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News

News and information from around the world including Atari's presence at the latest PCW Show.

Editorial

We look at Atari's showing at the PCW Show and the merits of Computer Concepts' Fast Basic for the ST.

Competition

There are 50 copies of Atari Smash Hits, Volume Five to be won in this easy-to-enter contest.

Software

In this month's in-depth reviews include Collapse, Leaper, Ninja, Smash Hits Volume Five, Ultima IV and Ghostbusters. How do they fare?

Gadgets

Our electronics' wizard, Len Golding, shows you how to build a numeric keypad and use it in your programs.

Graphics

Steven Williamson combines his Player/Missile graphics to create Bughunter, a simple illustrative game.
Mailbag
Your diverse topics include printer interfacing, game tips and a discussion on the merits of high level languages versus Basic.

Utility
This extremely useful data editor for 8 bit Ataris allows you to manipulate data from disc, cassette or memory.

Adventuring
Brillig has escaped from the dungeons long enough to supply you with a bumper bundle of clues for five of the most popular adventures.

Five Liners
More of your prize-winning £25 five line programs, including one showing you how to use colour register rotation in your programs.

Order form
For subscribers this month we have special offers on Eidosoft's ST Karate and Mastertronic's Ninja.

3 ST Roundup
Mike Cowley reports on the new ST products on display in the Atari Village at the recent PCW Show.

5 Advice
Andrew Bennett solves some more of your ST-related problems and provides some useful hints.

9 Flash
A thorough evaluation of this new communications program from Antic.

12 Little Computer People
André Willey finds a ghost in his machine — a little computer person called Fritz, courtesy of Activision.

17 Software
The catalogue for the ST is growing fast — this month we review Thunder, K-Graph, Cornerman and Leaderboard.
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SUPER SOUND CHIP ON THE WAY

ATARI is on the verge of launching a revolutionary sound synthesiser chip for the ST.

Leonard Tramiel, son of chairman Jack Tramiel and himself a leading company boffin, revealed this to Atari writer Andrew Bennett.

The early development of the chip - known as the Amy - began in the pre-Tramiel days and was the first end user project started after the 800XL.

"They set out to develop a custom chip of great complexity but they had limited resources and poor development tools," explained Leonard Tramiel.

"Although the architecture was brilliant the early version of the chip didn't work.

"When we took over Atari we saw Amy as an excellent potential product. Now we have sold the design to a company that I cannot name just yet and they are hoping to have the final working chips ready soon!"

ST SOFTWARE

SEVEN new software titles for the Atari ST series have been announced by Microdeal.

They include four games - Shuttle II, Trivia Challenge, Electronic Pool and Pinball Factory - multi-user bulletin board system BBS Version 2, wages package Payroll, and mailout system Mighty Mail.

ALL program listings in Atari User are now available for free downloading on MicroLink, the UK's fastest growing electronic mail service. They join hundreds of programs already available in the telesoftware section, one of the most popular areas of MicroLink.

NEWS

ENTER THE WORLD OF ATARI

SUNRISE launches at the show

WITHOUT advance warning, Atari launched two new machines and a breakthrough graphics chip on the second day of the PCW Show.

Visitors to "The World of Atari" corporate stand at Olympia were surprised to see the latest additions to the ST range - the 2080STF and 4160STF - suddenly appear in a glass display case.

At the same time, officials began to demonstrate the Blit enhancer which increases graphics speed sixfold.

Even the Atari press office appeared to have been caught napping, having to prepare information sheets on the spot after the event.

The two new machines have the increased memory capacity of two megabytes and four megabytes respectively.

Both are totally ST compatible and feature an in-built one megabyte floppy disc drive.

According to Max Bambridge, general manager of Atari UK, the 2080STF and 4160STF will find a ready market among specialists working in "RAM disc operations, artificial intelligence applications and high level programming such as Lisp".

Price of the two megabyte machine is £1,499 with monochrome monitor and £1,349 for the colour model. The top of the range four megabyte ST will carry a price tag of £1,459 monochrome and £1,659 colour.

Both the 1040STF and the 4160STF will go on sale in the UK in November.

The same month will see the Blit chip go on sale for £60 as an upgrade for the complete ST range.

It will need to be fitted by Atari authorised dealers and independent Atari service centres.

Comments Les Player, Atari's technical manager: "It's very simple in operation. The chip just moves memory around very fast without the need to use the 68000 CPU. This means that animation sequences will run much faster, without impacting normal processing power".

MORE 8 BIT GAMES

NINE all-action games for Atari 8 bit owners are being released by Red Rat Software this autumn.

Just out are Freaky Factory and Rocket Repairman, both £4.99 on disc and £2.99 on tape, War-Copter and Astro Droid, £9.95 on disc and £7.95 on tape.

To come this month are Demolition Derby and Domain of the Undead, both £9.95 on disc and £7.95 on tape, and Treasure Island and Dragon's Breath, £4.99 disc and £2.99 tape.

Planned for release in November is Escape from Planet X which will cost £4.99 on disc and £2.99 on tape.

Red Rat will be releasing a version of its earlier success Screaming Wings for the ST series in early December, price £19.95 on disc.
**In brief**

ATARI has appointed DDT Maintenance as a preferred third party contract maintenance source for its 1040STF and 520STM machines.

The firm has a network of more than 100 engineers backed by 12 service centres and two repair centres covering the UK and Eire.

INTERACTIVE fiction specialist Infocom is releasing two new titles for ATARI machines this autumn.

Leather Goddesses of Phobos and Moonmist bring the number of Infocom titles available for ATARI 8-bit and ST to 22.

A NEW business program released by CashLink Software for the ST series is Hotelier, designed for small hotels of up to 100 rooms.

It offers a front office system handling all guest charges and transactions, as well as a full back office consisting of sales, purchase and nominal ledgers.

Hotelier also provides a word processor and menu writing facility. Price: £1,150.

A TRIO of new products for the ATARI ST has been launched by systems software house Metacomco.

Cambridge Lisp is an interpreter with integral compiler, said to be the first fully-featured expert systems development environment for the ST.

It opens up applications such as robotics, natural language interfaces and expert systems. Price: £149.95.

Also new for programmers from Metacomco are the BCPL compiler at £99.95 and Metacomco Make utility, £49.95.

A PERIPHERAL which offers true 80 columns for ATARI 8-bit machines was on display at the PCW Show.

The XEP-80 to be released any day now is one of a string of new products reported to be in the pipeline for the 130XE and 800XL.

**CHRISTMAS SHOW RUSH**

With two months still to go, exhibitors are rushing to book space at the ATARI Christmas Show.

They don't want to risk getting left out of a repeat success story following the enormous impact of the first ATARI Computer Show in London last March.

A total of 15,000 visitors turned up then and that massive demonstration of support effectively re-established ATARI as a market leader in the UK computer industry.

The spectacular ATARI showcase returns to London on Friday, Saturday and Sunday, November 28 to 30, at the centrally located New Horticultural Hall, Westminster.

All the leading producers and suppliers of ATARI add-ons and software will again be represented, occupying well over 100 stands in the spacious 20,000 sq ft exhibition hall.

Big names like Software Express, Twilistar, CDS, Microdeal, and Advanced Systems & Techniques will be there - ensuring plenty of interest for 8-bit and 16-bit enthusiasts alike.

New programs and add-ons for the ST series and 8-bit range will be launched at the show, and there will be opportunities to question the ATARI's leading experts on ATARI computers.

The event promises to fill all the wishes of pre-Christmas shoppers waiting to fill their stockings with the latest ATARI hardware and software.

It opens from 10am to 6pm Friday and Saturday, November 28 and 29, and 10am to 4pm Sunday, November 30.

There is £1 off the price of tickets ordered in advance using the coupon on Page 13 of this issue of ATARI USER.

**Artwork utility**

ALL kinds of artwork spring to life on the ATARI ST with Make It Move, a new package from Californian software house Avila Associates.

It comprises a set of utilities designed to enhance pictures and present them in a variety of dynamic ways by using such features as moving objects, video transitions, zooms and fades. Price: $49.95.

**8 bit speed boost**

OWNERS of ATARI 8-bit machines can load and run discs at twice normal speed and read/write up to five times faster with a new drive enhancement from Inovated Software.

The IS Plate device for the ATARI 1050 disc drive has 16k of on-board RAM and is compatible with all operating systems on the market.

Sectors show is not required to obtain hi-speed as with US doublers. Other features are slow down, fast write, fast read, drive look, drive write, look on/off, and fast formatting.

Available exclusively from Chips Computer Centre, West Worthing, the 1050 IS Plate disc drive enhancement costs £99.95.

**More power on tap**

DESCRIPTED as a 'major advance in raw processing power availability', K-Max is a new add-on from Kuma Computers which plugs into the rom port of the ATARI ST.

Inside K-Max is an interface board and a dual processor board which can contain two Inmos T414 transputers and two blocks of 256k of ram.

Each T414 is a 7.5 mips (million instructions per second) 32 bit Risc parallel processor.

Parallel means they can easily be connected by simply adding their Mips together - two 7.5 Mips processors having the potential of 15 mips.

K-Max is controlled via the ST keyboard and screen using specially developed software.

Kuma has supplied a cross-assembler and editor as the main tool for controlling and programming the T414 transputers.

Additional functions include a machine monitor, debugger and disassembler - the ST assembles T414 code at 50,000 lines a minute, says Kuma. K-Max costs from £1,450.

Some of the latest software packages available for the ATARI ST series are pictured with a 1040STF whose screen shows the GEM standard operating system TOS.
More ST packages

TWO powerful business packages have been released for the Atari ST by Execon.

Invoicing/Order Processing module includes order processing, price list and journal and has the facility to allocate either the complete invoice or individual entries to three main areas - such as sales representative, sales area and department - as required.

This can be used for many purposes in accounts, sales analysis and reporting, for example slow paying and bad debt report per salesman. Price: £155.

Execon Accounts includes sales, purchase and nominal ledgers, trial balance, forecasting and graphics. There is also an extensive search and reporting facility, and it is possible to use nominal account numbers to enhance reporting. Price: £250.

DEALING WITH DATA

A PACKAGE designed to handle multi-dimensional data efficiently is soon to be released by Module-2 Software for the Atari ST. GridFile/ST provides full access functions for the storage and retrieval of complex data structures, and is implemented as a set of library modules. A demonstrator program showing the use of GridFile for implementing a simple database of names and telephone numbers is included.

The price is expected to be around £50.

Making music

MAKING music with your Atari 8 bit micro becomes possible with two new products from 2 Bit Systems. MIDI Master is a MIDI interface featuring an eight track real-time sequencer, a Casio CZ voice editor for editing and storing voices on disc or cassette, and a Yamaha DX100/21 series voice editor. It has a music player program allowing users to play Music Composer or AMS song files via MIDI. Price: £27.50.

