Turn your Atari into a psychotherapist

The ST in colour: amazing pictures  Guy Fawkes: sparkling fast-action arcade game  Fifty Chop Suey games to be won
If you run any kind of cash-based business and you want total financial control without knowing anything about accounting, take a look at Cash Trader. It's been designed to address the problems you most commonly face in running your business and to solve them, simply.

**No knowledge of accounting?** If you want to distinguish income and expenditure, you can run your book-keeping and accounts with Cash Trader.

**Can't type?** Most Cash Trader operations involve using arrow-keys to select what you want to do from a menu of options – typing is reduced to an absolute minimum.

**Randomly accumulated piles of paperwork?** Simply enter them as they accumulate – Cash Trader puts an end to pre-sorting into type and date order.

**Not quite sure of the state of your business?** As you enter each transaction, your Profit and Loss Account and Balance Sheet are instantly updated and are constantly displayed, being up to date, on the upper part of the screen.

**Bogged down by VAT?** Cash Trader automatically extracts and accumulates VAT and reports on all VAT transactions.

**Can't use a computer?** A comprehensive manual containing easy-to-understand figures and step-by-step examples is the first step; the Cash Trader program also contains a number of training exercises which you must master before you can use it with your actual business figures.

In addition to these features, Cash Trader also gives you total flexibility in creating your own analysis headings and with Analyser, a module which extracts information under any criteria you care to define, you can produce reports and analyses at the touch of a key.

H. L. Goodwin and Co., Ltd recognises the suitability of Cash Trader records for VAT purposes and, as a recent review concluded: "Cash Trader will be welcomed by accountants and auditors alike and should pay for itself within a month."

---

**THE END OF THE BOOK-KEEPING & VAT NIGHTMARE**

To see Cash Trader in action is to appreciate its benefits instantly, so for a demonstration copy, fill in the form below and send it to Quest today. Of course, if you're already convinced it can help you run a more efficient and profitable business, there's no need to have a demonstration first.

---

**BEWARE OF MORE EXPENSIVE IMITATIONS!**

QL Cash Trader, available from Sinclair Research Ltd and its stockists.

---

Please send me CASH TRADER @ £14.95 inc. VAT.

Please send me CASH TRADER with ANALYSER @ £149.45 inc. VAT.

Please send me an evaluation copy @ £17.20 inc. VAT.

Please send me further information.

---

Microcomputer in use

Name

Address

Tel. No.

No. of employees

Type of Business

---

I enclose a cheque for

Please make cheques payable to

Quest International Computers Ltd.,

Quest International Computers Limited, School Lane, Chandlers Ford, Hampshire SO5 3YV Tel: (04205) 66621 Telex: 47326 QUEST G

---

Evaluation copies are usable but a restriction on the number of entries exists: on payment of the balance (£37.75 for Cash Trader only, £132.25 for Cash Trader with Analyser) you will be given a password to remove the restriction and enable full use to be made.

---

2 ATARI USER November 1985
SOFTWARE FOR THE ATARI ST

METACOMCO PRESENTS ITS NEW RANGE OF SOFTWARE FOR THE ATARI ST: A SET OF POWERFUL PROGRAMMING LANGUAGES FOR PEOPLE WHO WANT TO WRITE PROGRAMS FOR THE ST.

MACRO ASSEMBLER  £49.95
A high specification macro assembler, complete with linker and screen editor. Assembler is a fundamental language, useful for all kinds of programming - particularly where speed and compactness are important. Essential for all serious programmers who want to exploit the ST's full potential.

META PASCAL  £89.95
A powerful Pascal compiler designed to meet the exacting ISO standard. This Pascal is already widely used on the Sinclair QL and the Commodore Amiga. A fast, single pass compiler, generating native code. Complete with screen editor and an extensive user manual.

AVAILABLE SOON:

LATTICE C
The well known Lattice C compiler: a full Kernighan and Ritchie implementation with comprehensive libraries.

ALL METACOMCO'S LANGUAGES FOR THE ATARI ST INCLUDE METACOMCO'S POPULAR SCREEN EDITOR, AND A DETAILED MANUAL.

Metacomco are leading suppliers of systems software for 68000 based microcomputers. As well as these titles for the Atari ST, Metacomco have a very successful range of programming languages for the Sinclair QL, now widely used throughout the world. Metacomco was also chosen by Commodore to provide the operating system and a suite of languages for the new Amiga computer.

METACOMCO  26 PORTLAND SQUARE, BRISTOL BS2 8RZ, UK.
TELEPHONE: BRISTOL (0272) 428781
Prices include VAT and P&P UK mainland only. Delivery allow up to 28 days.

PHONE TODAY, OR POST THIS COUPON TO: METACOMCO, 26 PORTLAND SQUARE, BRISTOL BS2 8RZ.
PLEASE SEND ME: I ENCLOSE A CHEQUE FOR £ OR DEBIT
MACRO ASSEMBLER  £49.95  MY ACCESS/VISA NO. ____________________________
FOR THE ATARI ST  CARD EXPIRY DATE
META PASCAL  £89.95  NAME
FOR THE ATARI ST  ADDRESS
MORE INFORMATION
SIGNATURE  POSTCODE  TEL. NO

November 1985  ATARI USER  3
Software
Bob Chappell works his little fingers to the bone this month, assisted by David Andrews. Together they bring you this month’s software reviews.

Microscope
A detailed look at a program to draw and fill a circle.

Display List
Mike Rowe gets to grips with horizontal scrolling in Part V of his series.

Converse
Teach your Atari to be a psychotherapist and learn about file handling into the bargain.

Adventuring
Brillig gives his views on Level 9’s new Red Moon – their first Atari adventure with graphics.

Bit Wise
Mike Bibby concludes his series on the intricacies of binary numbers.

Mailbag
Five pages of your letters – questions answered, praise graciously accepted.

Order Form
One simple form on which you can order everything from a dust cover to a monthly cassette.

Beginners
How long is a string? Read Mike Bibby’s regular guide through the programming jungle and find out.

Utility
Kevin Edwards presents a useful subroutine to provide bitwise operators.

CREEPSHOW!
Superb machine code pinball game is FREE with this months disc and tape.

See Page 60
..And you thought you'd seen a Karate game

As you know, like the Martial Arts, Perfection is the only accepted standard, so play nothing until you play — SYSTEM 3's — INTERNATIONAL KARATE

For the Spectrum, C.64, Amstrad and all 48k Ataris at ONLY

£6.50
No flood of cut-price STs, says Atari

ATARI UK has described reports of cut-price 520STs flooding into the country through the back door as "suspect to say the least". The company has investigated several stories concerning possible black market machines and found them to be without foundation.

"All the leads we have followed up in this area have proved to be fruitless", says Max Bambridge, Atari UK's general manager.

"Naturally because of the intense interest generated by the 520ST some people will have gone to considerable lengths to get their hands on them", he said.

"But if there is such a market it is much more likely to be grey rather than black".

However one major distributor still insists there is an under-the-counter operation involving hundreds of machines. These are allegedly being offered for sale at discounts of more than £70.

These claims come from Tony Deane, a director of Silica Shop, the Atari distributor for Greater London south of the Thames, Sussex, Kent and Middlesex.

"We believe that these machines are coming in via the back door from sources in the Far East and Holland", he told Atari User.

"We know this to be true because dealers in our own area have bought them. This is all making a mockery of the Atari distribution plan for the ST which effectively carved the company up into regions".

Tony Deane added a warning for both dealers and customers that they may well get their fingers burned if they do not buy from legitimate sources.

"If a machine has not been purchased through normal channels the guarantee is not valid", he said. "So if it goes wrong there is no comeback for the buyer.

"Then they will realise that, even if they have bought it cheaply it certainly won't be good value for money".

Drive on schools

ATARI is poised to gain a foothold in the UK educational market with a discount scheme aimed at schools and colleges.

The company has announced that it is offering 10 per cent off all 8 bit computer hardware, peripherals and software.

In addition it is aiming to win over the colleges with 15 per cent off the ST machines and their associated peripherals and software.

The Mac basher

A BENCHMARK test of computer speed has proved conclusively that the 520ST can show a clean pair of heels to the Apple Macintosh.

Set up by Antic, an American computer magazine, it saw the Atari flagship machine execute a program in 3.8 seconds which took the Mac from 7 to 13 seconds.

By turning in a time of 3.8 seconds, the 520ST revealed itself to be as fast as minicomputers running on the Unix system.

ATARI has targeted a potential worldwide market of up to 20 million customers for the ST range.

This was revealed by the corporation's chairman Jack Tramiel during a recent visit to London.

Discussing the long term strategy behind the global marketing of the ST, he told Atari User: "What we have out there are 20 million people who have already bought 8 bit machines. "Now these people are looking to upgrade them. They want something that's faster and easier and at the right price. Well that is just what Atari is offering them".

Jack Tramiel believes that his team will set the pace because its members have a better understanding of what the end user really wants.

"The majority of manufacturers do not understand the customer", he insists. "All of them believe that with advertising they can reach the position that General Motors once held. That being they were able to persuade people that all they wanted out of life was a yellow car.

"Well that was okay until the Japanese arrived and offered blue cars of better quality at a lower price. Suddenly nobody wanted the yellow cars any more. "That's what is now happening in the computer industry".

The outspoken entrepreneur is unfailing in his belief that it will be the informed computer user who will make Atari number one.

"When I left Commodore I knew that the only way to bring this business back alive was to continue my philosophy of giving the end user – the most intelligent person in our society – the best technology available at the time", says Jack Tramiel.

"As far as I am concerned he has had enough of 8 bit products, even with all the advertising that's been done.

"The launch of the ST was the best I have been involved in since the beginning. It proved to me once again that the end user knows best what he wants."
Atari 'seal of approval' for top software

Atari has already decided on its first winners and one company which has fared extremely well in the listings is distributor Software Express.

The distributor's approved titles are Earthviews, The Factory, Paperclip, Syncalc, B-Graph, Action!, Basic XD, Bank Street Music Writer, Print Shop, Hitch Hiker's Guide, Kennedy Approach and Space Base, a number of which are American imports.

Ariolasoft was next in line with Seven Cities of Gold, a 130XE version of Paperclip and B-Graph.

Also included were Rescue from Fractulus and Ballblazer from Activision, Zorro and Kennedy Approach from US Gold, Microbase from Silicon and P-Forth from Bignose Software.

Atari have been commended on the approval scheme by Miko Rowlands-Jones of Software Express. "It is not only a good incentive for the software houses, but a great help to customers", he said.

"Customers usually have several titles of a similar nature to choose from. If they see a label of approval from the machine's manufacturer they at least know it must have something going for it".

"In the charts approval is given to a title because it is in the top ten that week. In three months it could be gone. I believe the titles which should be rewarded - and there are some out there - are the classics".

The approval scheme has already taken off in America and is working well, said Rowlands-Jones. "And it will work here as long as it is not a five minute publicity gimmick. It needs publicising and for all software houses to become involved".

Video digitiser launch

A VIDEO digitiser for the Atari 800, 800XL and 130XE has been produced by Stem Computing. Called Computereyes, it has been adapted for the British and European PAL video standard from the original NTSC model designed and manufactured by Digital Vision in the USA.

Computereyes will digitise from any standard video source including video recorder and video disc.

Images are placed in the hi-res graphics area and can be saved to disc if desired. Special high contrast and grey-scale capture routines are included. The system costs £139.

Double challenge on the ST

TALENT Computer Systems is providing users of the 520ST with a double challenge in its latest release.

The single 3.5in disc includes two fast paced adventures - West and The Lost Kingdom of Zkul.

West acts as an introduction to the more demanding dungeons and dragons scenario of Zkul. The aim is to track down a notorious gang of bank robbers who have gone to ground in an abandoned mine in Indian territory.

There is gold to be collected, clues to be solved, and Indians, rattlesnakes and robbers' bullets to dodge in more than 130 locations.

Zkul is a classic and complex adventure with in excess of 200 locations and a huge vocabulary.

Users must find the last refuge of the dwarves, the Domed City, and the precious secret of the old civilisation.

It is a real time adventure with tasks to complete, puzzles to solve and mazes to negotiate. The two-in-one disc costs £24.95.

Pascal for ST

FORTRAN 77 and Pascal are to be developed for the Atari ST by Prospero Software, which hopes to have the two language programs available at the end of this year.

Computer links for churches

THE recently-formed Christian Micro Users Association has begun its work of linking together computer users of various denominations and promoting the use of micros in church activities.

Association secretary Philip Clark told Atari User: 'There is a great need to discover and make contact with the individuals and companies producing 'Christian software'.

'We also need to share the expertise and ideas of the many who have sought to use micros in their church-related activities'.

The aim of CMUA is to concentrate on the popular computers like the Atari and it has already unearthed a significant number of programs based on Bible studies.

The Association intends to produce a quarterly magazine called Christian Micro and, from next January, launch a series of tape magazines for specific micros.

Its other activities will include the formation of local groups.
**PROTEUS ON ITS WAY**

A SECRET software product with the code name Proteus is currently being developed at the London headquarters of Softek.

It is an integrated suite of programs which has been designed, says the company, to sit on top of GEM.

"There has been nothing like it seen on the market before", says Tim Langdell of Softek. "We are convinced it will rival both Jazz and Symphony in its impact."

---

**Dutch schools go for the 800XL**

DUTCH children have begun to learn about computing, and the Atari 800XL is the machine chosen by the education authorities to do for Holland what the BBC Micro did for Britain.

A series of radio and television programs featuring the 800XL is being broadcast to Dutch elementary schools.

Its aim is to introduce youngsters to information technology and smooth the process of learning to use micros.

The project is being supervised by the Dutch school radio foundation SNS, a combination of the school radio services of AVRO and VARA, founded in 1951.

Other participants involved, apart from SNS and Atari, are the department of education at Amsterdam University and Wolters Software.

Atari Benelux sales and marketing manager Wilfred de Graaf says the project could lead to sales of more than 100,000 800XLs in Holland.

Pupils will learn the history of communication, how to use the 800XL, solving problems by computer, programming and other skills.

The SNS is encouraging pupils and teachers to develop their own software to add to the library of programs broadcast on the schools radio network for downloading onto cassette.

Two 15 minute television programs featuring the 800XL will be broadcast each week in the afternoon so that they can be watched during school lessons.

---

**Mohawks take the Atari trail**

BIG Chief Jack Tramel has come to the aid of the Mohawk Indians in Canada, the country where he had some of his earliest business successes.

The Atari boss presented the first of 10 520STs to band councillor Murray Macaque at the 1985 Computer Fair in Toronto.

The machines will be used for training at the First Nations Technical Institute, but their donation is of much greater value than that to the Indians.

For Atari has commissioned the Mohawks educational arm to develop a syllabic font for use in developing software in the many North American Indian languages.

The syllabic font will be based on an alphabet of pictogram-like marks, or picture symbols, developed to represent words and phrases in the Indian tongues.

When the development work is done the Mohawks will become value added resellers for Atari, marketing the 520ST to native groups all over the North American continent.

The idea of developing a syllabic font for use with the 520ST was discussed during meetings between the Mohawks and Atari Canada.

"Being a good Canadian, and the Indians have been here long before us, we thought why don't we try to do something for them", says Atari Canada general manager Ian Kennedy.

"Then we spoke to Jack Tramel about it and he thought it was a great idea and sanctioned the donation of the 10 machines for training and software development."

---

**Enhanced Gem is forecast**

A MAJOR row between the Apple Corporation and Digital Research has been settled in such a way that Atari may emerge as the eventual winner.

Digital Research has agreed to pay Apple an undisclosed sum and amend its Gem programs to avoid any possible infringement of copyright.

It is these programs that are being offered with the new ST range of micros.

One result of the compromise settlement is that new versions of Gem are to be produced, "designed to be substantially different to Apple's Macintosh personal computer in both screen appearance and operation."

This is viewed by the industry as a move by Apple to counteract Gem providing the ST with a Macintosh type environment. For this had already earned the Atari machine — some half the price of the Mac — its nickname of the Jackintosh.

However, Max Bambridge, Atari UK's boss, seemed unperturbed by the news when it was broken to him by Atari User.

"As this involves an agreement with which we are not directly involved, it is really nothing to do with us", he said.

"But it would seem safe to say that if the Gem packages available for the ST have to be changed they will naturally be improved.

"And this may well mean that the ST will be able to score even more heavily against the Macintosh."

Meanwhile Apple has disclosed that it has pressured Digital Research to take immediate action in the modification of three specific programs — Gem Desktop, Gem Paint and Gem Draw.

However, until the new versions of these become available, the current ones are available for the ST — will still be marketed.

Digital Research has given the assurance that all its present range of programs for the ST will operate in any future Gem environment.

November 1985, ATARI USER
## Hardware

<table>
<thead>
<tr>
<th>Item</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>130XE COMPUTER 128K</td>
<td>Call</td>
</tr>
<tr>
<td>130XE/1050 PACK including software</td>
<td>265.00</td>
</tr>
<tr>
<td>880 Interface</td>
<td>99.99</td>
</tr>
<tr>
<td>1029 DOT MATRIX PRINTER</td>
<td>199.99</td>
</tr>
<tr>
<td>WS2000 MODEM</td>
<td>149.55</td>
</tr>
<tr>
<td>MODEM INTERFACE c/w Viewterm software</td>
<td>59.95</td>
</tr>
</tbody>
</table>

## Simulations

<table>
<thead>
<tr>
<th>Name</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sublogic FS.11</td>
<td>(D) 43.95</td>
</tr>
<tr>
<td>F15 Strike Eagle</td>
<td>(D) 14.95</td>
</tr>
<tr>
<td>Solo Flight</td>
<td>(C/D) 9.95/14.95</td>
</tr>
<tr>
<td>Space Shuttle</td>
<td>(R) 19.95</td>
</tr>
<tr>
<td>Spitfire Ace</td>
<td>(C/D) 9.95/14.95</td>
</tr>
</tbody>
</table>

## Strategy

<table>
<thead>
<tr>
<th>Name</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Broadsides</td>
<td>(D) 33.95</td>
</tr>
<tr>
<td>Colossus Chess 3.0</td>
<td>(C/D) 9.95/12.95</td>
</tr>
<tr>
<td>Operation Market Garden</td>
<td>55.95</td>
</tr>
<tr>
<td>Computer Ambush</td>
<td>49.95</td>
</tr>
<tr>
<td>Battalion Commander</td>
<td>Call</td>
</tr>
<tr>
<td>Panzer Grenadier</td>
<td>Call</td>
</tr>
<tr>
<td>Eagles</td>
<td>(D) 33.95</td>
</tr>
<tr>
<td>Field of Fire</td>
<td>(D) 33.95</td>
</tr>
<tr>
<td>Fortress</td>
<td>(D) 29.50</td>
</tr>
<tr>
<td>Gemstone Warrior</td>
<td>36.95</td>
</tr>
<tr>
<td>Kampfergruppe</td>
<td>55.95</td>
</tr>
<tr>
<td>Rails West</td>
<td>(D) 62.75</td>
</tr>
<tr>
<td>Reforger 88°</td>
<td>(D) 45.95</td>
</tr>
<tr>
<td>Computer</td>
<td>Quarterback (D) 37.95</td>
</tr>
</tbody>
</table>

## Entertainment

<table>
<thead>
<tr>
<th>Name</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Zone Ranger</td>
<td>(R) 19.95</td>
</tr>
<tr>
<td>Mig Alley Ace</td>
<td>(C/D) 9.95/14.95</td>
</tr>
<tr>
<td>Pinball Construction</td>
<td>(D) 14.95</td>
</tr>
<tr>
<td>Seven Cities of Gold</td>
<td>(D) 14.95</td>
</tr>
<tr>
<td>Conan</td>
<td>(D) 14.95</td>
</tr>
<tr>
<td>Music Construction Kit</td>
<td>(D) 14.95</td>
</tr>
<tr>
<td>Whirlwords</td>
<td>(C) 9.95</td>
</tr>
<tr>
<td>Blue Max 2001</td>
<td>Call</td>
</tr>
<tr>
<td>One on One</td>
<td>(C/D) 9.95/12.95</td>
</tr>
<tr>
<td>Chop Suey</td>
<td>(C/D) 8.95/12.95</td>
</tr>
<tr>
<td>Mercenary</td>
<td>(C/D) 9.95/12.95</td>
</tr>
</tbody>
</table>

## InfoComs Invisicquels

<table>
<thead>
<tr>
<th>Name</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hitch Hikers Guide Guide</td>
<td>8.95</td>
</tr>
<tr>
<td>Cut Throats</td>
<td>6.95</td>
</tr>
<tr>
<td>Suspect</td>
<td>6.95</td>
</tr>
<tr>
<td>Available Now</td>
<td></td>
</tr>
</tbody>
</table>

## ATARI 520 ST

<table>
<thead>
<tr>
<th>Name</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>512k Personal Computer</td>
<td></td>
</tr>
<tr>
<td>Monitor</td>
<td></td>
</tr>
<tr>
<td>500k Disk drive</td>
<td></td>
</tr>
<tr>
<td>£749.99</td>
<td></td>
</tr>
</tbody>
</table>

## Additional Hardware

<table>
<thead>
<tr>
<th>Name</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Colour Monitors (various)</td>
<td>Call</td>
</tr>
<tr>
<td>Printer (various)</td>
<td>Call</td>
</tr>
<tr>
<td>3/4MB Disk drives</td>
<td>Call</td>
</tr>
<tr>
<td>Cables</td>
<td>Made to order</td>
</tr>
</tbody>
</table>

## Software

<table>
<thead>
<tr>
<th>Name</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Zork 1, Wishbringer, Hitchhikers Guide</td>
<td>Now</td>
</tr>
<tr>
<td>Assembler/Editor, Spreadsheet, VIP</td>
<td>Now</td>
</tr>
</tbody>
</table>

## Utility

<table>
<thead>
<tr>
<th>Name</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basic XE (R+D)</td>
<td>75.00</td>
</tr>
<tr>
<td>Action</td>
<td>(R) 75.00</td>
</tr>
<tr>
<td>Action Tool Kit</td>
<td>(D) 27.95</td>
</tr>
<tr>
<td>Basic XL</td>
<td>(R) 60.00</td>
</tr>
<tr>
<td>Basic XL Tool Kit</td>
<td>(D) 27.95</td>
</tr>
<tr>
<td>The Writers Tool</td>
<td>75.00</td>
</tr>
<tr>
<td>MAC/65</td>
<td>(R) 75.00</td>
</tr>
<tr>
<td>MAC/65 Tool Kit</td>
<td>(D) 27.95</td>
</tr>
<tr>
<td>US Doublor</td>
<td>79.95</td>
</tr>
<tr>
<td>80 Column Chip</td>
<td>69.95</td>
</tr>
</tbody>
</table>

## Special Offers

<table>
<thead>
<tr>
<th>Offer</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>800XL/Joystick/Game</td>
<td>69.99</td>
</tr>
<tr>
<td>800XL/1010 + software</td>
<td>99.99</td>
</tr>
<tr>
<td>1020 Printer/Touch tablet+S/W</td>
<td>109.99</td>
</tr>
<tr>
<td>Antic + Analog back issues</td>
<td>2.00</td>
</tr>
</tbody>
</table>

**PHONE US FIRST**

**HOTLINE**

(021) 384 5080

**MONDAY TO SATURDAY**

**SEND SAE FOR OUR PRICE LIST.**

**31 STONEYHURST ROAD**

**ERDINGTON, BIRMINGHAM B24 8HA**

10 ATARI USER November 1985
BELIEVE it or not — but MicroLink’s subscribers in Australia can have a Telemessage delivered in England before they actually send it!

