ATARI EXPLORER

The greatest discovery in computing

Instructions

Hints and Tips

Software & Hardware News

SUPER PACK ISSUE

ATARI

The BASIC for Your ST

Looking for a BASIC for your new Atari ST? Look no further

Power BASIC is all you need

The choice of your first programming language is an important one: the package you decide on should be fast, easy-to-use, dependable and it must be able to grow with you - your programming skills are bound to increase and the language you choose should grow with your expertise. For all these reasons the right language for you is **Power BASIC** ... but don't take our word for it, look at what others have said of **Power BASIC**

Power BASIC must rate as the best all-round version of BASIC for the price - there's nothing to touch it
Atari ST User June '88

With its foot on the gas it's most like the much mused Porsche 959
ST Amiga Format July '88

All the benefits of a compiler with the easy development cycle normally associated with an interpreter
PCW June '88

Magic! ... Amazing! ... Impressive!!!! ... An excellent BASIC with a superb manual ... the best BASIC I've seen (really wicked!) ... Top Marks! ...
Our Customers

Power BASIC Features

- Integrated, fast, easy-to-use GEM editor
- Produces faster code than any other ST BASIC
- Compiles extremely quickly from memory to memory for fast development times
- Advanced language, based on world-standard Microsoft QuickBASIC 3
- Powerful Procedures and Functions including local labels, all fully recursive
- More than 300 pages of clear manual with many example programs & quick reference card
- Complete access to GEM AES and VDI
- Complete access to BIOS, XBIOS & GEMDOS
- Includes joystick, mouse & sound commands
- Can produce stand-alone program files on disk for you to give away or sell! No royalties
- Supports short & long integers, single & double precision numbers and unlimited string size
- Line numbers are optional
- Multi-statement lines & multi-line statements
- Easy access to Alert boxes, Menus & Windows
- Flexible dynamic array handling; no limits
- Wealth of control constructs e.g. CASE, DO etc.
- Made & Supported in Britain

See the great reviews in PCW June 88, Atari ST User June 88, ST Amiga Format July 88

For All Your Programming Needs

Power BASIC **£49.95**

DevpacST **£59.95**
For assembly-language programmers, the ultimate in 68000 development systems, fully integrated

WERCS **£29.95**
Resource Editor to create GEM dialog boxes, menus, icons and use them from any programming language

FTL Modula-2 **£69.95**
Advanced programming language, integrated environment, includes full library source code

Aztec C **£129/£179**
High specification C compiler, very fast, produces excellent code, includes CLI and assembler

Personal Pascal **£79.95**
Easy to use, integrated environment, includes special libraries to make GEM easy

HiSoft BASIC **£79.95**
Everything in Power BASIC plus: create desk accessories, easy access to m/c, stand alone compiler

TWIST **£39.95**
Lets you have up to 14 programs active at once, memory permitting (1Meg RAM recommended)

Saved! **£29.95**
Invaluable collection of utilities including desk accessory, RAM-disk, printer spooler and much more

All prices RRP inc. VAT. Correct at time of printing

HiSoft
High Quality Software

HiSoft, The Old School, Greenfield, Bedford MK45 5DE
Tel: (0525) 718181, Fax: (0525) 713716

All products are available from your dealer or, in case of difficulty, directly from HiSoft

CONTENTS

The History of Atari 4
There are stories in every industry which trace massive business empires back to humble beginnings, but few are as diverse or dramatic as the rise and fall... and rise of Atari. The story begins in the States; the year is 1972.

Software Packages 6

GEM 7
GEM has been one of the most crucial factors in the ST's success because it harnesses... fingertips.

Puzzles & Problems 8

ST Hints and Tips 10
GEM allows the beginner to gain easy access to the power and versatility of ST software. Desktop, the environment which lets you perform various system housekeeping functions and gives access to the files stored on any 3.5 inch floppy disk, is actually a program written under GEM. The Desktop has many interesting little tricks up its sleeve, most of which are not documented. Here, we present a selection of useful hints and tips to help you get the most out of GEM, the ST, and the Desktop...

Hyperpaint 15
Magnification, multiple drawing screens, color-cycling and many more outstanding features adorn the newest paint program from Atari.