Percussion Master is a professional quality drumkit featuring nine sampled drum sounds, three drum polyphonic, a facility to load the user's own drum samples, and pull down windows.

... and composing

LATEST release in the K series from Kuma Computers for the Atari ST is K-Minstrel, a music composer package operating under GEM. It has 3,200 chords in four channel mode, with crescendos, accelerandos, diminuendos and retardandos to add expression to the user's compositions. The MIDI interface allows music to be played on 4, 8, 12 or 16 channels. There is a full range of accidents. All or selected parts of a tune may be played, and several example tunes are included on the disc, which costs £29.95.

New link-up to US database

MicroLink has achieved a world first with a new electronic link across the Atlantic. It allows subscribers to have instant access to a giant American database - including a dynamic section especially for Atari users.

And the cost will be approximately half that of a conventional transatlantic call.

The breakthrough has come about as a result of a deal struck between MicroLink, the UK's fastest growing Email service, and New York based Mnematics.

Gateway

With the help of its American partner, MicroLink has set up a complex electronic gateway which enables the exchange of messages between micros on opposite sides of the Atlantic.

The computer link opens up a host of new services to MicroLink subscribers.

Included among some 40 special interest groups is one specifically for Atari users which provides all the latest information on what's available for the machines States-side.

There's an extensive Atari database crammed with information, along with message and chat facilities.

But Mnematics isn't just about computers. Special interest groups catered for include doctors, dentists, estate agents, lawyers and writers, and there is a micro-conferencing facility.

Instant

Other services include global news round-the-clock from the Associated Press and instant information from Dow Jones, the New York stock exchange monitor.

'Ve are delighted that we are able to offer this first', says Derek Meakins, head of MicroLink. 'It's going to transform the way we communicate with our cousins over in the States'.
THE Personal Computer World Show has become the industry’s main forum for demonstrating the latest technology and showing off its new ideas. It cannot have escaped anyone’s notice that Atari planned to dominate the 1986 Show at Olympia, and dominate it it did.

On the lower floor you could see the latest offerings from Amstrad, Sinclair, Acorn and the like, while upstairs Atari had taken over an entire hall with its World of Atari show-within-a-show. But what was there to show for this massive amount of floor space?

Well the single most obvious fact about the Atari stand was that it was predominantly ST-oriented. There were a few 8 bit machines about — mainly on the third-party stands — but Atari seemed far more interested in pushing the ST.

Indeed, the only specially interesting development for the XE range was the XEP-80 80 column box. This seemed a somewhat tacky unit, interfacing as it did through the second joystick port. You might have expected Atari to use the parallel bus for such a device, but instead they used the more awkward joystick option. The display itself was good, but it required a special driver to be booted from disc in order to run.

On the ST side, though, the story was quite different. Atari was showing three major additions to the range. The much predicted 2mb 2080 ST was on display in a glass case, as was the even larger 4 mb 4160 ST. These new machines — to be released in four to six weeks — were probably far less interesting than the new blitter chip which was running on an existing 1040.

It seems this will be a straightforward modification for existing owners, consisting of six new ROM chips and the blitter itself, with the price including fitting by your dealer. Apparently the chip interfaces to the operating system by re-vectoring the Line A interface, thus speeding up almost every facet of the machine, including the rather slow GEM text displays.

The demo running on the stand showed a whole flock of birds flying over a coastline landscape, and the blitter version ran three to four times faster than the “straight” 1040. An Atari representative said that the blitter was in final beta test now, and should be available early in the New Year.

Atari is now awaiting delivery of the revised version of Basic, but from what I’ve heard so far you might just as well buy a copy of Computer Concepts’ Fast ST Basic — a truly remarkable feat of programming with benchmark times at least three times faster than the IBM AT, and an amazing eight times faster than the BBC Micro.

As it also fully supports the GEM environment, I feel that this could well be the Basic of the future as far as the ST is concerned.

The future of the ST is bright indeed if the quantity and quality of ST software support continues at the pace we saw at the show. Notable products included MirrorSoft’s Art Director — a superb graphic art package which gives more features and facilities than ever before.

Kuma and Microdeal had their latest offerings on display, and the number of accounts, spreadsheets, database, comms and other business packages available indicates that the market is treating the ST as a serious and useful business tool, not just a very pretty graphics machine as certain other 68000 based machines seem to be becoming.

All in all a very encouraging show, with Atari moving ahead in leaps and bounds with the ST range. Nor are the 8 bit machines being abandoned, although Atari does seem to be leaving that area mainly in the capable hands of the third-party suppliers while it concentrates on pushing back the frontiers of 16 bit technology.

With the 2080 and 4160, the blitter and the TT plug-in coprocessor board on the horizon, there has never been a better time to move into the world of 16 bit computers, and there has never been a better machine to do so with than the ST.

André Willey
An event NOT to be missed!

Atari Christmas Show

Royal Horticultural Hall
Westminster, London SW1

Friday November 28 10am-6pm
Saturday November 29 10am-6pm
Sunday November 30 10am-4pm

The first ever Atari Show last spring was an outstanding success. From all over Britain Atari enthusiasts flocked to London to find out all they could about their favourite machine.

Soon the record-breaking Atari Show will be back – with three days devoted to the exciting developments in this expanding market. Make a note in your diary NOW to make sure you don’t miss this great Christmas extravaganza!

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Royal Horticultural Hall, Westminster, London SW1
November 28-30, 1986

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★ Send it to: Smash Hits Contest, Atari User, 68 Chester Road, Hazel Grove, Stockport SK7 5NY.
★ Prizes will go to the senders of the first 50 correct entries opened on October 31.

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<td>1 Which game, written by American programmer Russ Wetmore, was the most successful ever written for the Atari?</td>
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<td>2 What is the maximum number of colours the Atari 8 bit computers can display at any one time?</td>
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<td>3 What girl's name was used to identify the Atari computer during its development over 5 years ago? Clue: it begins with a 'C'.</td>
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<td>4 Which game was English Software's first machine code program for the 16k Atari 400?</td>
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**Very different...**

**Program:** Collapse
**Price:** £1.99
**Supplier:** Firebird, Wellington House, Upper St. Martin’s Lane, London WC2H 9DL
**Tel:** 01-379 6755

This is a most unusual game and one none too easy to describe.

In the centre of the screen is a collection of grey sticks, the objective being to turn them all blue.

When you’ve done that you activate a gizmo known as a Rotix, which has the effect of collapsing all the sticks on top of each other.

Mission completed, you move to a new screen with a different configuration of sticks and do it all over again. And again until you’ve completed all the screens.

As well as the grey sticks a number of bridges are spread around each screen. You use them to gain access to the sticks. However, because there are insufficient bridges to get you to all the sticks, you have to construct more bridges.

Carrying out all this construction work, and under your control, is a small roly-poly character called Zen which operates in two modes – magic and normal.

In normal mode, Zen is yellow and will move left, right and up (the only way down is by falling), turning any grey sticks blue on contact. A press of the fire button puts Zen into magic mode, when he turns red and can move left and right.

A press of the fire button creates a bridge in the required direction or, if next to a blue stick, sets a Rotix (a sort of whirling wind) into motion.

Pulling back on the joystick while in magic mode releases a cloud of magic dust to freeze the aliens. Oh sorry, didn’t I mention them?

Well, any of the several blobby aliens which float around the screen will get stuck on contact with the dust. Zen can pass over them in this state and collect extra points.

Contact with the aliens at any other time is harmful to Zen’s health.

I also forgot to mention the flashing diamonds. These can be picked up for extra points. And there are bonus points for collapsing the blue stick matrix in one go. And one other small thing – there are 96 screens. I really don’t know what to make of Collapse. Top marks for originality unquestionably, but the graphics are only so-so and the abstract nature of the game doesn’t generate excitement.

But credit where credit’s due – Collapse IS different, and that must be good news for jaded players.

**Douglas Woolier**

**Sound** 5  
**Graphics** 7  
**Playability** 8  
**Value for money** 8  
**Overall** 7

---

**Graphics plus**

**Program:** Ultima IV
**Price:** £19.95
**Supplier:** U.S. Gold, Unit 2 & 3, Halford Way, Halford, Birmingham B6 7AX
**Tel:** 021-356 3388

**ULTIMA IV,** the latest in the Ultima saga, is the tale of the land of Brittania after the fall of the Triad of Evil.

Lord British, the all-powerful ruler has sent out a message to all the lands to find a person capable of completing the quest of the Avatar, and you have taken up the challenge.

The beginning is like a graphics adventure. You move between locations until you meet a gypsy woman in her caravan. She bids you to sit and you proceed to answer multi-choice questions about cards which she places on the table in pairs.

As you answer you build up your character which is represented on an abacus-like object. On your last choice the game starts.

You will be one of eight professions – mage, fighter, tinker, and so on – depending on how you answered the questions, and you find yourself outside the home town of your profession.

The display shows you as a single figure in the surrounding countryside. You cannot see beyond mountains or dense trees, which sometimes means that blocks of the display are left blank.

Movement is with the arrow keys and other commands like Attack are carried out by single key strokes.

I found that the most useful command was Talk. If you stand next to one of the town’s inhabitants and hit T followed by a direction key – his replies will appear in the text window.

If you type Job he might say: “I search for the blue stone”. Then if you type Stone he will tell what he can.

Do not lie to characters when they ask for a response, as this reflects on your character and will do you no good later on. Some characters will join your party if pressed.

Magic is important in this game, but it is also rather tricky. The Book of Mystic Wisdom, which is included with the game gives details of the reagents required for spells, and clues as to their quantities.

The whole game is, according to the advertising blurb, 16 times bigger than Ultima III.

With two discs, a book on the history of Brittania, the Book of Mystic Wisdom, and a full colour vinyl map of the land, it is good value. Ultima IV is an excellent game which deserves the attention of every keen adventurer.

**Simon Marden**

**Sound** 6  
**Graphics** 7  
**Playability** 9  
**Value for money** 10  
**Overall** 9
Simply boring?

Program: Leaper
Price: £2.99
Supplier: Bug Byte, Liberty House, 222 Regent Street, London W1R 7DB Tel: 01-433 0666

Leaper is a delightfully simple game, which is more or less identical to Leafit from Imagine Software released a few years ago and no longer available.

Surprisingly, to load the game you need to type CLOAD followed by RUN.

You control a little green character, Leaper, who can move to the left and right as well as jump. The screen consists of six thin horizontal bars each with a narrow moving gap.

Your task is to reach the top of the screen by positioning yourself below a gap then leaping up on to the next level.

Unfortunately if a gap appears below you you fall down a level — and this happens with frustrating regularity.

You can run off the screen on one side and reappear on the other, which adds another dimension to the game. But you need to be careful as action can occur off screen and you could get killed.

Each jump costs you energy, a limited commodity. You also have to contend with the Gribbles which run along the various platforms.