This feat of telecomputing wizardry is made possible by the speed of MicroLink’s electronic mail service and the ten hour time difference between the UK and Australia’s east coast.

Say, for instance, MicroLink subscriber Ned Kelly is waiting for his morning billy to boil in Sydney when he remembers with horror that it’s the birthday of Liza Doolitle, the shell he met on holiday in Earls Court, and he hasn’t sent a card.

It’s 5.30am Tuesday — which is 7.30 Monday evening at MicroLink’s nerve centre, and half an hour before the deadline for guaranteed next day delivery of Telemessages.

Ned hastily scribbles out a few affectionate words and soon has the greeting safely transmitted to MicroLink, from where it is passed on to Liza’s local delivery office.

In common with her fellow market flower sellers, Liza gets her mail very early, so Ned’s birthday greeting arrives on a colour card at 5.15 Tuesday morning — half an hour before he transmitted it to MicroLink.

Even better news for Ned — because Australia is on the International PacketSwitch-Stream network he is able to shoot his message across 10,500 miles for the equivalent of about 15p. The MicroLink Telemessage itself costs him £1.95, plus 65p for the fancy greeting card.

So Ned’s long distance romance with Liza is saved for less than £2.

A MICROLINK member with a mission is Colonel K. A. Clagett, who until his retirement was head of telegraph and data systems at British Telecom headquarters.

As secretary to the Deanery of Clare in the Diocese of Ely, St. Edmunds and Ipswich he uses his Tandy Model I and Miracle Modem as often as possible to communicate by electronic mail and telex with other church officials.

And he is also a member of the Church Computer User Group, whose patron is the Archbishop of York and whose aim is to spread the gospel of high tech among church administrators.

A prime target for a telecomputing baptism is his Rural Dean, the Rev Andrew Haig, who has a Commodore 64 but hasn’t yet got a modem.

“I’m hoping he’ll obtain one very soon”, says Col. Clagett, “I can contact our Deanery Treasurer’s Apple II via Prestel and I can use MicroLink’s telex facility to communicate with the Diocesan Registrar.”

“What would really please me is for them all to be linked by the electronic mail service so we could show how telecomputing can help church administrators function more efficiently.”

SENDING a telex message overseas via MicroLink is now easier and faster. Previously when a system user was asked “Fix, Key plus or Code?” he had to access an alphabetical list of countries and read through it to get the appropriate code number of the country he was sending to.

Now he can just type in the name of the country, telex number, and the answer back code where appropriate, and press Return before typing in the text of the message he wants to send.
ST colour magic

THE 520ST sitting in the Atari User office has obviously been the centre of attention recently. However, it was almost the scene of tears a few days ago when three demonstration discs for the 520ST arrived from America.

Tears of elation, then? Not so for the package had been damaged in the post. Fortunately, the story has a happy ending. Despite the ramblings of the Director of Mail Processing in San Francisco on how “insecurely enclosed” mail could cause their machinery to jam, the three discs had survived intact.

The collective editorial sigh of relief was heard several offices away.

The monochrome pictures in the “slide show” demos were pretty impressive, but when we hooked up a colour monitor – kindly rushed to us by Silica Shop – everybody gaped in amazement. The quality is so good that we’ve reprinted them here. If you think they look good, you should see them in real life.
The 520 ST’s black and white performance is superb, too.
FREE!!!
ATARI
TOUCH TABLET
with a
130XE Computer

Compumart
Mega Deals

Best Price for
ATARI HARDWARE
In the U.K.

* Atari is a registered trade mark
of ATARI CORP.

Atari 130XE Computer
(with a FREE ATARI TOUCH TABLET!!!)

£159.95
+ £3 p&p

Atari 1050 Disk Drive
(with FREE Home File Manager, Payoff
Adventure & Demo Disks)

£169.95
+ £3 p&p

Atari 800XL & 1050 Disk Drive
(with FREE Home File Manager, Payoff
Adventure & Demo Disks)

£234.95
+ £3 p&p

Atari 130XE & 1050 Disk Drive
(with FREE Home File Manager, Payoff
Adventure & Demo Disks)

£259.95
+ £3 p&p

Goods despatched: SAME DAY – PARCEL POST
12 Month Warranty: ANY PRODUCT FOUND TO BE DEFECTIVE WITHIN 12 MONTHS OF
PURCHASE WILL BE REPLACED – FREE OF CHARGE

Please send cheques/postal orders to:
Compumart, (Dept )
71 Gracedieu Road, Loughborough
Leics. LE11 0GQ Tel (0509) 269259

SEE OUR AMAZING DEALS
ON BLANK DISKS
IN THIS ISSUE
### Communications Software

<table>
<thead>
<tr>
<th>Company</th>
<th>Product</th>
<th>Expected availability date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Haba Systems</td>
<td>Habacom</td>
<td>Now</td>
</tr>
<tr>
<td>Kuna Computers</td>
<td>K-Comm</td>
<td>Now</td>
</tr>
<tr>
<td>Mark of the Unicorn</td>
<td>PC/Intercom</td>
<td>Now</td>
</tr>
<tr>
<td>Mictronic</td>
<td>Mi-Term</td>
<td>Nov 85</td>
</tr>
<tr>
<td>Miracle Technology</td>
<td>Ascom/Prestel Comms</td>
<td>Dec 85</td>
</tr>
<tr>
<td>Softworks</td>
<td>Ascom/Prestel Comms</td>
<td>Jan 86</td>
</tr>
<tr>
<td>Software Punch</td>
<td>Local Area Network</td>
<td>Now</td>
</tr>
<tr>
<td>SST Systems</td>
<td>Chef</td>
<td>Now</td>
</tr>
</tbody>
</table>

### Personal and Home Finance

<table>
<thead>
<tr>
<th>Company</th>
<th>Product</th>
<th>Expected availability date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Haba Systems</td>
<td>Checkminder</td>
<td>Now</td>
</tr>
<tr>
<td>Micro End Inc</td>
<td>Home Accountant</td>
<td>Now</td>
</tr>
</tbody>
</table>

### Creative Software

<table>
<thead>
<tr>
<th>Company</th>
<th>Product</th>
<th>Expected availability date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Island Logic</td>
<td>The Music System</td>
<td>Jan 86</td>
</tr>
<tr>
<td>Mirrsoft</td>
<td>Fleet Street Editor</td>
<td>Feb 86</td>
</tr>
</tbody>
</table>

### Entertainment Software

<table>
<thead>
<tr>
<th>Company</th>
<th>Product</th>
<th>Expected availability date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bluechip Software</td>
<td>Baron</td>
<td>Dec 85</td>
</tr>
<tr>
<td>Bluechip Software</td>
<td>Tycoon</td>
<td>Dec 85</td>
</tr>
<tr>
<td>Bluechip Software</td>
<td>Millionaire</td>
<td>Dec 85</td>
</tr>
<tr>
<td>English Software</td>
<td>Hyperdrive</td>
<td>Nov 86</td>
</tr>
<tr>
<td>Firebird Software</td>
<td>Starglider</td>
<td>Dec 85</td>
</tr>
<tr>
<td>FTL/Oasis</td>
<td>Sundog – The Frozen Legacy</td>
<td>Now</td>
</tr>
<tr>
<td>Infocom</td>
<td>A Mind Forever Voyaging</td>
<td>Now</td>
</tr>
<tr>
<td>Infocom</td>
<td>Deadline</td>
<td>Now</td>
</tr>
<tr>
<td>Infocom</td>
<td>Suspect</td>
<td>Now</td>
</tr>
<tr>
<td>Infocom</td>
<td>Whirlwind</td>
<td>Now</td>
</tr>
<tr>
<td>Infocom</td>
<td>Hitch Hikers Guide to the Galaxy</td>
<td>Now</td>
</tr>
<tr>
<td>Infocom</td>
<td>Zork I</td>
<td>Now</td>
</tr>
<tr>
<td>Infocom</td>
<td>Zork II</td>
<td>Now</td>
</tr>
<tr>
<td>Infocom</td>
<td>Stercros</td>
<td>Now</td>
</tr>
<tr>
<td>Infocom</td>
<td>Cut Throat</td>
<td>Now</td>
</tr>
<tr>
<td>Infocom</td>
<td>Sorcerer</td>
<td>Now</td>
</tr>
<tr>
<td>Infocom</td>
<td>Enchanter</td>
<td>Now</td>
</tr>
<tr>
<td>Infocom</td>
<td>Infernal</td>
<td>Now</td>
</tr>
<tr>
<td>Infocom</td>
<td>Planerfall</td>
<td>Now</td>
</tr>
<tr>
<td>Infocom</td>
<td>Seastalker</td>
<td>Now</td>
</tr>
<tr>
<td>Infocom</td>
<td>Witness</td>
<td>Now</td>
</tr>
<tr>
<td>Infocom</td>
<td>Suspended</td>
<td>Now</td>
</tr>
<tr>
<td>Intelligant Software</td>
<td>Zork III</td>
<td>Now</td>
</tr>
<tr>
<td>Island Logic</td>
<td>Three Dimensional Chess</td>
<td>Dec 85</td>
</tr>
<tr>
<td>Limeback</td>
<td>Polygraph</td>
<td>Jan 86</td>
</tr>
<tr>
<td>Mark of the Unicorn</td>
<td>Colspace</td>
<td>Nov 85</td>
</tr>
<tr>
<td>Mictron</td>
<td>Hex</td>
<td>Now</td>
</tr>
<tr>
<td>Mictron</td>
<td>Flip Side</td>
<td>Now</td>
</tr>
<tr>
<td>Mictron</td>
<td>Goldrunner</td>
<td>Nov 85</td>
</tr>
<tr>
<td>Mictron</td>
<td>Mud Pies</td>
<td>Now</td>
</tr>
<tr>
<td>Mictron</td>
<td>Flight Simulator</td>
<td>Now</td>
</tr>
<tr>
<td>Microdeal</td>
<td>Lands of Havoc</td>
<td>Now</td>
</tr>
<tr>
<td>Panorama Software</td>
<td>Gaverns</td>
<td>Now</td>
</tr>
<tr>
<td>Penguin</td>
<td>Pensato</td>
<td>Now</td>
</tr>
<tr>
<td>Penguin</td>
<td>Transylvania</td>
<td>Now</td>
</tr>
<tr>
<td>Penguin</td>
<td>Xylophone</td>
<td>Now</td>
</tr>
<tr>
<td>Penguin</td>
<td>Crimson Crown</td>
<td>Now</td>
</tr>
<tr>
<td>Sierra On Line</td>
<td>Ultima II</td>
<td>Now</td>
</tr>
<tr>
<td>Sierra On Line</td>
<td>Kings Quest</td>
<td>Now</td>
</tr>
<tr>
<td>Sublogic</td>
<td>Flight Simulator II</td>
<td>Now</td>
</tr>
<tr>
<td>Sublogic</td>
<td>Jet</td>
<td>Now</td>
</tr>
<tr>
<td>Talent</td>
<td>The Lost Land of Ziku &amp; West</td>
<td>Now</td>
</tr>
</tbody>
</table>

### Word Processing

<table>
<thead>
<tr>
<th>Company</th>
<th>Product</th>
<th>Expected availability date</th>
</tr>
</thead>
<tbody>
<tr>
<td>BOS</td>
<td>Boxwriter</td>
<td>Now</td>
</tr>
<tr>
<td>BOS</td>
<td>Gemwriter</td>
<td>Now</td>
</tr>
<tr>
<td>Digital Research</td>
<td>Malimate</td>
<td>Now</td>
</tr>
<tr>
<td>Fvriter</td>
<td>Spellmate</td>
<td>Nov 85</td>
</tr>
<tr>
<td>Fvriter</td>
<td>Wordmate</td>
<td>Nov 85</td>
</tr>
<tr>
<td>Fvriter</td>
<td>Haba Letters</td>
<td>Now</td>
</tr>
<tr>
<td>Fvriter</td>
<td>Habaword</td>
<td>TBA</td>
</tr>
<tr>
<td>Fvriter</td>
<td>K-Word</td>
<td>TBA</td>
</tr>
<tr>
<td>Haba Systems</td>
<td>Mince Editor</td>
<td>Now</td>
</tr>
<tr>
<td>Haba Systems</td>
<td>ED</td>
<td>Now</td>
</tr>
<tr>
<td>Haba Systems</td>
<td>Express Letter Processor</td>
<td>Now</td>
</tr>
<tr>
<td>Kuna Computers</td>
<td>Superstar</td>
<td>Jan 86</td>
</tr>
<tr>
<td>Mark of the Unicorn</td>
<td>Word Processor</td>
<td>TBA</td>
</tr>
<tr>
<td>Metacomo</td>
<td>Spelling Checker</td>
<td>TBA</td>
</tr>
</tbody>
</table>

### Database

<table>
<thead>
<tr>
<th>Company</th>
<th>Product</th>
<th>Expected availability date</th>
</tr>
</thead>
<tbody>
<tr>
<td>BOS</td>
<td>Autoclerk</td>
<td>Now</td>
</tr>
<tr>
<td>BOS</td>
<td>Optimimx</td>
<td>Now</td>
</tr>
<tr>
<td>Databench</td>
<td>Optimum</td>
<td>Now</td>
</tr>
<tr>
<td>Fvriter</td>
<td>K-Date</td>
<td>Now</td>
</tr>
<tr>
<td>Fvriter</td>
<td>Laserbase</td>
<td>TBA</td>
</tr>
<tr>
<td>Fvriter</td>
<td>Superbase</td>
<td>Jan 86</td>
</tr>
<tr>
<td>Fvriter</td>
<td>Filemanager</td>
<td>TBA</td>
</tr>
<tr>
<td>Fvriter</td>
<td>DB Master</td>
<td>Now</td>
</tr>
<tr>
<td>Fvriter</td>
<td>Flex File</td>
<td>Jan 86</td>
</tr>
</tbody>
</table>

### Spreadsheet

<table>
<thead>
<tr>
<th>Company</th>
<th>Product</th>
<th>Expected availability date</th>
</tr>
</thead>
<tbody>
<tr>
<td>BOS</td>
<td>Boalplanner</td>
<td>Now</td>
</tr>
<tr>
<td>Haba Systems</td>
<td>Habacalc</td>
<td>TBA</td>
</tr>
</tbody>
</table>
Maybe it's fun to you—
but it's £6 an hour to your wife!

The computer that's been giving you such a fine time with computer
games is now ready to earn you some real money. Helping you to run
your own business or giving your wife the chance to earn £6 or more
an hour for word processing/secretarial work.

All because of the brilliant new word processing package,
SuperScript from MicroPro — the makers of Wordstar — the world's
best selling word processing packages for microcomputers.

SuperScript writes letters, invoices, reports,
tables, documents, filing stores, edits and
even checks spelling.

Versatile SuperScript SuperScript combines word processor,
spelling checker, calculator and mail-merge facility, all in one package. So
SuperScript gives you all the tools you need to produce high quality reports,
tables, lists, personalised letters and prints labels quickly and efficiently.

Simple for the beginner If you are a newcomer to word processing,
SuperScript puts you immediately at ease.
Each command is a single word, and for each command you simply move the
cursor. You don't even have to type the command.

Good with numbers SuperScript allows you to extend your editing,
lines to 250 columns for wide documents like financial statements, and with
decimal tabs it's easy to enter properly justified tables of numbers.
SuperScript's complete set of calculator functions can be used interactively or
you can operate on numbers from the text of your document. Apart from the
usual mathematical functions like add, subtract, multiply, divide, and
percentages, you have the ability to add rows, columns or even whole tables.

Good with spelling, too The build-in spelling checker gives right
through your text, checking for errors. You have the option to correct any error,
ignore it, or add the word to its 30,000 word dictionary.

Editing options SuperScript gives you all the editing options of a
business style word processor with full block manipulation for cut and paste;
overtype or text insertion modes; search and replace with pattern matching
and optional case discrimination; backward search, case shifts for single words
or larger blocks of text. And much more.

Powerful for the experienced user SuperScript also gives you the
ability to cut work down to a minimum by storing your own command
sequences or text on single keys. This means that with a single keystroke you
can reproduce common used phrases or multi-line address from a document stored
in document format or execute a pre-programmed sequence of operations.

Mailings with SuperScript Personalised mailings are easy with
SuperScript. You can enter the data manually or use data extracted from your
spreadsheet or database. Mailing labels can be selected. A mailing labels template
is included to help you complete your mailing and you can alter the template
to suit your own label format.

Attention Easy Script users! If you're already an Easy Script user,
then SuperScript is the obvious next step. With its enhanced features and more
powerful facilities, you'll be able to do so much more. There are no
compatibility problems either. You can run your Easy Script data or Easy Script
dictionary disks under SuperScript. And by returning your Easy Script disk
we can offer an upgrade for £49.95.

ORDER FORM

ORDER BY PHONE
ASK YOUR LOCAL DEALER FOR THE
SUPERSCRIPT PACKAGE
OR ORDER DIRECT BY PHONE:
0483 503121
QUOTING YOUR CREDIT CARD NUMBER OR BY
COMPLETING AND
RETURNING THE ORDER FORM WITH YOUR
CREDIT CARD DETAILS OR REMITTANCE

Name: ____________________________
Address: ____________________________
Postcode: ____________________________

If you are intending to use SuperScript for a specific purpose, we should be interested to have details. Thank You.

November 1985 ATARI USER 17
IT'S November 5th and the plot to blow up the Houses of Parliament has been foiled. Guy Fawkes has been discovered in the basement with a barrel of gunpowder, just about to light the fuse.

He's on the run now and the guards are hot on his tail. Every way he turns they seem to be more and more guards. Can you help him escape?

All he's got is the spade he used to dig his way into the basement. He can use this to dig holes in the floors.

With a bit of luck the guards won't see these and will fall into them. But be careful though. If you fall down one of the holes yourself you've had it.

Guy Fawkes is a fast ladders and levels game with 15 screens. There's a catchy tune to accompany the title page and instructions.

The screen is stored as data statements starting at line 5163 and the layout can be changed by changing the data.

You could also add another set and randomly select one or the other for variety if you're feeling adventurous.
A seasonal fast ladders and levels game by ROLAND WADDILOVE

VARIABLES

LIVES Lives left.
SCREEN Screen.
A(19,23) A copy of the screen.
B(30,1) The coordinates of the guards.
D(30) Whether the guards are alive or dead.
X, Y Your coordinates.
S The start of screen RAM.
OK Whether you are dead or alive.
L Number of guards left.

