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From Interrupts and pound signs to Fried Goldfish... We answer your questions and problems.

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The 1040ST is only the beginning... Mike Cowley reveals there are even more powerful machines currently in the Atari pipeline.

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Type-in Basic program for the 520ST: Explore a 3D maze, but watch out for the Robo-Droids!

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19 More memory
Two completely different approaches to the same problem – how to give your 520ST a massive 1024k memory.

22 Advice
Andrew Bennett gives you more hints and tips on the ST, and answers some of your queries.
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**Art and the ST**

**Being developed by** Andromeda Software for release by Mirrorsoft next month is ST Art. This paint program will handle both graphics and text, produce an A4 printout for instant leaflets, and offer a cyclical display facility with simple animation.

It will be compatible with the ST version of Mirrorsoft’s personal publishing package Fleet Street Editor, due to be launched in September.

No price has been set for this latter package, but it is likely that two versions will be published — a full-blown professional program and a cut down version for the home, education and small business market.

Also promised by Mirrorsoft for the ST are Strike-Force Harrier and Spitfire 40 for flight simulation fans.

**Accounts suite**

A SUITE of integrated accounting software for the Atari ST range has been released by Systematics International Microsystems.

The range includes General Ledger and Financial Planning, Sales Ledger, Purchase Ledger, Invoicing, Stock Control, Payroll and Job Costing.

Prices range from £250 to £450.

**EXIT THE 520ST PACKAGE**

THE 520ST-based computer package that spearheaded the rebirth of Atari under Jack Tramiel has been phased out.

Having served its purpose of achieving a foothold in the UK serious user market, the original £749 configuration of micro, monitor, external disc drive and mouse has been overtaken by the new breed of Atari technology.

This includes the 520STM, 1040STF and the soon-to-be-available 520STFM.

Since the basic 520ST would be of little use without its own monitor, the 520STM includes a modulator which allows connection to a domestic television set.

The £399.99 520STM will still run with either a monochrome or an RGB colour monitor, and can be connected to a composite colour monitor such as a TV with a video input socket.

Although the operating system — TOS/GEM — is now provided in ROM, you must now buy an external disc drive to actually do anything with the machine — unless you want to wait for the new cartridge-based software to be released.

Atari’s 500k drive, originally supplied with the 520ST, costs £149.99 and the 1mbyte version £199.99. Alternatively, Southend-based AST has produced an ST compatible 1mbyte drive for the surprisingly low price of £99.

There is still no information as to when the 520STFM with built-in disc drive will be available, although a price of £499.99 has been announced.

For those who still want to buy a bundled machine at an all-in price, Atari’s 1mbyte monster with a built-in 1mbyte drive — the 1040STF — is available with a monochrome monitor at £799, or with an RGB colour monitor at £999.

**Making way for new breed**

**ATARI IN YOUTH TRAINING DRIVE**

THE proceeds of a lost property sale by police has helped buy Atari machines for a youth club project.

One of the computers, an Atari 130XE, was taken from the Honor Oak Youth Club, Lewisham, and used for demonstrations at a national conference on computer work in the Youth Service aboard the Royal Princess on the Thames.

The club’s senior youth worker, Mike Fordham, said: "We have four Ataris — two 800XLS, a 130XE and a 520ST with disc drive — all bought by donations from friends of the club, Inter-Action — an educational charity — and local police after their lost property sale.

"The conference strived to show how youth clubs now need computers to train youngsters ready for this new age of technology. I think within the next five years no one will even be able to get a job stacking shelves unless they can use a computer."

Atari has already funded the buying of machines for youth clubs and in the past also loaned 100 800XLS for use at community camps.

The company also donated two 800XLS to Inter-Action and Community Computers UK, who help link organisations to potential backers.

The Ataris are helping transform Britain’s youth clubs into job springboards, according to Ed Berman, founder of Inter-Action, an educational, non-profit making charity, which aids clubs and organisations.

● The Department of Education and Science has just announced a £75,000 grant over the next three years to Inter-Action for their youth club computer projects.
# Bits & Bytes Computers

## DISKS
- Alternative Reality: £16.96
- Fantastic Fear Part 1: £12.70
- Necronomicon: £10.95
- Knights of the Desert: £12.30

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- JumpJet: £4.95
- Air Wolf: £4.45
- Lionheart Europe: £4.45
- Ball Blazer: £4.45
- Mediator: £4.95
- Zorro: £4.45
- Diary of an Alien: £4.45
- Bounty Bob: £4.45
- King of the Ring: £4.95
- NATO Commander: £4.45

## ATARI ROM GAMES
- From £3.99

## MAD OFFERS
- Atari 1080 £99 plus £3 P&P
- Smash Hits Package: £20
- 1, 2, 3 & 4 Cassettes (10%)

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## Bits & Bytes Atari Top Twenty Chart

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## COMMISSION FREE COMPUTER

- Atari 800 £99 plus £3 P&P

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## SMASH HITS PACKAGE

- £20

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## MAY SPECIAL OFFER
- FREE £1 Gift Voucher

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## Bits & Bytes Computers

- Unit 7, Old Swan Shopping Arcade, Green Lane, Princes Road, Old Swan, Liverpool 13.
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BIG BOOST FOR ATARI SOFTWARE

FOLLOWING major deals with two top independent software houses a new series of Atari ST adventure games from Rainbird Software is in the pipeline.

The recently-released The Pawn is one of seven disc-based adventures to be written for Rainbird over the next two years by Magnetic Scrolls.

Level 9 Computing has also signed an agreement to provide three Rainbird products for the Atari ST over the coming year.

After meeting program authors from the two companies publisher Tony Rainbird said: "Part of the Rainbird expansion will involve reversing the current trend of imported American software, to which end we have already made a considerable impression on the American market with British games and utilities'.

Magnetic Scrolls' commitment will give Rainbird world marketing rights for a further six new games after The Pawn, starting with The Guild of Thieves, available in the autumn. All programs will be disc based and 16 bit versions will feature "stunning" illustrations.

Anita Sinclair, managing director of Magnetic Scrolls, said: "This agreement with Rainbird enables us to continue our research into natural language and other artificial intelligence-related projects'.

Level 9's deal was signed by Peter Austin, one of the partners in the brothers-and-sister company. He said: "We expect a substantial increase in adventure playing and Rainbird is prepared to support our products in a unique way'.

Rainbird will initially market Level 9's re-written Colossal trilogy - Colossal Adventure, Dungeon Adventure and Adventure Quest - as a disc at £19.95 for the Atari ST and a triple cassette at £15.95 for the 8 bit machines.

A second multi-load adventure, provisionally called Knight Orc, is due out in September, with a third, probably a three-cassette package, following two months later.

A picture shows Rainbird's adventure teams (left to right) the Level 9 brothers-and-sister team of Mike, Peter, Nick and Margaret Austin, Mike Clark, Tony Rainbird and Paula Byrne of Rainbird Software and Ken Gordon and Anita Sinclair of Magnetic Scrolls.

Single handed joystick

TWO new joysticks for the Atari games machines have been launched by Palen Electronics.

The Fantastic III has rapid-action dual electronic fire buttons suitable for both left and right handed players.

It also has eight directional movement with auto-centering and auto-fire control and comes with a two metre cord. Price: £6.95.

The Quickshot II plus has microswitches with auto-fire capability and two fire buttons so users can shoot with thumb and trigger finger. The mechanism can be locked to allow a continuous burst of bullets.

Single-handed video game play is possible with the Quickshot II Plus as a result of the built-in auction cups. It costs £12.95.

ACCOUNTS ON MENU

A NEW version of CashLink Accounts has been produced by CashLink for the Atari 520ST.

The program, designed for small to medium-sized businesses, takes advantage of windows and pull-down menus.

It offers a complete accounts department, handling all credit accounts and cash sales, with full accounting ledgers and records of stock.

CashLink Accounts costs £295. A full accounting package with Atari 520ST, disc drive, monitor, printer and accounts program is offered at £1,250.

Tips for authors

GAMES publisher Superior Software is looking for people with new ideas for programs for the Atari range.

The firm is offering a free guidebook, Top Tips for Games Authors, which contains general advice about selecting suitable software publishers and writing games software.

Sales manager Ken Campbell says: "The rewards for games authors can be enormous:

"Tim Tyler, one of our authors, who is only 17, has amassed more than £36,000 in royalties over the past year and that figure is still increasing week by week'.

ATARI'S ST PRINTER

ATARI has launched the first of its own range of printers for its ST computers.

The SMM9804 dot matrix 80 column printer introduces a new line of high speed printers that will be of integrated design to complement the 16 bit ST range.

Rob Harding, Atari UK's marketing manager, said: "It is our intention to become the major supplier of all kinds of printers including the daisywheel, dot matrix and laser models during the next 12 to 18 months.

They will all be priced at affordable levels in order to sell in substantial volumes'.

The SMM9804 costs £199.

June 1986 ATARI USER
Budget Gold

A GAME that cost almost £30 when it was first imported from the USA is now on sale for just £2.99 for the Atari 8 bit machines.

Shamus, an all action adventure, is one of four bargain priced arcade games from America now being sold under licence by US Gold in Britain.

The American games also includes New York City, where dangers lurk at famous landmarks, Scooter, a multi-level three dimensional game, and Oilfield Politics with 15 screens of action-packed challenges.

All cost £2.29, and are available on cassette only.

Inside the ST

THREE new books for the Atari ST user come from First Publishing.

The Anatomy of the Atari ST includes detailed descriptions of the sound and graphic chips, internal hardware and a fully documented dos assembly listing.

Gem on the Atari ST gives information on the Gem operating system in easy-to-follow language.

Atari ST Tricks and Tips explains basic commands to access Gem using VDIYS and GEMSYS and describes resource files with examples.

Each book costs £12.95.

Bugs menace

GERM warfare is the theme of Firebird's Atari 48k release, the Comet Game. It comprises three phases in which there is just one chance to save the world from germ bags that infect a look-alike Halley's Comet.

The aim is to hit enough of the germ bags to stop a colony reproducing and infecting the earth's surface. Price £7.95.

ATARI WILL BID FOR NAVY CONTRACT

ATARI will be competing when tenders are invited by the Royal Navy to supply standard micros for floating classrooms for its junior officers and young sailors.

Britain has had to double the number of sailors in sea-going jobs, cutting the time spent in educational training ashore.

Some warships have a variety of computers bought from ship's funds for study and recreation, as well as the officially installed computers needed for analysis of performance of missiles, guns and other weapons.

But the Royal Navy wants a standard machine capable of helping sailors' basic education in mathematics, English and other subjects, as well as professional courses previously taught ashore.

The idea is that by providing a standard computer a step-by-step teaching system can be worked out so sailors can learn either computerised operational work or CSE and GCE subjects at their own pace and be able to go back over parts they do not understand.

A Ministry of Defence spokesman told Atari User: "It is the intention to purchase a standard computer for all our ships for the education of sailors and junior officers aboard. But what type of computer will be installed will of course depend on the competitive price of the tenders".

The Royal Navy at present has 25 submarines, three aircraft carriers, 14 destroyers, four Fleet tender training ships, an ice-petrol vessel, eight survey ships, and a number of frigates, which would all need computers - the larger vessels requiring many additional machines.

Rob Harding, marketing director of Atari, said: "We are very interested to hear about this opportunity to provide computers for the Royal Navy."

"The ST range offers unbeatable value both in price and performance and is also very flexible."

"The ST is proving very popular at all levels of education and should suit them perfectly."

"A number of educational packages will be ready for the ST in the near future."