They come in six different forms: Sub-Gibbs, The Last VW, Cupid’s Arrow, Mutant Hot Cross Buns, the Gyro-Biro and UFOs. Some move along the platforms at a leisurely pace while others really shoot along. Contact with any is fatal.

If and when you reach the top level you must jump up at a letter to illuminate it. You return to the bottom of the screen to face a greater number of adversaries. Your task is to illuminate six letters to spell the word Leaper.

The concept is quite entertaining and in general well executed. Leaper and the other characters are well animated, colourful and humorous, but action does freeze for a split second when you jump.

The game is good value for money but its simplicity is its weakness. I suspect that the attraction may wear off after a few weeks because it lacks variety.

Mike Rowe

Worth the wait

Program: Ghostbusters
Price: £9.99 (cassette)
Supplier: Activision, 23 Pond Street, Hampstead, London NW3 2PN, Tel: 01-431 1101

PREPARE to be slimed! It’s been a long wait for the enormously successful Ghostbusters' game to reach the Atari range but at last the Slimer. Roamers and Marshmallow Man are here.

And what an excellent job Activision have made of the conversion.

New York has been invaded by ghouls and ghosties hell-bent on reaching spook central, the Temple of Zuul. As owner of a Ghostbuster franchise you must catch these goofy exomorphs, earn pots of money and make it to the grand showdown on top of the temple.

You’ll be greeted with a shout of “Ghostbusters!” followed by a fruity laugh (great speech synthesis).

When you finally manage to tear yourself away from the exuberant intro you buy your Ghostbuster vehicle and equipment.

You’ll either be presented with a loan of $10,000 or, if you’ve played before and reached a certain level, an appropriate cash credit depending on your entered account number.

Then it’s on to the streets to look for Slimers. The screen shows a map of the city, with the Zuul temple about centre screen.

Your position is marked by the famous Ghostbuster logo which has to be moved by the shortest route to a likely building (red flashing indicates Slimer presence) touching (and so freezing) any Roamers on the way.

The screen changes again to show an overhead view of your car cruising down the street. Any Roamers encountered can be sucked up provided you have a vacuum.

When you arrive at the infested site the screen shows the front view of the building.

You manoeuvre your men to trap the floating Slimer using the handheld ionisers.

Every Slimer captured pushes up your credit rating. If you miscalculate your positioning, or let the two streams touch, you'll be slimed.

When a Marshmallow alert is sounded, the Roamers join up to form the dreaded Marshmallow Man. Drop a dollop of bait fast before he does much damage.

All the while, two moving creatures – the Gatekeeper and the Keymaster – are headed for the temple. When they meet there the game ends if you haven’t earned sufficient credit. If you have, you can sneak into two Ghostbusters for the grand finale.

The graphics are very good, the music and speech synthesis excellent. Combine these with game play that is simple but great fun and you’ve got a winner.

Ghostbusters looks set to repeat its earlier conquests all over again.

Bob Chappell
Eastern bash away

Program: Ninja
Price: £1.99
Supplier: Mastertronic, 8-10 Paul Street, London EC2A 4JH, Tel: 01-377 6680

So much for the Oriental atmosphere, I may not know much about Ninja-speak but what I do know is that this martial arts game is pretty good stuff.

This is a single-player only game in which you control an all-kicking, all-punching Ninja. Suitably clad in the traditional black garb of such fighters, you set off through five screens to conquer all foes.

As well as walking left and right, your bodily skills include high, medium and low height kicking and punching, all done very swiftly, very smoothly. The animation is extremely good.

In addition to iron fists and lightning footwork, you have other wheezers in your repertoire - a slashing Samurai sword, spinning death stars and throwing daggers.

The sword you carry with you on your shoulder at all times, and can easily fetch your opponent a swinging blow with a quick flick of the joystick.

The stars and daggers may be found lying around in different locations and can be picked up by crouching beside them. Hurting one at an opponent may wreak fatal damage unless the opponent deflects it in time.

Unfortunately, the enemy have similar weapons so you won't be the only one doing the hacking and hurling.

Scattered around the area are small flashing idols which should be collected for extra points. Needless to say, these are always guarded by the enemy, who won't let you take them without a fight.

Moving off the screen either to the left or right causes the current picture to be replaced by the name of the area you are about to enter. The screen clears again to show you in your new location.

The animation in this game's best feature, though smooth and natural and fast, easily up to the standard of far more expensive games and adds an extra dimension to the fighting. For the low price, an unmissable bargain, grasshopper.

Bob Chapwell

<table>
<thead>
<tr>
<th>Sound</th>
<th>Graphics</th>
<th>Playability</th>
<th>Value for money</th>
<th>Overall</th>
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</thead>
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<td></td>
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Good collection

Program: Smash Hits Volume 5
Price: £9.99 (cassette), £14.99 (disc)
Supplier: English Software, 1 North Parade, Pendragon Gardens, Manchester M60 1BX. Tel: 061-836 1358

ANOTHER in the series of compilations of earlier releases, this twin cassette or disc anthology features Chop Suey, Mediator, Eletraglide and Quasimodo.

Chop Suey is an impressive martial arts game enabling you to pit your Kung Fu skills against another player or the computer.

As well as being able to jump upwards and shuffle quickly to the left and right, each fighter can kick high, low or to the body, jab and somersault over the opponent.

Eletraglide is a sort of Pole Position with tunnels. There are no other drivers to compete against. What you have to watch out for and avoid are giant spheres and cubes which come rushing out of the sky towards you.

A plane will also fly over, dropping large columns onto the track as added obstacles.

There are three courses and steering modes to choose from. The game plays very fast (the speed of the graphics will turn your hair white). As a result, it can be a bit of the difficult side but if you like a challenge and plenty of speed, you should enjoy this one.

Mediator is an unusual and tough mixture of multi-screen arcade action and problem solving.

Apart from the first, each screen offers something different and you can only progress by overcoming the hazards and solving the mysteries presented on each screen. A real challenge.

Finally, Quasimodo is a platform and ladders type game offering three basic scenarios. Scene 1 has you throwing cannonballs down from the castle battlements at ladder-climbing archers. Scene 2 has you swinging from rope to rope in the bell tower. The final scene sets you scaling the castle wall, fighting off all comers.

Quasimodo is graphically the weakest of the bunch, but still offers some good play.

This is probably the strongest compilation from English Software yet issued and provided you haven't got most of the games on it, Smash Hits Volume 5 is certainly a good buy.

Bob Chapwell

<table>
<thead>
<tr>
<th>Sound</th>
<th>Graphics</th>
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</table>
Set yourself
up with 16
extra keys

Part 5 of LEN GOLDING's series on
using your Atari to control devices

THIS month's constructional
project is a plug-in keypad which
gives you up to 16 extra keys, and
behaves almost exactly like the
standard keyboard.

The version described works as a
numeric keypad with its own Return
key and single-touch cursor move-
ment, but each key is fully programm-
able.

It works in a similar way to a
joystick, by setting up patterns of high
and low voltages on the four input
signal pins (as described in the June
1986 issue of Atari User). The
operating system reads this pattern
50 times a second, converts it into a
decimal number between 0 and 15,
and stores it in address 632 (for Port
1) or 633 (for Port 2).

Figure 1 shows the circuit for four
extra keys, one to each line, and this is

Figure 1: Four extra keys

Figure II: This diode matrix allows fifteen separate on/off
inputs to be channelled through a single joystick port

about the simplest worthwhile
gadget you can build. You could make
the keys extra large for disabled
people, colour-code them for pre-
readers, or set them up as function
keys. You could label them "Yes",
"No", "Don't know" and "Help" for a
children's quiz, or "Strongly agree",
"Slightly agree", "Slightly disagree"
and "Strongly disagree" for a
questionnaire survey.

You might like to consider
connecting something other than
keyboard switches – for example,
pressure mats to operate burglar
alarms, or central-heating ther-
ostats to monitor room tempera-
ture.

However, you're not limited to just
four keys. By using all possible
combinations of high and low states
on the four signal lines, you can
generate up to 15 different numbers
(16 if you count 0).

Most keyboard switches are
simple on/off devices and can't
control more than one line without electronic help. But a simple diode matrix is all that's needed - and the circuit shown in Figure II will work perfectly well. When any of the keys is pressed, it connects one or more signal lines via the diodes to 0v, while the other lines remain held at 5v by circuitry inside the computer.

Figure III shows a practical layout on the Verobloc breadboard - there's room for only 10 of the 15 possible combinations, but you can see the general principle.

The diodes are marked with a black band at their cathode ends, and must be connected the correct way - cathodes to the switches. However, you won't do any damage by trying them both ways round.

Connect the breadboard to Port 1 using the joystick extension lead, then run Program I.

10 POKE 752,1:PRINT CHR$(125)
20 POSITION 2,5:PRINT PEEK(632)+
    "";60070 20

Program I

The number 15 will be displayed - meaning all lines are high. Now connect a test lead to the 0v line, touch it to each of the numbered points in turn and watch the number change on screen. The single touch action can be made to generate any number from 0 to 14.

Having established the principles of operation, we can move on to the keypad construction. A printed circuit board is available (see the parts list) and this makes assembly very straightforward.

If you have facilities to make your own, the full pattern is given in Figure IV. Holes for the diodes are 0.8mm, those for the switches are 1.2mm and the fixing holes are 3mm or 1/8in. A ready-made board is available from RH Design, and this comes drilled and tinned ready for use.

For a professional finish, the design uses full-travel keyboard switches which have removable transparent covers so you can insert your own legends. The PCB holes are spaced so that the keys butt up to one another, avoiding the need for a complicated panel cut-out.

Solder the diodes first, making sure to get them the right way round (black band towards the centre of the PCB), then fit the terminal blocks and switches. Make sure the switch bodies sit firmly onto the board's surface with no gaps, otherwise...
constant pressing will cause the copper track to peel away from the PCB.

Fit a cable clip to anchor the joystick lead, and mount the whole assembly in a suitable case using at least four of the six mounting holes. The front panel cut-out should be 75mm square.

Now we need some software to drive the gadget. You could program it in Basic, just like a joystick, but it's more impressive if the new keypad can be made to act like the existing keyboard, with no visible software driving it.

This means using a machine-code routine to scan the keypad during the vertical blank interval and activate the operating system's keyboard handler whenever a key is pressed.

There is a shortcut here. Whenever you write a number into address 764, the computer thinks you have just pressed a key which generates that number, and will obediently print the corresponding character on screen for you.

Our software simply reads the keypad (address 632), converts the number into an appropriate keycode and stores it in address 764. The operating system does the rest.

Once in place, the routine will execute every fiftieth of a second, independently of any Basic program which may be running at the same time.

From the user's point of view, the only difference between our new keypad and the existing keyboard is that the new keys don't have auto-repeat, which helps guard against accidental double-entry. The standard keyboard keys can still be used in circumstances where auto-repeat is an advantage.