The Power of Basic 20
The Basic language has come a long way since its conception in the early 1960s. Here we look at BASIC of the Eighties and show you what to look out for when getting a BASIC for your Atari ST.

Silica Shop 22
Mention the name 'Silica Shop' to any Atari computer owner and they will know exactly who you are talking about. We visited Silica 'The UK's No 1 Atari Specialists' to discover what makes their service so special.

Elite Systems 23
Elite Systems was incorporated in 1984 by Steve Wilcox and his father Brian. In four years they have developed a reputation for producing some of the best 8-bit software around, with no less than seven Gallup No 1. hits to their name, and prestigious awards such as Software Publisher of the Year (Computer & Video Games 1986), and Game of the Year (ESTA 1987).

A Return to Software Development 26
Under the Warner management and the subsequent sale to Namco, Atari became the premier game company in the arcade, with titles like Breakout, Asteroids, Missile Command, Pole Position, Championship Sprint, Star Wars, Gauntlet and A.P.B. – the list goes on! By way of an introduction of this re-emergence into software development, Atari have released some of the favourite games from the arcade and eight-bit market.

Public Knowledge 29
The ST has a growing corpus of Public Domain programs from Britain, the states and Europe. Picking the best bits can save pounds, as Elliot Stein discovers when he ventures into the libraries.

Recommended Reading, Beginners Books 30

Puzzles & Problem Answers 30

The History of Atari

There are stories in every industry which trace massive business empires back to humble beginnings, but few are as diverse or dramatic as the rise and fall... and rise of Atari. The story begins in the States; the year is 1972.

With an initial outlay of $250, Nolan Bushnell founded a company which he called 'Atari', an expression of victory used in a Japanese board game called Go – similar in intent to the chess term 'check'. The product which formed the basis of the company was a video game called Pong, which was ludicrously simplistic by today's standards, but no less than a phenomenon sixteeen years ago. Ironically, this simple bat and ball game was the very rudiment of an entire industry!

The company grew rapidly and in 1975 the annual turnover exceeded $40 million. Atari was attracting the attention of the business world and, in particular, Warner Communication Incorporated. A massive conglomerate in the 'entertainment' industry, Warner were quick to realize the limitless potential of this new medium. The following year, Warner wooed Atari, negotiated and subsequently bought the company for $28 million – a relatively cheap price to pay for a company that was at the forefront of a rapidly growing industry.

Atari was just a division in the massive Warner ranks, but no time was wasted in the development of games for the amusement arcades and, on the home consumer sector, the famous VCS game console was designed and introduced on the market in 1977. The VCS package included a game console which connected to the television and two joysticks to play the games. The software itself was in cartridge format and could be bought separately, initially through catalogues.

Concurrently, Warner had established the Atari name as a major force in the arcades with some of the most popular and profitable games in arcade history.

The Atari VCS

The Big Squeeze

Over the next five years, more than 25 million VCS units were sold, which grossed over $2 billion. But this phenomenal success only served to highlight what was about to happen in the following year – the big crash! In 1983, losses of $533 million were recorded, a vast amount at any level!

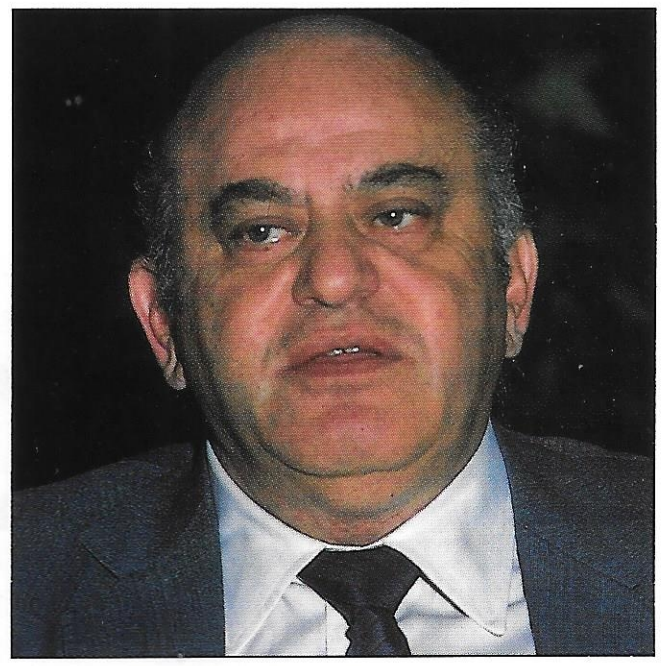
Many theories have been expressed as to why the debacle of the video game business occurred in the wake of such incredible success, but what exactly caused the downfall has never been satisfactorily clarified. Almost certainly, it was a combination of many contributory factors. Foremost, the public had turned to computers and, in comparision, the games available for the VCS were very simplistic and the graphics noticeably inferior. Additionally, the VCS had no keyboard and would therefore perform no other task than playing games – the importance of buying a computer rather than a 'game machine' was suddenly paramount to the consumer.