Business is booming

MORE than £400,000 has been invested by distributor Twillstar Computers to improve its services for Atari users.

Over the last three years business boomed so much at its West London shop - just 750 sq ft - the company was forced to move to larger premises.

In two months two buildings covering 7,000 sq ft in Southall have been converted into a well-stocked warehouse and extensive showroom.

Sevy Dhesi, managing director, said: "The Atari ST range brought about increased sales".

Part of Twillstar's new showroom
Upgrade the 520 ST to one megabyte and add the professional look from under £100!

MEMORY CARDS
The AST-520 MEMORY CARD upgrades the standard 520 ST to ONE MEGABYTE of RAM, and costs under £100 inclusive of VAT! The AST-2080, goes even further, brings the RAM to TWO AND A HALF MEGABYTES for less than £900 inclusive!

Now, really big RAM DISK — as big as a double-sided disc drive, compilers that can crunch thousands of lines a minute, megabyte-long documents, huge spreadsheets and useful databases with thousands of records in memory become practicable.

SYSTEM CASE
WHILE STOCKS LAST
You can give your ST a really professional look with the AST SYSTEM CASE. It can hold two 3.5 inch, and one 5.25 inch floppy drives, or a Winchester drive together with the ST power supply units. The Monitor can stand on top.

The System case will improve your viewing angle and leave your desk uncluttered.

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1) 520 STM, SM124 — Hires Monitor, SF364 — 360K disc drive, TOS in ROM, standard software on disc

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PRICES
AST-520 MEMORY CARD, free fitting

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3.5ins DRIVE, cased, with leads

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*Installing the RAM upgrades will affect your warranty, which will be replaced by AST's own guarantee. AST will install the upgrades for you, free of charge, at our premises. For the AST-520 RAM upgrade, you can send in your ST keyboard with payment of £30 to include board and return postage (£11.95). Enterline next-day service is required.
MICROLINK TRANSFERS SPACE PROBE DATA

MICROLINK has been chosen to provide vital transatlantic communications for a project that will eventually push back the frontiers of space even further.

An organisation called Astra - the Association in Scotland To Research into Astronautics - is experimenting with the design of a spacecraft that could travel millions of miles hopping from planet to planet and still survive a close encounter with the sun.

This is based on a concept known as Voyager, originated 20 years ago at Glasgow University by Professor Terence Non-weiler, where the vehicle flies at hypersonic speeds on the shock waves produced by the leading edges.

The project has attracted the attention of the Jet Propulsion Laboratory of the University of California which is working with NASA on the voyage, a mission to fly within two miles of the sun.

The Americans see Voyager as the most serious contender for the role of Starprobe transporter, because it can travel far into space by hopping from one planet to another, harnessing the gravitational force of each in the manner of a slingshot.

A leading member of the Starprobe team, Professor Donald E. Schlang, has been to Scotland to see the work in progress.

"Voyager is an ideal solution, perhaps the only one, to the problem of finding a vehicle with a high lift-to-drag ratio", he said after his inspection.

MicroLink was not the only contractor shortlisted.

MicroLink's role in the project is to act as a fast and efficient medium for transmitting information from Astra in Scotland to the Jet Propulsion Laboratory in California.

"Wind tunnel test data and other details are constantly being assimilated and have to be passed on to JPL as soon as possible. Therefore we have turned to MicroLink as a cost-effective and rapid means of data transfer", said a spokesman.

Menu for a good night out

ALL the world's a stage, and nowhere more so than London where theatregoers have a choice of over 40 glittering shows.

Now, in association with renowned booking agency Edwards & Edwards, MicroLink can reserve your seat in the stalls at any of them.

TheatreLink is a new service from MicroLink incorporating every play, musical, thriller, comedy and opera - plus major reviews and cabaret - being presented in the capital.

This cornucopia of entertainment ranges from the evergreen The Mousetrap, through old and new favourites like Blithe Spirit, Cats and Run For Your Wife, to the new musical Time.

To help you make your choice, the menu not only gives a full alphabetical list of every show currently running in London but also breaks it down into categories such as musicals, plays, comedies, thrillers and so on.

And as well as performance times and seat prices, each individual show listing contains the names of the stars appearing and a helpful description of its theme.

Bookings on TheatreLink can be made 24 hours a day, seven days a week up to the day before the performance you wish to attend. Seats for Friday and Saturday performances must be booked at least two days in advance.

Reservations will be confirmed on your mailing list within an hour if you book between 10am and 4.30pm, Monday to Friday.

Tickets will be charged to your credit card and either posted to you on the same day or held at the box office of the appropriate theatre.

TheatreLink is menu driven for maximum user-friendliness and also incorporates a section giving all the latest show news and a breakdown of which theatres still have seats available for performances during the current week.

YOUR chance to join MicroLink – Page 39
NEW York, New York, so good they named it twice! This is a debatable fact for those who have spent any time there, but one good thing to come from the Big Apple is Philon. It's one of the most professional of the software houses currently writing for the ST.

Two products have emerged from this company—Henry's Fundamental Basic and Fast/Basic M. The former is an introductory language which can be used by first time users through to advanced Basic programmers. The package contains a whole host of built-in features but, more importantly, it is upwardly compatible with the second package.

Fast/Basic M is Microsoft MBasic compatible, which means that programs can be transported from other micros. The two packages represent a strong opposition to the current Atari ST Basic and the price will not break the bank. Henry’s Basic will retail for £49 and Fast/Basic M for £99.

Philon also plan three more titles to add to the ST library—Fast/C, priced at £125 and Fast/Fortran and FastCobol at £249.

The graphics aspect of the ST is an exciting area for many people. The sheer resolution of the ST graphics handling makes the machine a must for creative people. Degas was the first to illustrate the power of the machine's graphic capabilities, and we are now starting to see more graphic packages arrive on the scene. Xlent Software has produced three, one of which, Typesetter, claims to be the perfect tool for layout and design. I found it interesting in as much as you can load Degas pictures into the program and reduce or enlarge them and add text. At £39.95 it represents a good utility to use alongside Degas.

Moving on to the real professional programs we find Easy-Draw from MiGraph which is truly excellent. If you have ever had the good fortune to see Gem Draw this package will amaze you.

You can create floor plans, landscape design, architectural designs, or simply draw pretty pictures. The printed results are very good, with the ability to print either a landscape picture or a portrait.

Apart from owning a 130XE and a 520ST, I also admit to an IBM XT. Until recently the IBM was very useful because, in the course of my working week, I need a very powerful relational database. DBase II did the job excellently—until I received a package from a company called Holmes and Duckworth.

H & D Base is basically DBase II, but for the 520/1040 ST. You can even run DBase II files created on another machine without any alterations. It retails for £99.99, and should turn out to be the software package of the year for the serious business user.

For the 8-bit Atari, Origin Systems has at last released the long awaited sequel to Ultima IV. Not surprisingly it is called Ultima IV. The game claims to be 16 times larger than its predecessor and takes up four disc sides.

Inside the packaging you will find the discs, a book on the history of the kingdom of Britannia, another on the Mystic Wisdom of the game and a very informative players reference guide. The nicest touch to the whole package is the map, which is printed in full colour on cloth and looks rather nice on my wall. It will doubtless be available within the next few months from US Gold, but do not expect all the refinements that come with the US version.

The American Civil War is the topic of SSI’s latest contribution to the world of the strategist. Battle of Antietam for the 8-bit Atari is set in Maryland on the day the battle took place between Robert E. Lee and his army of North Virginia and the army of the Potomac lead by General George McClellan. The simulation is up to the usual SSI standards and retails for £39.95.

If you read last month’s column you might remember a company I told you about called Hippopotamus. Well, I have received another Hippo package for the ST called HippoConcept which is an outline and idea processor.

Imagine you are preparing notes on a subject but do not have the time to elaborate on those notes at the time you record them. When you come back to them, the program will allow you to elaborate and format them into an orderly manner, adding, deleting and editing as necessary.

It is difficult to explain the full working details of the program in a few words but, for the person who likes to put his or her ideas down on the spur of the moment, and make sense of them at a later date, this package will certainly help.

When it comes to arcade games and the like my interest begins to fall. On the other hand, I do enjoy a game where you are not tied down to speed and joystick ability. Word for Word is for me. Copyright and trademarks prevent the authors, Bay View Software, from calling it by the name I do, and that is Scrabble.

This is possibly the best version of the famous board game produced for any computer. I don’t need to say much more, apart from the fact that when used on the ST the mouse is invaluable. The price of the game in the UK will be £39.95.

I have just finished reading the American magazines Antic and Analog, and I am pleased to say that the products reviewed in their latest issues are ones that Atari User covered some time ago.

It is nice to find that a British magazine is more up-to-date on American products than the Americans themselves, and you can read Atari User for a third of the cost of our American cousins.

Until the next time.
Classy classic

Program: The Tail of Beta Lyrae
Price: £9.95 (cassette), £14.95 (disc)
Supplier: Otabyte, Suite 31A Grove Terrace, Highgate Road, London N76 1PL
Tel: 01-481 1755

Despite its novel title, The Tail of Beta Lyrae turns out to be none other than a cloned version of Skramble, a game that first saw the dim light of an arcade about three or four years ago.

Basically the game consists of flying a fighter spacecraft through a series of caverns. The happenings on screen are displayed in standard two-dimensional, cross-sectional mode. Your view is from the side.

The spaceship flies from left to right through the caves but can accelerate or decelerate, and can move up and down. The cave scenery scrolls smoothly to the left as you progress.

The cave system is divided into a number of sectors, each being further divided into subsections. Your progress is marked by indicators at the top of the screen.

If you lose one of your lives by crashing into something solid or getting shot down, you continue from the particular sector and sub-sector where the disaster occurred.

Loss of your lives, though, and you are right back at the beginning of the complex again.

Each sector gets progressively harder, with the caves ever more claustrophobic and twisted. Likewise the quantity, variety and perniciousness of the cave's defence systems grow with each passing sector.

The defence systems consist of two main elements. Firstly, there are obstacles which block your way but don't go out of their way to attack your ship. These consist of such things as generators, scanners, antennae and mid-air barricades.

Secondly there are the actively aggressive components such as alien vessels, asteroids and different types of ground to air missiles - rockets, lasers and plasma cannonballs.

Particularly nasty are the Backfire missiles which, as their name suggests, fly up at an angle towards the unprotected rear of your ship. Your sole means of defence, apart from agility, is a forward-firing, repeater cannon which is used to blast any obstacles and attackers that are destructible - and not all are.

If you are skilled enough to reach them, there are city settlements and the aliens' power generators within the complex. Your mission is to destroy these generators.

The game allows up to four players and has six skill levels. Level 1 being tough and 6 plain suicidal, so fast and numerous are the attackers and hazards.

You may choose to have five or seven spaceships at your disposal.

One unusual feature is that the caves and their contents appear to be randomly generated during play, so the game is different each time you start up your spaceship.

The drawback is that there is no way you can map the cave layouts, thus making eventual victory that much more difficult.

Not an original game by any means, and I missed the ability to bomb as well as shoot that other versions have included. Even so, this is the best Skramble clone I've seen on any micro.

Presentation, graphics, sound effects and music are all good quality, and with its random generator and range of options, the game should prove to be durable.

The Tail Of Beta Lyrae is an exciting and challenging shoot-em-up that any fan of the genre would enjoy playing. A first-rate implementation of a classic arcade game.