10 REM Guy Fawkes
20 REM By R.A.Waddilove
30 REM (C) Atari User
31 REM Written on Atari 400 XL
35 POKE 106,PEEK(106)-4:GRAPHICS 0
37 ?:"Thinking..."
40 GOSUB 5900:REM Initialise
50 GOSUB 8500:REM Instructions
100 LIVES=3:SCREEN=1
150 GOSUB 5000:REM Screen
160 GOSUB 6000:REM Start
200 GOSUB 1010:GOSUB 1585
300 IF OK AND L THEN 280
310 IF OK THEN SCREEN=SCREEN+1
320 IF NOT OK THEN GOSUB 7000
330 IF LIVES THEN 150
350 GOSUB 6500:REM Rating
400 GOTO 100:REM Another game
500 END
1010 P=5+X*Y%28:IF A(X,Y)=4 OR PEEK(P)
113 THEN OK=0:RETURN
1015 IF A(X,Y)=4 THEN I=X:J=Y:GOTO
1870
1020 IF STRIG(8)=0 AND D THEN A(X",Y"+
13=C:POKE P+1/8:0:RETURN
1050 JOY=STICK(D)<>X<>Y<113<>+1057)
1319=J=14<>L=13<>IF J<>0 THEN J='Y
1061 IF I<>0 OR D<19 THEN I=X
1065 IF A(X,J)=4 OR (I=X AND J<>Y) THEN
RETURN
1070 SOUND 0,50,10,8:85+X:J=28:IF PEE
K(D25)<>0 THEN OK=0
1090 POKE P,134+(X,Y)=2:POKE 0,133:
D=1-K:K=17:J=150000,0,0,0:RETURN
1500 REM ----- Move Guards ------
1590 SOUND 1,131,10,4:N=1:IF N=SCREEN
2 THEN N=0
1515 P=B(8),0:0:0:D=1:IF O<>N THEN
RETURN
1530 IF A(J,0)=4 THEN O(N)=1:POKE 54+1
0208,0:0:X=1:RETURN

November 1985  ATARI USER 19
Tired of typing? Take advantage of our finger-saving offer on Page 61.
Silicon Chip
No. 1 FOR ATARI*

Atari 520 ST

GUARANTEE
Our EXCLUSIVE Direct Exchange Guarantee is available FREE OF CHARGE to all our customers. If a product purchased from SILICON CHIP becomes faulty due to a manufacturing or component defect, within ONE YEAR of purchase, we will, subject to availability, exchange for new.

PRICES
ST PACK INCLUDES:
520 ST
½ Meg. Floppy Drive
Hi-Res B/W Monitor
Plus software listed below
£749.99
Basic. Logo. GEM WRITE, GEM PAINT and GEM BOS Operating Systems.
Final prices and specs may be subject to change.

POWER WITHOUT THE PRICE
Chipsoft Integrated Accounts Package:
Including Stock Control, Nominal, Sales and Purchase Ledgers £250
ST to Centronics Printer Lead £29.99
ST Midi Lead £14.99

SPECs
512K RAM. Expandable Rom.
MIDI Interface. RS232 Serial/Centronics Parallel Interface.
Floppy Disk and Hard Disks Interfaces. RGB Video and TV outputs. Sound Generator with 3 channels.
2 Joystick Ports. 3 Graphics and Text Modes –
320x200 = 512 colours, 640x200 = 4 colours, 640x400 B/W.
16 Bit Motorola 68000 Microprocessor running at 8 MHz.

SILICON CHIP LTD, Showroom address:
302 High Street, Slough, Berkshire. Tel: 0753 70639

* 1st Atari Business Centre.
* 1st Dealer for 130 XE.
* 1st Dealer for 1029 Printers.
* 1st Dealer with our own Software House for Software Support.
* 1st Dealer for 520 ST

Please phone or write for full details.
(Dealer Enquiries Welcome)
50 prizes in our great free competition

THIS month we're giving away 50 copies of Chop Suey, the great new Kung-Fu game, courtesy of English Software.

All you have to do is study the word square below and find as many names of Far Eastern countries as you can.

Then send the coupon back to us with the names neatly circled.

We also want you to tell us how many you discovered—we're not telling you how many there are, but it's in double figures!

Closing date for the competition is November 30 and the winners will be the first 50 correct entries picked out of the editorial hat.

It's not too hard, so why not enter? Remember, there are 50 chances of winning, so give it a try.

Chop Suey competition

Name ____________________________
_______________________________
_______________________________
_______________________________

Address ____________________________
_______________________________
_______________________________
_______________________________

Number of names found ______

Return by November 30, 1985 to Chop Suey Contest, Atari User, Europa House, 68 Chester Road, Hazel Grove, Stockport SK7 5NY.
SO far in this series we’ve looked at Modes 0 to 8. If you have one of the older Ataris or 800s that’s as far as you can go. This month’s article assumes that your machine has a particular chip which some early models lacked.

The chip in question is referred to as G1IA, or Graphics Television Interface Adaptor, and its predecessor was referred to as CT1A. Unless you’ve had your machine since 1981, the chances are that it contains the G1IA.

If you have got an old machine and don’t know which chip it contains, try entering Program 1, a simple routine which cycles through colours and luminances.

If you do have the G1IA the whole of your television screen will cycle through the colours because the border and background are indistinguishable. However if your machine contains the earlier CT1A the border will be a different colour from the background and so will be visible. Press Break or Reset to stop the program.

Assuming that you’re still with me then, I’ll take a look at modes 9, 10 and 11. You can access these in the same way as the other modes we’ve considered, using the Graphics command.

Press Reset to get an empty Mode 0 screen with the Ready prompt at the top. Now type:

```
GRAPHICS 9
```

and press Return. The brief flash you’ll see is Mode 9, but once the command has been executed the system reverts to Mode 0. If you want to see Mode 9 you’ve got to keep it there somehow.

In fact we saw the method used last month to keep a full-screen Mode 8. All that’s involved is putting the system into a never-ending loop. With a program you can simply use a line which GOTOs to itself. For example:

```
10 GRAPHICS 9
20 GOTO 20
```

In immediate execution mode you can use the FOR . . . NEXT construction to create an endless loop. For example, type:

```
FOR A=1 TO 2 STEP 0:
GRAPHICS 9:NEXT A
```

and press Return. The fact that we’ve used a step size of 0 means that A never reaches its upper limit so the loop goes on forever.

The blank screen which confronts you is Mode 9. Unfortunately there’s not much you can do with it in this state. The machine is locked in the loop and so most of the keys produce no response.

You can Break out of it, though, or Reset the machine.

Modes 9, 10 and 11 all have the same resolution of 192 rows x 80 columns with no possibility of a useful text window unless you’re prepared to use a display list interrupt and/or redefine the character set.

If you’ve been following Mike Rowe’s series in Atari User you’ll know what to do, but for now I’ll assume that these modes don’t have any text capabilities.

You can produce a Mode 9 screen with a separate window at the bottom very easily. Simply type GRAPHICS 8 and then POKE 623,64. However if you try this you’ll soon see why I used the phrase “useful text window” earlier.

In Mode 9 you can only use one colour, but you can have up to 16 luminances of that colour on the screen. Mode 11 is the opposite, with 16 available colours but only one luminance.

Mode 10 is a bit different in that it allows one background and eight foreground colours. However using these colours from Basic is not as simple as for the other two modes, so we’ll leave Mode 10 until the end.

In Modes 9 and 11 we use a combination of SETCOLOR and COLOR commands. Only colour register 4 is used, so in Mode 9 the
colour is selected with:

SETCOLOR 4,colour,0

while in Mode 11 the luminance is selected with:

SETCOLOR 4,0,luminance

In Mode 9 the COLOR command is used to select one of the 16 levels of luminance, while in Mode 11 the same command is used to select one of the 16 colours.

To see the difference between the two modes type in Program II and run it. This produces a simple Mode 9 starburst pattern which cycles through the colours and luminances. When you’ve had enough of that Break out and list the program. To convert it to Mode 11 we need to change lines 10 and 30.

Alter line 10 to read:

10 GRAPHICS 11:C=0

and alter line 30 to read:

30 SETCOLOR 4,0,C

If you now run the program you should see the same starburst pattern but in a multi-coloured single-luminance form rather than the single-coloured multi-luminance Mode 9 version.

You might think that having only one colour available, as in Mode 9, is a severe limitation on what you can display. However the fact that you can have 16 luminances means that you can produce some stunning 3D graphics.

Rather than tax my brain to produce an example of such a display, Program III does the job admirably. It was sent in to the *Atari User* offices by Dean Rossiter, of Wellingborough.

If you fancy a different colour you’ll need to alter line 10. As usual, a well-placed loop will cause the program to cycle through all the colours.

To see the sort of colourful effect that Mode 11 can give, enter and run Program IV. Its squashed appearance illustrates the pixel shape in these modes. With more rows than columns, pixels are long and thin.

Mode 10 allows nine independent colours, each with its own luminance, but there aren’t nine colour registers, are there? Certainly the SETCOLOR command can only be used to access registers 0 to 4.

This is the problem with colour selection in Mode 10. Some of the registers can be accessed via SETCOLOR but the others must have the appropriate value POKEd in.

Rather than try to mix the two
methods, I recommend that when using Mode 10 you always POKE the
colour registers. Of the two methods this is the only one which can be used
on all the registers, and so is simpler.

To be accurate, we don’t actually
poke the registers themselves. Rather, we poke their “shadows” in
RAM. However this is a detail which we need not take any further here.

The locations which contain the
colour information are 704 to 712. These locations correspond to the
commands COLOR 0 to COLOR 8 respectively.

The value which is poked into the
register needs to contain not only the *

10 REM Xök PENCILS WW
20 REM WW by WW
20 REM Xök BEAN ROSS ITRRN
30 GRAPHICS 11:SETCOLOR 4,2,0
30 X=1:Y=55:COLOR 1:POKE 77,0
30 DO SUB 1000:REM Xök PENCIL 1
301000:REM 1001:REM Xök PENCIL 2
300 40 LX=3:RY=55:Y=70:PK=67:PY=90
50 DO SUB 1000:REM Xök PENCIL 3
60 LX=10:RY=52:Y=64:PK=64:PY=76
70 DO SUB 1000:REM Xök PENCIL 4
80 POKE 77,0:GOTO 80
90 REM WW Main Routine WW
100 REM FOR T=2 TO 14:COLOR T
1000 POKE LX,Y:PRINT RH,Y
1001 T=1:T=1:PRINT Next T
1004 FOR T=1 TO 2 STEP -1:COLOR T
1005 POKE LX,Y:PRINT RH,Y
1006 Y=1:NEXT T
1007 T=2:T=2:PRINT NEXT T
1008 POKE PX,PY:PRINT RH,Y
1009 T=1:NEXT T
1010 FOR T=1 TO 2 STEP -1:COLOR T
1011 FOR T=1 TO 2 NEXT T
1012 T=1:NEXT T
1013 COLOR 0:POKE PX,PY:RETURN

Program III

to produce some interesting effects.
Suppose, for example, that we load
the registers with particular values.
We can then move the values “along”
one register and move the last value
back to the beginning.

This will have the effect of creating
a “circle” of colour, and we can use
this to produce an effect of
movement. If your eyes aren’t feeling
too tired, try entering Program V.

Lines 10 to 120 load the registers
with random values and then draw
bands of these colours across the
screen. Each band is five rows deep.
Lines 130 to 190 then shuffle the
registers around constantly, produc-
ing the movement effect.

Since the colour values are
selected randomly, the display will
be different each time you run the
program.

Use Break to give your eyes a rest
every now and then.

If you want to choose a random
background colour too, change line
30 to read:

30 FOR A=0 TO 8

Because these modes require the
GTIA chip, you’ll sometimes see them
referred to as the GTIA modes.

This chip’s job is to interpret the
data passed to it by the Antic chip,
and in fact Modes 9, 10 and 11 are
three different interpretations of
Mode 8. Consequently they require
the same amount of memory – 8k.

Next month we’ll finish off this
series with a look at Modes 12 to 15
which are available to XL and XE
owners from Basic.

10 C=0
20 GRAPHICS 10
30 FOR A=1 TO 8
40 POKE 704+4,INT (CROM (A)255)
50 NEXT A
60 FOR C=0 TO 188 STEP 5
70 C=C+1:IF C<7 THEN C=1
80 COLOR C
90 FOR Z=0 TO 4
100 POKE 8+2,1:POKE RH,Y
110 NEXT Z
120 NEXT Y
130 FOR PEAK (768)
140 FOR 8=765 TO 711
150 PEAK 8,PEAK (8+1)
160 NEXT B
170 POKE 152,A
180 FOR DELAY C TO 200:DELAYS
190 GOTO 110

Program V

November 1985 ATARI USER 25
Get into top gear for a gruelling challenge

WITH the current trend toward athletics simulations, you might expect a game called The Great American Cross-Country Road Race to be all about marathon running—shades of Flanagan’s Run, Loneliness of the Long Distance Runner, and all that.

A gruelling race game this certainly is, but not on foot. A powerful racing car is your mode of transport.

Road Race (well, I’m not typing that title out again) is Activision’s latest and follows in the best traditions of Pole Position and Pit Stop.

My thanks to Software Express of Birmingham for speedily arranging to let me have a review copy as soon as it became available here.

At bottom, the game is a race against other drivers across America. But there’s more to it than just waiting past everything on four wheels.

To begin with, you can try to compete against any one of nine fields of already established times. Each field consists of the best results of 10 drivers.

Then there are four west to east coast crosscountry races to choose from: Los Angeles to New York, Seattle to Miami, San Francisco to Washington, and the US Tour. The latter is a toughie since it requires you to drive through every city on the map.

The map pops up once you’ve selected your race. And this is much, much more than a bit of gloss—careful planning.

GUILTY UNTIL

IT was a wet night when I arrived at the mansion. As I entered, my reporter’s instincts made me wonder whether I might be a little too conspicuous. I needn’t have worried.

Over by the fireplace Titania, queen of the fairies, was chatting up a sheik. She was going on about one of her horses, name of Lurking Grue.

A vampire seemed to be enjoying himself hugely. A six-foot rabbit cavorted with a man-sized peanut butter sandwich. Three mice in dark glasses brushed past Pacman. An astronaut strolled up to the bar.

Near the entrance a gorilla was doing a splendid job of looking after the guest’s coats.

Other assorted weirdos were discussing everything from politics to local scandals while the more athletic took to the dance floor. By comparison, the cowboy looked the very model of sobriety and good taste. The man in the outlandish cowboy outfit was me.

I wasn’t having a bad dream—the nightmare would come later. No. I was attending one of Veronica Ashworth’s famous helmet parties.

Actually I was mixing business with pleasure. Pleasure because I had been invited as a friend of the hostess. Business because my editor thought there might be a good story in it.

The fairy queen, none other than mine hostess Veronica, had clearly been knocking back the Buck’s Fizz from quite early on. Her words were slurred and she was none too steady on her fairy pins.

Emphasising a point to the sheik, she waved her glass on high and succeeded in slopping alcohol and ice cubes all down her tinsel dress. Using a word that would make an elf’s hair curl, she staggered off to clean up.

A little later, I saw Veronica again. She was slumped on the floor of her office elsewhere in the mansion. She was less than dead drunk—she was dead, period.

And if that wasn’t enough to dampen my party spirits, my cowboy’s lariat, which I could have sworn I hung up in the closet with my damp coat, was wrapped tightly round her pretty little neck.

Just to put the cherry on the cake, a bullet lay by the body. Guess whose gunbelt had one empty cartridge loop? I could almost hear the click of the jail cell door.

So there I was, plunged deep into Suspect, a superb new text adventure from
and selection at this stage should help you achieve good times. Equally, slapdash selection may well be regretted before you even reach your first checkpoint.

A flashing circle on the map donates your point of departure, while a pulsating arrow indicates a possible next stop on your route. By joystick movement, the arrow can be positioned to another destination city. Only those cities connected by a major road to your departure point are available for selection.

A scrolling bulletin across the top of the screen tells you the conditions on the road you have chosen. You have to be careful - things like lane closures, the dreaded roadworks or all sorts could cause you to lose valuable time.

The weather conditions are no less critical in your route selection. Just like our good old Met Office maps, this one has plenty of those cute little symbols. Snowflakes and rainclouds indicate just that while clouds without rain indicate fog. It all seems more like Britain than the US of A!

A clock indicates your time of departure. It can be set to any time you like. But watch it - you could end up driving at night or arriving at a city in the middle of the rush hour.

Now the race is on. The screen changes to reveal a Pole Position type scene; blue sky, green sward, a city skyline and your car sitting on a central road which tapers into the distance.

At the foot of the screen, reading from left to right, is a fuel gauge, a rev counter, timer, meter, speedometer and radar trap warning.

The timer counts down, showing how much time remains for you to complete this leg of the journey. Failure to reach your destination before the timer reaches zero disqualifies you from the race, and that means you'll have to start all over again.

If you beat the clock the spare time is added to the time allowed for the next stage, so it pays to burn rubber.

The mileometer also counts down, telling you how much further to your target city. The radar warning lights up when a police speed trap lies ahead - you'll know anyway because sirens start blaring.

You have two choices when hitting a trap - slow down or try to outrun the white police car. If you're caught, you stop dead, the police car pulls alongside, a sardonic message is displayed, like "Where's the fire?" and you're stuck there for several precious seconds. At least you don't get booked!

Left and right movement of the car is controlled by similar movements of the joystick. The fire button is used to accelerate, and pulling back on the joystick applies the brakes.

Gear changing is neatly handled. When the rev counter reaches the 9 o'clock position - and by then the engine is beginning to scream - the fire button is released and a quick forward tap of the joystick causes a change up. Similarly, a quick backward tap shifts gears down.

All very easy to get the hang of and, coupled with the appropriate engine noises, adds much to the motor racing atmosphere of the game.

There are four gears. Shift too soon and the car will respond sluggishly. Shift too late and you could blow your engine and have to push to the car to the next service station. Pushing it along accomplished by tapping doggedly away at the fire button. You'll also have to push if you run out of petrol. Warning messages are given when you are approaching a service station.

The station is shown as a petrol pump and you must pull up beside it. Your car will be automatically refilled and/or repaired.

It's all too easy to overshoot, or stop by mistake at a cactus, when you've been having along at 150mph. If you're not driving very fast, other drivers - and there are lots of them - go flashing past but never hit you from behind. The same cannot be said for you.

If you hit a car while overtaking your car instantly switches to bottom gear and slides over to the side of the track. Luckily, it hasn't stalled. Arrive at the city within the time limit and you'll be greeted with a jolly tune and a welcome sign. Then it's back to the map to select the route for your next leg.

Run out of time and you'll be told "Sorry" and be out of the race.

The sound effects certainly add to the air of excitement and joystick response is perfect.

The graphics are first rate - I especially liked the changes in skylines, the gradually darkening scene as night descends and the smooth high speed scrolling.

Add these qualities to the planning elements, the combinations of possible routes and the variety of the challenge, and you have a very good race game indeed. This is one I would unhesitatingly recommend to any race game fan.

Bob Chappell

November 1985 ATARI USER 27
SUPERB VALUE ~

ADVENTURE TWIN PACK

Two absorbing text adventures ZUL and WEST. These games are already best-sellers on the Sinclair ZX Spectrum. The special pack combines both adventures on a single 3½" disk. Full instructions plus a helpful Blueprint for Adventurers are included.

WEST is a fast-paced action adventure which acts as an introduction to the more demanding ‘dungeons and dragons’ scenario of the classic adventure, ZUL.

A demanding and exciting text adventure, using over 200 words and as many phrases. There are over 150 locations to search — all of them easy to find. Events happen in real-time outside your control — Indians charge, rattlesnakes slither past and robbers appear and shoot at you. How long can you survive?

£24.95

(Add 50p postage & packing in U.K. £1.00 for overseas)

LOST KINGDOM OF ZUL

The quality of the game is superb — this is the standard others have to beat.

Micro Adventurers

Explore the ancient dwelling-place of the dwarves — where the Wizard guards the last precious secret. A classic, complex text adventure for the experienced games player, with hundreds of locations and a huge vocabulary, set in real-time with traps, tasks, puzzles and mazes — and special note-pad feature to aid you.