After five years, the VCS was dubbed a 'heavy fad' item which had served its purpose. Combine these reasons with Warner's reluctance to respond and adapt to the change, and the resounding crash is not so surprising.

The Tramiel Revolution

In July 1984, Warner sold certain 'key elements' of the home consumer side of Atari to a new company headed by Jack Tramiel. Warner retained their interest in the arcade sector for a short time, until they sold to Namco who are still in control today. Both Tramiel and Namco kept the name Atari for their respective companies, even though the two concerns were completely separate.

As founder of Commodore, Tramiel was experienced in the industry and brought with him a wealth of talent in twenty-five key country managers from Commodore, including his three sons. The immediate response of the new company was to lower the price of the VCS, improve the product and continue with the business. But in the interim period, Nintendo filled the void in the market with their up-dated game console and futuristic gun package. However, at its release, Atari's new VCS, the 2600, could run external software and was a third of the price of the Nintendo.



Jack Tramiel

The Atari XL series of eight-bit computers was introduced under the Warner management and was in direct competition with Commodore. But even with the boast of over 2000 software titles and a considerably lowered price, it was never to reach the popularity of the Commodore 64. Tramiel used his skill to analyse the failing product and the result was the new XE series. The immediate advantages of the XE from a sales point of view, was its updated design, which is similar in appearance to a small ST and it could run the existing vast software library. Additionally, the 64k and 128k computers in the range could cater for new and advanced users alike.

As for the game console, a new updated VCS was released as late as 1987. Dubbed as a 'super video game machine' with laser gun, many wondered whether the machine had a legitimate place in Atari's new range – perhaps it was hoped that it would start another, more carefully controlled fad? Atari still reckon that there is a place in the market for a sophisticated game machine and recently, a slickly designed and commercially appealing XE machine was introduced to take over from the existing series, which had enjoyed modest success. The new XE consists of a cartridge-based game console and an infrared gun; but with 64k of memory and a QWERTY keyboard, it was expected to upstage both the Nintendo and Sega consoles.

The Atari Comeback

Since the success of the VCS in the late 70's, Atari had always been a major contender in all sectors of the home-consumer market, but had not dominated a particular

Continued on page 6

ELIMINATOR

Commodore
Amiga £19.99
Atari ST £19.99

Spectrum,
Commodore 64
Amstrad CPC
Available soon.

Ace Programmer
John Phillips,
author of
Nebulus ...

Brings to you
Mind-Blowing
Action,
Electrifying 3D
Graphics -
culminating in an
unimaginable
experience
intent on
destruction .....

ELIMINATOR

HEWSON

For Mail Order send a cheque/P.O. to Hewson Consultants Ltd. Order by credit card by sending
your Access/Barclaycard number, and enclose a specimen signature. Don't forget to enclose your name and address.
Hewson, Milton Park, Milton, Abingdon, Oxon. OX14 4RX Tel: (0235) 832939 Fax: 0235 861039
As part of our continuing development of innovative Software we are always happy to evaluate software sent to us with a view to publication.

area. But the good-sense Tramiel management was just beginning to bear fruit.

When the ST series was introduced, it was widely reported that, in the intermediate term, it would either make or break Atari. From the start, the machine itself was controversial as it was not compatible with either IBM or Apple. Initially, this self-assured independence was misconstrued by some as arrogance, but even to ardent critics, it soon became blatantly apparent that there were many favourable characteristics to the machine. 'Power Without the Price' is the memorable sales slogan which accompanied the release of the ST series, and the 520 ST is still the cheapest 16-bit machine on the market.