Bob Chappell

A seat on the managers' bench

Program: Football Manager
Price: £9.95
Supplier: Addictive Games, 10 Albert Road, Bournemouth BH1 1BZ. Tel: 0202 296404

As you have guessed, your role here is to manage a club of your choice. The job ahead is to take your club from the Fourth Division to the First, and possibly win the FA Cup on the way.

This is by no means easy because players get injured, you lose a few too many matches and your gate receipts go down forcing you to take out a loan - with all the hazards of borrowing from the bank.

The first thing you do is select one of the current British Football Association league sides. Next you select a skill level, ranging from beginner to genius. All choices are made via the keyboard, so be prepared for lots of typing.

Then on to the main screen where you sell or list your players, arrange a loan, or perhaps pay one back. Loans can range from £250,000 for a Fourth Division team to £1,000,000 if you make it to the top.

Before every match you select your team. A careful evaluation of a player's morale, energy and skill will be needed if you want to succeed.

After every match you are given your share of the gate receipts and shown the results of the other games played in your division, thus allowing a league table to be calculated.

Fourteen matches later you are marked for your end of season league placement. If you are promoted you can look forward to the start of a new season.

Football Manager is a fun game with only three faults. It is written in Basic, so play is rather slow, there are no graphics, and it is only available on cassette. This is a shame as so many Atari owners have disc drives now. Software houses should take note.

On the positive side, there is a save game feature which means that you don't have to start from scratch every time you load.

Football Manager is a good game in which you can really get involved.

Paul Irvine

Sound................. N/A
Graphics................ N/A
Playability............. 7
Value for money........ 8
Overall................ 6

14 ATARI USER June 1986
Cavern capers

Program: Sidewinder
Price: £9.95 (cassette), £14.94 (disc)
Supplier: Futureware, 143 Grays Inn Road, London WC1X 8UB. Tel: 01-359 7217.

SIDEWINDER is a well written arcade game where you have to pilot a helicopter through underground enemy installations in search of kidnapped colleagues.

As my helicopter appeared on the take-off pad the screen filled with laser beams, gravity bombs and various large buildings and caverns.

I took off and the screen scrolled from right to left, revealing even more traps and joystick-breaking twists and turns.

Reaching the other end of the cavern after what seemed a nerve-shattering eternity I landed on the pad. Suddenly this raised to an upper take-off point and I had to fly back to the starting pad while avoiding new hazards.

Eventually I completed the first level, and progressed to a more difficult cavern with stronger defences.

You can replenish your ever-decreasing fuel supply by bombing fuel pods.

There are five caverns, and the fuel pods become harder and harder to hit. If you manage to complete the fifth cave there is quite a surprise in store, but I will leave that for you to discover for yourselves.

Sidewinder is great fun to play because it holds your attention, something that is missing from a lot of software nowadays. I found it very addictive, playing game after game to get to the next cavern.

The program also offers a screen editor which allows you to design your own caverns, saving them to disc or tape.

Paul Irvine

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Danger, addictive

Program: Boulderdash II
Price: £9.95 (cassette), £14.94 (disc)
Supplier: Databyte, Suite 31A, Grove Terrace, Highgate Road, London NW5 1PL. Tel: 01-482 1755.

If you’re a taste for games that leave you red-eyed and stiff-fingered, that have you saying for the 99th consecutive time, “I’ll just have one more go”, that exert such an inexorable grip that you lose track of time, then Boulderdash II is just your cup of insomnia.

Its predecessor, Boulderdash, was one of the most enjoyable, addictive games ever released, a computer classic no less. This follow-up, although it is pretty much the same mixture as before, is every bit as riveting.

You control a cute little figure called Rockford who blinks and taps his foot impatiently if you leave him idle. Rockford’s task is to tunnel his way through a series of two-dimensional caves and collect as many jewels as he can.

Now while the plot may strike you as perhaps lacking in the originality department and although the graphics, while pleasant, are nothing to gasp about, the game has one ingredient that sets the whole thing alight and starts the old adrenalising coursing. In a word, boulders.

Large boulders, embedded in various parts of the strata, are scattered liberally throughout the cave system. What makes the game so much fun is that the boulders are prone to come crashing down with a noise like thunder.

If Rockford’s in the path of a falling boulder, and doesn’t shift smartly out of the way, he gets squished and loses one of his three lives.

The boulders drop predictably. They will either fall straight down if unsupported or topple off underlying objects if there’s nothing else to hold them in place.

You’ll soon master the laws of physics in Boulderdash but there still remains the need to adopt a careful strategy if you’re to succeed.

As well as the boulders, roving butterflies, amoeba, fireflies and other obstacles and oddities see to it that you’re kept on your toes.

You control Rockford’s movements with normal joystick manipulation. He leaves a tunnel behind him as he goes, and automatically collects any jewels he passes over.

When a certain number of jewels have been gathered, a secret exit appears, giving Rockford the chance to move on to the next cave.

There are 16 new caves to traverse, each of which consists of several scrolling screens and has its own unique layout and set of problems.

To increase the playing life of the game, each cave has five selectable difficulty levels; the greater the difficulty level, the more jewels you have to collect and the less time you have to do it in.

In addition, there are four non-obligatory intermissions to solve, giving you the chance to earn valuable bonus points.

The program also thoughtfully provides the option of starting at caves A, E, I or M so you can get to see a lot of the game from the word go.

The Rockford exploits are classic – great fun and numbingly addictive. Become enslaved – go buy Boulderdash II.

Bob Chappell

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Wearing well...

Program: Arcade Classics
Price: £9.95 (cassette), £14.95 (disc)
Supplier: US Gold, Parkway Industrial Estate, Heneage Street, Birmingham B7 4LY. Tel: 021-369 3020.

GAMES compendiums seem to be all the rage at the moment. Arcade Classics is a collection of four fairly ancient Atari games bundled together on a single cassette or disc — Pole Position, Pac-Man, Mr Do! and Dig-Dug.

At least three were originally released on ROM cartridges (whatever happened to cartridges?) so this cobwebbed collection exudes a strong whiff of nostalgia. Nothing wrong with that, especially if the games are still fun to play.

Pole Position is still one of the best motor racing games around and is a must for any Atari owner. The game gives you the chance to drive a racing car at hair-raising speed around any of three different race tracks, competing against other computer-controlled cars. To enter a race properly, you first have to complete a qualifying race within a time limit. How fast you qualify governs your position on the starting grid in the subsequent race.

Options include selecting the course and number of laps, and having a practice race without other cars getting in your way.

Beware that part of the inlay instructions which tell you how to control the car — it’s wrong. For the record, the car accelerates automatically. Joystick forward switches you into high gear, backward into low while left and right move the car in that direction. To brake, press the fire button.

An exhilarating game — fast movement, good use of sound and graphics and still one of my personal favourites. Pac-Man must surely be familiar to everyone. You control the famous yellow, jaw-snapping head and zoom around a simple maze, gobbling up dots while dodging pursuing ghosts.

Special energy dots which allow you to turn the tables on the ghosts and the inclusion of several difficulty levels add to the fun.

A simple game by current standards, yet still powerfully addictive. One of the few arcade conversions worthy of the title classic.

Mr Do!, with a 15 minute load time from cassette, consistently refused to boot up successfully. Let’s hope that it was just my review copy at fault otherwise there could be a lot of frustrated buyers.

From memory, the game itself could almost be described as a loose combination of Pac-Man and Boulderdash. You tunnel around a field digging for cherries, cakes, puddings, and so on while avoiding giant falling apples and fending off monsters with your Powerball.

It will not have escaped your notice that when it comes to computer game plots, reality and logic invariably take a back seat.

Dig-Dug was fairly popular in its time but this conversion of a golden oldie fails to spark. It is similar to, but nowhere near as good as, Mr Do! It is graphically crude, lacks variety of challenge and, worst of all, plays slowly.

Dig-Dug compares badly with today’s standard of releases. The rest hold up pretty well, though.

Bob Chappell

Desperate drive

Program: The Last V8
Price: £2.95
Supplier: Mastertronic, MAD Range, 8-10 Paul Street, London EC2A 4JH. Tel: 01-377 6880

THE Last V8 is one of the first budget games to appear for the Atari computers and is a very interesting release too.

During the Nuclear War you have stayed hidden in your base developing a super car — the V8. Now, in a desperate attempt to reach the remainder of mankind, you come out into the open only to discover that there is an unpolluted nuclear bomb with only minutes left before it detonates.

So you must drive to your base in the short time remaining — but will you make it?

If you think Elektraglide is difficult, you will find this game even more so. It isn’t so much that you have a very short time in which to return to base, but more a matter of controlling the V8.

Instead of a straightforward up, down, left and right to control the car you have left, right, accelerate and decelerate.

It is very easy to skid off the road at any speed, let alone the speed that you have to travel in order to reach the base in time.

To add to your troubles you have a limited amount of fuel and your radiation shield gets progressively weaker.

On the positive side, the graphics are excellent and the scrolling is very smooth.

The screen is divided into two: the top half shows a bird’s eye view of your car as it travels along the road, and the bottom half shows your dashboard.

An ever-present onboard computer tells you how far it is to the base and how much time remains before the bomb goes off.

The Last V8 is a good game which lets itself down because it is extremely difficult to play. But at the asking price it is certainly a worthwhile challenge.

Ben Halligan

Sound ....................... 8
Graphics .................... 9
Playability .................. 4
Value for money ............... 8
Overall ....................... 7
Making your own mazes

This program was written for those of you who liked my Cavern Escape in last month's Atari User. The problem with that game is that as soon as you have explored the maze of rooms, drawn a map and completed the game much of the enjoyment has been removed.

With Maze Creator you can now make a new maze using the same elements as in the original game. Conversely if the game is too difficult you can make the game easier to complete.

Firstly I will explain how the maze is made up. There are four basic room layouts built into the program. These are arranged in a 10 by 10 square with variable connections between them. They are numbered from 0 to 99 starting in the top left corner running in horizontal rows.

The start is always 0 and the end is always at 99. These cannot be altered easily. The data for the exits of the rooms, the type of room, its name and the difficulty factor are all stored in data statements in lines 2000 to 2099. The key and lock rooms are defined in lines 1180 to 1189.

The maze creator program will allow easy design of a new maze and automatically create a file which will merge and replace these lines in Cavern Escape.

The program is easily used and largely self-explanatory. After it is run the screen will blank for a few seconds to read in a new character set. It will then create the current maze on the screen. The key rooms are in blue and the lock rooms are in red.

All the connections between the rooms are shown. The program will then ask if you are happy with the lock and key rooms as they are. Enter Y if you are or N if you want different rooms.

If you want to alter these rooms you will be asked for a new location for each key and lock in turn. You must enter the number corresponding with new room from 1 to 98 - do not use 99 as this is the end.

After all the locks and keys are placed a flashing cursor will appear on the map. Use joystick 1 to move this to the first square to be edited and press the button. The room type will then be displayed in the text area of the screen.

You can cycle through the four types available using the joystick. When you have the type you require displayed press the button to store it. Next the difficulty level is displayed. Again alter this with the joystick and press the button.

Only rooms 3 and 4 are affected and the higher the number the greater the difficulty. After this the room being edited is placed to the right of the map with the exits displayed. Cycle through the various combinations of exits until the desired one is found using the joystick and then press the button.

After this you are asked to type in the room title. If you just press return the standard name for that type of room will be used. This will then bring back the flashing cursor and you are ready to edit the next square. If you have finished editing just press Start. This brings up a prompt for a filename to send the data to.

If you are using a cassette enter C: if disc type D:filename, for example MAZE.LST. This will produce a listed file of the necessary lines of data to alter the original program.