Two different versions of the software are presented. Program II is the simpler, and runs as part of a Basic program using page 6 to store the machine code. Program III is the de-luxe version for disc drive owners.

It will create an AUTORUN.SYS file which boots automatically at power-up, resets the MEMLO pointer to make a safe area for our machine code and traps the SYSTEM RESET routine to ensure that the new keyboard stays active as long as the computer is switched on. This version is completely invisible to the user, and can be used with cartridge-based languages other than Basic.

Both programs work in exactly the same way. Pressing any keypad key will return a number from 0 to 14 in address 632. The bit pattern is inverted - which is equivalent to subtracting the number from 15 - and the result is used as an index into a table of keycodes supplied by you. The number retrieved from this table is written into address 764, then the operating system takes over to print out the selected character.

The new keys can be programmed to duplicate any of the standard keys - or key combinations - by changing the values in the keycode table. This table appears in the Basic programs as 18 entries in a single line of DATA (line 40 in Program II, line 70 in Program III), and can be altered simply by changing the values.

Let's say you want one of the new keys to print a comma, to allow you to type-in long DATA statements with one hand, and still hold down your program listing. First you need to find the keycode which corresponds to "", (it's not the Atascl number), so type-in and run this line:

```
10 PRINT PEEK(764):GOTO 10
```
then press "", on your keyboard. The number that comes up is the keycode you want - in this case 32.

Now decide which of your new keys you want to do the job, and get its number from the underside of the keypad.

The parts for the keypad are available from Maplin Electronic Supplies, PO Box 3, Rayleigh, Essex SS6 8LR. Tel: 0702 552911.

Approximate cost £8.40.

A joystick extension lead is available from Tandy stores (code 276-1978) or from large computer shops.

The printed circuit board (order code DBP2) is available from: R.H. Design, 137 Stonefall Avenue, Harrogate, North Yorkshire HG2 7NS. Tel: 0423 508359.

Price £3.40 including VAT and postage.
PCB. This tells you which of the 15 DATA values to change.

Let's say you want the comma to be printed by the double-width key. This is key number 13, so count to the thirteenth DATA entry and change the "12" to "32". Run the modified program and you're in business.

The specified key layout is suitable for most purposes, but you can set the double-width key to the right if you prefer. It then becomes key number 15, and the remaining two keys on that line become 13 and 14, as the PCB markings show.

There is also provision for a sixteenth key, so that you could make a hex keypad for use with the Assembler Editor cartridge. An extra input is needed for this, and the joystick trigger line is the obvious one to use.

To add a sixteenth key, cut the copper track where it is marked "cut" on the PCB, then connect joystick pin 6 to the terminal marked "NC". If you're programming the keypad in Basic, you'll need to combine the value in 632 with the trigger line value (644). Here's one way:

10 KEY=PEEK(632)+
16*PEEK(644)=0

This returns the normal joystick values for keys 1 to 15, and 16 whenever the sixteenth key is pressed. However, if you want a hex pad, the chances are that you're already into machine code programming so you should have no difficulty modifying either of the source listings to take account of key 16.

<table>
<thead>
<tr>
<th>PARTS REQUIRED FOR 15-KEY VERSION OF KEYPAD</th>
<th>Maplin Order Codes</th>
</tr>
</thead>
<tbody>
<tr>
<td>32 1N4148 signal diodes</td>
<td>QL80B</td>
</tr>
<tr>
<td>15 Keyboard switches</td>
<td>FFE61R</td>
</tr>
<tr>
<td>14 Keytops (1 position)</td>
<td>FFE62S</td>
</tr>
<tr>
<td>1  Keytop (2 position)</td>
<td>FFE63T</td>
</tr>
<tr>
<td>2  3-way PC terminal blocks</td>
<td>RK72P</td>
</tr>
<tr>
<td>1  Cable 'P' clip 3/16in</td>
<td>LR44X</td>
</tr>
</tbody>
</table>

Assembler listing of Program II

Assembler listing of Program III
IT is possible to access the player missile system without using the direct memory access method we have been using so far. This new method is much simpler to operate but has one major drawback – only a single byte can be plotted in the player stripe and this runs the whole height of the screen.

To see how easy it is to turn on a non-DMA player type:

POKE 53248.180:
POKE 53261.231
and press Return, and you will see a player stripe. The number 231 is the bit-mapped code that switches on selected pixels along the width of the stripe and this pattern is then copied on every row.

Locations 53261 and 53264 switch on players 0 to 3 and 53265 the missiles. The normal registers associated with player missile graphics can be used with non-DMA players – horizontal registers, colour, size, collision detection and so on – but vertical movement is impossible.

Program 1 is a demonstration of some of the effects that are possible with non-DMA players. The first section shows quadruple size player stripes adjacent to each other. The number 255 is POKEd to locations 53261 to 53265 to turn on all the pixels within each stripe.

Additional colours are obtained on some parts of the screen where Playfield 0 (the text window) overlaps the players. The Graphics Mode 2 text at the top of the screen takes on a different colour depending on which player stripe it is over.

The programmer has little control over what colours appear – experiment by changing the colour registers in the program to see other combinations.

If the stripes remain next to each other, and are set to the same colour – as in the second section of the demonstration program – the effect is like creating a square playfield. Notice that text that appears on the right hand side takes on a different colour to that on the left.

Finally, the program shows double size stripes with selected pixels plotted and illustrates how easy it is to move all the stripes together. By altering priority (in register 625) the stripes can appear to travel over or underneath the text.

In part VI of his series on player missile graphics STEPHEN WILLIAMSON brings all the techniques together in . . .

![Bug Hunter](image)

Non-DMA players can be used as an easy method of creating additional colours to those normally possible on a graphic screen. They can also be used as borders, or incorporated into graphs and charts.

Program II is Bug Hunter, a game starring all the player shapes that have appeared in other programs in this series and demonstrated something of what can be achieved by the use of player missile graphics and the Basic language.

The object of the game is to catch a bug in a net and take it to the cage on the right of the screen. Treading on fruit, being bonked on the head by falling fruit or being stung by the bug costs one life. Points are awarded according to how long it takes to catch each bug – the longer the time taken, the lower the score.

To assist you in following the program, Figure I is a summary of all the main registers associated with the player missile system.

Player 0 is the man, Player 1 the top of the tree, Player 2 the net and Player 3 the bug. The falling fruit are missiles.

Playfield 1 is the tree trunk and vertical cage bars, Playfield 2 the border line and top of the cage, and Playfield 3 the dark green ground at the bottom of the screen (set to the same colour as the text window).

The listing is liberally sprinkled with REM statements that document each section of the program. Lines 60 to 740 initialise everything. They reserve the player missile data area, set the PMBASE address, load shape and machine code data, set colour, size and horizontal registers, set initial values for the variables and set the Atari clock registers to zero.

If you have followed the rest of this series then a lot of these routines will already be familiar to you as they are fairly standard player missile initialisation procedures.

Three machine code routines are included in the game, the same ones used in previous programs in this series. The first is a high speed clearance routine that clears any garbage that may have accumulated within the player data area. Line 200 calls up this routine.

The second routine transfers specified bytes from one area of memory to another and is used to control up and down movement of Player 3 (the bug). The last routine handles the downward movement of the missiles.

Bug Hunter is written in a series of subroutines. Each is responsible for a particular operation of the program – movement, collision detection, sound effects and so on. Lines 760 to 830, the control routine, decide the order in which these subroutines are accessed.

This type of program structure makes both writing the program and fault finding much easier than if the program was written largely in one continuous section.

If, for example, there is a fault in missile movement, then it is a safe bet to assume that the error lies within
the missile movement routine (lines 1080 to 1120) or the re-plot missile routine (lines 1640 to 1670).

Line 760 prevents the game from going into the attract mode which normally happens if no key has been pressed for about 9 minutes, causing the Atari to cycle its screen colours.

If the joystick is not in the central position with STICK(0) equal to 15, then POKE 77,0 stops the attract mode clock.

The first subroutine that the control routine calls is found between lines 850 and 950. These lines handle movement of Player 0, the man, and Player 2, the net. Players move horizontally unless the man has been hit by fruit or the bug (this situation is handled in a later subroutine).

If the joystick is moved left or right, then the horizontal register (HORIZ) is increased or decreased by 2 and the updated horizontal coordinates POKEd to the Player 0 and Player 2 registers.

The man and net movement routine is called up twice from the control routine for each cycle of the game. This gives additional speed for the man and net compared to the bug, so that the player has a chance of actually catching it.

Line 920 checks if the bug is in the net, (when the variable NET is set to 1), and if the man has reached the cage at horizontal position 48. If both these conditions are met the program POPs out of the routine to increase the score.

Line 940 checks to see if the bug

```
10 REM PLAYER MISSILE GRAPHICS
20 REM BY STEPHEN WILLIAMSON
30 REM FOR ATARI USER
40 REM BRIGHT STAR
50 REM PLOT COOK - FACT 1
60 GRAPHICS 2:SETCOLOR 1,0,12
70 SECTOR 1,2,0:SECTOR 4,4,4
80 POSITION 2,2,16:MS:"non dma Players"
90 POKE 53256,3:POKE 53257,1
100 POKE 51259,3:POKE 51259,3
110 POKE 52248,6:POKE 52249,92
120 POKE 52258,124:POKE 52251,156
130 POKE 784,0:POKE 780,780:POKE 786,787
140 POKE 52261,155:POKE 52262,155
150 POKE 53761,3:POKE 53264,255
160 FOR DELAY=2 TO 200:NEXT DELAY
170 GRAPHICS 17
180 FOR I=8 TO 4:POKE 70491,18:POKE 51,53
190 POSITION 4,4
```

has touched the net. If it has, the program branches to 1140 to see if the catch was successful. If the bug has been caught, line 930 moves the bug, Player 3, along with the net. Player 3 movement is handled in lines 970 to 1080. Line 970 checks the Player 3 collision register to find out whether the bug has touched the ground (Playfield 3) in order to send it flying upwards again by resetting the direction change when the bug is about halfway up the screen during its upward flight. Line 990 alters the horizontal coordinate (stored in variable HORIZ) by a random amount to

```
200 POKE 53251,4801
200 FOR DELAY=2 TO 20:NEXT DELAY
210 NEXT I
400 GOTO 60
```

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<table>
<thead>
<tr>
<th>D</th>
<th>Vertical direction increment (-1 = up, 1 = down).</th>
</tr>
</thead>
<tbody>
<tr>
<td>HORIZ</td>
<td>Vertical coordinate for players.</td>
</tr>
<tr>
<td>LIVES</td>
<td>Number of lives left.</td>
</tr>
<tr>
<td>M</td>
<td>Vertical coordinate of missiles.</td>
</tr>
<tr>
<td>NET</td>
<td>Bug in net flag (1 = in net, 0 = not in net).</td>
</tr>
<tr>
<td>PWB</td>
<td>Data area address in pages.</td>
</tr>
<tr>
<td>PMBASE</td>
<td>Data area address in bytes.</td>
</tr>
<tr>
<td>SCORE</td>
<td>Total score.</td>
</tr>
<tr>
<td>SCORE1</td>
<td>Score of last bug catch.</td>
</tr>
</tbody>
</table>

Figure II: Main variables used in Bug Hunter.

give the bug its jerky flight pattern, and lines 1000 to 1010 check the horizontal coordinates to prevent it flying off the screen.