TALENT

COMPUTER SYSTEMS

CURRAN BUILDING, 101 ST JAMES ROAD, GLASGOW G4 ONS

SOFTWARE FROM SCOTLAND

BUY NOW BEFORE THE CHRISTMAS RUSH

We are the only company that will personally deliver and install all Atari computers

<table>
<thead>
<tr>
<th>Hardware</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>5250T (with free printer and modem cables)</td>
<td>£49.95</td>
</tr>
<tr>
<td>1030K (with free joystick or game)</td>
<td>£69.95</td>
</tr>
<tr>
<td>900X1 (with free joystick or game)</td>
<td>£69.95</td>
</tr>
<tr>
<td>900X1 Starter Pack (computer + tape deck + Innovation to Programming)</td>
<td>£99.95</td>
</tr>
<tr>
<td>1050A Enhance (DOS 2.5 + 5 blank disks)</td>
<td>£109.95</td>
</tr>
<tr>
<td>5 2&quot; Blank Disks (each)</td>
<td>£4.55</td>
</tr>
<tr>
<td>3 2&quot; Blank Disks (each)</td>
<td>£3.50</td>
</tr>
<tr>
<td>Atari Basic Manual Printer</td>
<td>£149.95</td>
</tr>
<tr>
<td>Turbo Font Interface</td>
<td>£59.95</td>
</tr>
<tr>
<td>Epson Printers</td>
<td>(ring for best deal)</td>
</tr>
</tbody>
</table>

Utilities

| Basic XL | £99.95 |
| Basic Toolkit | £27.95 |
| Mat 65 | £79.95 |
| Mat 65 Toolkit | £79.95 |
| Action | £79.95 |
| Action Toolkit | £79.95 |
| US Dovex | £79.95 |
| Ultimex | £49.95 |
| BC Column Pack | £99.95 |
| Overwrite 10 | £79.95 |
| Triplet | £18.95 |
| File Loader | £7.95 |
| Printer Interface | £9.95 |
| Bed Sector | £18.95 |

<table>
<thead>
<tr>
<th>Games</th>
<th>Cassette</th>
<th>Disk</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bounty Bob</td>
<td>£9.95</td>
<td>N/A</td>
</tr>
<tr>
<td>Bruce Lee</td>
<td>£16.95</td>
<td>£12.95</td>
</tr>
<tr>
<td>Dale Flight</td>
<td>£8.95</td>
<td>£12.95</td>
</tr>
<tr>
<td>Drop Zone</td>
<td>£8.95</td>
<td>£14.95</td>
</tr>
<tr>
<td>Coded snatch</td>
<td>£8.95</td>
<td>N/A</td>
</tr>
<tr>
<td>Pale Punsion</td>
<td>£8.95</td>
<td>£12.95</td>
</tr>
<tr>
<td>Do Do One</td>
<td>£8.95</td>
<td>£12.95</td>
</tr>
<tr>
<td>Swash Hit 1</td>
<td>£14.95</td>
<td>N/A</td>
</tr>
<tr>
<td>Swash Hit 2</td>
<td>£14.95</td>
<td>N/A</td>
</tr>
<tr>
<td>Swash Hit 3</td>
<td>£14.95</td>
<td>N/A</td>
</tr>
<tr>
<td>Swash Hits Games</td>
<td>N/A</td>
<td>£33.70</td>
</tr>
<tr>
<td>Colourless Chess</td>
<td>£8.95</td>
<td>£12.95</td>
</tr>
<tr>
<td>F15 Strike Eagle</td>
<td>N/A</td>
<td>£14.95</td>
</tr>
<tr>
<td>Airforce</td>
<td>£8.95</td>
<td>£12.95</td>
</tr>
<tr>
<td>Mercenary</td>
<td>£8.95</td>
<td>£12.95</td>
</tr>
<tr>
<td>Encouter</td>
<td>£8.95</td>
<td>£12.95</td>
</tr>
<tr>
<td>Super Xenon</td>
<td>£8.95</td>
<td>£12.95</td>
</tr>
<tr>
<td>Mutant Caneidos</td>
<td>N/A</td>
<td>£35.95</td>
</tr>
<tr>
<td>Kozin's Koznistro</td>
<td>£6.95</td>
<td>N/A</td>
</tr>
<tr>
<td>Attack of the Mutant Caneidos</td>
<td>£6.95</td>
<td>N/A</td>
</tr>
<tr>
<td>Quasimoto</td>
<td>£8.95</td>
<td>£14.95</td>
</tr>
<tr>
<td>Panceman</td>
<td>£8.95</td>
<td>N/A</td>
</tr>
<tr>
<td>Seven Citros</td>
<td>N/A</td>
<td>£32.95</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Games</th>
<th>Cassette</th>
<th>Disk</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rescue From Fractals</td>
<td>N/A</td>
<td>£43.95</td>
</tr>
<tr>
<td>Ball Blaster</td>
<td>N/A</td>
<td>£24.95</td>
</tr>
<tr>
<td>Mt. De</td>
<td>N/A</td>
<td>£39.95</td>
</tr>
<tr>
<td>Caverns</td>
<td>N/A</td>
<td>£14.95</td>
</tr>
<tr>
<td>Zark 1-2-3</td>
<td>N/A</td>
<td>£29.95</td>
</tr>
<tr>
<td>Ghost Chaser</td>
<td>£8.95</td>
<td>N/A</td>
</tr>
<tr>
<td>Deception</td>
<td>£9.95</td>
<td>N/A</td>
</tr>
<tr>
<td>Hero</td>
<td>£17.95</td>
<td>N/A</td>
</tr>
<tr>
<td>Male</td>
<td>£9.95</td>
<td>£12.95</td>
</tr>
<tr>
<td>Red Moon</td>
<td>£7.95</td>
<td>N/A</td>
</tr>
<tr>
<td>Tapfer</td>
<td>£5.95</td>
<td>£12.95</td>
</tr>
<tr>
<td>Reiss West</td>
<td>N/A</td>
<td>£20.95</td>
</tr>
<tr>
<td>Super Xenon</td>
<td>£9.95</td>
<td>£12.95</td>
</tr>
<tr>
<td>Hitch Hikers Guide</td>
<td>£9.95</td>
<td>N/A</td>
</tr>
<tr>
<td>Deadline</td>
<td>£9.95</td>
<td>N/A</td>
</tr>
<tr>
<td>Lords Of Time</td>
<td>£9.95</td>
<td>N/A</td>
</tr>
<tr>
<td>Sun Cross</td>
<td>£29.95</td>
<td>N/A</td>
</tr>
<tr>
<td>Biorhythms</td>
<td>£7.95</td>
<td>N/A</td>
</tr>
<tr>
<td>Cut Throat</td>
<td>N/A</td>
<td>£29.95</td>
</tr>
<tr>
<td>Sea Stalker</td>
<td>£7.95</td>
<td>N/A</td>
</tr>
<tr>
<td>Wish Bringer</td>
<td>N/A</td>
<td>£29.95</td>
</tr>
<tr>
<td>Ultima III</td>
<td>N/A</td>
<td>£19.95</td>
</tr>
<tr>
<td>Sorcerer</td>
<td>N/A</td>
<td>£29.95</td>
</tr>
<tr>
<td>Mask of the Sun</td>
<td>N/A</td>
<td>£43.95</td>
</tr>
</tbody>
</table>

PROGRAMMERS: URGENTLY REQUIRED FOR FREELANCE WORK ON PROJECTS

COMPUTER SUPPORT LTD, 26 Seacourt Road, Abbey Wood, London SE2 9UWX. Tel: 01-311 7339

28 ATARI USER November 1985
Arcade action deep in the pond

WHY not take a break from those shoot-em-up arcade games and take a visit to a quiet country pond? Starcade can take you there with Savage Pond, their interpretation of wild life under water.

Quiet it may be, peaceful it certainly isn't. In this fast arcade game you start by playing the role of a tadpole struggling to survive to adulthood.

Just like the inhabitants of any country pond, you have to avoid the perils of other insects and animals striving to live in there with you.

Survival of the fittest would appear to be an apt rule in this scenario.

Using the keyboard or joystick you must guide your tadpole through its stage of immaturity, fattening it as you guide it round the pond digesting algae.

Now and again a fat juicy worm falls into the water and eating this increases your worm count by one.

Every time your worm count reaches five a beetle larva appears and if you can polish this off you take another step along the long path of evolution.

In stage one a multi-coloured dragonfly buzzes about above the pond dropping its eggs into the water. It is vital that you eat these as they sink, otherwise they settle into the cover of dead hydra and become irretrievable.

When they hatch at the bottom of the pond a larva dashes off the screen only to return as a deadly dragonfly nymph whose staple diet is...yes, tadpoles.

He relentlessly chases you until he either catches you or you tire him out by outswimming him across the screen.

In stage two a bulldozer comes along, adding another hazard as it dumps radioactive waste into the pond.

If you can survive all this and manage to become a frog, with a flick of your long sticky tongue you can catch that pestering dragonfly as it buzzes overhead. There's thanks for you.

If having got this far you have had all your eggs and tadpoles destroyed, the computer dating agency comes into action and provides you with a lady frog.

After a loving embrace you provide a specimen of frog spawn and depart for pastures new.

The spawn comes to rest at the bottom of the pool before hatching to give you another chance to start all over again.

As it progresses the program introduces many more wonders of the deep such as blood worm, jelly fish, spidery, water fleas and bumble bees.

They all have their role to play in this real life adventure.

Overall the game is fun to play and has very good graphics. The sound is effective and complements the game very well.

The instructions are clear and concise and give a good insight not only to the game, but to the species that you will meet and their descriptions.

The 16k cassette costs £7.95 - a bargain in my opinion.

David Andrews

A touch of the Bruce Lees

SIT down at your Atari, hold your joystick at an aggressive angle, screw up your face, let rip a bloodcurdling shout and go to it.

Well, even if you're not acting this strangely at the start of playing English Software's Chop Suey, I guarantee you will be after just a few minutes.

This martial arts simulation really gets to you. If you thought you were just a gentle pacifist at heart, better think again after you've tried this game. You might discover a latent Bruce Lee has been lurking undetected under your skin.

The action takes place, not in the fresh air or a gymnasium, but in what appears to be a theatre.

In fact it's very similar to the traditional setting used for the weightlifting events at the Olympic Games. In the lower portion of the screen, looking up at an enclosed stage, are three rows of spectators who fidget around from time to time to let you know they're wide awake.

On stage is where all the leaping, kicking and punching takes place.

The two dreadlocked Kung-Fu participants are dressed similarly - loose, white pyjama-like costumes complete with black belts.

There are three options: player versus player, player versus computer and, if you want to select demo mode, computer versus computer. The demo mode will automatically begin if you just sit there and do nothing.

In addition you can choose between the laughingly named slow or fast modes. Slow mode is quite fast enough, thank you very much. Fast mode has the two players dashing around like characters from one of those old Keystone Kop movies. Move up to this level only when you've become really adept at the art.

There are eight moves at your disposal - two shuffles, three kicks, one jab and two jumps. All are executed by moving the joystick to the appropriate compass position.

Pressing the fire button lets you make one further move - a smart about-turn from the direction you are currently facing.

The quick shuffles take you to the left or right. The one punch in your repertoire is a stiff-armed jab. Used well it can have very gratifying results.

Kicks come in three sizes: the low sweep to the opponent's legs, the sharp kick...
to the midriff and, my personal favourite, the high kick.

Executing the high kick when your opponent is some distance from you is most satisfying — you arc smoothly through the air with your leading leg outstretched as dangerously as a warrior's lance.

There are two leaps. One is a simple vertical jump into the air, the other a full-blooded somersault taking you right over the top of your opponent's head to the far side of the stage.

At the bottom of the screen, each player has a Power gauge, pain-level indicator. It changes colour as punishment is soaked up. When it starts to flash the player is in a fragile state of health and one more thump will bring him to the floor.

The player recovers after a brief respite but always has a residual pain level which rises after each knockdown. When this reaches an intolerable level that player is retired and the opponent declared the winner.

It is comforting to note that nobody ever gets completely flattened — falling down on one knee and grinning at the floor is the worst that can happen to you. Apart from your opponent's fists and feet, there is one other hazard. From time to time an air vent opens in the stage ceiling and a large scorpion drops down to scuttle across the stage.

You have to leap to avoid its poisonous bite. David Attenborough would not be amused — scorpions are supposed to have lethal stings, not bites!

The scorpion interludes detract somewhat from the main business at hand and the game is exciting enough without them. Even so, they do present an added challenge.

Scorpions aside, the only minor criticism I have is that the contestants are identical twins. If you've both just finished cavorting around the stage and have ended up close to each other, it is possible to get in a muddle as to which fighter is yours. Differently coloured belts or hair, for example, would have helped.

The two-player option is hugely entertaining but no doubt much of the time you'll play against the computer. And that option is just as much fun.

The computer opponent seems pretty easy meat to start with, a few swift jabs usually sufficing to bring him quickly to his knees. However, you mustn't let that mislead you into leaving your Atari and

BIO-DEFENCE, from Tymac, appears to be an original idea in computer software. The object of the game is to keep a patient's temperature below the level at which he dies.

There are two separate parts to the game. In the first an outline of the human body is displayed horizontally across a grid of approximately 500 squares. Using a joystick, you move a cursor from square to square within the body outline until you find an area of infection. There is no skill attached to finding this — it just suddenly appears, indicated by an orange dot.

From here you progress on to part two. This scenario is acted out in the infected area, which is laid out like a maze.

You play the part of what appears to be a white cell, looking something like an amoeba, and your task is to soak up most of the bacteria around you. I say "appears" because there were no instructions with my advance review copy and surprisingly, none on the screen.

There are, in fact, several different sizes of bacteria and you should only be chasing the smaller ones. Any contact with the largest variety results in a darkening of your colour.

Should you contact these too often within a short space of time, you turn black and die and the patient's temperature rises by one degree.

You can eat the big blobs but you've got to time it right, hiding in your niche at the bottom of the screen. Of course, while you're hiding the bugs are multiplying.

Should you succeed in absorbing all the bugs, you automatically return to the first part of the game and start searching again for another infected area.

Once you find one it's back to work as a bug gobbler until such time as you get sapped too often by the big boys, and the patient's temperature gets so high that he snuffs it.

The more successful you are in your bacteria bashing the more numerous and vicious are the enemy in subsequent locations. The graphics are quite nice but don't really do the Atari justice, and the sound is nothing to write home about. An attempt has been made to synthesise speech, but the result is almost unrecognisable.

The game was fun the first few times I played it, but I didn't find enough variety to maintain interest.

David Andrews
Give your micro mainframe power

With MicroLink your micro becomes a terminal linked directly to the Telecom Gold mainframe computer, and able to tap its tremendous power and versatility. Right away you'll be able to use giant number-crunching programs that can only run on a mainframe. You can set up your own computerised filing systems, store and update statistics and other information, cross-reference material between files, selectively extract the information you want, perform massive calculations and design reports to display information from any of the files and in any format you choose.

The biggest bulletin board of them all

The number of bulletin boards is growing rapidly. New ones are springing up in all parts of Britain and all over the world, with people of like minds chatting to each other on all manner of subjects. The only snag is that the vast majority are single-user boards - which means lots of other people are also trying to make contact and all too often all you get is the engaged tone. But with the MicroLink bulletin board there is no limit to the number of people using it at the same time. And no limit to the number of categories that can be displayed on the board.

We're only a local phone call away

More than 96 per cent of MicroLink subscribers can connect to our mainframe computer in London by making a local phone call. This is possible because they use British Telecom's PSS system, which has access points all over Britain. A local phone call is all you need, too, for access to the international Dialcom system through MicroLink.

Telemessages - at a third of the cost

The modern equivalent of the telegram is the telemessage, which is sent before 9pm and delivered by first post the following day (except Sunday). Originally designed for people to phone their message via the operator, the service costs £3.50 for 50 words. Now it's available via MicroLink - and costs only £1.25 for up to 350 words!

Send and receive telex messages

With MicroLink you can turn your micro into a telex machine, and can send and receive telex messages of any length. You will be able to communicate directly to 96,000 telex subscribers in the UK, 1 million worldwide - and even with ships at sea via the telex satellite network. Business people can now send and receive telexes after office hours, from home or when travelling. You can key in a telex during the day and instruct MicroLink not to transmit it until after 8pm - and save 10 per cent off the cost!

The mailbox that is always open

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

What does it all cost?

Considering all the services you have on tap, MicroLink is remarkably inexpensive. You pay a one-off registration fee of £5, and then a standing charge of just £3 a month. On-line costs are 3.5p a minute (between 7pm and 8am) or 10.5p a minute during office hours. There is an additional 5p a minute if you are calling from outside the 01-London call area. Charges for telex, telemessages and storage of files are given on the next page.
How much it costs to use MicroLink

Initial registration fee: £5.
Standing charge: £3 per calendar month or part.
Connect charge: 3.5p per minute or part - cheap rate, 10.5p per minute or part - standard rate. Applicable for duration of connection to the Service. Minimum charge 1 minute.
Connection charge: 4p per minute from 7am to 8pm, Monday to Friday; all day Saturday and Sunday and public holidays; Standard rate is from 9am to 7pm, Monday to Friday, excluding public holidays.
Filling charge: 20p per unit of 2,048 characters per month. Applicable for storage of information, such as telex short codes and mail file. The number of units used is an average calculated by reference to a daily sample.
Information Databases: Various charges. Any charges that may be applicable are shown to you before you obtain access to the database.
MicroLink PSS service: 2p per minute or part (300 baud); 2.5p per minute or part (1200/75 baud).
Only applies to users outside the 01 London call area.
Telex registration: £10.
Outgoing telex: 5.5p per 100 characters (UK); 1p per 100 (Europe); 16.5p per 100 (N America); £1.15 per 400 (Rest of world), £2.75 per 400 (Ships at sea). Deferred messages sent on the night service are subject to a 10 per cent discount.
Incoming telex: 50p for each correctly addressed telex delivered to your mailbox. Obtaining a mailbox reference from the sender incurs a further charge of 50p.
It is not possible to deliver a telex without a mailbox reference. If a telex is received without a mailbox reference the sender will be advised of non-delivery and asked to provide a mailbox address. Each user solicited for telex and using the facility will incur a charge of 6s storage units a month. Further storage charges could be incurred depending on the amount of telex storage and the use made of short code and message file facilities.
Telemessages: £1.25 for up to 350 words.
Radiopaging: No charge.
If you have a BT Radiopager you can be paged automatically whenever a message is waiting in your mailbox.
International Mail: For the first 2,048 characters: 20p to Germany and Denmark; 30p to USA, Australia, Canada, Singapore, Hong Kong and Israel. For additional 1,024 characters: 10p; 15p.
These charges relate to the transmission of information by the Dailcom service to other Dailcom services outside the UK and the Isle of Man. Multiple copies to addresses on the same system host incur only one transmission charge.
Billing and Payment: All charges quoted are exclusive of VAT. Currently all bills are rendered monthly.

Software over the telephone

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

Talk to the world - by satellite

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

What you need to access MicroLink

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

MicroLink in association with TELECOM GOLD

Application Form

AT 11

I/we hereby apply to join MicroLink

[ ] I enclose my cheque for £5 payable to Database Publications as registration fee to MicroLink.

[ ] I declare that I am over 18 years of age.

Signature

Date

I intend to use the following computer

FOR OFFICE USE ONLY:

Mailbox assigned

Start date

Password

SCELD TO:

MicroLink

Database Publications

Europa House

66 Chester Road

Hazel Grove

Stockport SK7 5NY.

* Telecolm Gold is a trademark of British Telecommunications plc.
From...

Computer Support

"THE UTILITY SPECIALISTS"\n
A fine selection of software and hardware directly from its makers. Something for every ATARI® enthusiast.

- BAD SECTOR
  £19.95
  A hardware modification. Write bad sectors to any disk, can be used for custom creation of bad sectors or to backup some protected diskettes. Comes complete with sector writer and speed checking software.

- PORTPRINT
  £29.95
  Runs a standard Centronics compatible parallel printer from the joystick ports. Includes a relocatable transfer, runs with most boot programs. Complete with lead.

- PRINTER INITIALISE
  NEW £29.95
  An autostart batch file that automatically flushes the printer and presents printer default, such as font styles etc. Complete with programmer.

- SUPER DISASSEMBLER
  £24.95
  Disassembles any disk, cassette or cartridge. Uses XL system labels, separate input to pre-determine data bytes. The end result file can be customised then re-assembled using an assembler.

- FILE LOADER
  NEW LOW PRICE £8.95
  A self booting menu and micro DOS system which purely loads files, saves at least 60 sectors on every disk.

- DALE LOADER
  £14.95
  A self booting menu, compacts disks and cassettes to a file format, can be written to any disk. Utilities include: TAPE TO DISK, DISK TO TAPE, DISK TO DISK.

- *DISK BACKUP
  * Sold subject to not infringing Copyright.
  NEW LOW PRICE £9.95
  Same as above but specifically for the extra memory of the 130XE.

- OTHER PRODUCTS AVAILABLE: MAILING LIST £12.95, BIORHYTHMS £7.95, ZAPPING ZOMBIES £6.95, UTILITY PAC ONE £8.95, UTILITY PAC TWO £8.95, UTILITY TAPE ONE £7.95, MACRO LIBRARY £12.95, CARTRIDGE BACKUP £15.95, CASSETTE BACKUP £9.95 and SERIAL 1/0 PLUG £2.99

- USER GROUP DEMONSTRATIONS ARRANGED
  We are continually adding new and exciting products to our range please send S.A.E. for more details.

- ATARI® is a trademark of ATARI CORPORATION

Mail order only, to order send cheque or postal order to: COMPUTER SUPPORT LTD
26 Seacourt Road, Abbey Wood, London SE2 9UW
Tel: 01-311 7339
All prices include postage & packing. Same day dispatch.

DATASCAPE

ATARIT SOFTWARE SPECIALISTS

---

<table>
<thead>
<tr>
<th>ARCADE</th>
<th>cart</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bounty Bob Strikes</td>
<td>Back</td>
</tr>
<tr>
<td>BC's Quest</td>
<td>14.95</td>
</tr>
<tr>
<td>Miner 2049er</td>
<td>9.95</td>
</tr>
<tr>
<td>Jungle Hunt</td>
<td>9.95</td>
</tr>
<tr>
<td>Pacman</td>
<td>9.95</td>
</tr>
<tr>
<td>Centipede</td>
<td>9.95</td>
</tr>
<tr>
<td>Donkey Kong Jnr.</td>
<td>14.95</td>
</tr>
</tbody>
</table>

---

<table>
<thead>
<tr>
<th>CASS</th>
<th>disk</th>
</tr>
</thead>
<tbody>
<tr>
<td>Archon</td>
<td>9.95</td>
</tr>
<tr>
<td>Realm of Imposs</td>
<td>9.95</td>
</tr>
<tr>
<td>Bruce Lee</td>
<td>14.95</td>
</tr>
<tr>
<td>Decathlon</td>
<td>9.95</td>
</tr>
<tr>
<td>Pitfall II</td>
<td>9.95</td>
</tr>
</tbody>
</table>

---

<table>
<thead>
<tr>
<th>BAD SECTOR</th>
<th>9.95</th>
</tr>
</thead>
</table>

---

<table>
<thead>
<tr>
<th>UTILITIES</th>
<th>cart</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oil's Well cart.</td>
<td>12.95</td>
</tr>
</tbody>
</table>

---

**SPECIAL OFFER**

For FREE Catalogue send a loose stamp. Send cheques P/O to: DATASCAPE 46, Hunsworth Mews, London NW1 6DB Tel: 01-723 0562

---

November 1985 ATARI USER 32
HORIZONTAL scrolling is essentially achieved in a similar way to the vertical scrolling described in my previous article. However, as you will see, things are never quite that simple.

You will remember that coarse vertical scrolling can be achieved by moving the start of screen memory down the screen data one line at a time. Horizontal scrolling can be similarly achieved by moving the pointers for screen memory along one character at a time. This is shown in Demo #1.