When this is completed load in the
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original Cavern Escape program, type
ENTER "C:" or ENTER
"D:MAZE.LST" and merge in the new
data lines. Save out the new program
under a different filename, and VIOLA
a new game.

The program is essentially aimed
at hackers at heart. As such it is not
the most elegant piece of program-
ming. There is a lot of error trapping
built in, but it is very easy to make an
impossible maze or even a version
which will not run at all. A few golden
rules will help prevent this:

- Lock and key rooms should not be
  placed on the same square under any
circumstances.
- Lock rooms always need an East
  exit and therefore cannot be placed
  on the right column of rooms on the
  map.
- The program will usually stop you
  from making an exit which leads off
  the map as this is obviously
  impossible.
- Remember to place corresponding
  exits and entrances in neighbouring
  rooms so if a room has an East exit
  the room to the right of it must have a
  West exit. If not you will end up with a
  one-way door allowing movement in
  one direction only. This is used in the
  original maze to create five dead-end
  rooms.
- A subway room needs exits in all
  four directions and this is auto-
matically done. However this means
  you cannot have one of these at the
  edge of the map.

I hope this utility helps you get
more enjoyment from Cavern Escape.
Happy creating.
Player designer takes the tedium out of plotting all those pixels

Part Two of STEPHEN WILLIAMSON's series on player missile graphics

WE already know that a player is a shape formed by pixels plotted within a player stripe. The normal method of designing a player is to draw the shape on graph paper and work out the data that is used by the player missile system to define that shape.

To do this requires a little knowledge of binary maths. Stripped down to its bare essentials, a computer is not very intelligent. Its heart is an area which recognizes whether a switch is turned on or off. In the case of the Atari there are eight switches or gates through which a small electrical current can pass.

In the binary system, if a current is present this is represented by the number 1, and if there is no current 0 is used. Because the Atari works on an eight gate system it is called an 8 bit machine. Its big brother the Atari ST uses a 16 bit system which is more powerful.

When we design a player we have to work in a similar way. The width of the player stripe is eight pixels and within any row, pixels can either be turned on (1) or turned off (0).

Figure 1 is a diagram of the bug encountered in last month's program. The shape occupies 11 rows within the player stripe. Each empty square in the diagram represents a section of the stripe where no pixel has been plotted, with the filled squares representing the plotted pixels that make up the bug shape. In each row of eight pixels there are various combinations of pixels that are either switched on or switched off. Figure 1 also shows the binary representation of the shape.

Although the Atari works at the binary level it will not directly accept binary input. In the early days of the first mainframe computers programmers wrote their programs in the binary system.

But it was soon evident that the human mind, unlike computers, finds writing programs as a series of Os and 1s very tedious and the chances of making errors are high. Hence the need for computer languages - machine code, Pascal, Cobol, good old Basic and so on.

Having designed the player using a binary-type system we have to convert all those Os and 1s into something that the Atari can understand. This is done by a process known as bit-mapping. In each row of the design, the combination of pixels that are off or on can be represented by a single number.

To do this each pixel space within a row is assigned a numerical value. Starting from the last column on the right the first position is assigned a value of 1, the next column to the left 2 (double 1), the next column 4 (double 2) and so on until the left hand column becomes 128. Figure 1 should make this clear.

By adding up the values of all the plotted pixels in a row we arrive at a single number that represents the pattern of pixels, or the bit pattern.

If you look at the top row of the diagram, a pixel has been plotted in the 8 column and a pixel plotted in the 32 column. Adding these two together gives a value of 40 which is the numerical code that represents the pattern of pixels in this row.

Using the bit-map system any combination of eight pixels that are on or off can be given a single number value from 0 - which equals no pixels plotted - to 255 when all the pixels in a row have been plotted (255 = 128 + 64 + 32 + 16 + 8 + 4 + 2+ 1).

255, which in binary maths is equivalent to current being present in all eight gates, is the maximum value that can be understood by the 8 bit system which is why if you poke a value above 255 into any address you will get an error message.

Of course in Basic we can use numbers larger than 255, but this is only because the Basic Interpreter breaks larger numbers up into two or more 8 bit numbers before passing them on to the processor.

The diagram shows how the bug shape is coded into a series of 11 bit-mapped numbers which can then be incorporated into data statements.
in a Basic program to be read and poked into the area of memory where the appropriate player stripe data is held. We will look at how this area is allocated next month.

This bit-mapping process may seem a bit cumbersome. It is also difficult to visualise what the graph paper plotted shape will actually look like on the screen. Graph paper consists of squares whereas player missile pixels are actually rectangular, so there is a problem in working out the correct ratio of height to width.

But take heart, the computer is designed to take the strain out of such tasks. This month’s program is a player designer that works out the correct bit-mapped numbers. The designer will allow you to design and edit player shapes in such a way that you will see exactly how the shape will look when used in your player missile programs.

The designer plots a grid of dots eight wide by 20 high which represents an enlarged section of a player stripe. A cursor can be moved around this grid using a joystick.

By pressing the fire button an asterisk will appear beneath the cursor and the equivalent pixel will be plotted on the player stripe which has been set up to the right of the grid. Placing the cursor over an asterisk and pressing the fire button will cause the asterisk to be erased and the equivalent pixel in the player stripe will be switched off.

At the bottom of the screen is a list of the various options that are available to the operator. Key C changes the colour and brightness of the player. The system used is the same as that found in the Atari Reference Guide with a 16 colour palette – 0 to 15 – and brightness range from 0 to 14.

Only even brightness numbers alter the brightness. If an odd number is entered than the brightness value one below this number will be used by the system. After entering a brightness or colour value, press Return.

When satisfied with your design pressing D gives a list of the bit-mapped numbers that represent the shape, and these can then be used in programs to create the same player shape again. If you are not satisfied with the design then E erases the shape and you can start again.

Key M moves the player around the screen using the joystick. The player missile system supports up to four players. The designer allows you to design more than one player. By placing a player next to another player a wider or taller shape can be designed.

Although the designer only allows you to design a player up to a maximum of 20 pixels high this restriction can be overcome by placing one player directly above another. The program will work out the number codes for each shape separately but these can be easily combined in your own programs for taller shapes.

A two colour player can be designed by placing players over or near each other. In this way you could, for example, design a man with a pink head using one player and the rest of him a different colour using another. Multicoloured designs are possible by using all four players.

To further increase the option of multicoloured players pressing key Q gives a third colour when two players overlap. This third colour is decided by the Atari. If, for example, you overlap a green player with a blue player the resultant third colour will be orange. Experiment with this option to see other colour combinations.

Another restriction of the overlap facility is that it only works with Player 0 overlapping with Player 1 and Player 2 with Player 3. You cannot get a third colour by overlapping Player 0 with Player 2, or Player 1 with Player 3 and so on. So remember to stick to the 0 and 1 or 2
and 3 combination. Pressing Key 0 again switches off the overlap mode.

A player can be a single or double resolution player. All players must be in the same resolution, as due to a limitation within the player missile graphic system it is not possible to mix players of different resolutions. It may be possible to overcome this limitation with the clever use of interrupts — but this could only be done in machine code and is beyond the scope of this series.

Key S changes the size of the player on the horizontal plane. The player missile system has three size options — normal size, double size and quadruple size. Unlike the resolution option it is possible to mix players of different sizes. Press keys 0 to 3 to change the player which the designer is operating on.

The program could also be used to design characters in programs where you want to redefine all or part of the Atari character set. This can be achieved by using eight rows of the grid only — which will not give an accurate depiction of the redefined character as character pixels are smaller than player pixels — but it does bit-map the character correctly and is a lot easier than working with squared paper.

I will not go into how the designer program is constructed as plenty of REM statements label each section of the program. At the end of the series when I have detailed all the processes needed to control the player missile system it may be useful to refer back to the program listing of the designer to see how the program options manipulate the player missile system — how the program changes resolution, size, plots pixels, moves players and so on.

Next month I will show you how to make the shape that you have designed appear on the screen from within a player missile program.
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PAGE 6 - COMPLIMENTING AND EXPANDING THE WORLD OF ATARI

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We'll also look at remote keyboards customised for children, disabled people or ham-fisted amateurs. Energy saving aids, acoustic interfaces and simple robotics.

All these are driven by software written in BASIC or by simple USR-level machine code routines. All the gadgets work through the joystick ports and this month we will explore the various signals you can put in and get out. Figure 1 shows the pin functions.

Pins 1 to 4 are the main on or off signal lines and they are normally held at +5V by internal circuitry. A signal occurs when the line is taken to 0V by some external means, like a joystick. You can plug a switching device of your own to port 1, and read its output by PEEK STICK(0), or PEEK(632).

The pattern of highs and lows on the four signal lines is interpreted as a 4-bit binary number with 0V meaning on and +5V meaning off, so a number between 0 and 15 will be returned.

It's best if the transition from +5V to 0V is rapid so sensors which produce a slowly changing output, like temperature-sensitive resistors, are not really satisfactory. Devices that switch quickly — like photodiodes or keyboard switches — are suitable, so long as they can handle at least 1 milliamp per line.

The signal lines can easily be turned into output switches. POKE 54018, 56 – POKE 54016, 255 – POKE 54018, 60 – to set up both ports for output, then POKE a number between 0 and 255 into 54016. The number will appear in binary form at port 1 – bits 0 to 3 – and port 2 – bits 4 to 7.

In output mode pins 1 to 4 are held at +5V while they are off and fall to 0V when they switch on. They can each sink 15mA in the on state, which is enough to control transistors, thyristors, LEDs and integrated circuit devices.

Some form of current and voltage amplification will normally be needed before these outputs can do useful work in the outside world, but with appropriate hardware you could control appliances the size of Tower Bridge. More about this next month.

By LEN GOLDING

Figure 1: Joystick port pin-outs

Pin 6 is the joystick trigger line. It can't be made into an output, but remains effective as an input regardless of how the four signal lines are configured.

Taking this pin to 0V will change the number in address 644 from 1 to 0. This opens the way for simple feedback — a motorised device driven by pins 1 to 4 could send a stop signal when it had finished opening a door or drawing the curtains.

The pin could also be used as a fault line, triggering an alarm if anything went wrong with the hardware. As with the signal pins 1 milliamp of current is required to make it operate.

Pin 7 is connected to the positive side of the internal power supply, and is held constantly at +5V. It will deliver 500 milliamps or more if you let it, but Atari specify a maximum current drain of 50mA, shared between the ports.

If you try to draw more you could end up with an expensive smell, so it's a good idea to build some form of current-limiting protection into any circuit that draws power from this pin. A 50mA quick-blow fuse is used in the gadgets we will be describing.

Pin 8 is the common 0V line. It connects to all the rest of the computer circuitry and provides the 0V point for signal and trigger inputs.

Pins 5 and 9 are analog inputs designed for use with paddles. A variable resistance can be connected between either of these pins and the +5V line. The computer measures this resistance, converts it into a number between 1 (1k or less) and 228 (500k or more) and then puts the result into address 602 (pin 9) or 625 (pin 5).

These pins continue to work as inputs even when the signal lines are outputting data, so complex feedback is possible. The obvious use is for servo sensors in robot arms.

Pins 1 to 4 can control motor

Figure 2: Practical layout

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on/off lines, while variable resistor is connected to pins 5 and 9 monitor the degree of rotation in two dimensions.

