ball in the joystick emulator mode — is Missile Command. This is a shame, as such games as Centipede would be great in the trak-ball mode.

You can read the trak-ball in the same way as a joystick – by using the STICK and STRIG commands. For the first joystick, STICK(0) will return the direction value, and STRIG(0) will tell you if either of the buttons have been pressed.

If STRIG(0) returns a zero then the button has been pressed and a one indicates no action.

You can work out the direction from the following table:

Value	
returned	Direction
14	UP
13	DOWN
11	LEFT
7	RIGHT
10	UP/LEFT .
6	UP/RIGHT
9	DOWN/LEFT
5	DOWN/RIGHT
15	NO MOVEMENT

Revised opinion

I HAVE a 800XL with revision B Basic and the guarantee has expired. I have been trying to buy a revision C cartridge for some time without success. Could you please tell me where I might purchase one and the cost of it?

I have typed in Dots from the January 1986 issue of Atari User and have used Get It Right! to check it. Everything seems OK and a friend has also checked it for me, but I keep getting an error 9 at line 5. Is this something to do with revision B Basic?

Also, is there any way I can stop Get It Right! from changing colours other than by using Control+1? The last line of checksum also disappears too quickly for

me to check it. - S.D. Sargun, Hastings.

• For a Rev. C cartridge, try Silica Shop or Software Express – they cost about £9.95.

The error 9 could well be caused by the Rev. B problem, as DIM is one of the commands that shows up the bugs.

If you want to stop Get It Right! from cycling thorugh the colours, simply add line 101 as:

101 POKE 77,0

The last line will not disappear if you haven't pressed any keys since the current checksum was started – assuming you are using the updated August 1986 version, of course.

Loading cassettes

I HAVE recently bought a 1050 disc drive and an Atari 800XL. Is it possible to use a normal cassette recorder to load cassette games, or must I buy the special Atari data recorder?

Also, could you tell me how to use the COLOR command in different graphics modes? I have tried using this command in various modes, but it doesn't seem to display the number of colour mentioned in the manual.

For example, the manual says that mode 9 should have only one colour, but the COLOR command displays 16! How does the SETCOLOR command work, as it is not very well explained in the manual?

Lastly, is it possible to have more than one graphics mode on the screen at the same time? – Francis Sreeves, Alcester.

 Firstly, you will indeed need an Atari recorder for use with your computer, or a special adapter which is nearly the same price anyway.

The COLOR and SET-COLOR commands in Atari Basic are quite powerful. In mode 9 you have only one

PEN PALS

Jim, Toumpanakis Dimitris, Pericleous 5, Kato Akarnai 13677, Athens, Greece would like to hear from English pen pals. And Fred Swanevelt, 169 Alton Drive, Beaconsfield PQ, Canada H9W 221 is especially interested in hearing from Dutch Atariowners.

colour available, but 16 brightness levels. Thus, COLOR specifies the various brightness scales in this particular case.

For more information on mixing graphics modes see our series on Display Lists in the July to December 1985 issues.

Mercenary compendium

I AM interested in your special reader offer in the February 1987 Atari User for the complete Mercenary compendium, but the "suit able for" box states Atari XE/XL.

The question is will Mercenary run on my 48k Atari 800 – something I would like to know before I order a compendium from you. – Peter Boulter.

● There are two versions of Mercenary which come on the disc or tape. One is for 48k machines, and will therefore work fine on your 800, and one is an enlarged version which has extra features and operates in 64k.

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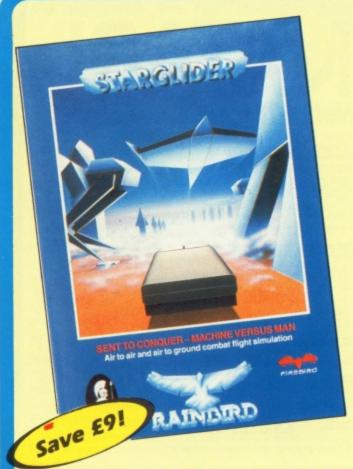
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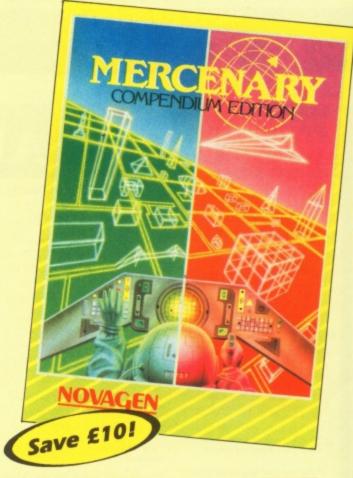
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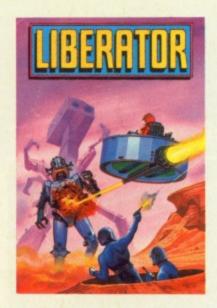
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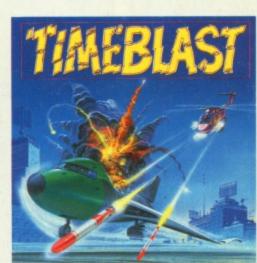
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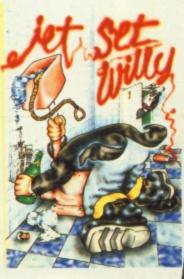
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