Firstly you need to decide what data you want to show. I have chosen to hold the data in a string (A$). You will notice that you have to use CHR$(0) that is Control , (the heart symbol) to represent a space. This is because when printing to the screen a space is CHR$(32) but the Atari converts this to a O in screen memory. In fact all the numbers printed are stored as a different number in screen memory. Play around with A$ to confirm this.

Back to the program. The high and low bytes of the address of A$ — that is, screen memory — are calculated and stored in LO,OLDLO,HI and OLDHI. A custom display list is created in Page 6 (memory location 1536), and the operating system is told that it is there by poking the low and high bytes of the display list into decimal 560 and 561.

Now we are ready to scroll. Firstly increase the low byte of the address of screen memory by 1. If the number is greater than 255 then reset LO to 0 and increase HI by 1.

You now have the new address of screen memory moved along by one byte — one character. These values can now be placed in the two bytes following the LMS command (Load Memory Scan — see previous articles) as in line 210. Repeat this and there you have coarse scrolling of one line.

Smooth scrolling is again similar to vertical smooth scrolling. Demo #2 shows how this is used. A similar display list is used but a decimal 16 is added to the mode byte. This is 71 — that is, Antic mode 7 + LMS instruction 64. Adding a 16 enables smooth scrolling in that line.

The horizontal smooth scrolling register is decimal 54276 (SD404). This can be poked with numbers up to 15 which will move the line along one pixel at a time up to a maximum of 16 — two Graphics Mode 2 characters.

Now obviously combining these two techniques will result in true smooth horizontal scrolling. Demo #3 is essentially the same as Demo #1 but with the smooth scrolling added to it.

Now we begin to get the first drawback, screen flicker. This is because the changes often occur part way through the creation of the screen on the television.

Things can be improved somewhat by making some of the changes more rapidly in machine code, as in Demo #4. The machine code here simply pokes each memory address with the byte following it but much more rapidly than in Basic.

Okay, so we have reasonably good smooth scrolling of one line. Not going to make much of a game is it? The next step is to extend this to full or part screen scrolling.

Unfortunately things are not as simple as in vertical scrolling, where
Do it sideways

tent programmers

Firstly the screen memory needs to
be considered. In vertical scrolling
the screen is divided vertically as a normal
screen. However, in horizontal scrolling
the screen is divided horizontally. Therefore,
using either method requires the use of
special instructions such as DRAW or
PAINT. Alternatively, it is possible
for manual instructions to be used for
horizontal scrolling. The first line in
each group of four characters in
the display list will consist of a group
of four numbers. The first will be a 64 (LMS) +
mode number (10 = smooth
collapsible). The rest of the screen will follow
the first line.

Demo #5 does this in Basic. As
you can see, the 'scroll' goes in
location points along one byte at a
time. Demo #4 is similar to the
single line

80 FOH 3E TO 9F READ 8 x 8" PICTURE

10 REM MODERN-SIDECAR READ-8X8IME

89 REM PICTURE

256 REM PICTURE: PICTURE: PICTURE: PICTURE:

555 REM PICTURE: PICTURE: PICTURE: PICTURE:

888 REM PICTURE: PICTURE: PICTURE: PICTURE:

1234 REM PICTURE: PICTURE: PICTURE: PICTURE:

Next time

900 REM PICTURE: PICTURE: PICTURE: PICTURE:

1 0 FOR I=1 TO 16 READ 8 x 8" PICTURE

2 FOR I=1 TO 16 READ 8 x 8" PICTURE

3 FOR I=1 TO 16 READ 8 x 8" PICTURE

4 NEXT I

5 NEXT I

6 NEXT I

7 NEXT I

8 NEXT I

9 NEXT I

10 NEXT I

11 NEXT I

12 NEXT I

13 NEXT I

14 NEXT I

15 NEXT I

16 NEXT I
waves down the screen. Basic is just too slow.

Demo #6 is the same program with a machine code routine doing the job of increasing the 10 screen location pointers in the display list. Now the screen moves along in a single block.

The next step is to add the smooth scroll. Demo #7 does this with an improved machine code routine for the coarse scroll. However it is less generalised, and will only work for a 10 line screen scrolling in one direction.

10 REM HORIZONTAL SCROLLING DEMO #6
20 REM EXT SAVE BEFORE RUNNING AS DESCRIPTOR IN TAB-00:
30 FOR I:=1700 TO 1729:READ A:POKE I, A:
40 NEXT I:REM READ MACHINE CODE
50 DATA 104,170,171,182,183,255,104,113,25
60,114,104,104,254,298,208,208,20
70,228,245,96
80 DIM AS(IO82)="atari\user\":FOR
90 I:=12 TO 980 STEP 11:AS(I):AS:=NEXT I
100 H:INT(AD0(AS)/256)(0):AD0(AS):HI+
110 256
120 DIM MEMO(I),(I),(I),(I),(I),(I),HI,
130(10)
140 200 POKE 1536,112:POKE 1537,112:POKE 1
150,112
160 210 FOR I:=1 TO 10
170 220 POKE 1537,113,71
180 MEMO(1):=1536+HI+1:MENMO(I):=MEMO
190(11)
200 240 LOC(I):=HI(HI):HI:=HI+1:FO(I)
210 255 THEN LOC:=256:HI:=4
220 250 POKE MEMO(I),LO:POKE MENMO(I),
230(HI)
240(10)
250 NEXT I
260 270 POKE 1571,112:POKE 1572,65:POKE 15
270,7,POKE 1574,6
280 290 POKE 568,0:POKE 561,6:REM SET UP A 5 IN DEMO #5
290 300 REM EXECUTE SCROLL
310 S0 FOR J:=1 TO 80
320 330 S0 FOR I:=1 TO 80
340 LOC(I):=LOC(I)+1:IF LOC(I):<255 THEN LOC
350(I):=LOC(I)+HI:=HI+1
360 380 NEXT I
390 400 S0 REM USE MACHINE CODE FOR FAST MULTIPLE POKE
410 420 500 IF I=17 THEN 10 STEP -1
430 530 POKE 54276,I:REM PRINT SCROLL 8 PX
440 ELSE
450 535 IF J=1 TO 80:HOME NEXT I
460 550 560 NEXT J
470 580 GRAPHICS 1

There's that flicker again...

You now have your smooth horizontal scrolling. Disappointed? I would be, because there's that flicker and flashing again.

The same problem arises as before, because the changes happen part way through drawing the screen, only now things are worse because so many alterations are being made to get smooth scrolling.

As in vertical scrolling, the only way around this is to use machine code during the vertical blank interrupt (for new readers this is the small delay between the drawing of each screen).

Although VBI routines are too complicated to discuss at the end of this article, Demo #8 will give you some idea of how much improvement they can give in scrolling.

As a parting note, on the XL and XE models smooth, upward vertical scrolling is very easy in Graphics 0. Try this. First load a relatively long Basic program. Secondly type POKE 622,255 then press Return. Thirdly type GRAPHICS 0 then Return. Now list the program.

10 REM HORIZONTAL SCROLLING DEMO #7
20 REM EXT SAVE BEFORE RUNNING AS DESCRIPTOR IN TAB-00:
30 FOR I:=1700 TO 1729:READ A:POKE I, A:
40 NEXT I:REM READ MACHINE CODE
50 DATA 104,162,10,184,133,285,104,113
60,204,169,0,24,177,294,201,1,145,284,20
70,177,284,195,0,145,204,208,208
80 DATA 202,208,237,96
90 DIM AS(IO82)="atari\user\":FOR
100 I:=12 TO 980 STEP 11:AS(I):AS:=NEXT I
110 H:INT(AD0(AS)/256)(0):AD0(AS):HI+
120 256
130 DIM MEMO(I),(I),(I),(I),(I),(I),HI,
140(10)
150 200 POKE 1536,112:POKE 1537,112:POKE 1
160,112
170 210 FOR I:=1 TO 10
180 220 POKE 1537,113,71
190 MEMO(1):=1536+HI+1:MENMO(I):=MEMO
200(11)
210 240 LOC(I):=HI(HI):HI:=HI+1:FO(I)
220 255 THEN LOC:=256:HI:=4
230 250 POKE MEMO(I),LO:POKE MENMO(I),
240(HI)
250(10)
260 NEXT I
270 280 POKE 1571,112:POKE 1572,65:POKE 15
280,7,POKE 1574,6
290 300 POKE 568,0:POKE 561,6:REM SET UP A 5 IN DEMO #5
310 S0 REM EXECUTE SCROLL
320 S0 FOR J:=1 TO 80
330 S0 FOR I:=1 TO 80
340 LOC(I):=LOC(I)+1:IF LOC(I):<255 THEN LOC
350(I):=LOC(I)+HI:=HI+1
360 380 NEXT I
390 400 S0 REM USE MACHINE CODE FOR FAST MULTIPLE POKE
410 420 500 IF I=17 THEN 10 STEP -1
430 530 POKE 54276,I:REM PRINT SCROLL 8 PX
440 ELSE
450 535 IF J=1 THEN 10 STEP -1
460 550 560 NEXT J
470 580 GRAPHICS 0

602,255
610 FOR I:=1700 TO 1729
620 POKE I, A:
630 NEXT I
640 H:INT(AD0(AS)/256)(0):AD0(AS):HI+
650 256
660 DIM MEMO(I),(I),(I),(I),(I),(I),HI,
670(10)
680 200 POKE 1536,112:POKE 1537,112:POKE 1
690,112
700 210 FOR I:=1 TO 10
710 220 POKE 1537,113,71+16
720 MEMO(1):=1562+HI+1:MENMO(I):=MEMO
730(11)
740 240 LOC(I):=HI(HI):HI:=HI+1:FO(I)
750 255 THEN LOC:=256:HI:=4
760 250 POKE MEMO(I),LO:POKE MENMO(I),
770(HI)
780(10)
790 260 NEXT I
800 270 POKE 1571,112:POKE 1572,65:POKE 15
810,7,POKE 1574,6
820 280 POKE 568,0:POKE 561,6:REM SIMILAR SETUP
830 S0 REM EXECUTE SCROLL
840 S0 FOR J:=1 TO 80
850 S0 FOR I:=1 TO 80
860 LOC(I):=LOC(I)+1:IF LOC(I):<255 THEN LOC
870(I):=LOC(I)+HI:=HI+1
880 890 NEXT I
900 910 S0 REM USE MACHINE CODE FOR FAST MULTIPLE POKE
920 930 940 IF I=17 THEN 10 STEP -1
950 960 970 POKE 54276,I:REM PRINT SCROLL 8 PX
980 ELSE
990 1000 IF J=1 THEN 10 STEP -1
1010 1020 NEXT I
1030 1040 S0 REM USE MACHINE CODE WHICH TO EXECUTE COARSE SCROLL
1050 S0 REM EXECUTE SCROLL
1060 S0 REM INSERT VBI
1070 1080 GRAPHICS 0

36 ATARI USER November 1985
Now's the time to join the communications revolution!

IT’s by far the fastest growing field in micro-computing. All over the world micros are taking to each other over the telephone line. As well as to the ever-increasing number of public and private databases, bulletin boards – and even giant mainframe computers.

We want all Atari User readers to share in the new technology that makes all this possible. So we’re offering a unique starter pack at an unbeatable price. It gives you everything you need to get in touch with the big wide world outside.

Modem/Software/Serial Interface.

The Miracle is the amazing Miracle Technology WS2000. One of the most powerful on the market, it’s simplicity itself to use. Just plug it into a standard British Telecom jack and you’re away.

The package also features the superb Datari serial interface which links the modem directly to the Atari’s peripheral port without the need for the 850 serial interface.

The best hardware deserves the best software to drive it, and with the specially written Multi-Vaxterm program the package is complete. It supports all the standard baud rates – 1200/75, 75/1200, 1200/1200 half duplex and 300/300 full duplex.

Your Atari User package will allow you to talk directly to other computers, to send your own telex messages, to go tele-shopping – even to download free software programs directly into your Atari.

You will be able to join Micronet/Prestel, which will immediately open up to you a vast menu of 750,000 pages of information – instant world news, sports, holidays, hotels, train and airline timetables, all regularly updated.

And you can become one of a growing number of enthusiasts who are joining MicroLink, the giant database set up in conjunction with Telecom Gold.

But first, send for the Miracle package – and enter the fascinating, limitless world of communications!

Use the order form on Page 61

... and this is the magazine to tell you all about it!

Sales of modems are soaring. The number of on-line databases and bulletin boards grows and grows. TeleLink is THE way to keep fully informed of the rapid changes now taking place in the world of communications.

ORDER FORM

Please supply the following:

Subscription to the next 12 issues of TeleLink £ 12.00 5001
Commence with Issue No.
Issue 1 (Nov/Dec 1984) £ 1.25 5002
Issue 2 (Jan/Feb 1985) £ 1.25 5003
Issue 3 (Mar/Apr 1985) £ 1.25 5004
Issue 4 (May/June 1985) £ 1.25 5005
Issue 5 (July/Aug 1985) £ 1.25 5006
Issue 6 (Sept/Oct 1985) £ 1.25 5007

Total

☐ Cheque enclosed made payable to Database Publications Ltd.
☐ Debit my credit card account:

Access

Visa

Name Signed

Address

Post to: TeleLink, Database Publications, 68 Chester Road, Hazel Grove, Stockport SK7 5NY.

Phone orders: 061-480 0171

Telecom Gold: Mailbox No. 72: MAG001

Prestel Key *89. Mailbox No. 614988383

Don’t forget to include your credit card number and full address.
DENIS KINANE comes up with a program to teach your computer how to win an argument

CONVERSE is an Eliza type program which simulates a conversation between the user and the computer but differs from similar ones by allowing the Atari to learn new key words and replies.

It thus learns from conversations continuously and eventually will be able to converse without recourse to the learning procedures. It can also be altered easily to give the computer different “personalities”.

Atari Basic has often been criticised for its lack of string handling functions and for not supporting string arrays. This program provides a fairly extensive demonstration and tutorial on both string handling and file handling with the Atari.

It includes informative REM statements and should be easy to follow.

The string handling routines include simulating a string array in Atari Basic, a string searching routine, routines for joining and patching up strings and exchanging words within a string.

The disc handling techniques used are standard files for printing and inputting, NOTE and POINT commands for random access of files and the PUT/GET files for holding numeric variables. All of these files can be updated during a program run, and are used in all subsequent program runs.

Finally the program can be easily used with the SAM and Reciter programs available from Don’t Ask Software, thus allowing the computer to voice the replies rather than typing on the screen. To do this simply add the following lines:

```
100 DIM SAMS(128)
1153 FS=“YOU ARE SAYING TO ME“:
"SAMS-F$ :A=USR(0199)
1355 SAMS-F$ :A=USR(0199)
```

In simulating a conversation between the computer and the user, Converse initiates the conversation and then accepts a sentence inputted by the user.

This sentence is then searched for specific key words which are contained in a file created on the first run of the program.

The file is then used to create a simulated string array and the keywords taken from the array for the search procedure.

On subsequent runs the keyword file is simply read and the contents placed in the simulated string array. This simulated array is necessary as Atari Basic does not support string arrays.

Atari Basic does not have an INSTRING or specific string searching facility, so Converse uses an instring routine to search the input string to find keywords.

On locating a keyword the program gets a reply, chosen at random from a variable number of suitable replies for the given keyword, in the reply file.

The reply is examined to see if it requires addition of a terminal phrase from the user input. If so the phrase is examined for words which will be required to be exchanged in order to preserve grammatical sense when the phrase is returned by the computer.

These words – called swap words – are personal pronouns and verb conjugations read from simple data statements within the program.

Once the word is swooped the phrase is reconstructed and tacked on to the reply and the complete reply is printed.

The program loop is then begun again as the user is prompted for the next input.

If during the conversation the program does not find a keyword in the input the user is prompted to teach the computer a new keyword and some suitable replies. These are saved to disc and used in all subsequent program runs.

If you choose the program to run in Learn mode any input that has no keyword will cause the program to ask for new keywords and replies. If the program is not in Learn mode and does not recognise keywords in the input it will give a “bluff” type response.

Thus the conversation is continued without the computer actually knowing what it is talking about – a situation I find myself in all too often.

When the new keyword is inputted you are asked to input the number of
WHEN typing in Converse all REM lines and statements can safely be omitted. The data, particularly the swap words, should be typed in exactly as in the listing, as all the spaces, etc., are important.

Changes can be made to the basic program if required, and completely different replies and keywords used to create different personalities.

A copy should be kept on a back-up disk as the program requires to run with a non-write protected disc.

I should be delighted to hear from any readers with improvements or interesting applications or personalities for Converse. Because the program relies on random access files it is, of course, only suitable for use with a disc drive.

KEYWORD.FIL file, which has or has not been updated, is directly inputted into the keyboard array.

The simulated array is formed by inputting the keywords, all made to eight characters in length, into one large string — (ARRAYS).

The string is then accessed at eight character intervals for the individual keywords. There is a random choice made for reading the keywords from this array either in the normal or reverse order.

* This is so that certain specific keywords do not dominate others by always being searched for first due to being in an earlier position in the keyword file.

Standard files. Print and Input, are used for the replies (REPLY.FIL), but the position of each reply is noted in terms of its starting sector and byte value. This is achieved using the NOTE and POINT disc commands and permits completely random access to the disc files.

These sector and byte values are stored in a standard file, POINTS.DAT, and are read into numeric arrays on running the program.

The numeric arrays are accessed for the sector and byte value of a particular reply by the program. The POINT command then positions the reply file at the particular sector and byte and the correct reply is read.

Numeric variables are used for the total number of replies and keywords and as they are constantly being updated during and in subsequent program runs, they are stored by the PUT and GET command into a numeric file that holds single byte data — that is, numbers between 0 and 255.

This need not limit the number of replies and keywords that files may contain as, for example, it is a simple matter to allow two numbers to be used which can be added, allowing twice the number of replies, and so on.
SMART ART (16k)

- OVER 80 DIFFERENT COLOURS CAN BE DISPLAYED AT ONCE
- INTERRUPT DRIVEN CURSOR
- 4 BRUSH SIZES
- 3 BRUSH SPEEDS
- AIR BRUSH MODE
- PLOT
- DRAWTO
- FILL
- DRAW BOX
- DRAW CIRCLE
- SAVE PICTURE
- LOAD PICTURE
- SEPARATE PROGRAM TO DISPLAY PICTURE
- DEMO PICTURE

ALSO AVAILABLE
BLACKJACK (16K) realistic card display ........................................... £1.95
PICTURE PUZZLE (32K) Two pictures to choose from ...... £2.95
PICTURE TORMENT (16K) Very difficult ................ £2.95
FRUIT SALAD (16K) Colourful version of mastermind ........ £2.95
FRUIT PICKIN (16K) Arcade action ................... £2.95
(For orders only FRUIT SALAD & FRUIT PICKIN .......................... £4.50)

AVAILABLE ON CASSETTE FOR ALL ATARI 8 BIT COMPUTERS
ONLY...£3.50
(Previous purchasers of Art Atari can upgrade to SMART ART for only £1.00)

P.F. SOFTWARE

CENTRONICS INTERFACE

- Transparent to all s/w - no driver programme necessary
- Connect direct to 600 or 800/XL or 130 XE – or to disc drive if fitted

FCC SYSTEMS LIMITED
THE LODGE
MOORLANDS ROAD
MERRIOT
SOMERSET TA6 5NF
TEL CREWKERNE (0460) 73442
PRESTEL MAILBOX 046073442
DEALER ENQUIRIES MOST WELCOME

£59.99
+ P&P at £1.00 and VAT = £70.14

40 ATARI USER November 1985
ATARI GRAPHICS

Graf-Stix

Self-adhesive control graphics for the 600/800XL

Free yourself from your reference manual

You know the problem, typing in a listing from any magazine or book. You are suddenly faced with line after line of "Special" characters that are not shown on the keyboard, and that means searching through your reference manual just to type a program in. Well, now you can forget that problem with Graf-Stix controlled graphical character fixed to the front of each individual key. You can find those "Special" characters instantly. And they are really easy to fix.

Send Cheque/P.O. for £4.95 inc. VAT and P&P to:

Selectavideo Computers
5 Belmont Road, Astley Bridge, Bolton BL1 7AF

Allow 14 days for delivery

THE GRAPHICS ART DEPARTMENT

The GAD is the most powerful, most versatile graphics design program available for the Atari Home Computers. Its simplicity of use make it a joy for people of all ages to paint with. It has more than 128 different colours and an incredible 30 different commands. An incredible 128 different colours can be used in any one picture. A three stage zoom feature allows one the ability to do very detailed and intricate work.

Other features include the use of text in your pictures in several different sizes. Velocity draw mode, Eclipse draw, Circle draw, Triangle draw, Kaleidoscope draw, Square draw and Ray line draw are just a few of the drawing features available.

Invert/Rotate/Mirror/Flip and a move feature make for easy design. The move feature allows one to move any part of a picture to the location of their choice. You can use the 40 paint brushes available or create your own and save them to disk. Edit character sets, pattern paint, fill mode and rainbow special effects make the GAD the best graphics program available for your Atari.

If you own a printer you can obtain a printout of your creations.

The GAD works with all printer modes, its absolutely true. You can use pictures created with the GAD in your own programs/software etc. There have been several graphics packages, but none that satisfy all your needs. Now at last the GAD has arrived. Don't believe us, see for yourself you'll be amazed.

Disk Only £29.95. Available now.

Ask your dealer for a demonstration now!

ARCADE CONSTRUCTION SET

IS COMING SOON TO A STORE NEAR YOU!