The analog inputs can also be used for devices which produce a slowly changing voltage. How about a photocell to set a burglar-deterrent program running when it gets dark? Or sensors to control temperatures and exposure times in your darkroom? Or a humidity monitor for the conservatory? Or a transducer that will react to sound? It’s all possible without too much knowledge of electronics.

Here’s a simple light-sensitive gadget to get you started. You will need the materials shown in the parts list. First test the extension lead using joysticks and paddles in the usual way. If all is well unplug it, cut off the end you don’t need and carefully strip about ⅜ of insulation from each of the nine wires.

Screw the terminal block to the baseboard and attach the wires as in Figure II. The colours shown are those used in the Tandy extension lead—other makes may be different.

Now fit the cadmium sulphide cell on the terminal block as shown, check that all the screw terminals are tight and then plug the gadget into port 1. Run this program:

```
10 PEEK 752,14;PRINT CHR(125)
20 POSITION 2,1;PRINT PEEK(524)"";
30 GOTO 20
```

Initially the displayed number will be low—probably less than 10—but if you now cover the cell with your hand the number will rise rapidly to 50 or more. Try this:

```
10 GROUND 0;PEEK(524)+10,10,8;GOTO 10
```

and you get a light-activated swanette whistle guaranteed to delight even the youngest members of the family.

Shopkeepers could use this device to make their window displays more alluring. Fit extension leads to the cell and tape it inside the window so that passers-by can cover it with their hands. Then write appropriate software to generate something interesting on the TV screen when the number in 624 exceeds your threshold value.

A similar gadget can also be used to help train hand coordination in severely disabled children who have little control over body movement. Random waving will have no effect, but careful positioning of the hand can be made to produce some form of reward.

Next month we’ll explain how to use the four signal lines as output switches and how you can get them to control high power appliances.

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28 ATARI USER June 1986
In this final part of the compiler series I’ll give those commands which the compiler provides but which have no direct equivalent in Atari Basic.

Firstly let me introduce the concept of a named procedure. These are like subroutines, but they differ from them in the fact that each named procedure can have its own local variables, and that a named procedure not surprisingly has a name. To handle named procedures the Compiler BASIC has three new keywords – DEFPROC, VAR, and ENDPROC.

Using these keywords let’s define a named procedure called DELAY which loops around doing nothing for a short time. We could use a FOR ... NEXT loop to provide the delay, say FOR N (=1) TO 1000. Here’s a possible solution:

```
2000 DEFPROC DELAY
2010 VAR N
2020 N=1: FOR N TO 1000: NEXT N
2030 ENDPROC
```

Note the use of VAR N in line 2010 which declares N to be a local variable. In effect this means that the procedure DELAY has its own private variable called N which no one else may use. Another way of looking at it is that if any other procedure or program is using N for some purpose then calling procedure DELAY will not cause N to be corrupted. An example will make this clearer:

```
1000 N=0: FOR N TO 100
1010 PROC DELAY
1020 NEXT N
```

PROC is similar to GOSUB – it just causes DELAY to be executed. Notice that this piece of code uses N for its loop counter, as does DELAY. However DELAY uses its own private variable called N and this is quite separate from the variable used in lines 1000 to 1020. The compiler will quite happily keep track of the two variables even though you might expect it to become confused.

This powerful feature of the compiler allows you to develop self-contained procedures with their own variables. You can then safely use these in your programs without having to worry about what variables you used and whether or not they clash with the variables in your current program – which is more than likely with variable names just one letter long. Programming in small packages like this is sometimes called structured programming.

Another construct which lends itself to structured programming is the REPEAT ... UNTIL loop. This allows you to repeat a sequence of statements until some condition becomes true. For example:

```
REPEAT: PROC DOSOMETHING: UNTIL F=1
```

This will execute the procedure DOSOMETHING repeatedly until F is set equal to 1. It is a clearer way to write the loop than using IF ... THEN ... GOTO.

And now on to what is possibly the most powerful feature of the compiler – the keywords which deal with timed interrupts. These are ENTER, AFTER, ENTRY and EXIT. The ENTER command is a little like GOSUB. Here’s an example of it being used:

```
ENTER ROUTINE: AFTER 10
```

What this means is enter the piece of code called routine, but wait until after 10 jiffies (50ths of a second) have expired. While the program is waiting for the 10 jiffies to elapse it simply continues executing the statements in your program. Once the time limit is up the program stops whatever it is doing and enters the routine which you have specified.

Once the routine has executed to completion the program resumes executing where it left off. You may be asking yourself what the point of it is, but I can assure you that it is extremely useful – how does interrupt-driven music in perfect tempo grab you?

Before I show you how you might go about that here’s how you set up an entry routine as I call them. You simply bracket the code to be entered with the keywords ENTRY and EXIT as follows:

```
1000 ENTRY ROUTINE:PROC
1010 DOSOMETHING:EXIT
```

Of course you don’t have to call your ENTRY routine by the name ROUTINE, any name will do.

Program I provides a procedure called SET UP MUSIC which starts the music playing when you execute PROC SET UP MUSIC. The DATA statements in lines 8090 to 8110 are the data for the music. These are pairs of items – pitch and duration.

There are 12 notes in the example data list, but you can have as many as you want. The numbers were chosen at random so I doubt if it sounds that good. Note that the ENTRY routine ties up variables P and D and also

Concluding

FRANK O’DWYER’s series
requires the exclusive use of the READ...DATA mechanism, so the main program must use the READ or RESTORE keywords.

Note also that line 8060 uses AFTER without an ENTER keyword — this is perfectly valid and simply means Call me again after 1/80th of a second. It is a fairly simple matter to change this program so that it deals with all four sound channels and/or the distortion and volume parameters.

If you try this bear in mind that you can’t have very much code in between the ENTRY and EXIT keywords. This is because the time available for an ENTRY routine to execute in is very limited. For this reason you should keep your routines as short as possible — exactly how short is a matter of trial and error.

There are still a few compiler commands I haven’t dealt with. These are ZERO, INC, DEC, BASIC, CODE, ENDCODE and a special version of GET.ZERO simply sets variables to be equal to zero. ZERO A,B,C for example is just a shorthand for A=0,B=0,C=0.

It will also execute quicker than the assignments. INC and DEC are similar to ZERO. They increment and decrement variables respectively. INC A,B,C is equivalent to A=A+1,B=B+1,C=C+1. Similarly DEC A,B,C is the same as A=A-1,B=B-1,C=C-1.

The command GET may be used to read a character from the keyboard. GET K will wait for a key to be pressed and will set K equal to the ASCII code of the key being pressed.

The command BASIC may be used to return your USR function — wondering what becomes of the USR function’s arguments when the function is executed. The answer is that they are slotted into the compiler’s variables A to Z as follows:

- A will equal the number of arguments (0 if there were none)
- B will equal the first argument, if any
- C will equal the second argument, if any, and so on with Z equalling the 25th argument, if any!

So if your compiled program is called with X=USR(14356,1,2,3) you will find that A will equal 3, B will equal 1, C will equal 2 and D will equal 3. You can ignore this or you can check A to see if there have been any arguments, and give an error message or process the arguments as appropriate.

Whatever you do there is no danger of the arguments being left on the stack and crashing the computer — the compiler looks after the stack. See Programs II and III for examples of compiler programs which process arguments.

The only keywords left are CODE and ENDCODE. These allow you to remember compiler programs end up as USR functions — to BASIC. You can use the keyword on its own or follow it with an expression.

BASIC 2 for example will cause the value 2 to be returned as the answer given by the USR function. You can have more complex expressions too, such as BASIC X/256 which will return the hi-byte of X to Atari BASIC.

While we’re on the subject of the USR function you may have been
embed assembly language in your compiled programs. The only restrictions are that you must leave the Y register equal to zero when you finish and that each instruction must be on its own line. Here's an example:

```
1000 DEF PROC DONOTHING
1010 CODE
1020 NOP
1030 NOP
1040 ENDCODE
1050 ENDP
```

Note the spacing of these lines - two spaces before the assembler instructions and one before CODE and ENDCODE. You should follow this exactly. You may put anything between the keywords CODE and ENDCODE which the assembler recognises - you are effectively talking directly to the assembler without the compiler's intervention until it spots the keyword ENDCODE.

Well that's it. By now you should have a good idea of what can and cannot be done with the compiler. Let me leave you with two example programs. Program II is a routine to redefine the character set. It takes one argument, the address to which the character set is to be moved - this should be a pointer to free space of 1k in size.

You can call the routine with X=USR(14336,CHBASE) where CHBASE is the address where you want the character set X will be set to the hi-byte of CHBASE. Simply POKE 756 with X and you will have redefined the character set.

The whole process - copying the ROM set and poking the bytes for the new character definitions - takes about 1/10th of a second. Compare this with the usual please wait message while an Atari Basic program redefines the character set.

Program III is an alarm clock routine. It takes one argument, the number of jiffies which you want to elapse. After this number of jiffies has elapsed you will hear a beeping sound and the message "Wakey Wakey!!" will be displayed on the screen. Although just a toy program really, it does demonstrate the ability of ENTRY routines to work concurrently with Atari Basic.

To call the routine try X=USR(14336,1000). The computer will reply READY. You can carry on typing but after 1000 jiffies - about 20 seconds - the fun begins.

One final program. Remember I said that PRINT cannot display a number on the screen but that you could write a routine to do it? Here it is, presented as a named procedure. It will display the contents of the variable N on the screen. To print an expression just set N equal to the expression and call PROC PRINT N.

```
0000 DEFPROC PRINT N
0010 VAR C,S,N,D
0020 ZERO S
0030 D=10000
0040 REPEAT
0050 C=N/D: N=N-D/D: 0
0060 IF D=0 THEN S=1 ENDF
0070 IF C=S THEN PRINT C*8: S=1 ENDF
0080 UNTIL D=0
0090 ENDP
```

Program III: Alarm clock. Again don't type the REM statements in.
Compiler Library for the XL and XE

THERE was a small omission in the machine code Compiler Library listing in the April issue. Put simply, it will not function correctly if you have an XL or XE computer, although it works fine on the old 400/800 machines.

To correct the program so that it will work on both types of machine plug in your Assembler/Editor cartridge and ENTER the original program from tape or disc.

Now add the new lines (right) and LIST it back on to your tape or disc. Lines 2 and 10 remove the references to the old EOUTC and GET routines, while lines 510 to 525 allow the program to find out which sort of computer it is running on, in order to jump to the relevant EOUTC or GET subroutine.

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AFTER all the excitement of the Atari Show I seem to have a brief lull between games being released and arriving for review, so it gives me a chance to catch up with my mailbag and to look at an older game from the Infocom Wizards.

First out of the bag is Phillip Turner playing the excellent Dungeon Adventure from Level 9. By the way I hear that the whole dungeon trilogy is to be released soon — good news for anyone wanting to get into adventuring in a Colossal way.

Despite being called Brillig the Brilliant — flattery will get you part of the way — I am loath to solve a list of problems, as often the solution to one will lead on to others without further help being required.

So Phillip to get past the siren you need to turn deaf ears to her call. To do that arm yourself with some seeds that may make your ears go a bit poppy.

Also having trouble with Level 9 is Michael Byrne from Eire who is playing Red Moon. Among other things he is being blinded by the flashing lights. To stop these dazzling you need to think like a mason.

They use something round and dark to get rid of the things they don't want. So drop it there. Also if you saw April's glitch column you may know how to swim and breathe underwater, but it is easier than you think.

Another question about Red Moon comes from Colin Brunt of Rotherham who asks why the keyboard locks up in mid-game and he has to switch off and reload. Any ideas folks? Colin says he is going to cast the Zapping spell at his computer if it happens again.