Lines 1030 and 1050 use the machine code routine to re-plot the bug shape, first with wings, then without, to give the illusion of flapping.

The sound effect for the flying bug is sorted out in line 1040. The two sound channels are changed according to the current vertical position of the bug stored in the variable DOWN.

Missile movement is processed in lines 1080 to 1120. Missiles only move down and line 1080 calls the machine code routine that moves them down the missile stripes. A fresh set of missiles is plotted at the top of the tree when the missile vertical variable M has reached a random value between 44 and 50 (calculated in line 1110).

This means that either the missile fruit will stay above ground to become a hazard to the man, or will fall to a position that allows the man to pass over it.

Lines 1140 to 1210 check to see whether the bug is in the net.

Line 1150 sees if the horizontal position of the bug corresponds to that of the net. If this is not the case, the rest of the routine is not entered.

Another check is made in line 1160 to see whether the bug is below the net or flying upwards. Lines 1150 to 1160 determine the conditions under which a successful catch is made. The bug must be flying down into the net, and must be caught at exactly the right horizontal position. To make the game easier, these two lines could be altered to allow a greater margin of error.

If the bug has been successfully caught then NET is set to 1 and the bug moves 4 pixels down so that it appears to sink into the net (line 1200).

If the bug has been put inside the cage then lines 1220 to 1300 update the score. Locations 18, 19 and 20 keep count of the internal clock. Line 2230 works out how much time has elapsed since the clock was reset during the initialisation routine and subtracts this time from 10000 to give a score based on how long it has taken to catch and cage the bug.

The rest of this subroutine updates the current score and performs some initialisation functions before restarting the game. Lines 1310 to 1380 check the collision detection registers to see if the bug (Player 3) or the missiles have hit the man. If a collision has been detected then the program jumps to the man dead routine at 1450.

The sound routine at 1380 to 1430 mimics an alarm sound when the bug has been caught.

Lines 1450 to 1620 control things after the man has been hit. The FOR...NEXT loop between 1460 and 1500 moves man and net 14 pixels down the screen which, because of the shape priority options set at location 623, means that the players pass underneath Playfield 3 (the ground), appear to sink into the earth.

Line 1510 reduces the remaining lives by 1. If no lives remain then the program waits for the start key to be pressed before re-initialising the game. Address 53279 detects the Option, Select or Start keys.

The rest of the man hit routine initialises the system ready to start the program again, and lines 1640 re-plot the missiles near Player 1 (the top of the tree).

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THIS month's type-in game is an epic. Written in a combination of Basic and machine code, Cubes in Space follows the Q*bert style format, with some very colourful Antic Mode 4 graphics and Player Missiles.

This is the scenario: You have become bored with destroying yet more alien invaders, jumping on and off platforms and running around mazes feeling peckish.

Realising there is now a gap in your life you have decided to indulge in a little bit of extra-terrestrial graffiti by drawing lines all around the galaxy-renowned Space Cubes, home of the new liberated Pacmen clan. (It seems that you weren't the only one bored with running around mazes...)

The Pacmen are naturally not at all amused by your vandalistic activities, and decide to have a go at stopping you. Everybody knows that wild Pacmen are quite harmless, but due to their prolonged stay in space these ones have become contaminated by assorted cosmic rays and the like, and are hence likely to burn you to a frazzle if you come into contact. You are advised to give them as wide a berth as possible.

There are eight different combinations of Space Cubes - each a little harder to cover than the last. After completing the eighth level you move on to level one again at a higher speed.

You move your graffiti marker with the joystick, but note that movement is diagonal only.

You lose one of your lives if you run into a radioactive Pacman or fall off the side of the Cubes. The game may be paused at any time by pressing the spacebar.

Be especially careful when typing in lines 1110 to 1112 (scrolling) and 10010 to 10015 (sprite movement).

There are lots of other data and print statements to keep you busy, but try to make sure that you type in all of the special characters correctly. Don't forget that if you have any problems the checksum should help - or why not get the completed program on the monthly cassette or disc? 

Full listing starts on Page 30
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October 1986 ATARI USER 33
HARDWARE REFLECT by PAUL FARNFIELD

THIS is a rather neat demonstration one of the Atari's least used features, the hardware reflect facility. The program is written in Basic, but there is a small machine code interrupt service routine which is used to turn the reflect register on during the lower portion of the screen only. This program could have been written in three lines, but the five line limit has allowed a much clearer approach.

Line 10 sets up the screen mode and colour, and the start of the display list.

Line 20 loads the machine code routine into Page 6.

Line 30 tells the operating system where to find the interrupt routine. It also enables the DLI's and sets up the custom Display List.

Line 40 simply prints and prints out the text.

Get it right!

CURSOR HIGHLIGHT from TIM BAILEY

HAVE you ever been de-bugging a program or editing a screenful of text and wished the cursor was a little easier to see, or even wished you could find out which line it is on?

Well this program solves both problems. It is written in machine code, and resides in page 6 of memory. Its function is to highlight the line that the cursor is currently on. It also flashes the cursor, and any inverse video characters that are on screen.

The program sets up a display list interrupt on one of the blank lines at the beginning of the display list. The program calculates where the cursor is with respect to the scan lines of the TV display by checking VCOUNT (54283, the scan line counter), and at the appropriate time changes the colour of that line.

Next it delays long enough to cover eight scan lines — equal to one graphic mode 0 line — and then restores the original colour and returns from the interrupt. The flashing cursor is operated from the vertical blank interrupt, which operates 50 times a second.

If you wish to save or load programs while this routine is running first POKE 54286,64 to turn the display list interrupt off. If you do not, some errors will result in the serial port input/output routines.

On completion of SAVE/LOAD operations POKE 54286,192 to restore program operation. Note the cursor will still flash, but the coloured line will disappear when POKE 54286,64 is used.

After the program is typed in save it before running it. If all is well you will see a dark red line across the screen on the same line as the cursor and the cursor will be flashing. You may type NEW to clear the memory as the routine sits in page 6, safe from Basic.

If you press System Reset, or call a new graphics mode, the line will disappear. You may restore the function of the routine by typing X=USR(1638).

Get it right!

More £25 winners!

Send your Five-liners in to us at:
Five-Liners, Atari User, Europa House, 68 Chester Road, Hazel Grove, Stockport SK7 5NY.
COLOUR ROTATION from D. ROBSON

This program draws a pattern in Graphics 10, and then rotates the colours with a small machine code routine.

The colours are rotated by cycling the shadow colour registers 705 to 712, and this method could be used for animation in other programs too. Line 10 contains a TRAP statement to re-run the program when all the colours have been used. Graphics 42 is used instead of a plain Graphics 10 in order to retain the pattern on the screen.

POKE 559.0 turns the display off to speed up the screen update. POKE 559,34 (line 20) turns it back on again.

Line 20 POKEs the machine code data on the first run, and also POKEs in the different colours as the program needs them.

Line 30 simply contains the machine code data.

Line 40 draws the actual pattern on the screen.

Line 50 handles the colour rotation via a USR call. Variable T is used to slow down the colour change, but the value 22 could be reduced to speed up the effect.

Some of the lines are very long, and you will need to use abbreviations to type them in - for example, use GR.42 instead of GRAPHICS 42.

<table>
<thead>
<tr>
<th>VARIABLES</th>
</tr>
</thead>
<tbody>
<tr>
<td>C</td>
</tr>
<tr>
<td>R</td>
</tr>
<tr>
<td>T</td>
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<tr>
<td>A</td>
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<tr>
<td>L</td>
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</tbody>
</table>

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MAKING THE RIGHT CONNECTIONS

I HAVE just finished reading your excellent article on gadgets in the July issue of Atari User.

I was just a little concerned about the author's recommendation to use a battery charger for supplying the 12 volts DC required to run the unit.

From my point of view it would be no problem as I have worked in electronics for nearly 30 years, but for the novice it could have potentially disastrous results.

The reason for this is that the standard car battery charger has no smoothing and thus delivers 13.8 volts raw DC at 100Hz. This will almost certainly destroy any semiconductors used.

I would recommend a smoothing condenser of between 1000 and 3500 UF rated at about 25 volts used electrolytic be connected across the supply rails, or that a car battery be used as a reservoir. — R.C. Cornall, St Leonards-on-Sea, East Sussex.

Pros and cons of Logo

COULD you please explain what the advantages and disadvantages of Logo are? I only know that it is a language. Can Logo be used on my 800XL? Also, is machine code a hard as everyone says it is to learn?

I bought my Atari at Christmas and so far I am quite satisfied. I have only one complaint. Why do cassettes take so long to load? I have Mr Do which takes 15 minutes and Spy V Spy 2 which takes 18 minutes.

Most of my friends have Spectrums or Commodore 64s and their games take about 3-5 minutes to load. Is there any way to shorten this loading time — except by buying a disc drive as I don't have enough money? — Julian Turner, Weston-Super-Mare, Avon.

Logo started life as an educational language. It is very good for use with children, as you write the programs in English and further words can be defined and saved as you go along. However, it is not really suitable as a language to go on to after Basic — for that, something like machine code may be more appropriate.

Machine code does take a bit of learning, although once you have got the hang of it it all makes a lot of sense.

It is very logical, but rather long-winded and also not very forgiving of little mistakes. If you want a lot more speed and power from your computer, but feel that machine code may be beyond you at this stage, then Action! is the language for you. People who have written complete commercial packages in this very straightforward language, say it is worth every penny.

There is no easy answer to your last question, unfortunately. The Atari tape system simply can't be speeded up beyond about 900 baud without becoming very unreliable.

The only answer is to keep on saving for a disc drive or to have your recorder fitted with a hardware modification to speed it up, which may not work with some commercial programs.

Digitised snapshots

Do you know of anyone offering a service to have photographs digitised and saved onto disk? — G. Forrester, East Kilbride, Glasgow.

Aside from paying out a small fortune for a ComputerEyes add-on and a video camera, does anyone know of a commercial service that can digitise photographs for Mr. Forrester?

Locking problems

IT'S that lock up bug raising its head again. Readers with early model machines may find that the otherwise excellent 80 column screen program given in August's issue locks while deleting line numbers.

The answer to this one is easy — either modify the program to delete the lines given by the FOR loops in lines 1020 and 1100, in reverse order, or do it by hand.

Finally, when storing strings using PRINT the system uses long inter-record gaps when they really don't seem necessary. Is there a way of fooling the system into using short gaps, and PRINT input cope all right? — Alan Puffett.