Available November '85

LOOK OUT FOR OUR ADVENTURE SERIES

AND STATE OF THE ART ARCADE GAMES

DATABYTE products are available from:

SILICA SHOP 01-309 1111, SOFTWARE EXPRESS 021-384 5060, SILICON CHIP 0753 70635, A.S. WOOTON & SONS 0270 214118, MICROBYTE 051-630 6333, DATASCAPE 01-723 0562, LADBROKE COMPUTING 0772 21474, INTOTO 0602 410987, ORDEM 0734 583062, SUNARO and other good computer stores.

If you have problems in obtaining any of these products then you can order direct. All cheques/P.O.s should be made payable to DATABYTE. Post to:

DATABYTE

Suite 31A Grove Terrace, Highgate Road, London NW5 1PL.

MIDI SYNTHESISER INTERFACE

for the Atari 400/800/600XL/800XL/130XE

Control MIDI equipped electronic instruments from your Atari. Hardware comprises MIDI IN, THRU and OUT ports. Complete instructions and example programs supplied. Disk drive required. £59.95 inclusive.

RS232 PRINTER INTERFACE

Connect your Atari to RS232 printers. Works with BASIC, ATARIWRITER etc. Disk drive required. £39.95 inclusive.

MULTI TAPE TO DISK UTILITY

* Transfer single AND multi-stage tapes to disk and then run them from a fast, autoload menu. The only one that can handle five stages. £14.95 inclusive.

CASSETTE BACK-UP UTILITY

* Re-records cassette software at any of thirteen different speeds. Can even handle non-standard format tapes. £8.95 inclusive.

Cheques/P.O. to DIGICOMM

170 Bradwell Common School, Milton Keynes, Bucks MK13 8BG.

* These products should not be used on copyright material.
LAST month we saw how the binary operators AND and OR can be used to combine pairs of binary numbers. The example we used was that of turning machines on and off under computer control.

Of course these operators have far more uses than this. To illustrate one, consider the ASCII character set. The codes for A to Z are in the range 65-90, while their lower case equivalents, a to z, are in the range 97-122.

Looked at in this decimal way, there seems little relation between the upper and lower case sets. If we look at them in hex, though, we can see that:

A to Z runs from &41 to &5A
a to z runs from &61 to &7A

I hope you can see the pattern.

In fact the numerical ASCII difference between a lower case character and its upper case equivalent is always &20. Looked at in binary, this difference is %00100000. In other words, bit five is set for lower case, and is clear for upper case - remember, we start with the zero bit.

For example, the code for A is:

%01000001
whereas the code for a is:

%01100001

Similarly, the code for Z is:

%01011010
and the code for z is:

%01111010

In both cases the only difference is in bit five.

So if we have an ASCII code for a letter, we can force it to be upper case by clearing bit five to zero. We can do this by ANDing the code for the letter with the mask %11011111 (&DF).

Remember, the bits in the mask that contain 1 will leave the corresponding bits in the ASCII code for the letter unchanged in the resultant byte, whether they be 0 or 1. On the other hand, the bit in the mask with 0 in it will force the matching result bit to be zero.

So:

%21100001 (the code for a)
AND %21101111 (the mask - &DF)
gives %21100001 (the code for A)

It won't surprise you to learn that we can reverse the procedure - forcing upper case into lower case - by using OR to set bit five. This time the mask will be %01010000, the 1s leaving things unchanged in the resultant byte, the 0 forcing a corresponding 1 in bit five of the result bit.

So:

%21011010 (the code for Z)
OR %20100000 (the mask - &20)
gives %21101010 (the code for z)

One further use for AND is to test if a particular bit in a byte is set. We just AND that byte with a mask consisting of a 1 in the bit being tested, with 0s in all the rest. The bits with 0 in them, of course, set the corresponding bits in the resultant byte to zero.

Since the rest of the bits are already cleared to zero by the mask, the only thing that could stop the entire resultant byte being zero is the value derived from the bit under investigation:

• If that bit is set, the corresponding result bit will be set also (1 AND 1 = 1) so the resultant byte will be non-zero.
• If the bit being checked is clear, the corresponding result bit will be clear (0 AND 1 = 0) so the resultant byte is zero.

In machine code we can differentiate between zero and non-zero bytes fairly easily.

Let's see how this works in practice. If we were testing for bit four being set, the mask would be %00010000.

Try ANDing this value with %00110100, where bit four is set, and also with %00101100, where bit four is clear, and you'll see that the resulting bytes are non-zero and zero respectively.

So what of EOR/XOR? Well, its function is to return a 1 if the pair of bits being combined differ, and 0 it they're identical. Given this, we can use XOR to test which bits in a byte differ. For example:

%21101111
XOR %21100111
gives %20101000

where the set bits neatly mark out the differing pairs.

We can also use EOR/XOR to complement or NOT a byte, by EORing it with a mask of %11111111. Since the mask is all 1s, the result depends entirely on what's in the byte under investigation. Bits that contain 1s will give 0.

MIKE BIBBY
concludes his series
on binary numbers

November 1985  ATARI USER 43
(since \(1 \text{ EOR } 1 = 0\)), while bits that contain zero will give 1, since \(0 \text{ EOR } 1 = 1\).

This is exactly what we want to happen with a NOT – change the 0s to 1s and vice versa. For example:

\[
\begin{align*}
11010110 \\
\text{XOR} \\
11111111 \\
gives \\
10000001
\end{align*}
\]

which is, of course, non-zero, since the bytes differ.

We've probably already mentioned the use of EOR in graphics application programs where it's widely used for its 'hey presto' effect. This is based on the fact that if you EOR a first byte with a second and then EOR the result of that once more with the second byte, the first byte reappears. Look at this, if you don't believe me:

\[
\begin{align*}
11010110 &\quad (\text{first byte}) \\
\text{XOR} \\
11110101 &\quad (\text{second byte}) \\
\text{gives} &\quad 10000001 \\
\text{XOR} \\
11111111 &\quad (\text{second byte again}) \\
\text{gives} &\quad 11010110 \\
\text{XOR} &\quad 11010110 \\
\text{gives} &\quad 00000000
\end{align*}
\]

We use this EORing technique to draw things on a background and then move on, leaving the background unchanged. In this case the first byte is the background colour number. If we then EOR our second byte – corresponding to the colour number of whatever it is we're drawing – on to the background, it will be displayed in the resultant colour number. It's rather like mixing colours mathematically.

To get rid of what we've drawn, we draw it again with the same colour number, once more under the influence of EOR. Of course EORing twice with the same byte gives us the original byte back. This results in whatever it is being drawn appearing in the original background colour. Hey presto – it's gone!

Well, that's the end of the series. Hopefully you'll have gained some idea of the power of binary numbers and the ways they can be combined. I've only touched on a fraction of the potential uses, but you'll be well equipped to work things out for yourself from now on.

---

### WOOTON COMPUTERS

**FOR SPECIAL OPENING OFFERS – PLEASE PHONE**

<table>
<thead>
<tr>
<th>Model</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>5200/1 2724 Computer + 3 1/2 Drives 500k</td>
<td>£250.00</td>
</tr>
<tr>
<td>48K Workstation + DSK + 30K</td>
<td>£150.00</td>
</tr>
<tr>
<td>314A Drilled Industry disc drive</td>
<td>£170.00</td>
</tr>
<tr>
<td><strong>All 5T BUSINESS AND GAMES SOFTWARE TO BE AVAILABLE AT THIS LOWEST PRICE</strong></td>
<td></td>
</tr>
<tr>
<td>Hardware:</td>
<td>£100.00</td>
</tr>
<tr>
<td>Software:</td>
<td>£125.00</td>
</tr>
<tr>
<td>Price Includes</td>
<td>£225.00</td>
</tr>
</tbody>
</table>

**HARDWARE**

- Full XL Range
- 120 3 1/2" F5s
- Epoxy Printers
- Interfaces
- 512 Characters
- Full supporting peripherals
- Full service support etc.

**SOFTWARE**

If it's available we have it here!

- Arcade
- Adventures
- Educational
- Utilities
- All latest titles

**SPECIAL OFFER**

- **All Computer Accessories**
  - £25.00 each
  - £20.00 per dozen

**ADDRESSES**

- Direct American Imports from our USA Branch
- Bulletin Board with PUBLIC DOMAIN DOWNLOADED SOFTWARE

---

**33 Ormskirk Road, Preston, Lancashire PR1 2QP**

**Mail order: (0772) 27236 – 6pm-8pm 116 EDESTON ROAD, CREWE, CHESHIRE, 0270-214118**
I TOLD you a lie last month when I said we’d be continuing with loops! Before that we’ve an interesting diversion into the world of strings.

Strings are simply groups of characters, letters, numbers or punctuation marks and so on, “strung” together. The micro remembers them as a group. More often than not, they’re words or sentences, as in:

PRINT "This is a string"

Notice the quotes – they’re the way we signal to the Atari that it’s a string we’re dealing with. Also, whatever’s between the quotes is reproduced exactly so:

PRINT "This is a string"

and:

PRINT "This is a string"

will give different outputs, since the second has two spaces between the quotes and the first word.

We saw that we can label strings with variables as in:

STRING$ = "This is a string"

The rule for string names are identical to those for numeric variables, except that string variable names must end with a $.

Perhaps the most important thing about strings is that you have to tell the micro in advance the maximum size they’re going to be. That is, you have to DIMension them as in:

30 DIM STRING$(6)

In this case, STRING$ can only ever be six characters long. Of course, it can be under six long, it just can’t be over six, as Program I illustrates.

If you run it, you’ll see the following output:

12345
123456
123456
123

I think you can guess what’s happened to the 1234567 you assigned to STRING$ in line 80 – it was one character too long, so the Atari simply ignored the last character.

However, the micro doesn’t mind the string being shorter than maximum size, as shown by its accepting 12345 quite happily.

And just as you can lengthen strings, so you can shorten them, as shown by the assignment of 123 in line 100.

After running the program, enter:

PRINT STRING$

and you’ll find that it’s 123, as the program left it. Now enter:

STRING$=""

Notice that the two quotes go directly side by side, with no space between. Then enter:

PRINT STRING$

This time instead of printing 123 as the value of the string, absolutely nothing appears on the screen save for the READY prompt. This is because the value of STRING$ is absolutely nothing since:

STRING$=""

has absolutely nothing between the quotes, not even a space. This string
is called the null string and we use it when we wish to wipe out, or nullify, a string.

To see some more aspects of strings on the Atari, assign:

```
STRINGS$="HELLO"
```

and then enter:

```
PRINT LEN(STRINGS$)
```

You should receive the answer:

```
5
```

You see, LEN() is a function that tells you how long a particular string is. We’ve used it with a string variable, but you can, if you wish, use it with a string in quotes as in:

```
PRINT LEN("ABCD")
```

This might seem a bit cockeyed to you, though. Why do we need LEN since if the string’s in quotes you can see how long it is, and if it’s a variable you’ve already dimensioned it? Don’t forget, though, that a string doesn’t have to be the size you’ve dimensioned it, it can be less.

Often, when you’re using INPUT with a string variable, you won’t be too sure how long the string will be.

LEN lets you find out so you can, for instance, allow for different lengths in your screen layout.

Before we leave LEN, try to find the length of the null string with:

```
PRINT LEN(""")
```

You’ll receive the answer zero, proving that the null string consists of absolutely no characters whatsoever.

Incidentally, we’ve only been able to do all this assigning to STRINGS$ because we’ve dimensioned it when we ran Program I. If we tried to assign to a new variable as in:

```
TEST$="HELLO"
```

we get an error message, since TEST$ hasn’t been dimensioned.

Anyway, at present STRINGS$ should hold the value HELLO. Try entering the following:

```
PRINT STRINGS$(1)
```

and you’ll see HELLO appear. Now try:

```
PRINT STRINGS$(2)
```

and ELLO should arrive.

```
PRINT STRINGS$(3)
```

will give you LLO, while:

```
PRINT STRINGS$(4)
```

will produce LO.

No prizes for guessing what:

```
PRINT STRINGS$(5)
```

gives you!

What’s happening is that by following STRINGS$ with the brackets, only part of the string is printed. It’s as if we’re taking just a slice of the string.

The start of the slice will be the character whose position in the string is given by the number in brackets. It finishes at the end of the string.

So STRINGS$(3) would give us from the third letter of STRINGS$ to the end, giving LLO. With STRINGS$(1) the whole string is printed out since 1 means the slice starts at the first letter. On the other hand STRINGS$(5) gives us a single character slice, since the fifth letter of the string is also the last.

See what happens when you try:

```
PRINT STRINGS$(6)
```

Program II gives a graphic example of this slicing using a FOR...NEXT loop. Here the loop variable START decides the starting position of the slice. Each time through the loop the slice starts further up the string.

```
10 REM PROGRAM II
20 PRINT CHR$(125)
30 DIM STRINGS$(10)
40 STRINGS$="ABCDEFGHIJKLMNOPQRSTUVWXYZ"
50 FOR START=1 TO 10
60 PRINT STRINGS$(START)
70 NEXT START
```

Program II

Let’s look at this in detail. The first part of our program clears the screen then sets STRINGS$ equal to ABCDEFGHIJ. We then enter the loop.

The first time through START has the value 1 so line 60:

```
60 PRINT STRINGS$(START)
```

is in effect:

```
60 PRINT STRINGS$(1)
```

If you’ve been following this you’ll see it means we can print out from the first character of STRINGS$ to the
last. That is it prints:

```
ABCDEFHGIJ
```

The next time through the loop though START is 2, so line 60 is in effect:

```
60 PRINT STRING$(2)
```

so we can start at the second character of STRING$ and continue to the end to give:

```
BCDEFHGIJ
```

On the next cycle, START is 3, line 60 being:

```
60 PRINT STRING$(3)
```

which gives you:

```
CDEFHGIJ
```

and so on.

Finally, START has the value 10, so line 60 prints out the slice from the 10th character to the end – the single letter J.

Actually we can slice off any part of a string we want by giving two numbers in brackets separated by a comma. The first number specifies the start of the slice and the second the finish.

Enter the following (assuming you've run Program II):

```
PRINT STRING$(2,6)
```

You'll get back:

```
BCDEFG
```

Remember, STRING$ is ABCDEFGHJI, so STRING$(2,6) gives us the slice with its second letter, B, and finishing with its sixth letter F. Notice you get five letters, not the four that 6-2 might lead you to expect.

Program III allows you to experiment with slicing STRING$. Initially STRING$ is printed out, then you'll be prompted for the number of the character you want to start from, and the number you want to finish with.

The slice you've requested will be printed out, and the process repeated. (You can escape from the loop by pressing the Break key.)

Play around with various slices until you're sure you understand how they operate, then have a look at how further along STRING$, giving us our triangle of letters.

After you've run Program IV enter:

```
PRINT STRING$(1,LEN(STRING$))
```

As you'll see, the whole of STRING$ is printed out. The reason is that LEN(STRING$) gives us 10, the length of STRING$. This means that what we've entered above boils down to:

```
PRINT STRING$(1,10)
```

Since STRING$ starts at its first character and finishes with the tenth, the whole of the string is printed out.

Finally, take a look at Program V. We're using the fact that:

```
PRINT STRING$(5,5)
```

prints out just the fifth character of STRING$, since the slice starts and ends with the fifth character. Instead of specifying a number, however,

```
PRINT STRING$(5,5)
```

we've made the loop variable, LETTER, which ranges from 1 to 10, so line 60 reads:

```
60 PRINT STRING$(LETTER,LETTER)
```

This will pick out and print each letter of STRING$ in turn, as you'll see when you run it.

By the way, we could have written line 50 as:

```
50 FOR LETTER = 1 TO LEN(STRING$)
```

Since LEN(STRING$) is 10, this is equivalent to the original line 50. It has the advantage that, if you missed out one of the letters of STRING$ when you typed in line 40, the LEN(STRING$) automatically compensates for the error, calculating the true length.

Well, perhaps I didn't mislead you too badly after all – we've used quite a few loops this month. And next month there'll be even more!
FULL PRESTEL FOR ATARI USERS!

Please send me
☐ Multi-Viewterm/Datatari packages @ £50.95 incl. VAT + £15 UK P/P.
☐ I enclose cheque/postal order
☐ change my Access/Visa card no:
 expiry date

Name:

Address:

Postal code:

send to:
Atari Support 3, Miracle Technology (UK) Ltd.
St Peters Street, Ipswich IP1 1X.
Tel 0473-21614

For models 400, 800, 600XL, 800XL, 65XE, 65XEM and 130XE used with suitable modems.

To get your ATARI on-line, all the way, clip the coupon today.

———

The KUNG-FU CHALLENGE!

For ATARI 400/800/600 XL/800 XL/130 XE—48K—

Cassette £8.95. Diskette £12.95

from

ENGLISH SOFTWARE

The ENGLISH SOFTWARE Co.
1 North Parade, Parsonage Gardens,
Manchester M60 1BX

ACCESS

Haystack

Peripherals

Haystack

Peripherals

8 Midgrove, Delph, Oldham OL3 8EJ. Tel: 04577 5229

HAYSTACK PERIPHERALS

ALL OUR PRICES INCLUDE VAT AND CARRIAGE

REQUEST FREE CATALOGUE (Please write on airmail style)

NAME

ADDRESS

Phone No.

Access No.

C15 Computer Cassetes

(30 of)

£4.50

BEWARE OF CHEAP BOOTLEG SOFTWARE—ALL OUR TITLES ARE ORIGINAIS!
Make yourself a...

BIT WISE OPERATOR

with these routines by KEVIN EDWARDS

THE program listed here contains three useful subroutines to provide bit by bit (bitwise) operators for the logical functions AND, EOR and OR.

Atari Basic already recognises the two commands AND and OR, but these are treated as logical operators. In other words their result will be either true (1) or false (0).

To illustrate this we'll use a simple Basic program:

```
10 A=12:B=13
20 IF A=12 AND B=13 THEN PRINT 'YES'
30 END
```

As you can see, it tests to see if A is 12 AND B is 13. Since this is true (1) the THEN statement is executed. But if B were changed to 100 the result would be false (0) and the THEN statement would be ignored.

However the operators can be used in bitwise fashion - not using Atari Basic commands, though.

With bitwise operations all corresponding bits of two numbers are compared to produce another bit - the result bit. Table 1 lists the result bits for AND, EOR and OR operations.

You can find more information on this subject in the Bit Wise articles in Atari User for August and September 1985.

The machine code routines provided by Program I permit you to use all three of the bit by bit operations on two 16 bit numbers. Table II lists the start addresses for each machine code routine.

If you change line 60 to GOSUB 7300 the two numbers will be ORed. See if you can work out the line number for EOR.

All line numbers below 7000 in Program I are there to test the three routines. When you require the bitwise operations in your own programs you only need lines 7000 onwards.

And that's it. There's plenty of things you can do with them. Why not have a go at printing hexadecimal and binary numbers?

```
10 REM BITWISE OPERATOR
20 REM BY KEVIN EDWARDS
300 GOSUB 7000:REM SET UP NCODE
310 NUM1=255:NUM2=15
320 GOSUB 7200:REM EOR
330 ? RES
340 GOSUB 7300:REM OR
350 ? RES
360 GOSUB 7400:REM AND
370 ? RES
380 END
```

Table II - Start addresses for each routine

<table>
<thead>
<tr>
<th>Start address</th>
<th>Operator</th>
<th>Subroutine line number</th>
</tr>
</thead>
<tbody>
<tr>
<td>1552</td>
<td>EOR</td>
<td>7200</td>
</tr>
<tr>
<td>1572</td>
<td>OR</td>
<td>7300</td>
</tr>
<tr>
<td>1592</td>
<td>AND</td>
<td>7400</td>
</tr>
</tbody>
</table>

Each operator has been given its own Basic subroutine from which it should be called. This saves you repeating lines and lines of USR commands. Before the routines can be used the variables NUM1 and NUM2 must be set up with the two numbers which are to be compared.

The appropriate routine is then called and the result is returned in the variable RES. The end column in Table II shows the Basic line number for each operator.

You can, in fact, call the routines yourself, although it's a bit messy. First assign two variables with the numbers to be operated upon - VAR1 and VAR2 say. Next find the location of the required function - see Table II.

Once this has been done the command USR is used to execute the routine and return the result:

```
A=USR (ADD,A,VAR1,VAR2)
```

A will now contain the result.

The subroutine at line 7000 is responsible for picking the machine code data into memory.

This must be called at the start of any program which makes use of the bitwise routines. The example listed below shows how the two numbers 255 and 63 are ANDed:
Micro
Scope

CIRCLE computes a circle and draws it on a graphics screen chosen by the user. It uses the XIO command to fill the circle as it's drawn.

If you remember your school maths you'll know that the general equation for a circle is \( R^2 = x^2 + y^2 \).

```
10 PRINT "Graphics Mode...";
20 INPUT G
30 GRAPHICS G;COLOR 1;POKE 765,1
40 PRINT "Centre (X,Y)...";
50 INPUT X0,Y0
60 PRINT "Radius...";
70 INPUT R
80 R2=R*R
90 PLOT X0,Y0+R
100 FOR Y=R TO -R STEP -1
110 X=50R*(2-(Y)/Y)
120 PLOT X0+X,Y0+Y
140 NEXT Y
150 FOR Y=-R TO R
160 X=50R*(2-(Y)/Y)
170 PLOT X0-X,Y0+Y
180 IF ABS(Y)<R THEN GOTO 200
190 X10 18,86,0,0,"5:"1
200 NEXT Y
210 GOTO 10
```

10-20 Ask for and receive the desired graphics mode.
30 Set up the mode and colour. Location 765 tells the fill command which colour to use.
40-70 Ask for and receive the centre and radius of the circle to be drawn. Note that no error checking is done to prevent the cursor going out of range in the chosen mode.
80 Square R. Since the radius is a constant for any circle being drawn, it's more efficient to calculate it once outside the main drawing loops than repeatedly inside the loops.
90 Plot the first point on the circle.
100-140 Draw the right-hand half first. Compute the position to be drawn to using the circle equation.
150 Start of loop to draw left-hand half.
160-170 Compute each point and plot it.
180 Check for top and bottom pixels.
190 Fill the circle as it's drawn.
200 End of loop.
210 Go back and start again.
Super Savers from 4 fabulous action games by "K-BYTE"

**BOULDERS AND BOMBS**
99 levels of intensity! Alien birds and their spreading fungus try to turn your cave explorers into fossils! Tunnel underground, blast away boulders to get to safety.