Richard Burke of Gwent is one of several readers stuck in The Pay-off from Atari/Bignose. Never mind the bone for the dog, Richard. He wants something far more juicy, so why not spice it up for him a little and let him make good use of the kennel?

As for the picture, you need to have a good feel for what you are looking for, but the desk should help you get the right combination.

Duncan Husband was smashed on the nose when he attempted to climb the fence. By whom he asks? The fence of course Duncan — oh that sort of fence. Well it is an almost deserted car-park.

Last of this month's Help batch goes to Sharon Brizell of Chester who is stuck in Morden's Quest. She wants to get past the pygmy and the carnivorous plant.

To get past the first you need some puff and a tube with thorns and berries to load it.

Once you have done that guess what you need for the second. As I said earlier one solution often opens
up ideas for solving other problems.

Now a plea for assistance for two patient adventurers playing a game I know not. Synsoft's Quasimodo. Dave and Joy are going bananas trying to get the second lot of jewels back to their rightful home from the bell tower.

If anyone can help them send the answer to me by first class carrier pigeon and I will pass on the solution. Don't give up Dave and Joy, we'll save you yet.

As magic seems to be the trendy theme for adventures I have reviewed Infocom's new release, Spellbreaker. The third of the Enchanter trilogy sent me scuttling back to the original game for a play.

You play an inexperienced Enchanter sent to combat the might of the evil Krill whose power is rising in a castle to the east.

Armed with only a few weak spells you are despatched by Belboz the necromancer to do your best. The most charitable thing that you can say about Belboz is that he does revive you each time you get killed.

Like any sensible person sent to deal with evil in the east I rapidly set out west, only to be caught by the series of signs asking me why I was doing just that.

Ashamed I slunk back through the almost deserted castle village to attend my gruesome fate and gruesome it was. I was imprisoned and then sacrificed on a bloody altar, only to be revived and returned.

The game pervades evil and the oppressive feeling of being spied on. It is an excellent example of how to transport you to another time and place, and give you a real sense of being there.

The scribe facility is a boon to remember the complicated spell names, and the standard of prose never falls below superb. If you want to be a sorcerer's apprentice look no further then Spellbreaker.

Next month I shall look at the work of another well known adventure author, Jim Pearson, but until then keep making those maps.
What it offers the Atari user ...

Electronic mail is much cheaper than the post

Sending mailbox messages to other subscribers, whose numbers are rapidly growing, is the cheapest form of communication possible. You can send a message of any length to another mailbox for less than the cost of a first-class stamp. And it doesn’t cost a penny more to send the same message to 500 different mailboxes! Even a message sent to a mailbox on the other side of the world only costs 50p.

The biggest bulletin board of them all

The number of bulletin boards is growing rapidly. The only snag is that the vast majority are single-user boards – which means lots of other people are also trying to make contact and all too often all you get is the engaged tone. But with the MicroLink bulletin board there is no limit to the number of people using it at the same time. And no limit to the number of categories that can be displayed on the board.

Give your micro mainframe power

With MicroLink your micro becomes a terminal linked directly to the Telecom Gold mainframe computer, and able to tap its tremendous power and versatility. Right away you’ll be able to use giant number-crunching programs that can only run on a mainframe.

The mailbox that is always open

MicroLink is in operation 24 hours a day, every day. That means you can access your mailbox whenever you want, and from wherever you are – home, office, airport – even a hotel bedroom or golf club! No-one needs to know where you are when you send your message.

We’re only a local phone call away

The majority of MicroLink subscribers can connect to our mainframe computer in London by making a local phone call. This is possible because they use British Telecom’s PSS system, which has access points all over Britain. A local phone call is all you need, too, for direct access via MicroLink to all the other countries belonging to the international Dialcom system.

Telemessages – at a third off

The modern equivalent of the telegram is the telemessage. Send it before 10pm and delivery is guaranteed by first post the following day (except Sunday). The service was intended for people phoning their message to the operator, which costs £3.50 for 50 words. But you can now use it via MicroLink, for only £1.25 for up to 350 words! For an extra 65p your message can be delivered in an attractive greetings card.

Go teleshopping on your micro

With MicroLink you can study the British Rail timetable – and then buy your ticket in advance. You can book theatre tickets. And even order a bouquet of flowers. It’s all part of the tele-shopping revolution!

Send and receive telex messages

With MicroLink you can turn your micro into a telex machine, and can send and receive telex messages of any length. You will be able to communicate directly to 96,000 telex subscribers in the UK, 1 million worldwide – and even with ships at sea via the telex satellite network. Business people can now send and receive telexes after office hours, from home or while travelling.

What does it all cost?

Considering all the services you have on tap, MicroLink is remarkably inexpensive. You pay a once-only registration fee of £5, and then a standing charge of just £3 a month. On-line costs are 3.5p a minute (between 7pm and 8am) or 11p a minute during office hours. There is an additional 2.5p a minute PSS charge if you are calling from outside the 01-London call area. Charges for telex, telemessages and storage of files are given on the next page.
How much it costs to use MicroLink

Initial registration fee: £5.

Standing charge: £3 per calendar month or part.

Connect charge: 3.5p per minute or part - cheap rate, 11p per minute or part - standard rate. Applicable for duration of connection to the Service. Minimum charge: 1 minute.

Filing charge: 20p per unit of 2,048 characters per month. Applicable for storage of information, such as telex, short codes and mail files. The number of units used is on average calculated by reference to a daily sample.

Information Databases: Various charges. Any charges that may be applicable are shown to you before you obtain access to the database.

MicroLink PSS service: 2.5p per minute or part (300 baud); 3p per minute or part (1200/75 baud). Only applies to users outside the 01 London call area.

Telex registration: £10.

Outgoing telex: 5.5p per 100 characters (UK); 11p per 100 (Europe); 18p per 100 (N. America); £1.25 per 400 (Rest of world); £2.75 per 400 (Ships at sea). Deferred messages sent on the night service are subject to a 10 per cent discount.

Incoming telex: 50p for each correctly addressed telex delivered to your mailbox. Obtaining a mailbox reference from the sender incurs a further charge of 50p. It is not possible to deliver a telex without a mailbox reference. If a telex is received without a mailbox reference the sender will be advised of non-delivery and asked to provide mailbox address. Each user initiated for telex and using the facility will incur a charge of 6 of storage units a month. Further storage charges may be incurred depending on the amount of telex storage and the use made of short code and message file facilities.

Telemessages: £1.25 for up to 350 words. Telemessages can be sent with an illustrated greetings card for 55p extra.

Radiopaging: No charge. If you have a BT Radiopager you can be paged automatically whenever a message is waiting in your mailbox.

International Mail: For the first 2,048 characters - 25p to Germany and Denmark; 30p to USA, Australia, Canada, Singapore, Hong Kong and Israel. For additional 1,024 characters - 10p; 15p. These charges relate to the transmission of information by the Database service to other Dialcom services outside the UK and the USA. All other charges are subject to a 10 per cent discount.

Billing and Payment: All charges quoted are exclusive of VAT. Currently all bills are rendered monthly.

Software over the telephone

MicroLink is setting up a central store of software programs which you'll be able to download directly into your micro. The range will include games, utilities, educational and business programs, and will cover all the most popular makes of micros.

Talk to the world

by satellite

MicroLink is part of the international Dialcom network. In the USA, Australia and a growing number of other countries there are many thousands of users with electronic mailboxes just like yours. You can contact them just as easily as you do users in Britain - the only difference is that the messages from your keyboard go speeding around the world via satellite.

What you need to access MicroLink

You must have three things in order to use MicroLink: a computer (it can be any make of micro, hand-held device or even an electronic typewriter provided it has communications facilities), a modem (it can be a simple Prestel type using 1200/75 baud, or a more sophisticated one operating at 300/300 or 1200/1200 baud) and appropriate communications software.

MicroLink in association with

TELECOM GOLD

Application Form

I/We hereby apply to join MicroLink
( ) I enclose my cheque for £5 payable to Database Publications as registration fee to MicroLink.
( ) I also wish to use Telex. I authorise you to charge an additional £30 to my initial bill for utilisation.
I confirm that I am over 18 years of age.
I confirm that I accept the terms and conditions for the time being in force, a copy of which are available on request.

Signature

Date

FOR OFFICE USE ONLY:

Mailbox assigned
Start date
Password

SEND TO:

MicroLink
Database Publications
Europa House
68 Chester Road
Hazel Grove
Stockport SK7 5NY.

*Telecom Gold is a trademark of British Telecommunications plc.
MULTIPLE DLIs - AND GOLDFISH IN DIRE DANGER

CAN you give me some guidance on how to put more than one DLI on the screen at once? I never even knew what an interrupt was before I read Mike Rowe’s article in the September Atari User.

A few months ago I ordered a Revision C Basic cartridge from Silica Shop. With it plugged in I ensured it was a C ROM by PEEKing location 43234. This returned 234 - a C ROM. But my 800XL still continued to lock up. I am quite frustrated as to what I do next. If someone won’t help me, I’ll eat my goldfish. – David Manlove, Edinburgh.

To use multiple DLIs simply use more mode lines with the 126 added to the display list number.

Each interrupt will go to the same address in memory, but you could then use a small counter routine to work out how many times it has been run, and so what to do next.

Alternatively location 54283 (VCOUNT) will tell you the routine how far down the screen the display is at any given time – thus you could work out where the interrupt had happened.

You will almost certainly find that the problems you are experiencing with Basic owe more to a hardware fault than to the bugs in Revision B Basic.

Try taking the machine back to the dealer and explaining the situation. Otherwise, we recommend a medium dry white wine to go with your meal.

Protocol standards

I WONDER if you or one of your readers could help me. I need to transfer data from an Atari 800XL to an IBM PC. To do this, I require two communications programs, one for the Atari called AModem and one for the IBM called PC Talk III.

I have PC Talk III, but so far I have been unable to locate A Modem and the instructions that go with it.

I would be most grateful for any advice you can give me. – Louis Alexander, Haslemere, Surrey.

AModem is a protocol standard, not a program. Many comms packages for the 800XL give you either a standard 800XL version or its close twin Xmode for transferring data files.

Try Home-Pak or many of the public domain terminal programs available from user groups.

If you do not have the 850 interface module for RS-232 you could do a lot worse than getting Miracle Technology’s DataTari cable and terminal software package.

File end dilemma

AS a user of an Atari 800XL and 1050 disc drive I have come across a problem for which I can find no answer either in Atari User or my user manuals.

I am experimenting with the commands to open channels to the disc drive in order to write data to a named file:

```
OPEN "1,8,0," "D:BANKFILE"
```

write data to the file and

```
OPEN "1,4,0," "D:BANKFILE"
```

read from the file within a program.

I have succeeded in writing a program to give screens to ask a user to update a file called bankfile with new charge details and so on without any errors in the file.

However, I would be obliged if you could give me any advice on the above and also tell me if this particular assembler cartridge is fully compatible with the 800XL? – Dominic S. Smith, Airdrie, Lanarkshire.

Your problems are all related to the fact that neither Atari Basic nor the cassette system fully supports the normal binary load format of an object file.

For disc users, you just use the Binary Load option on the disc menu. For cassette users, since Basic will not load a binary load file, the file format of a binary save is as follows:

First 2 bytes: SFF SFF (flags)

Next 2 bytes: First Address

to send the program to a new line when the error occurs. You could then check PEEK(195) to find the error number. If it is 136 (End of file), you could do whatever you need to do in that case. Otherwise, you should handle the error in whatever way you feel appropriate, or halt with some form of printed "Error has occurred" message.