Disc indexing and DOS

IN the April issue of Atari User a disc index utility program was listed which promised to be an excellent utility for my recently bought 1029 printer. All my disc files could be listed on paper in an orderly and organised manner without wasting paper.

Yet after spending nearly an hour typing in the program and running it, I get a disc error statement after the filenames have been printed. No sign of the number of files, used sectors or free sector prompts which should appear.

Is this due to the fact that I am using DOS 2 and DOS 3 with the 800XL and 1050 drive?

Also, is there any way in which to overcome this error and get a complete printout without actually using DOS 2.5 as suggested in the article? — Ian Williams, Carmarthen, Dyfed.

The program should work fine with DOS 2.0 or DOS 2.5, and we see no reason why it shouldn't work with DOS 3 also.

Check lines 230 and 290, as they are the only ones run between the file names being printed and the bottom line being started.

If you can, stick to DOS 2.0 or 2.5 rather than DOS 3 — you'll find them a lot more efficient.

October 1986 ATARI USER 37
Higham Ferrers, Northamptonshire.
Thanks for the tip to help out Rev B Basic sufferers. To make the cassette system use short inter-record gaps, simply use 128 instead of 0 as the second parameter of the Basic OPEN statement.

For example, use OPEN #1,8,128,"C:"

Don’t forget that you won’t be able to stop/start the tape in this mode, and that Basic’s GET command may be too slow to pick up some data. INPUT and PRINT should be fine, though.

You will probably find that if you PUT bytes from Basic you will also be able to GET them back again. This is because the gaps will have extended to allow for the slower PUT speed.

Colour compatibility

I PRESENTLY own an Atari 130XE computer system with a 127" printer. While I am extremely pleased with the computer, the printer no longer meets my needs and I am therefore in the market for a new one.

I am interested in an Okidata Okimate 20 dot-matrix colour printer, but I am unsure if it is compatible with my system. Please let me know if this is suitable and if so, where I can obtain the necessary software and interfaces. — Charles T. Miller, RAF Alconbury, Huntingdon.

The Okimate 20 is quite compatible with your computer – all you need to do is get a Centronics interface such as the FCC model to link it to the computer.

Be warned, though, that you won’t be able to get instant full colour screen dumps. If you want them you’ll have to do a good bit of programming for yourself to get them to work. Ordinary text should print with no problems.

Printer interfaces

I HAVE an Atari 130XE, an 800XL, a 1050 disc drive and a Brother M1009 printer.
I have sought advice from various sources over a long period of time as to what I need to link the computers to the printer. The advice I have been given so far has been either vague or non-existent.

The biggest disappointment was writing to FCC systems who advertise in Atari User and from where I got the address. I asked them if their interface would work with the Brother M1009 and even enclosed an s&h for their use.

They did not even have the courtesy to reply.

All I am asking is for someone, anyone to tell me what interface I need to connect the two machines. And, if indeed an interface is available, where can I purchase one.

Can someone please give me some authoritative advice?
— N.R. Fairclough, Kidderminster, Worcestershire.

The Brother M1009 has a

Games people play...

• Many of you have been writing in with questions on how to get through some of the tougher parts of the latest games, but unfortunately not all of our staff can afford the time to sit around all day playing games...

Oops — sorry — evaluating and play-testing multi-level entertainment software releases...

However, we’ve decided to let you all help each other out. If you send in your questions and queries, and also include a few tips on your own favourite titles, we’ll print the best ones. Here’s a selection to be going on with:

PLEASE help! I am desperate — could someone who has 'Feasibility Experiment' tell me how to get the diamonds?

I have had this game for months but cannot get them, even though I can go back to the altar and read the inscription. — Michael Pope, Basildon, Essex.

• • •

MY friend and I have been reading your magazine for a few months and thought your readers would be interested in hints for the following games:

Ghostbusters: to get $999,900 use no name and the code 31222646. Ghostchaser: to get extra lives and be transported to the halfway mark type Frank several times followed by Fanda — do not move while typing.

In Redmoon: if in trouble you can type the command Plant followed by the name of the object or creature, but beware for it will disappear forever. Ollas Foilies: passwords in order are Frank, Fanda, Norbi, Zoomi. Blue Max: be careful not to bomb your own hangar or the game will crash.

With F-15 Strike Eagle, if out of fuel keep your finger on the afterburner key to keep flying. Track and Field: in the high jump when the bar is set at 2.40m, you can go under it.

We would be interested to hear other peoples hints, particularly the passwords for Bounty Bob and Whirlfords.


• • •

I AM seeking help on Bounty Bob Strikes Back.

Do you know how to get past the Acid Rain? I have tried many times but failed.

Also, is it possible to save the position you are at on the game as I feel like bashing my head against the wall when I run out of lives and have to start all over again. — Stephen O’Neill, Newquay, Cornwall.

• • •

I THOUGHT you might be interested in the following codes and warps for Bounty Bob and One Man and His Droid.

The codes for the latter are:
L1. None.

Bounty Bob special code numbers are: 5, 6, 40, 49, 69, 100, 666, 818, 1000, 2049, 782, 6861.

40 — Fills up the high score with YUKOH! so you don’t have to go through the game 10 times to see Yukoh.
100 — Gives bob a haircut.
Finally the secret warps in Bounty Bob are:
L1. Pick up flower pot, press 1 and start.
L2. Pick up coffee pot, press 8 and start. L2. Kill all mutants, pick up point roller, press 3 and start.
L3. Get goblet 4 and start.
L10. Get pitch fork 5 and start.
L13. Get goblet 4 and start.
L15. Get pie and set suction tube 1 to left 9 and start. — James Lloyd, Rockferry.

• • •

I AM writing to tell you how much I like your magazine and to tell everyone that Airwolf for the Atari is not really Airwolf but Blue Thunder.

It was lucky that the shop keeper said that, or I would have wasted my money. — C. Wilson, Hillingdon, Middlesex.
**Paperboy for Atari?**

I WOULD like to make a complaint, not to Atari User, but to the Atari software houses.

It is about the arcade game Paperboy. I think it is a disgrace that Commodore, Amstrad and Spectrum should bring out the game while Atari has not. I was also wondering if any Atari software houses were thinking of bringing out Ghost 'n Goblins, as I have played it in an arcade and think it is a very good game. — S. Cartlidge, Stoke-on-Trent.

**Dumping graphics**

I'VE battled through thick and thin, through sleet and snow but I can't figure out how to dump a graphics screen from my 800XL onto my Atari 1029 printer. Is it possible? If it is can you please help? — Jonathan Evans.

• See our article, Screen dumps with the 1029, in the September 1985 issue. By the way, can we interest you in a thick coat and an umbrella?

**Basic update**

I BOUGHT my 800XL over a year ago now and it is now out of guarantee.

I recently discovered it has Rev B basic. What should I do, if anything at all, to get the updated Rev C machine?

Secondly in future issues I would like to see an occasional free gift, for example, small game on tape.

To cover its cost just for that issue you could put the price up 20 or 30 pence. I think this would please many people and increase your market. — Steven Hall, Kidderminster, Worcestershire.

• If your 800XL is out of warranty when you find out that it has Rev B basic you can always purchase a plug-in cartridge of Rev C, which will only cost you about £9.99 from most good Atari dealers.

As to your second question – we're not entirely sure we can get away with asking people to pay an extra 30p for a free gift.

**Cavern Escape — again**

FURTHER to my earlier letter about Cavern Escape I notice you have issued a correction in the August issue of Atari User and that it works without line 5508.

I have corrected all the errors to the correct checksum but it still will not work. Please let me know where I go to from here. (Keep it clean!)

Is it possible to produce a checksum which will tell you whether the line you have typed in is correct after you have typed it in? I find Get It Right very time consuming, especially if you only have to correct lines at the end of one or two long programs. — R.H. Marsland, Coalpit Heath, Bristol.

• As we said in the August issue, the listing is fine with or without line 5508 – and apart from that it was printed quite correctly.

If you have now got the checksum values to match and you are still having problems, could it be related to the old Rev B (or even Rev A) bugs in Basic? Check your revision and see if that might be where your problem lies.

**That XL handbook**

I HAVE tried to get The XL Handbook, Century Publications, but no bookstore in Edinburgh stocks it. Could you please tell me where I should be able to get it? — Elinor Ballard, West Lothian, Scotland.

**Loading problems**

ABOUT three years ago I purchased an Atari 400 and 410 recorder from Laskys.

About a year ago I discovered the computer would not load programs. I even tried the start/ton process but all this game was BOOT ERROR.

The c:save command worked well and I tried the saved programs on an 800XL and they worked.

Until I bought Magic Window from Quicksilver! I had only used cartridges so I hadn't discovered the error.

I sent the data recorder back for repair and after waiting four months tried again. I loaded a cassette into my computer and after the whistling has finished I heard the usual beeps covered up with a horrible noise.

Error 146 etc was printed on the screen. I tried again and again but to no avail. So this time I sent the computer and recorder back. Six months elapsed and I received a postcard saying there would be a small delay.

After this postcard I rang and was told the parts were just being fitted. I waited a
month and rang again to be told the parts were just going to be fitted.
Does it really take six months to repair a small fault?
I think Lasky’s repair services should pull their socks up!

Also, I heard about an adventure writing program by Codewriter. Could you give me a phone number on which I could inquire?

- Stephen Beck, Hartford, Hertfordshire.

- We’re sorry to hear of your misadventures, but hope you’ve got a fully working machine now.

The Codewriter program is no longer available, but you could try asking round some of the mail order dealers to see if they have any left.

I HAVE just typed into my Atari 800 the modified version of Get-It-Right but keep getting error 18 at line 4310. I am unable to find an error despite checking it thoroughly.

Could you advise me where I can obtain a 5-pin monitor lead as I wish to connect my 800XL to my video.

I have also been looking for Summer Games II and Winter games but have not been able to find them — are they around for the Atari yet?

Finally, can the Home Filing Manager still be obtained other than as a disc pack, and is the Touch Tablet still available?

- James R. Bloodworth, Nottingham.

- Your problem could be caused by one of two things. The first is that you might be trying the checksum on a SAVE or SAVE “D:xxxx” program. Don’t forget that you must use LIST format to record your program before running Get-It-Right on it.

It is not your program, check over any lines that set up or use the variable LNS are correct — especially lines 60, 4000 — 4050 and 4310.

The error is caused by trying to find a valid number in LNS where none is present.

Most of the larger mail order firms can supply you with a lead, or alternatively you could take your copy of the March 1986 issue of Atari User into a local hi-fi shop and ask them if they can make up a lead as shown on page 49 for your type of video.

Summer Games II and Winter Games are not yet available, but the Touch Tablet is. As for Home Filing Manager, check around and see if you can find one.

Extending Alphacom 81

CAN somebody help me in getting my Alphacom 81 thermal printer working with any of these programs:

- David T. Beec, Bristol.