**MOUNTAIN KING**
A quest for diamonds and the mystic Temple Crown! Get your treasure back through the caverns to the mountaintop before the cave bats close in! Dangerous spiders, musical clues.

**K-RAZY SHOOT-OUT**
Trapped within deadly control sectors, you must shoot it out with dangerous Droids! You’ll need fast reflexes and precision marksmanship. And watch out for the radioactive walls!

**K-RAZY ANTIKS**
Defend your anthills against enemy ants! If they don’t get you, their exploding eggs might. Watch out for the anteater’s tongue and the floods.

**SPECIAL MAIL ORDER PRICE**
Including P&P

£4.99 EACH

**Send to: I.C.E. Ltd, PO BOX 22 PANGBOURNE, BERKSHIRE RG8 8LJ**

<table>
<thead>
<tr>
<th>Option</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>MOUNTAIN KING</td>
<td>£4.99</td>
</tr>
<tr>
<td>BOULDER AND BOMBS</td>
<td>£4.99</td>
</tr>
<tr>
<td>KRAZY ANTIKS</td>
<td>£4.99</td>
</tr>
<tr>
<td>KRAZY SHOOTOUT</td>
<td>£4.99</td>
</tr>
<tr>
<td>ENCLOSE A CHEQUE/PAYABLE TO I.C.E. LTD FOR £</td>
<td></td>
</tr>
<tr>
<td>PayPal</td>
<td></td>
</tr>
</tbody>
</table>

Silicon Chip reserve the right to substitute

November 1985  ATARI USER  51
Graphics exact
too great
a sacrifice

LEVEL 9's Red Moon is now in the shops and doing well by all accounts. It's the first Atari version with graphics, and part of Level 9's new strategy of releasing lower priced games between their normal priced "theme" games.

At £6.95, the same price as Emerald Isle, Red Moon is £3 cheaper than the Silicon Dream Trilogy, the final part of which, The Worm in Paradise, will be launched soon.

In the meantime we adventurers are to get to grips with the first Majik adventure from Level 9. The story goes, as recounted on the inlay, that when Majik was at its most powerful so was the moon which glowed - surprise! surprise! - deep red.

The moon and sun, however, didn't get on so well together, and whenever their paths crossed they tended to have a bit of a battle, and so the moon grew weaker and weaker. As a consequence so did Majik.

Obviously the Magicians' Union was none too pleased and so, in the moon tower of Baskalos, it placed a moon crystal powerful enough to cover the whole kingdom.

So what is the problem, you may ask? Well some little thing has nicked the crystal - and off you go to find it.

Two new elements appear in this game. First the use of spells, through a CAST command. Each spell requires a focus object - listed on the inlay. It might have been a bit more of a challenge if you had to discover which object was a spell focus.

Some of the connections are a bit remote. A pearl is the focus for the SNOOP spell and gloves for discovering whether or not TREASURE is valuable.

Also SAVE and RESTORE are listed as spells. No focus object is required, but it means that, as with the other spells, they will not work in the presence of iron, which can be a bit of a bind.

The other addition is of combat, as some of the treasures are guarded by the mythical beasts of the kingdom. This is the weakest of the new elements, since the combat routine is repetitive and is, in effect, a stand up battle between you and your opponent until one keels over.

The first screen sets you on a grassy plain and gives you the first taste of a slickly drawn colourful, yet somewhat two dimensional, graphics screen.

The plain is a sheet of green, with what appears to be six tufts of grass. The screen also refers to a yellow sun, but unless my Sony is playing up, or that is the RED moon up there, the sun is anything but yellow.

Just to help you at the start, you own nothing. By following the guide sent to reviewers you are able to quickly acquire several useful possessions. The ubiquitous axe and lamp, and by drawing the lake, a pearl, not from an oyster but oyster fungus - shades of Return to Eden.

In fact there is a great sense of déjà vu about the whole game. The graphics mean that the text is not as voluminous as usual and the whole game seems to consist of rooms, corridors and caves, with few interesting articles or problems other than a knock 'em down fight to the death.

The problems are not as involved as we have come to expect from Level 9, and some problems are recognisable from other adventures, such as getting past the watchdog.

Anyone who finishes The Pay-Off will have no problem here.

I reserve my final comment for Level 9's graphics. Let's face it, they add little or nothing to the game. They merely depict the fixtures of the
rooms in which you stand.
Even the more interesting characters, such as Sog the Newtling and the Rat, are not drawn.

At £6.95, Emerald Isle is a definite step forward by Level 9, a good cheap adventure with bags to do and lots of atmosphere. Red Moon loses much of that involvement through including graphics, and to my mind the sacrifice is too great.

On to a game which requires no introduction following the review in the August edition of Atari User, Infocom's Hitch Hiker's Guide to the Galaxy.

In this review the problem of how to get the Babel fish was touched upon, and it is an extremely entertaining puzzle which unfolds as you try to prevent each successive Babel fish from disappearing in an even more convoluted way.

It is not my policy to give away the answer to a problem. This particular problem, however, had me so enjoyably bamboozled that, step by step, I shall take you through how to solve it.

People wishing to extend themselves should read no further, but jump to Wizard of Akryz later on.

Now then, as Arthur Dent, recently of no fixed planet, I have come to my senses in the hold of a Vogan space ship, and have a sleeping Ford Prefect and a Hitch Hiker's Guide for company.

Knowing from the books that I now need to insert a Babel fish in my ear in order to understand the wider universe and its various tongues, I press the button on the Babel fish dispenser, only for it to shoot across the room and vanish through a hole under a small hook!

No problem. Simply remove my dressing gown (I hope no one comes in), hang it on the hook, and try again. This time the Babel fish slides down the sleeve of the gown and slips through the previously unnoticed grating on the floor and down the drain. Curses!

Eventually, as no hoopy frood should be without it, I place my towel on the grating. It fits, and lo and behold the next Babel fish slithers neatly onto the towel.

Behold also the zippy little cleaning robot which whizzes through at breakneck speed, picks up the Babel fish and disappears through a small panel a few inches high in the wall. After several attempts at catching the robot I eventually hit on trying to block the panel.

Several bulky objects later, including myself, I place the satchel next to the panel.

Press the button and this time the robot ploughs into the satchel and the Babel fish arcs gracefully into the air, where a top half of the cleaning robot zips out and grabs the fish in mid-air and vanishes.

The next few hours are spent fending off a succession of objects into the air and watching a succession of extremely efficient cleaning robots gather them up, plus Babel fish.

Even summoning the Sirius Cybernetics Corporation engineer robot did no good. You see, he only repairs the automatic thumb I tried throwing in the air.

Finally a brainwave.
Instead of throwing things into the air before getting the Babel fish try and get them there at the same time.
Carefully I piled the mail on the satchel, and pop out comes the Babel fish, down the sleeve of my gown, onto the towel, scooped up by the robot which smashes into the satchel, sending the whole kit and caboodle into the air.

So while the top half of the cleaning robot is frantically gathering up junk mail the Babel fish slithers neatly into my ear.

So now when the Vogon announcement that Ford and I are to be thrown overboard is translated I can still smile.

The HHG is without doubt the zaniest, funniest adventure yet written, even if much of the action simply unfolds before you.

It's an absolute must for fans and non-fans alike.

This leaves me time to have a quick look at Wizard of Akryz from Adventure International, where Simon Ashford keeps finding his spectacles falling off.

Early in the game, Simon, you should find a painting held on the wall by a fine chain. That should fix you up all right, but carry plenty of objects as mapping this Mysterious Adventure is as tedious as ever.

Finally Glitch of the Month this time goes to S.P. Banit of Daventry and concerns The Pay-Off from Atari.

Not the two responses that he got from the game, however.

They are both quite deliberate, and you should get a chastening response for one of the things you typed.

No, the glitch belongs to the Atari Helpline, which told Steve that by cutting a notch in his disc he would corrupt it.

In fact that is the only way to save the game position on the disc provided, which comes with the Atari disc promotion package.

Failing that, any disc formatted to standard DOS 2.0 will enable you to save your position. But Tut Helpline, A medium T shirt is on its way to you Steve.

Also, move things around in the bank to find an exit you ought to realise is there, and you're almost home and dry at Luigi's.
Graphics galore on the 800XL

RECENTLY I purchased an Atari 800XL and after a few reliability complaints with the 1010 cassette unit I settled down to the keyboard and taught myself the majority of Atari Basic.

However, it does not support all the graphics modes of the GTIA chip, in particular the mode which allows 16 colours with a resolution of 80 x 192.

So I am left in a position where I know it’s in there but I can’t get to it.

Are there a few simple pokes to put me in this mode? If not, can you suggest a book with a routine to do this?

At the moment all I have is a few American books and they seem to deny the existence of such a mode.

In reference to the new XE range which I’m told will have a new improved disc drive available, should I buy a 1050 or will the new disc drive be compatible with the 800XL and the available disc software? - M. Wilson, Yeovil.

- You will be delighted to find that Atari Basic does support the extra graphics modes, even if the books you have been reading don’t.

After Mode 8 there are another seven modes (or three on the old Atari 400/800).

Briefly, Mode 9 has one colour and 16 brightnesses (80 x 192).

Mode 10 has nine full colour/brightness combinations (80 x 192).

Mode 11 has 16 colours and 1 brightness (80 x 192).

Mode 12 is multicoloured text (40 x 24).

Mode 13 is multicoloured text (20 x 24).

Mode 14 is 2 colour (160 x 192).

Mode 15 is 4 colour (160 x 192).

See Dave Russell’s Graphics column for more details.

We wouldn’t bother waiting for the new drives – for quite a while yet software will be only available for the old drives and a 1050 is quite cheap now anyway.

Banishing boggler

HAVING been an avid Atari user for many years now, I recently bought your magazine which I found, to my delight, was that which I had been waiting for.

After years of Sinclair/Commodore/BBC domination, good old Atari have finally woken up their magazine/soft-

ware markets which pleases me no end.

I am writing in the hope that you can solve a few problems I and other Atari Users know of have had.

The first of these mind boggler is that I was wondering whether the video touch pad from the Console game (1200) Star Raiders is compatible with the joystick ports of my Atari 800.

If so, how is it possible to “read” the various buttons of the pad?

Secondly, I have discovered a bug in the Atari manual “Your Atari Computer” the peek/poke location for allowing up to seven files open simultan-

ously.

A full paragraph carefully explained that I should poke 1801 , x : x being the amount of files I wanted to open at one time.

To my disgust this failed to work even after sustained efforts to discover the problem and I have viciously savaged various pieces of my Atari equipment.

I am sure I have enough memory, and using DOS 2.0S I should be allowed seven files open at once if it only require four! so what is the problem?

Finally, I was wondering whether you know of a program that could handle vertical and horizontal scroll-

ing in various graphics modes.

- R. Chapman, South-

ampton.

P.S. Here is a table of the peek location to see if a console key has been pressed: PEEK (53279); You will get a value 0-7 and the following explains the meaning of each:

| 0  | START | SELECT | OPTION |
| 1  | 1     | 0      | 1      |
| 2  | 0     | 0      | 0      |
| 3  | 4     | 0      | 3      |
| 4  | 4     | 0      | 1      |
| 5  | 0     | 0      | 0      |
| 6  | 1     | 0      | 1      |
| 7  | 1     | 0      | 1      |

- Firstly, assuming that the video pad from Star Raiders works in the same way as the ordinary key pad for the VCS, there is a little program to read the buttons in the Atari Basic Reference Manual – that’s the original loose leaf manual released with the old 400/800 machines, which is still available from Atari.

The POKEs for DOS which enable extra buffers DD work, but don’t forget that they won’t come into effect until you hit the System Reset button.

Better still, POKE the numbers you require, then go to DOS and format a new disc.

Once you’ve written the DOS files to that disc, the new configuration can be booted up every time.

For anyone who wants to try for themselves, location 1802 contains the number of drives active in bit-coded form.

Lighting up the micro scene

I HAVE a small amperage bulb which lights quite brightly on the power supply at the joystick port on my 800XL.

I wondered whether you could tell me how I could turn it off and then on again.

What software would have to be written to achieve this and which two pins would the lamp have to be fitted to on the joystick port? - Dean Rossiter, Wellingborough, Northants.

- André Willey replies: The fact that the bulb may light quite brightly does not necessarily mean that the computer is rated to run it. The +5V DC output on Pin 7 of the joystick connector is only rated at 50mA maximum drain, which is not really enough to run even a small bulb.

The PIA output ports - the joystick connections — are rated for TTL levels, one load. This means that you can’t directly run a bulb from the port.

However if you run a transistor from the TTL port and switch a bulb/battery combination, then the sky’s your limit.

If you go one stage further and use an opto-isolator or relay, you can even switch mains — indeed, I’ve built a module to do that very thing.

The software would be very simple indeed, needing only a very few POKEs. If anyone would like to see an article on plugging Ataris into the outside world, then let us know and we’ll plan one for a future issue.
Thus 1 means you have Drive 1 only, 3 means Drives 1 and 2 are active, 7 means 1, 2 and 3, etc.

Each new drive requires more buffer space to work, so if you only have one drive, POKE with 1 to save memory. Location 8001 contains the number of active buffers. Each open file you wish to use simultaneously needs one buffer, plus each active drive will need two buffers.

Change this number if, for instance, you want more than three files open at the same time.

Don't forget, though, to either hit Reset, or format a new DOS disc and re-boot before you try to use the newly-set up configuration.

Bomb Run flashes

WHEN I received the July issue of the Atari User I typed in Bomb Run on my 16k Atari 800, but when I ran the game the screen was disturbed by yellow and orange flashes. Is there anything wrong with the program?

I also typed in Treasure Hunt. I had not finished the program but I had to go out, so I taped the program with my Atari 1010 recorder.

When I returned and tried to load the program, the computer loading sound was distorted and "Error 140" appeared on the screen.

So I reloading the program. This time the message "Error 138" appeared.

The whole program had gone. Please can you explain why this happened? - Kalpesh Tanna, Kenton, Middlesex.

As far as we know there is no problem with Bomb Run. Check all data statements and any pokes made from items read from data.

A faulty poke could easily crash the computer. Also, see the modifications offered by Brian Appleton on page 58 in last month's Atari User.

The problem with your crashing tape sounds like the age-old bug in the operating system of the 400/800 computers - it was corrected from the XL range onwards.

Basically, the tape recorder buffer area can be left full of random data and this is not cleared before writing to the tape.

To correct this anyone using a 400 or 800 computer should always type LPRINT before saving anything to tape.

This will clear the buffer by sending the contents to a printer. If you don't have a printer, you will get an Error 138, but the buffer will still have been cleared, so you can ignore the message.

Pixilated pixels

I OWN an Atari 400 and both 410 and 1010 recorders. Looking at the programs in your magazine, I noticed that it was a headache typing them in. You have a monthly disc with the programs on, but why not a monthly cassette?

This is quite irritating because I have no choice but to type them in. I suppose that other Atari users think the same.

Also, when I type in graphics Mode 8 on my 400 it should only be one colour, but when I start drawing lines, they end up in lots of different colours. Why is this?

Finally, can you name anywhere where I could buy a 12-pin printer plug like the ones on the tape decks? - A. Groves, Bristol.

The multicolour lines in Graphics 8 are not the fault of the computer, but of the TV you are using.

The British TV system is made up of tiny patterns of red, green and blue dots. By turning three adjacent dots on "full", you get a white image on the screen.

The problem is that a Graphics 8 pixel is about the size of one of these small

LOOKING FOR A BETTER BASIC

I OWN a BBC Micro and am considering purchasing an Atari, due to its excellent graphics and colour, and also as Location 1801 contains the BASIC microprocessor, whose assembly language I am accustomed with.

I know that the BASIC provided with the machine is quite good, but is not structured. I should therefore like you to tell me what is the best BASIC to buy for it, if necessary, which has structured programming and is generally similar in concept to BBC BASIC.

I have heard that Basic XL is excellent, and would be pleased if you could give me any details on this. I have also heard of a language known as Action!, and would like to know the purpose of this.

I would like to know the best assembler cartridge (disc) to buy. I already know the 6502 operation codes, but do not know the Atari computer's built in machine code routines.

Basic XL (and its new, ever more powerful, big brother Basic-XE) and Action! are products of OSS in California, and can be obtained from many dealers or from the UK distributors, Software Express.

They each have their own advantages. Basic-XL/XE have many features not available in normal Atari Basic, including structures, sprite handling, better I/O, etc.

They are also about three times faster than Atari Basic.

Action! is a very high speed editor/compiler system which behaves like C and runs faster than anything else on the Atari except machine code.

It is also quite easy to write in, with a format nearer to structured Basic than C.

I use both extensively, and recommend them without question to any serious Atari programmer.

Your second question boils down to OSS again. Mac-65 (cartridge or disc) gives you speed, macros, etc. It also has an editor/assembler, though it can do a complete disc-to-disc assembly if required.

For the technically minded, I recommend three main books:

De-Re-Atari (Atari) is a tutorial/guide to many features of the hardware and OS.

Mapping the Atari (Computer Books) is a superb memory map, and I find it quite invaluable. Once you know the system, this book would be referred to more than any other.

Technical User Notes (Atari) are the complete notes, including circuit diagrams, for the computer. You also get a full operating system listing and full OS documentation.

The above books cover sprites too, in great depth. There are eight, single colour, sprites (four large, four small), but these can be multiplexed and so forth "on-the-fly".

The cheapest ST, the 280ST, will be around £500.
"colour gun" dots, and so the TV turns off all adjacent dots — thus it can't properly balance out the first colour with two others — you get a colour bias.

If you use a high resolution monitor the effect becomes much less noticeable.

However, the effect can actually be quite pleasing if you utilise it well. See Dave Russell's Graphics column in the October issue for a good example program.

13-Pin I/O plugs are quite hard to get hold of, but you could try Silica Shop or Software Express.

As for monthly cassettes of Atari User programs, these are now available — see Page 61.

3D colour system

I AM looking for a three-dimensional colour drawing system for the Atari.

I have seen two advertised already, Atari World and 3D Super Graphics. Both were advertised by Maplin in 1983, but when I rang them they had never heard of them. They are made by United Software of America.

Do you know anyone who stocks them or is willing to order it?

I have tried Silica Shop, Maplin and Zoomsoft. Has anyone heard of it? — Nigel Mirza, Rainham.

Both Maplin and the Atari Center in Broad Street, Birmingham, have had these titles in stock at one time or another, but if they have sold out. Perhaps Software Express can get one for you, as they specialise in getting special order items in from the States.

You may, of course, find that these items have been discontinued.

Books on machine code

WOULD you please be so kind as to tell me where I could obtain a machine code book for the Atari, or the name of a book with this information in. — Shane Bradbury, Hartwell, Northants.

That's an easy one. Try Compute! 's First Book of Machine Code, in conjunction with their Mapping the Atari (Compute! Books, available from most good Atari specialists).

Also recommended, but on 6502 machine code generally, are Rodney Zaks' Programming the 6502 and Lance A. Leventhal's 6502 Assembly Language Programming.

Don't forget that with the last two a good book on the workings of the Atari is also essential, such as Mapping the Atari, or Atari's own De-Re-Assembly Language Notes.

Logging on to MicroLink

I HAVE an Atari 800 computer, an 850 interface and a WS 2000 modem.

I have until recently used Hometerm software by Batteries Included to access bulletin boards.

Two weeks ago I paid a subscription to MicroLink but on trying to use this excellent program on MicroLink I was unable to log on to the system.

I am however able to log on with my S20ST with the inbuilt software, so there is no problem with the modem.

I have printed a complete disassembly of Hometerm but am unable to find where the RS232 port is configured as I am only a beginner at machine code.

I would be grateful if you or anyone else could tell me how to correct this problem as I am reluctant to change this excellent program. — R.A. Horner, Sheffield.

We had exactly the same problem with HomePak as you seem to be experiencing.

After trying other programs — much less user friendly, but easier to re-configure — we found the problem was with the PSS system, not with HomePak.

What HomePak does in Asci mode is to send a line feed after every Return character. This causes Gold, and most other boards we have tried, to have no trouble.

However PSS needs two Returns with nothing between, so the line feeds throw it off completely.

The cure is to switch into Atari mode from menu, and whenever you should type Return (at ends of lines, etc), just type Control-M instead.

Once logged on, that is as soon as you have typed in your password, hit Control-S to pause the system, return to Asci full-duplex mode, and use Control-Q to restart MicroLink.

We have configured a defaults file on HomePak to start up in Atari mode, and stored a macro to do all the work for us.

All we then need to do once the macro is complete is hit Select (for menu). A (for Asciil), Return (for main screen again), then Control-Q and we're on-line. Have fun!

Saving data files

I WOULD like to congratulate you on your superb new magazine, it's about time Atari users had their own publication.

I recently purchased a 1050 disc drive and at the same time Microsoft Basic 1.

However I can't seem to save data files successfully, although I know you should use the OPEN, CLOSE and EOF commands.

Please help, as I need to be able to do this for my O level project.