The most elegant method is still to exit gracefully via a rouge record, with a neat TRAP to handle any errors in the file.

Bring on Brataccas

THANKS for your magazine. At last the definitive issue for the long forgotten Atari users.

The ST software page was appreciated, but what happened to Brataccas by Pygnosis, a game with an in-depth review crying out to be written?

Something you might like to consider would be reviewing Atari arcade games from time to time. Some time ago now I had the pleasure of playing Marble Madness at Southend, and what an experience that was.

Played with a track-ball built into the machine, it's a game I can recommend to all Atari fans.

For some time now I have envied users of the Quill creating works on fessers machines, so please has anyone heard of a similar program for Atari users? – Geoff Redburn, Milton Keynes.

Try a petventure writer by Coda Writer – if you can find one.

No great saving . . .

I OWN an 800XL and have recently obtained a CXL 4003 assembler editor, which seems to work perfectly except for two things.

The command SAVE+C: which saves object code does not appear to be operating properly.

The command ASM, C: appears to work properly. However, when I try to load the saved object code from Basic, which according to page 65 of the manual it should do, the load routine crashes and no program is loaded.

I would be obliged if you could give me any advice on the above and also tell me if this particular assembler cartridge is fully compatible with the 800XL? – Dominic S. Smith, Airdrie, Lanarkshire.

Your problems are all related to the fact that neither Atari Basic nor the cassette system fully supports the normal binary load format of an object file.

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June 1986 ATARI USER 41
ATARI USER 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:
Mailbag Editor
Atari User
Europa House
68 Chester Road
Hazel Grove
Stockport SK7 5NY

I own a 400 and a 1010 recorder. The information supplied with both said that I should have a manual I did not receive either.

Could you please tell me where I could buy the 400 and 1010 manuals.

Also I wish to have my 400 upgraded to 48k. Could you please recommend a relative upgrade and its cost.

Jacob Morgan, North Kilworth, Leicestershire.

I try Atari, or any main Atari dealers, for the books.

If you can't get Atari's own book there are plenty of others which will provide very much the same information.

As to upgrading your 400, it would be far cheaper to buy an 800XL from Dixon's, as the last price I heard of was £80.

Once you have done this you could sell off your old 400 and recorder, since the new machine comes with its own anyway.

That rare 1200 XL

Browsing through computer books in W.H. Smith recently, I came across mention of an Atari computer I hadn't heard of before.

Several books had references to the Atari 1200XL, and one had a picture. It was in the XL brown and white style but with silver keys across the top of the keyboard and several keys numbered F1, F2 etc along with the Start, Option keys.

The cartridge slot was on the side of the machine, which was said to be 64k. I thought...
the 1200XL had a very smart appearance. — P.J. Rixon, Stafford, Beds.

The 1200XL was a forerunner to the 800XL, and was never released in the UK. It had a very short life of only a few months in the States, and is something of a collector’s item these days.

Apart from the extra function keys and a couple of other minor details, it was simply an 800XL with no built-in Basic. This came as a card, as on the old 400/800 machines.

Costly button

YOUR correspondent Mr. Ward wrote about the cost of replacing the Play button on his 1010 recorder. My recorder suffered the same breakage and was also under guarantee, but unfortunately the local retailer had closed down.

I was reluctant, following previous experience, to make any approach to Atari UK so self help was the answer.

Since I had never used the Pause button, and seemed never likely to do so, I decided to make an exchange.

As an incompetent mechanic, I managed to complete the job successfully in about an hour. I reckon I could do it second time round in 20 minutes, and it seems to me that someone who charges £20 for such a job must be cheating.

The job is quite straightforward — firsty, turn the recorder over and remove the four recessed retaining screws. Gently ease off the plastic cover which is partially held by concealed plastic lugs.

The buttons hinge on a common rod held in place by a circlip, so ease off the circlip. Then push the rod out of its bearing sufficiently to allow removal of the buttons one by one — take care not to lose the return springs associated with each button.

Replace the buttons, leaving the broken one — or new one if you are lucky — in the pause position, and finally reassemble the machine. — K.T. Osborn, Costessey, Norwich.

Look to your rights

LIKE F. Ward in the March issue of Mailbag the Play button of my 1010 Atari recorder became disconnected in the 11th month of its 12 month guarantee.

I contacted my local Atari service agents who stated that they no longer carry out repairs under warranty — their minimum charge is £25 plus VAT — and I was advised to purchase a new EX1 recorder.

However, I then remembered Atari’s new policy that retailers should replace faulty items up to 90 days from purchase, and after that the items should be sent to the Atari repair depot at Slough — but I also remembered reading complaints that repairs had been taking between three and six months.

Nevertheless, I sent my 1010 to Atari at Slough in January and it was returned to me repaired and certified fully tested within six working days of receipt.

The moral of this is — insist upon your rights under the 90 day warranty from your retailer, and after this time — and up to 12 months — return the items direct to Atari at Slough.

Don’t go to any registered Atari service agents until after 12 months have elapsed — even then you may be told that the charge will be anything between 60 per cent and 95 per cent of a new one. — Norman Williamson, Sutton, Surrey.

Screen dump modified

I HAVE made two modifications to the 1020 screen dump in the January issue.

If one or more of the colour registers is set to white, then the paper colour, the printer goes through a pass of that pen which is not needed, doing nothing.

My alteration allows you to skip the pen colours that are not used.

Add lines 391 to 403 and 851 to 854.

The second modification moves the pen and paper quicker by putting the move and draw commands into a string.

Change lines 900 and 980, then delete lines 910, 920, 930, 940, 950, 960, 970 and 990. — Brian Wright, Hull, N. Humberside.

Speedy service

WHEN writing to magazines most people have complaints to make. I would like to give someone a hearty compliment for a change.

My son has an Atari 800XL and he wanted to buy an Atari 1050 disc drive. We looked through the February 1986 issue of Atari User and saw the advertisement by Compumart of Loughborough, Leics, who were offering 10 free discs with their disc drive.

I telephoned them on the morning of January 30 and enquired how soon I could expect delivery if I placed my order immediately, and was informed it would be despatched that same day.

I placed the order and to the great delight of my son and myself it arrived the following morning.

Well done Compumart, I know where I will be placing my orders in future. — John Steel, Hounslow.

Cassette capers

I WAS not surprised to hear about Gareth Lowe’s cassette capers. I myself was at one time in the same boat.

To help those people who use the 1010 cassette recorder, I thought I would give a few tips from my experience.

When a program needs to be saved from Basic I suggest an LPRINT command is executed with the printer off line. This clears the buffers of any garbage.

Also I would advise that the cassette be fully rewound and advanced to 003 on the counter, as some cassettes have long leader which interferes with the length of the first tape.

I have found that low quality cassettes greater than C30s can cause uneven winding during saving or loading and thus cause crashes.

In general though good quality cassettes do not have this problem and I have used up to C30s. I should also add that the Boots C15, described in Gareth’s letter, also caused me problems, so I now avoid them.

Nevertheless, some programs still refuse to load. There are two methods which usually prove successful in correctly reloading the cassette.

The first is to advance and rewind the cassette completely several times, which removes uneven winding.

The second is to copy tape to tape using a high quality hi-fi and cassette. A combination of these techniques reduced my cassette failure rate. — Leo Charlton, Halesowen, West Midlands.

Good advice. Don’t forget you only need the LPRINT on old 400/800 machines, not XLs or XEs.
Simpler user defined graphics

AFTER many hours of de-ciphering user defined graphics by adding up all those numbers, I sat down and wrote a formulae for getting around the problem.

Put down on grid paper your UDG, an 8x8 grid should be used.

Draw a line straight down the grid middle and mark sides A and B.

Write down horizontally numbers 1 to 8 by the side and read 4A as write on left hand side hex code (see hex table).

Now carry on 4B the same as 4A thus 2A, 2B, 3A etc. to 8B.

Now you take line one hex and convert on the hex to dec. converter. Do all 8 lines.

This method can be mastered and can be worked out in the mind. I hope this is a useful formulae. — D. Clapson, Shaftesbury, Dorset.

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International characters

WITH reference to your reply to G.O. Dubourg of Mansfield in your December 1985 issue concerning printing the £ sign I would like to add the following information.

Not only do you have to turn on the international character set with [CTRL-O] 27 [CTRL-O] 23 but you then have to turn it off again before the end of the line with [CTRL-O] 27 [CTRL-O] 24. If you do not turn it off you
I have read that one could put [CTRL-O] 27 [CTRL-O] 23 into the format printing block at the beginning of a file but certainly using AtariWriter and a 1027 printer this does not work because every line starts with 0.

I have taken the liberty of enclosing a copy of instructions for obtaining the ICS which I put on disc so that I wouldn't have to keep explaining it to my wife and kids. If you think it is any use, perhaps you could forward it to Mr or Mrs [or even Ms] Dubourg, Mask and R. Pearson, Wick, Caithness.

When I want to write an International Character, say £, I have to type [CTRL-O] 27 [CTRL-O] 23 to turn on the International Character Set and then [CTRL-O] * (where * is a number found in the back of the 1027 manual) which produces an international character.


I have an 800XL which I use with a 1050 disc drive, a 1027 printer and an AtariWriter disc. I find when printing lengthy reports occasionally the 1027 will stop in mid-sentence and apparently lock up. I tried hitting Break and then P again, but all I got was "Device not available".

I contacted the Help-Line and was told that if I waited 4 or 5 minutes all should be well, as it was just the 1027 re-inking. I tried that, and lo-and-behind it they didn't. The 1027 started off again 4 or 5 minutes later and completed the job.

My first query is this. As the 1027 doesn't make any move at all during the rewriting time, what exactly is re-inking?

My second query is that when using the International Character Set the 1027 prints a small o with an accent in the left hand margin. This spooks reports incorporating German or French words. Is there any way of printing out the set without this appendage?

Incidentally congratulations on the magazine. I look forward to receiving it as much as I do my Norwich User Group's Nuggets. I wish they were both weekly. — Bill Sibley, Wells-Next-the-Sea, Norfolk.

Well, we've never heard of it being called re-inking before, although we do know of the problem you refer to. It is basically a throwback to the types of printer which used to get very hot when used for long periods.

The computer simply pauses for a while to let the printer cool down. This manifested itself in the old 400/800 series machines as a bug which repeated the last line of text after re-starting, which could be even more annoying.

As to your 6th problem, this is caused by the fact that AtariWriter sends extra control codes after a carriage return, and can be avoided by turning the International Character Set off again after each such character is printed, and then on again before the next one.


Testing RAM

COULD you please let me know if the 32k expansion RAM I have for my 600XL is faulty or does 32k + 16k add up to 40k in the 600XL? I only get 40 memory blocks when using the memory test.

Many games using 48k RAM like Colossus Chess 3.0, F-15 Strike Eagle and Space Shuttle are OK, Solo Flight being the exception. Could I get this problem with Mercenary from Novagen?

Has anyone else had this problem with RAM add-ons?

— P.J. Tappenden, Walton-on-Naze, Essex.

You will have to go from Basic into the self-test. BASIC is still using up 8k of memory, so 40 blocks will be quite normal on the memory test.

To check the full 48k hold Option/Reset while you switch on. This will disable Basic completely and take you straight into the self-test. You will exactly get the same result on an 800XL or a 130XE, so don't worry about it. By the way, Mercenary should work fine on your upgraded 600XL, as, indeed, should Solo Flight.

How to save pictures like this?