- Can anyone help Mr. Beec? We don’t know of a driver that will allow the programs he mentions to work with an Alphacom thermal printer, but there are an awful lot of resourceful readers out there. Please let us know if anyone has managed to get any of them working.

If you are considering buying a printer do try to stick to something that is Epson RX/LX compatible, as this will save you an awful lot of headaches in the future.

Transferring programs

I HAVE a 130XE with 1050 disk drive. Please can you tell me if there is a way of transferring several programs from disc to Ramdisk from within another program?

I have tried using the Run and Save commands in the indirect mode, but of course this means that the main program is lost. I suspect that the answer is connected with Input and Print.

Also please can you review some peripherals and accessories in future issues, and another series on machine code would be appreciated.

- C. R. Goodfellow, Newbury, Berkshire.

- All you need to do is OPEN a channel for input to the file on disc, and another for output to the ramdisk.

Then simply GET each byte from the first file and PUT it back into the second. Use a TRAP statement to detect the end-of-file error when the last byte has been read.

To transfer a file called MYPROG.DAT, you would do the following:

```
10 OPEN#1,8,"MYPROG.DAT"
20 OPEN#2,8,"RAMDISK.DAT"
30 LPRINT#2,12,10,12,12
40 GET#1,1,8
50 PUT#2,1,8
60 END
```

You could speed this up considerably if you modified Aaron Spillings’s binary-get and binary-put routine for transferring blocks of memory to and from files.

Simply read the data into a long string, then send it out to the second file. Keep doing this until the whole program has been transferred. See the Data Editor article on Page 42.

Double sided discs

EITHER it got it wrong or my first thoughts were right and there’s really something wrong with your Get-It-Right.

I’ve typed the program, checked and double checked it but it won’t work. The problem is that it doesn’t print any numbers at all.

By the way, is line 4512 IF START=0 THEN CC=1: or IF START=0 THEN C=1: ?

I’ve bought four double sided, double density discs from BASF. I asked the salesman how to use the two sides of the disc and he said I should cut a notch opposite the existing one. Is this possible? Will it damage the disc drive? The disc’s reference is 5.25 20 PXX, - Joao Paulo F. Silva, Lihuao, Portugal.

- The line reads:

  IF START=0 THEN

  CC=1:

  If you still have problems, why not get the monthly tape or disc with it on?

  Cutting a notch in the other side of the disc is an accepted practice. There are arguments on both sides, but we use B-sides in the office all the time with no problems to speak of.

- Ian James, Lewes, Sussex.

- The Help Line was half right. It is only possible to have a program automatically run

Games for all seasons

The error is caused by trying to find a valid number in LNS where none is present.

Most of the larger mail order firms can supply you with a lead, or alternatively you could take your copy of the March 1986 issue of Atari User into a local hi-fi shop and ask them if they can make up a lead as shown on page 49 for your type of video.

Summer Games II and Winter Games are not yet available, but the Touch Tablet is. As for Home Filing Manager, check around and see if you can find one.

Autorun for cassettes

CONGRATS on a first class magazine. I got more information out of Mailbag than most of the books I either buy or borrow. The 5-liners are very useful too.

I am writing to ask if you can tell me how to make my programs autorun. I have a 800XL with a 1010 data recorder. I have phoned up Atari Help Line and they insist that this is only possible on disc.

If this is so then how is it that some of my better games, once loading has finished, will go straight into the run model?

Please, please will you help me solve this very frustrating problem.

- Ian James, Lewes, Sussex.
on disc, but there is no reason why someone couldn’t come up with a routine to do the same thing on cassette.

If enough people are interested we’ll print one in a future issue that will allow your Basic programs to load and go via the normal holding down the Start key procedure.

Colourful characters

IS there a POKE statement or something to change the sound of the cursor? If so please could you tell me how.

Also, how do you get multicoloured characters? I wish to know as I am writing my own game.

I think Atari User is a great mag, it has helped me a lot. — Richard Hider, Havant, Hampshire.

You want POKE 731.1. This disables the key-click on XL or XE machines. POKE 731.0 to turn it back on again.

As for multicoloured characters, have another look at John White’s article in the April 1986 Atari User on using graphics Modes 12 and 13. We think this should answer most of your questions.

Getting it right

MANY thanks for the updated version of Get It Right! I was obviously one of the lucky ones having already obtained your December 1985 and January 1986 versions, but the added printed option makes life much easier checking Checksum listing on paper as opposed to on screen.

However, I do have one problem with checking large programs on my Atari 1029 printer, in as much as I only use single sheet paper, and there is no mention in the instructions of any way of interrupting the printer while it is printing.

That is, after it has printed the next line to stop printing while I insert a new sheet of paper and then type CONT or some other command for it to continue printing. I have experimented but cannot find any combination of Escape or Control keys to assist in this task.

The other thing I thought of was to save the typed program in sections, checking each section (less than one page in length) at a time, but I am not yet experienced enough to be able to then put the sections together as one program after checking.

Finally, would it be possible to add a line or two to the Get It Right! program to count the number of lines printed while creating Checksum and then letting the program interrupt the printer while the paper is changed? — Chris Barker, Woodley, Berkshire.

The following lines could be added to the Get-It-Right! listing printed in the August 1986 issue to pause the listing when you hit the spacebar.

```
4060 IF PEEK(164)<>33 THEN 4062  4062 IF PEEK(164)=33 THEN 4060
4064 IF PEEK(164)=32 THEN 4065
```

The disc may continue to turn for a few moments after you press the spacebar while the computer is working out a line, but no further lines will be printed until you hit the spacebar again.

This also applies to the screen for those who are too lazy to use two fingers to press Control-I.

Monkey Wrench II

I HAVE been using an Atari computer for about four years now. I began on an Atari 900.

A trip to America my parents returned me a Monkey Wrench II utility cartridge. This proved to be incredibly useful.

However, when I was given my own computer, an 800XL, I found that this utility did not work. When the cartridge is inserted a blank screen is all I get, allowing no inputs or output.

Can you help? I am open to suggestions. — D. Hutton, Carterton, Oxon.

As you have quite rightly said, the old Monkey Wrench cartridge will not work on XL or XE machines.

You could send to the States for an XLXE version, but perhaps better still you might like to consider getting a copy of Basic XL or Basic XE from O.S.S.

Both feature lots of the useful features of Monkey Wrench, and might be quite a bit cheaper as they are available from UK sources such as Software Express.

Lost in Space Maze

I HAVE just typed out your Space Maze and on the first board there is a tower, but what is it for?

On Board 2 there is what I think is a fuel station, but I have not been able to get there.

On Board 3 I got through the rocks and landed on what I thought was fuel but was killed.

Could you please tell me how to get fuel? — Carl Dickin, Preston, Lancs.

To refuel all you need to do is hover inside the fuel dump by giving quick bursts on the rockets until you are stationary. The fuel will then load automatically.

Swapping ideas

I OWN a 800XL and 1010,1050. I would like to swap ideas with people in Europe, especially Germany.

I have a lot of disc games and a few good cassettes. Please could you put me in touch with someone? — Darren Scully, Dublin, Ireland.

Screen flicker

I AM writing to ask about a problem I have with my Atari 800XL.

The screen display flickers and wobbles, in parts, with some games, mostly scrolling games like Boulderdash. I also have an old 400 and this is not affected. I’ve swapped televisions to no effect.

Can you tell me if this is a hardware defect which needs dealer attention, or might it be the modulator needs a tweak?

The 800XL is still guaranteed, but if it only needs a tweak this would save time.

I have enthusiastically bought your magazine from the start and don’t remember reading of a similar fault. — J.C. Bavey, Guiborough, Cleveland.

This sounds like a fault in the computer. It could be a dry joint, but to be on the safe side you should take it back to your dealer for repair.
THIS program lets you edit various types of media—cassette or disc files, disc sectors and defined areas of memory. Modified data can then be stored back on any of the four media, regardless of where it originally came from.

To leave as much space as possible for the editing buffer, the program does not include many REM statements. After typing in the listing, it is possible to edit a file of up to approximately 13k. Disc and cassette subscribers will also have a compressed version which enables approximately 17.5k to be edited.

The editor is designed to accept either hexadecimal or Atascll input, which can be toggled by holding down the Option key and pressing M on the keyboard.

Other options are:
N Goto next block
P Goto previous block
G Goto block number xx
C Convert a number from hex to decimal or back again
F Format disc
S Save data
A Abort

You should save the program after typing it in as if there is the slightest error in the way you have typed in the machine language data statements, the computer may lock-up, losing everything that has been keyed in so far.

After typing RUN, a title screen is displayed and 'Please wait ...' appears as the program goes through its initialisation routine. After about 30 seconds the main menu is displayed.

There are five options, allowing you to load the edit buffer from a cassette or disc file, disc sectors or memory, or alternatively to exit the program.

When loading from cassette the program prompts insertion of the tape and to press Start to continue or Option to abort. On Option the program returns to the main menu to allow another selection. If Start is pressed, the tape file is loaded and the editing screen appears.

Follow the same procedure for disc files, but you will obviously need to enter the filename too.

When loading from disc sectors, start by entering the first sector to load, followed by the number of sectors to load. Then, as with tape loading, press Start to continue or Option to abort the process and return to the main menu.

To load from memory, enter the starting address (in decimal, ranging from 0 to 65535), followed by the number of bytes to transfer to the buffer.

The editing screen is displayed automatically after loading. The top line shows: 'Editing block xx of yy', where xx refers to the current 128 byte block being worked on, and yy is the total number of blocks currently in the buffer.

Below this is the actual data, with hexadecimal codes on the left of the screen and Atascll text on the right. At the bottom of the screen are notes to remind you of all the available options.

Simply hold down the Option key and press the highlighted letter of the function required. For example, to move to the next screen block, hold down Option and press N.

The bottom line displays the status of the editor—hex or Atascll mode and the caps and inverse video settings. To toggle from upper-case to lower and back, press the Caps key only—neither Option nor the Shift key are necessary.

To move the cursor around the screen hold down Option—not Control—and press one of the arrow keys. You can then change the data by typing in the new information.

If editing in hex mode you may only use the 0-9 and A-F keys, and as you change the bytes the Atascll representation is automatically updated and recorded in memory.

To change between the hex and Atascll modes press Option and M. The cursor is always displayed in the hex area of the screen, but when in Atascll mode you can enter any keyboard character you like and both the text and hex codes will be updated.

There are three ways of moving on...
PROGRAM DESCRIPTION

30-100 Screen handling routines for printing text, centering it, drawing borders and erasing portions of the screen.

110-190 Short machine language routine to load or save data to or from a disk file. This routine can be used in your own programs and is contained in LS. The data for LS is contained in lines 3150-3160. To use this routine first open your file then use a USB call the form of X=USRRAD(LS), Channel, Code [7=READ, 11=WRITE], Address of buffer, Length of buffer. When loading set the length of buffer variable to the maximum possible number of bytes to load. The actual number of bytes loaded is returned in X.