Might I suggest you start a page for classified advertisements, which should also include the names and address of user groups? — D. Hansen-Luke, Pulloxhill, Beds.

As far as we know Microsoft Basic II works fine as far as I/O goes, although the commands are a little different to those in standard Atari Basic.

There may be some problems when trying to use it with some DOS variations, such as DOS 3, so perhaps your problems lie there?

Anyway, if after trying with another DOS you still have problems, contact the Atari Helpline on 01-309 7770.

Printer for labels

I NEED a roll feed printer with ratchet for printing labels.

I have an Atari 800 computer with disc drive and tape recorder, so I would like any available information about the interface and software to go with the printer.

As it would be used to print address labels and product information, the software must be able to store the necessary addresses and information ready to print. — P.I.C. Gooch, Brighton.

Atari's own 1029 printer is

November 1985 ATARI USER
probably the cheapest available with friction and tractor feed, and it has the advantage of plugging straight into the machine.

It allows graphics printing, but is rather poorly supported by software. Print quality is only fair, but it retails at about £200.

If you can afford that little bit extra, probably the best printers to look at for linking to an Atari are the Epson range, especially the established RX 80 F/T or the new LX 80 near-letter-quality model with optional tractor feed.

These are supported by a wide range of software which also allows you to print graphics. They use a Centronics connection, so will work with most commercial printer interfaces - Atari 650, Blackthorn, FCC Systems.

It is really a case of a producer for courses though, and if you find a cheaper printer fits the bill exactly, then buy it.

The other thing to bear in mind is that if you may want to use a modem in the future try to get hold of an 850 module, because that has both serial and parallel ports.

On the software side, a good database to try is Synapse's SymFile+, which is not too expensive and is very versatile.

It will allow storage to any density of disc drive, plus full list/label options for your printouts.

It is also driven by pop-up menus, which makes it very easy to use.

**Connecting a printer**

I AM interested in buying a printer for my Atari 800. I actually require a letter quality printer, but the market for all types of printer seems rather limited.

There were virtually no adverts for printers in the first issue of Atari User. Please can you tell me what is available.

Does anybody besides Atari themselves manufacture printers directly compatible with the Atari bus? What is the specification of the connector for the Atari bus, that is what signals are on what pins as well as the connector type?

Finally, what are the disadvantages of connecting a printer via a joystick port? — D.A. Wilson, Reading.

Atari makes a letter quality printer - the 1027, but it is very slow and noisy. It does, however, connect directly to the Atari without an interface, which saves you a bit of money.

It is the only letter quality we know of which can connect directly to the Atari bus.

Most types of printer will connect via a Centronics type connector, and any computer shop will be able to show you printers which can do this.

The bus is a special 19,200 baud serial interface, and can't be linked to printers without a lot of extra circuitry to convert the serial signal to the parallel Centronics standard.

You can buy such interfaces, and there are about half-a-dozen currently available from various companies - see adverts in this issue.

You can connect a printer via the joystick ports if you write a machine code handler routine, but it would only work with your own programs, say Basic listings. Any commercial software at all will expect the printer to be attached via the bus, and it would be almost impossible to modify for joystick port use.

**Drawing software**

DOES anyone know of any technical drawing/drafting software which is available for the Atari 800XL?

Numerous packages exist for the Apple and BBC computers which use the same processor, the 6502, as the Atari.

The Atari Touch Tablet should be an ideal input device for such a program.

The increasing use of CAD (Computer Aided Design) in engineering should promote a greater interest in this type of application on home computers, particularly those with the graphics capabilities of the Atari.

Schools and technical colleges would also appreciate such an application no doubt. Anybody got any ideas? — A.C. Chamberlain, Tunbridge Wells.

- We don't know of a specific CAD package for the Atari, but Datasoft produced something very similar called Graphic Master, which allowed designs to be created on a Graphics B screen, manipulated, rotated, flipped, etc.

- Routines were included for lines, circles, polygons, overlays, moving blocks, changing the scale of portions of the design and three different text overlays.

- You could also transfer portions between work screens and the main design screen, and use a system of icons, for example electronic component symbols.

- Once drawn, the images created could be stored on disc or printed on an Epson or NEC-type printer.

- It's quite an old program, but well worth searching for. If you can't find one see if someone like Software Express can import a copy for you.

**Problem with Basic**

I HAVE a problem with Atari Microsoft Basic V1.0.

I have just bought a 130XE to replace my old 800, at the same time I received my copy of DOS5.5 with the Ramdisk utility. What I would like to know is, can I use the Ramdisk with Microsoft Basic booted.
and how can it be done? – George Lusher, Erith.

The old MicroSoft Basic was recorded on a master disc which included DOS 2.0 and then protected. This means that short of copying it to another disc and re-protecting it – a complex job – it can’t be used with a different DOS.

However, Microsoft Basic 2 – the cartridge can be used with DOS 2.5, as can Basic-XL from OSS.

If you decide to upgrade, we recommend Basic-XL over Microsoft, as it features almost all that the MSB-II does, plus better graphics routines and memory management.

More support needed

I’m selling my Commodore 64 to buy the Atari 130XE.

There are several shops not far from my home that sell Atari computers, and software for just about every home micro, other than for the Atari.

I am thankful for your excellent magazine from which I will be able to send off for software.

Why is there so little support for Atari computers, that are in a class of their own? – Andrew Sharp, Sale, Cheshire.

Support for Atari machines seems to be increasing all the time. Keep asking for Atari software in the shops and maybe they’ll get the message.

Shorter programs

CONGRATULATIONS on yet another excellent issue of Atari User.

It is a pity, however, that you see fit to devote letter space to games scores. This sort of information is of interest only to its sender, usurping space which could be put to better use.

Could you please at least ration the coverage given to this tedious and gratuitous ego trip?

I have interest in your guidelines for putative contributors. While it must be agreed that they are sensible and well thought out, they could also be a little restrictive.

Your insistence on disc or cassette support could result in a dearth of the very useful short programs.

Surely only the most fanatical or apathetic among your readers would willingly shell out a fiver on the chance of their minor effort proving acceptable. Accordingly I have a suggestion.

Could you not instigate a regular shorts feature? Submissions could be accepted in the form of listing + documentation, under the understanding that any not used would be binned.

I am sure that you would attract plenty of material, and so could be very choosy.

The financial incentive need not be particularly high, and the extra work load on editorial staff minimised. – Bruce Woodland, Harlesden, London.

Submitting anything should only cost you postage both ways. Any disc or tape will be returned. The ‘shorts’ is a good idea, but even they need to be typed in so they can be listed legibly and it all takes time – a rare commodity around here.

Trouble on line 1020

I have a 600XL and I am a great fan of adventures so I typed in Raider 1997 as soon as I got my copy of the August edition. Having only 16K I can’t buy any adventures so you can imagine my annoyance when I got an error 5 at line 1020. Could you please tell me what might be wrong with it?

Also, I think you should have more competitions and software reviews. – Andy Latto, Fife.

You’ve probably made a typing error somewhere. Check line 110 where B$ should be dimensioned 20.

Data on disc drives

CANSAGENDOME SOMETTDALS ON THE 1050 AND 810 DISC DRIVES.

The Thorn game Tennis does not seem to work on my 800XL. Why is this? Can I get a cartridge or cassette that will get this game to work? – T. Dunn, Waterlooville, Hants.

The best thing to do if you want details on disc drives is to contact either your local dealer or Atari in Slough, both of whom can give you the information you require.

We would need to know the 1050, as it can store more data, is more compact and quieter.

Otherwise, there is no real difference between the drives except that a few – a very few, about five or six – old programs would not load correctly on the new drives. New versions of these titles have, of course, been brought out, but if a shop has stock over two years old it could be suspect.

The problem with Tennis is that there is no real difference between the drives except that a few – a very few, about five or six – old programs would not load correctly on the new drives. New versions of these titles have, of course, been brought out, but if a shop has stock over two years old it could be suspect.

The Thorn/EMI Tennis is so old that we don’t even remember it, but the best solution for a cassette-based system is either XL-Fix or Computer Support’s 80 Column Pack. Atari’s own translator is good, but is only available on disc.

The 80 Column Pack has the very useful side-effect of converting the XL operating system into an enhanced version of the old Atari 800 one.
FREE T-shirt for all new

Here's a really unbeatable offer for all Atari users!

This top-quality T-shirt, woven in an attractive shade of grey with the Atari logo in red, is a genuine American 'Fruit of the Loom' product, made from 50% cotton/50% polyester.

Worth £4.25, it will be sent FREE with every new subscription ordered on the form on the right!

The T-shirts are also on sale at £4.25. Please order on our official order form.

Made in three sizes:
- Small: 34"-36"
- Medium: 36"-38"
- Large: 38"-40"

£3.95
£5.95

Keying in long programs too much of a chore?

Then give your fingers a rest by sending for our monthly disc or cassette containing all the programs from each issue of Atari User. See order form opposite.

MAY: Alphabet Train: The combination of colour, sound and animation makes this early learning game a winner with the children. Sounds Interesting: Drive your neighbours potty with these ready-made sounds. Hexas: Enter, display and run machine code programs with this hexadecimal loader. Attack Squad: A fast action game to keep you on your toes. Reaction Timer: See how fast your reactions really are. Binary: Convert denary numbers to binary notation.

JUNE: Frog Jump: Guide the frog across the road and river to his home in this version of the arcade classic. 130XEN: Ram Power: Use the extra 64k of memory to good effect, or use the drawing routines to produce some pretty displays. Submarine: Scuttle the submarines. Etch-a-


AUGUST: Assembler: Make machine code programming easier. Fruit Machine: Save money with this fruit machine simulation. Mandala: Complex patterns made easy. Protection: Protect your programs from prying eyes.


Starting this month we are giving away an extra game along with the monthly cassette or disc.

To start the ball rolling, this month's offering is CREEPSHOW, a superb machine-code pinball game which will keep you glued to your Atari for hours.

And remember, you won't find it listed in the magazine - it's only available if you buy the monthly cassette or disc.

FREE
May issue: Profile of Jack Tramiel, preview of the new machines, Attack Squash, Adventuring, Alphabet Train, Hexer utility, Software reviews, Sounds, the 6502, Microscope, Atari Insights - regular series of tutorials: Bit Wise, Beginners and Graphics.

June issue: In-depth analysis of the 130XE, Submarine, Adventuring, Random numbers, Software reviews, Frog Jump, Microscope, Sounds, Atari Insights - regular series of tutorials: Bit Wise, Beginners and Graphics, special 12 page feature on Communications.


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

October issue: Computer Canvas graphics program, Updates for the RAW 6502 assembler, 130XE Ram-disc utility, first ST book on offer, Hex/Ascii memory dump utility, Pontoone, Software reviews, 68000 operating environment, Wraptrap, Insights - regular series of tutorials: Bit Wise, Beginners and Graphics.

Protect your 130XE with our luxury dust cover made of soft, pliable, clear and water resistant vinyl, bound with long cotton and decorated with the magazine's logo.

How to keep your collection complete
Bound in chocolate brown pv, and bearing the Atari User logo, this handsome binder will hold a year's supply of the magazine's family-secured in place with metal rods.

£1.25

ORDER FORM

All prices include postage, packing and VAT. Valid to November 30. Overseas orders despatched by Air mail.

Please enter your requirements by ticking boxes

<table>
<thead>
<tr>
<th>Subscription Options</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>UK &amp; EIRE £12 (stale only)</td>
<td>£2001</td>
</tr>
<tr>
<td>Europe £15</td>
<td>£7000</td>
</tr>
<tr>
<td>Overseas (Air mail) £30</td>
<td>£7004</td>
</tr>
<tr>
<td>Free T-shirt - circle size required</td>
<td>£500</td>
</tr>
</tbody>
</table>

Commence with

<table>
<thead>
<tr>
<th>Issue</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>May 2005</td>
<td>£7006</td>
</tr>
<tr>
<td>June 2007</td>
<td>£7008</td>
</tr>
<tr>
<td>July 2008</td>
<td>£7009</td>
</tr>
<tr>
<td>Aug 2009</td>
<td>£7010</td>
</tr>
<tr>
<td>Oct 2010</td>
<td>£7011</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Cassette</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>£3.95 UK</td>
<td>£7017</td>
</tr>
<tr>
<td>£3.95 Europe</td>
<td>£7018</td>
</tr>
<tr>
<td>£3.95 Europe/Overseas</td>
<td>£7019</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Disc</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>£5.95 UK</td>
<td>£7020</td>
</tr>
<tr>
<td>£5.95 Europe</td>
<td>£7021</td>
</tr>
<tr>
<td>£5.95 Europe/Overseas</td>
<td>£7022</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Miracle Modem</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>£19.95 UK</td>
<td>£7033</td>
</tr>
<tr>
<td>£20.95 Overseas (Air mail)</td>
<td>£7034</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>T-Shirt</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Small</td>
<td>£7047</td>
</tr>
<tr>
<td>Medium</td>
<td>£7048</td>
</tr>
<tr>
<td>Large</td>
<td>£7049</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Dust Cover</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>£4.95 UK</td>
<td>£7050</td>
</tr>
<tr>
<td>£4.95 Europe and Overseas</td>
<td>£7051</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Binder</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>£3.95 UK</td>
<td>£7052</td>
</tr>
<tr>
<td>£5.95 Europe</td>
<td>£7053</td>
</tr>
<tr>
<td>£5.95 Europe/Overseas</td>
<td>£7054</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Disk Doubler + free D.O.S 2.5</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>£9.95 (UK &amp; Overseas)</td>
<td>£7055</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>ST Companion Book</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>£9.95 UK and Overseas</td>
<td>£7056</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Payment Method</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Access/Mastercard/Eurocard</td>
<td>£7057</td>
</tr>
<tr>
<td>Barclaycard/Visa</td>
<td>£7058</td>
</tr>
<tr>
<td>Cheque/PO made payable to Database Publicanors Ltd</td>
<td>£7059</td>
</tr>
</tbody>
</table>

Name
Address

Signed
Send to: Atari User, FREEPOST, Europa House, 68 Chester Road, Hazel Grove, Stockport SK7 5NY. (No stamp needed if posted in UK) Please allow 28 days for delivery

Orders by phone: 061-480 0178
- by Prestel: Key '89 Mailbox No. 61456383
- by Telecom Gold: Mailbox No. 72912200

Don't forget to include your credit card number and full address.

November 1985 Atari User 61
CARTRIDGE TRANSFER SYSTEM

Transfer your cartridges to disk or tape. Simply plug in the supplied cartridge simulator board and load the tape/disk copy as you would any other program. 40K RAM minimum required, copy tape or disk version. 40K/80K version £16.95, 160K/320K version £22.95. 138 KiB universal works on all models £30.95.

FAST LOADER
Reduce the loading time of almost all of your single/multi stage tapes by 3 to 4 minutes. Fast Loader £13.99.

CENTRONICS PRINTER INTERFACE

Operates similar to the 507 but has a built-in character buffer to enhance your computer for extra work. 1K buffer version £56.90, 2K buffer version £69.90.

FROM PROGRAMMER
Programs both 2764s and 27128s. Supplied with full instructions and tape or disk software to perform all usual programs programmer functions. Make your own cartridges using the blank cartridge boards with sockets for 1 or 2 2764s. From programmer £14.99. V. Y. Eraser £10.99. Blank cartridge boards 80p.

Prices are fully inclusive, no more to pay. The above products are suitable for any of the 400EXTENDER/REDUCER/138KiB computers except where stated. Send S.A.E. for latest catalogue and further details. Add 10% for annual postage outside the U.K.

S. T. E. R. E. L.
17 Cock Close Road, Yaxley, Peterborough PE7 3HJ

Our products are not intended for or should not be used for infringement of copyright.

ADVERTISERS INDEX

Chips Computer Centre 62
Compuart 14.82
Computer Support 26.33
Datatype 42
Datasaive 33
Digicom 42
English Software 46
F.C.G. Systems 40
G. Paul 42
Haystack Peripherals 48
Homeview 54
J & J Softs 54
K. E. C. M. 54
Kuma 64
Ladbrooke Computing 44
Level 9 62
Metacomco 3
Micropro International 17
Miracle Technology 48
Miles Better Software 54
P.F. Software 40
Quest 2
Silica Shop 63
S.E.T. 24
System 3 6
Software Express 10
Silicon Chip 21.51
Strategic Plus 62
Selectvideo 42
Stocksoft 54
Sunaro 54
S. T. E. R. E. L. 52
Talent Computer Systems 28
Wootton Computers 44

ATARI SPECIALISTS

WE BUY, SELL, PART EXCHANGE
ALL TYPES OF COMPUTER EQUIPMENT
THE BEST PRICES POSSIBLE
XL, XE, ST RANGE ALL IN STOCK
E.G.: 130XE £120 including VAT
1560 £150 including VAT

CHIPS COMPUTER CENTRE
53 RUGBY ROAD, WORTHING, SUSSEX BN11 5NB
TEL: (0903) 40509 (24 hours)

STRAEGIC PLUS
SOFTWARE

WARGAMES AND ADVENTURE GAMES FOR YOUR COMPUTER
Strategic Plus: the only people in the UK who specialise in quality computer games for the discerning gamer. Our speciality is quality, strategic, adventure and simulation games from the USA (Canada and Australia for the Apple family, Amiga and IBM computers).

Whichever your interest or level of play, the games we offer provide challenging and stimulating entertainment, either for solo play against the computer or for interactive play against fellow gamers. Many provide multiple scenario sections and 'save game' features, allowing for extended play over a period of time.

Send for our free 28 page '85/86 catalogue, which has a large selection of titles, with descriptions and complexity ratings for each game.

All gamers who receive our catalogue will be eligible for our quarterly newsletter, updating our catalogue and keeping you in touch with up and coming titles.

Our aim is to make you a part of Strategic Plus, so if you have any comments or require any information regarding our catalogue or games available for your computer please call Simon or Steve on 01-976 2007.

Business Hours: 10am-6pm Mon-Fri. 11am-4pm Sat.
Or write to: Strategic Plus Software, P.O. Box 8, Hampton, Middlesex TW12 3XA.

THE WORM IN PARADISE

The computer's choice

£9.95 on AMSTRAD, ATARI, BBC, CBM, MSX, SPECTRUM etc.

Available from Level 9 Computing, PO Box 39. Weston-super-Mare. Avon BS24 9JR.
ATARI 520ST SPECIFICATION

**MEMORY**
- 512K RAM (1M EXP) with expansion slot
- 512K ROM, 155K READ-ONLY
- 250K MEMORY EXPANSION
- 128K BASIC expansion
- 128K HOMEBREW EXPANSION

**GRAPHICS**
- Z80A microprocessor, 8-bit color
- 256 colors on screen
- 240x180 resolution
- 40x30 characters

**ARCHITECTURE**
- 8-bit architecture
- 8-bit microprocessor
- 8-bit hardware

**DATA STORAGE**
- 512K floppy disk drive
- 1MB hard disk drive
- 5.25" floppy disk drive
- 3.5" floppy disk drive

**DISK DRIVE**
- 5.25" diskette drive
- 3.5" diskette drive

**SOUND AND MUSIC**
- 16-bit audio
- 8-bit music

**SOFTWARE**
- Macintosh compatible
- Apple software
- Atari software

**MONITOR**
- 8-bit monitor

**SYSTEM**
- 8-bit system

**PRICE**
- £2,584

---

MACINTOSH v F16 v 520ST

<table>
<thead>
<tr>
<th>Feature</th>
<th>F16</th>
<th>Macintosh</th>
<th>520ST</th>
</tr>
</thead>
<tbody>
<tr>
<td>Keyboard</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Mouse</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Diskette Drive</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Printer</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Expansion slot</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Color</td>
<td>16-bit</td>
<td>8-bit</td>
<td>8-bit</td>
</tr>
<tr>
<td>Resolution</td>
<td>480x270</td>
<td>640x480</td>
<td>320x200</td>
</tr>
<tr>
<td>Price</td>
<td>£2,584</td>
<td>£1,642</td>
<td>£780</td>
</tr>
</tbody>
</table>

---

PRESS COMMENT

"The new Atari 520ST computer is a powerful and versatile machine that is well-suited for a variety of tasks. Its powerful 8-bit processor and 512K RAM provide a solid foundation for running a wide range of software, and the expandable nature of the system allows for future upgrades. The 520ST is a great choice for anyone looking for a reliable and versatile computer."

---

SILICA SHOP LTD., 1-4 The Mews, Hatherley Road, Sidcup, Kent, DA14 4DX
SEND FOR FREE ATARI ST LITERATURE

---

SILICA SHOP
WE ARE THE UK'S NO1 ATARI SPECIALISTS

---

FREE POST & PACKING ON MAIL ORDERS
FREE NEXT DAY SECURITY DELIVERY
INFORMATION MAILING SERVICE
TECHNICAL SUPPORT TEAM
HIGHLY COMPETITIVE PRICES
AFTER SALES SUPPORT SERVICE
REPAIR SERVICE ON ATARI PRODUCTS

---

SILICA HOTLINE 01-309 1111

---

PLEASE SEND ME FREE LITERATURE ON THE NEW ATARI 520ST COMPUTER

---

Do you own an Atari computer or do you own an Apple Mac computer?
A superb range of STware including:

KSPREAD
Spreadsheet

An easy-to-use Spreadsheet enjoying the benefits of the user friendly GEM system with its mouse-driven icon selection and multi-window presentation.

This professional package combines full use of the ST's large RAM capacity with its fast processing speed and facilitates easy data transfer with the KUMA word-processing, database and communications packages.

Get down to business with Kuma - first off the mark for the ST

Available from your ST-Dealer