— Alan Pick, Cannock, Staffs.

Although you could still see the pictures on your screen this was only because you had not cleared the memory when you did the GRAPHICS 15-32 call.

Similarly, NEW and RESET do not clear the graphics area. Only a GRAPHICS command can do this, and by adding 32 you selected a version which retains the previous picture.

Once you turned off the computer all of the memory was wiped — including your picture. Unfortunately, the SAVE command will only save your program, not other areas of memory.

The fastest way to save the picture is by a machine code routine, but a simple Basic version is as follows:

To SAVE (while the picture is showing):

10000 REM SAVE BR.15 SCREEN TO DISK
10010 REM CHANGE LINE 10010 TO USE
10020 ADB0-177 FOR A BR.31 SCREEN
10030 (IEE WITH NO TEST WINDOW)
10040 OPEN 01,0,0,"<FILENAME.EXT"
10050 8000-127 FOR 8000-127
10060 1600-127 FOR 1600-127
10070 2000-127 FOR 2000-127
10080 2500-127 FOR 2500-127
10100 PUT 01,PEEK(1)
10150 NEXT 1
10160 CLOSE 01

To LOAD again, use:

20000 REM LOAD BR.15 SCREEN FROM DISK
20010 REM CHANGE LINE 10010 TO USE
20020 ADB0-177 FOR A BR.31 SCREEN
20030 (IEE WITH NO TEST WINDOW)
20040 OPEN 01,0,0,"<FILENAME.EXT"
20050 8000-127 FOR 8000-127
20060 1600-127 FOR 1600-127
20070 2000-127 FOR 2000-127
20080 2500-127 FOR 2500-127
20090 GET 01,1,POKE 1,0
20050 NEXT 1
20060 CLOSE 01

Both of these could be added to the Canvas program if you want.

Saving pictures

After typing in the Canvas program from the October 1985 Atari User I produced a very good picture of which I was very proud.

I thought I would try to save the picture, and that's where the problem started. I pressed Break and while the picture was still on the screen typed NEW and GR.15-32. Then I saved it on tape, I pressed Reset and typed NEW, and GR.15-32 would put the picture back on the screen.

After the computer was switched off and on again I tried to load the picture but it was not there.

Could you please tell me how to save pictures like this?

— Alan Pick, Cannock, Staffs.

Storing connection

HOW about some programs for the 130XE using more of the available memory?

Also, will my 130XE produce audio output at a level to drive my stereo?

— Stewart Bowld, Evesham, Worcs.

To use your stereo connect a mono DIN plug from the Atari monitor port to one of the Aux In sockets.

June 1986 ATARI USER 45
Take part in our wide-ranging Reader Survey, help to decide the kind of features you’ll be reading in future issues of Atari User, and...

Win yourself the revolutionary

**PSION ORGANISER**

ONE of the reasons for the outstanding success of Atari User has been our determination to reflect, as far as we possibly can, the interests of our readers. We do this by careful study of the letters that pour into our editorial office every day, and by talking to the many thousands of readers who visited us at the Atari show.

Now, as we plan the features that will entertain, amuse and intrigue you during the rest of 1986 – and hopefully stimulate to make even more use of your Atari computer – we feel we need to take the pulse of the whole of our readership. To find out the kind of equipment you use now, and are considering buying in the future. To discover where your interests lie – and the subjects you would most like to read about in the pages of Atari User.

What YOU say when you fill in our reader survey on the opposite page could play a vital part in determining the kind of features you’ll be reading in Atari User in months to come. So we’re asking for the cooperation of every one of you in making it a success, whether you own an 8-bit computer or an ST.

To encourage you, we’ve some excellent prizes – the brand new Psion Organiser II, and ten luxury binders and dust covers for the runners up.

Help us give you the magazine you want by filling in our reader survey form. If you would like to enter the draw, please include your name and address, but you can, of course, remain anonymous if you wish. Remember, you have 11 chances to win a prize.

The handheld Psion Organiser was a worldwide success when it was released two years ago. Now Psion have announced the Organiser II crammed with the latest CMOS technology.

**Its many features include:**
- A clock and calendar with 8 regular alarm clock
- A diary that reminds you audibly of appointments
- An alpha-numeric key pad
- 16k RAM and 32k ROM
- A powerful calculator
- A built-in Basic programing language
- A database system – to store your personal information or stock records

Rugged, reliable and battery powered, the Organiser II can be carried in your pocket to be used whenever and wherever you are. No computer experience is required because Organiser II is menu-driven.

You can expand the internal memory up to a massive 304k by plugging in Datapaks – thumb-sized EPROM cartridges on which to store your data or programs.

Be one of the first to own one – fill in the survey now!

If you wish your survey form to be included in the draw for the Organiser II, please return it by June 30, 1986.
READER SURVEY

I wish to enter the draw for a Paxion Organiser II.

Name (Mr Mrs Ms): Mr J B Hanks
Address: 35, Mundania Rd, London SE22 ONH

Age group: □ Under 15 □ 16-20 □ 21-30 □ 31-40 □ 41-50
          □ 51-60 □ 61-70 □ Over 70

How long have you been reading Atari USER?
□ 0-3 months □ 3-6 months □ 6 months-1 year □ since issue 1

How often do you buy Atari USER?
□ every issue □ 1 in 3 □ 1 in 2 □ less regularly

If you play games, which of the following types do you enjoy most?
□ arcade □ strategy (eg chess, draughts) □ adventure □ simulations

Which, if any, of the following modems do you own?
□ WS2000 □ Nightingale □ WS3000 □ Voyager
□ WS3000 V22 □ other

Which of the following baud rates do you use?
□ 300/1200 □ 1200/1200
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If you own a printer, is it:
□ dot matrix □ plotter □ other □ None
□ thermal □ daisywheel

Please state manufacturer/type ATARI 1029

If you have a disc drive, is it:
□ 810 □ 1050
□ other

Which pieces of hardware are you likely to buy over the next 6 months?
□ printer □ digitiser □ other
□ disc drive □ MIDI interface □ other
□ monitor □ plotter
□ modem □ joystick □ other
□ cassette recorder □ other

Which of the above do you intend to buy eventually?

How do you rate your knowledge of Basic programming?
□ Novice □ Experienced □ Intermediate □ Don't program

If you attend a computer club, please give its name and town:

How do you purchase products for your micro?
□ mail order □ high street shop
□ exhibitions/shows □ Atari User special offers

Do you plan to attend the next Atari Show?
□ Yes □ No

Will your main interest be:
□ new product launches □ bargain prices
□ purchasing a particular product □ the wide range of products on view

Where do you buy Atari USER?
□ newsagent □ subscription □ computer dealer

How many other people read your copy of Atari USER?
□ 1 □ 2 □ 3 □ more than 3

Which other magazines do you read?
□ Antic □ Monitor □ Computer Gamer
□ Compute! □ C & VG □ Page 6 □ other

Which articles, or series of articles, would you like Atari USER to contain in forthcoming issues?

Have you any general comments to make on the magazine contents?

Finally, by circling one number on each line, could you indicate your level of interest in the following articles (0 lowest – 9 highest)

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CROWN
OUR first program simulates a die, displaying one of six possible faces after every roll.

It's fun to watch and can be used by small children or handicapped youngsters who would have difficulty handling traditional dice. It also makes a good pre-school counting and shape-recognition game in its own right.

Packing everything into five lines is tricky. You can't simply generate random dots on the screen because only six of the possible combinations look like real dice faces.

This five-liner gets round the problem by storing the six legal patterns in an array then using a random number (0 to 5) as an index into it.

A die face has three columns and three rows, so we need nine bytes of information to store each legal pattern of dots and spaces. Six possible faces therefore require a total of 54 bytes.

There's no need to arrange them as 3 x 3 matrices in the computer's memory - a 54 x 1 array will do just as well and can be handled much more easily.

Line 10 switches the cursor off, clears the screen, sets up the array and puts the number 32 - blank space character - into every element. Then it opens the keyboard for input.

Line 20 holds the positions (4th, 9th, 17th, 20th and so on) where dot characters - CHR$(20) - are to be stored. If you drew the array out on graph paper you would see that each block of nine entries can be split into three sets of three, then arranged one under the other to form a die face.

Line 30 does nothing more than draw a box shape to contain the dots.

The POKE 764,1 command is there to fool the computer into thinking you've pressed a key. Without it your initial screen would just contain a rather enigmatic box with no dots in it.

Line 40 is where the main loop starts. It waits for any character key to be pressed, then generates two random numbers. The first is between five and 15 and determines how many times the die will roll before it settles.

The second range from 0 to 5 and determines which face will be displayed. This second number is multiplied by nine to find whereabouts in the array the chosen face pattern starts. Line 40 also produces a bleeping sound to accompany the pattern changes.

Line 50 retrieves the chosen nine bytes, chops them into three sets of three and prints each character - dot or space - at its correct position inside the box on screen.
These back issues are still available


June issue: Analysis of the 130XE, Submarine, Adventuring, Random numbers, Software reviews, Prog Jump, Microscope, Sounds, Atari Insights - Bit Wise, Beginners and Graphics, special 12 page feature on Communications.


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September issue: 8 page special on the 520ST, Mode 8 screen dump routine, Maze Munch, Data Maker, Display List Tutorial, 68000 addressing modes, list processing with Logo, Software reviews, Insights - Bit Wise, Beginners and Graphics.

October issue: Computer Cansus graphics program, Update for RAW 6502 assembler, 130XE Ram-disc utility, Flex/Auto memory dump utility, Portico, Software reviews, 68000 operating environment, Warptrap, Insights - Bit Wise, Beginners and Graphics.

November issue: Converse program, Electronic operator utility, ST graphics examples, ST software list, Guy Fawkes game, Display List tutorial, Adventuring, Microscope, Software reviews, Insights - Bit Wise, Beginners and Graphics.

December issue: Check-sum program, Special keyboard characters, Basic: XL, review, GemWrite and GemDraw, Countdown game, Disco Display List tutorial, Software reviews, Left-handed joystick, Adventuring, Beginners and Graphics.

January 1986 issue: Machine code games, Pt. 1, Atari in education, Sony ST monitor review, Hunchy game, Check-sum update, Listing utility, Dot-square game, 1020 screen dump routine, programming in C on the ST, Adventuring, Software reviews.

February issue: Machine code games Pt. 2, Dragon (racing in Logo, Flashing colour utility, Micromirus manipulator, Bridge program, Memory management techniques, Interrupt driven clock, Bounce game, ST problem page, Adventuring, Software reviews.

March issue: Machine code games Pt. 3, Kigraph's tour program, Compiler Pt. 1, Superscript review, Check-sum for early games, Book reviews, Adventuring, Software reviews, PLUS Atari ST User: Review of TDL's Modal 2, music via the Midi, Mortgage, Making the most of the ST.

April issue: Sound synthesizer, Compiler Pt. 2, Using modes 12 and 13, Mancura strategy game, disk directory printing utility, Adventuring, Software reviews, PLUS Atari ST User: Review of TDL's Modal 2, music via the Midi, Mortgage, Making the most of the ST, and all the latest new.

May issue: Sam Tramiel's Interview, Cavern Escape maze game, Compiler Pt. 3, Player Missile Graphics Pt. 1, Annie's Spelling Program, Adventuring, Software reviews, PLUS Atari ST User: Atari Show report, The Pow and Disk Utilities reviewed, ST Graphics Pt. 1, Degas to NeoChrome Picture conversion program, Making the most of your ST, and the latest 8 bit and ST news from the States.

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