200-370 Get or put disk sector routine. Again this can be used in your own programs and is contained in C/OS, the data for which is in line 3170. When calling this routine, set RW to R for a read operation or W for a write, S to the starting sector number, SE to the ending sector number and put the buffer address in BUFADO.

380-410 Memory moving routine. Contained in AS, this can also be used in your own programs (data in lines 3190-3200). Call with X=USRRAD(RM$), From, To, Length to move.

420-480 Cassette load or save routine. Contained in TLS (data in lines 3230-3290). Call with X=USRRAD(RTLS$), Channel number, Read/write, Address of buffer, Length of buffer. The actual number of bytes loaded is returned in memory locations 203-204.

490-710 Tape load or save routine.

720-1010 Disk file load or save routine.

1020-1240 Disk sector load or save routine.

1250-1400 Memory load or save routine.

1440-1690 Keyboard handler. This is used to replace the standard input routine of the Atari. This routine allows a numeric or string input, and waits for a specified number of keystrokes. This is carried out by setting NUM=1, if numeric input, or 0 for string input. NP is the number of keystrokes required before the routine returns. When the number of keystrokes required equals the number actually pressed the routine is exited, likewise if Return is pressed before the maximum number of presses are made the result string is found in AS.

1700-1920 Hex-decimal-hex convert routine. This will convert any number from 0-65535 ($0000-$FFFF).

2060-2120 Format disk routine.

2130-2280 Display editor options and state of caps and video or logo keys.

2290-2370 Clear screen and display current block of buffer.

2380-2550 Home cursor and look for Option key and/or keypress and flash cursor.

2560-2710 Check for valid options and GOTO sub-routine accordingly if found.

2720-2770 Accept hex input and modify screen or buffer.

2780-2950 Accept Atalscii input and modify screen or buffer.

2960-3370 Main menu initialization routine.

to another block:
- To move to the next block press Option and N.
- To go back to the previous block press Option and P.
- To go to a specific block, press Option and G.

To convert a number from hex to decimal or vice-versa press Option and C and enter the number to convert. If the number is in hex precede it with a $ sign.

To format a blank disk before saving data press Option and F. Make quite sure that you have removed your program disc before using this option.

To abort the edit, hold down Option and press Esc, which will immediately return you to the main edit menu.

To save the data press Option and S. The save menu will appear, which allows you to save the data to any of the four media options. Make your choice and follow the on-screen prompts.
Birthday tips for Level 9

By Brillig

LEVEL 9 Software, which celebrates its fifth birthday this year, has provided much pleasure to untold numbers of adventurers. Happy Birthday to the team and long may they continue.

By way of a small tribute here is a collection of tips for three Level 9 adventures, including the very latest, The Price of Magik.

We're also featuring hints from two of Infocom's Enchanter trilogy. As any Infocom's aficionado will know, the standard punishment for wandering in the dark without benefit of lamp or other source of light is to be pounced on by a grue and immediately done to death.

Not all of Infocom's adventures star these feared (yet strangely welcome) denizens of the dark, but even so they do seem to crop up fairly regularly, I'm pleased to say.

In Brian Moriarty's new adventure, Trinity, reviewed in this month's issue of Atari ST User, the mere mention of a grue meets with a sigh as a response. Although grues fail to put in an appearance in this one, their omission is more than made up for by the inclusion of one of the most fearsome-looking Barrow Wights it's ever been my misfortune to meet up with.

Go and get Trinity - it's marvelous. And be sure to visit the one-eyed cutie.

Finally what do you think about seeing direct, but simply coded, solutions to problems in Atari User? Would you rather they weren't coded at all? Or perhaps, like some adventurers, you might prefer not to be given solutions, but instead would rather have cryptic clues so that some of the brainwork is still left up to you.

I'm sure you've got strong views on the subject, so why not write in and let me hear them?

GLITCHES OF THE MONTH

This month two illustrious adventure companies to have their glitches revealed for all to see.

Firstly, in Infocom's Trinity, you'll eventually find yourself standing by a waterfall. If you then type GET WET, you'll receive the Daisiesque response: "You're already holding the handful of honey."

Secondly, when you're in front of the guru's hut in Rainbird's The Pawn say CLIMB THE HUT. You won't end up on the roof as hoped but merely inside the hut - it must be open-topped.

HINTS 'N' TIPS

LORDS OF TIME

Having problems in the amphitheatre? To deal with the lion:

NOIL EHTT ATEN EHTW ORHT
TNED IRTE HTWO RHT
To elude the gladiator:

SLAD NASD EGNI WEHT RAEW
Can't pass the invention room?

HTUO SGNH EHTA KERU ETUO HS

THE PRICE OF MAGIK

Want to help the ghost and get the plate armour?

TPYR CEHT NISE NOBD NALL UKSE NOBE LKCU

NKEH TYRU B
Can't see in the dark?

NEDR AGBR EEHE TMOR FTHG IRBE YEEH TTEG
SEYE NITH GIRB EVER UR
What use is the wargame on the large table near the roof garden?

KNG AMHT IWTI EKAW UOYF ILLE PSAN RAEL LLIW UOY

RED MOON

To carry the sword from the forge:

SEVO LGRE HTAE LEHT RAEW
Problems in the metal room?
STOO BNOT GNIL LEWE HTRA EW

SORCERER
This adventure features, for the first time, an actual grue's lair. However, these are no ordinary grues but mutations – they aren't scared of lights.
So just how do you manage to get them, for get by them you must?

When you meet a grue in the dark in this adventure, and in Spellbreaker, have you ever seen what happens when you attempt to FROTZ GRUE?

SPELLBREAKER
In this final and toughest part of the excellent Enchanter trilogy, there's a grue cave which is simply teeming with the nasty brutes. There's only one way to survive this gruesome experience.

EVAC EURG EHTO TNIT HGOIL YNAY RRAAC TONO D ENOO TNIIN RUTF LIWU OYDN AEUR GAG IVAN S
As soon as you've completed the above, perhaps for fun you might like to try the following. They won't help you to escape but they're a giggle!

REVA LS
EURG AKCA TTA
EURG A TA KOOL

Lastly, when you first enter the cave, have a go at YOMINing a grue.
ATTENTION ALL CLUB MEMBERS!

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ROBUST KIT CONSISTS OF 8 UTILITIES THAT USE THE GEM ENVIRONMENT. They will help you in a very simple way to get more speed and power from your ST computer.

PRINTER SPOOFLER: This utility makes it possible to use your computer when you are printing.

RAM DISK: This utility will speed up your file operations, saving you hours of time.

DISK COPY: A utility that helps you make backups and format disks at a much easier and faster speed then normal.

DISK UTILITIES: Are a set of three programs that will help you to control and organise your disk drive directory. It is now very easy to keep an accurate library of all your disks.

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ATARI ST KEY

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ATARI DB-CALC

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COMING SOON GAMES COMPREHENSIVE AND ACCOUNTS PACKAGE

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October 1986 ATARI USER 49
More special offers to Atari users

Mercenary was a smash hit when it was released last year. Now Novagen have produced a new dataset to load into Mercenary. The Second City is crammed with even greater challenges, and has moved our independent reviewer to describe it as: "A classic game... a heady mix of flight simulation, strategy and arcade action using incredibly fast 3D vector graphics."

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<thead>
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<th>Retail price</th>
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<td></td>
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PLEASE NOTE
To play The Second City you must also have a copy of Mercenary. Both programs require 48k and work with the Atari 400, 800 and the XL and XE range.

If you already have a subscription which does not expire for several months, you can re-order early to take advantage of these special offers.

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"...an unmissable bargain, grasshopper" says Bob Chappell, software reviewer.
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Helping relieve famine

MICROLINK was used to keep track of progress in a nationwide computer game marathon which raised more than £5,000 for Ethiopian famine relief.

The event involved micro owners all over the country playing the cult role-playing adventure Dungeons and Dragons.

Two teams of nine took part in a stamina-sapping Dragonathon at the Trafalgar Square Community Centre in London and wrote themselves into the Guinness Book of Records after 84 continuous hours.

Other major Dragon Aid events were held simultaneously at Aberdeen and Basingstoke, and hundreds of mini marathons took place in family living rooms throughout Britain.

Organiser Adrian Mars said the on-line adventurers raised at least half of the £5,000 which will go to Bob Geldof’s Band Aid Trust.

RADIO FANS ARE TUNING IN TO MICROLINK

WHILE its 38,000 members communicate with one another across the ether, the Radio Society of Great Britain has been conducting its business closer to the ground via telephone, snail mail and traditional telex.

But all that is changing thanks to the society’s group of mailboxes on MicroLink.

Chief executive David Evans says: “We are using MicroLink as a means of exchanging information between myself and a large number of members in the field who serve on our 16 committees, and other individuals both nationally and internationally.

“Being a commercial organisation, by law we cannot use the airwaves to conduct our business as the national organisation for radio amateurs in the UK.

“We represent the licensed amateur at government level and also publish books, magazines and technical material under 25 different titles.

“A remarkable two-thirds of our members are micro owners and we hope MicroLink will eventually be used for much of our committee work and the transmission of material for our publications, taking the place of ordinary telex and, to a certain extent, the telephone”.

Sales link

WHEN MicroLink subscriber John Heritage heard that friends of his were having difficulty selling their house he came up with a bright idea.

Why not advertise the £84,950 det. des. res. in Fleet, Hampshire, on MicroLink’s bulletin board? He duly did and within a few hours recorded more than 20 responses from other subscribers intrigued by the special offer of “at least three per cent discount” for MicroLink members.

But before the offers started rolling in the property was sold through normal channels.

Here’s YOUR chance to join MicroLink

All you need to use MicroLink is a computer, modem, appropriate communications software and a telephone. Fill in this coupon below for details on how to join:

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POST TO: MicroLink, Europa House, 68 Chester Road, Hazel Grove, Stockport SK7 5NY.

Sunny solution

OUT on the sunny Costa Blanca, David Corcoran is spreading the word about MicroLink to Spanish-based business people and fellow expatriates.

Corcoran, whose background is in insurance, believes there’s a real need for fast, reliable communications among a community that has strong ties with other countries, particularly the UK. He has been living in Alicante for 18 months, setting up a company providing computers, modems, acoustic couplers and comm software to Spanish residents with links abroad.

He has made MicroLink his choice as the recommended communications system for his clients, setting a target of 500 new mailboxes in the first year.
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**STRIP POKER**
Seduce in on aizzling evening of Strip Poker. Our new Hi-rated program with graphics so realistic that we can’t illustrate what you see when you play. Strip Poker comes with Scott and Massa, two gorgeous opponents, each with their own style of play. The more chips you win, the more they take. Additional data disks available providing the user with a variety of new women (and men) to play against.

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