Both the 520 and the 1 Meg 1040 are powered by the Motorola 68000 microprocessor and the graphics are infinitely superior to the Intel chip which ran the eight-bit machines. Additionally, the ST implementation which runs at 8MHz is exceptional in terms of speed, graphical quallity and colour potential. Combine this with the fact that the machine has been taken to heart by the best software developers in all fields and you have a series of computers that are good value for money, relative to anything on the market in 1985 and the present day.

Until the Tramiel management took control of the reins and introduced the ST, Atari had always placed software development above advance in hardware, but the ST reversed this policy completely.

The Atari 520STFM

However, while Atari have concentrated on developing and marketing more machines and peripherals, such as the new MEGA STs, the Atari PC and the low-cost Atari Laser Printer, the software community have responded with a gigantic effort to develop software for the ST and the list now runs into thousands of titles ranging from arcade quality entertainment software through to powerful productivity tools from companies like Microsoft and Word Perfect Corporation.

Under the Tramiel management, skilful marketing has resulted in a range of computers which can cater for everyone. Additionally, Atari have the lowest cost structure in the industry and the most effective worldwide distribution and so it is no surprise to learn that from a loss of $533 million in 1983, the company is now making a healthy profit, entirely from the machines introduced under the Tramiel management.

But that does not mean that more improvements cannot be made! The President of Atari, Sam Tramiel, expressed his concern about one area: 'The continuing shortage of DRAM has negatively impacted operating margins. We have opted to absorb the additional DRAM costs rather than increase the price of the machines.' (16th May 1988). And, his comments on the first quarter results for 1988: 'Further action is being taken to reduce costs, improve product mix and margin and to increase sales.' The intense monitoring of the hardware business has now been relaxed slightly and so there is some room to develop a sector of the market that has been dormant since 1985.

HyperPaint

Atari are now concentrating on software development introducing the powerful Hyper-range of productivity software alongside conversions of Atari coin-op games and innovative, new ST titles that stretch the ST to its limits. Atari's clear intention is to re-emerge as a leading force in entertainment software, juxtaposed to their current healthy position in the hardware sector.

ATARI ST SOFTWARE PACKAGES Available Now.

Asteroids Deluxe

One of the all time favourite coin op games faithfully converted onto the ST, Asteroids Deluxe finds you trapped in an Asteroids field, you must blast your way out.

Battlezone

The Dateline is 1999, Robot tanks roam the earth and you in a vintage military model must seek and destroy them. Another coin op classic.

Cracked

Protect your rare South American eggs from all kinds of egg eating creatures. Wield your mouse and shoot those rats!

Crystal Castles

Bentley Bear is in the Crystal Castles, you must help him to escape whilst collecting the precious stones.

Joust

Mount your Ostrich, hoist your lance and prepare to battle against the evil Buzzard Riders, this is a Joust to the finish.

Missile Command

Your planet is under air attack, protect your cities with the only weapons available to you. Your speed, your skill and your anti ballistic missiles.

Moonbase

Moonbase is one of Atari's most original games yet, transfer vital metals from each Moonbase to an orbiting transporter whilst blasting and avoiding baddies.

Moon Patrol

An all time Atari favourite now available on the ST, guide your Lunar patrol vehicle across the cratered surface in one piece, it's not easy!

Super Breakout

The game that sparked a million clones. Super Breakout is on the ST and only £9.99.

XOR

Logical thinking, strategy and tactical problem solving is the key to solving XOR. A huge labyrinth game and an experience in itself.

GEM

GEM has been one of the most crucial factors in the ST's success because it harnesses... fingertips.

The history of Gem

A few years ago you had to be a veritable expert if you wanted to use a micro. Even simple operations such as formatting a disc or printing out a file required a considerable and fairly detailed knowledge of computer theory.

At first this was acceptable as the majority of users were enthusiasts who actually enjoyed unravelling complicated procedures. But as time went by people started buying computers for far more practical commercial reasons.

Many users weren't the slightest bit interested in how the computer worked. What they wanted was a system which enabled them to directly apply the computer to their own individual problems with the minimum of effort. Research was therefore conducted to discover new and simpler ways of using computers.

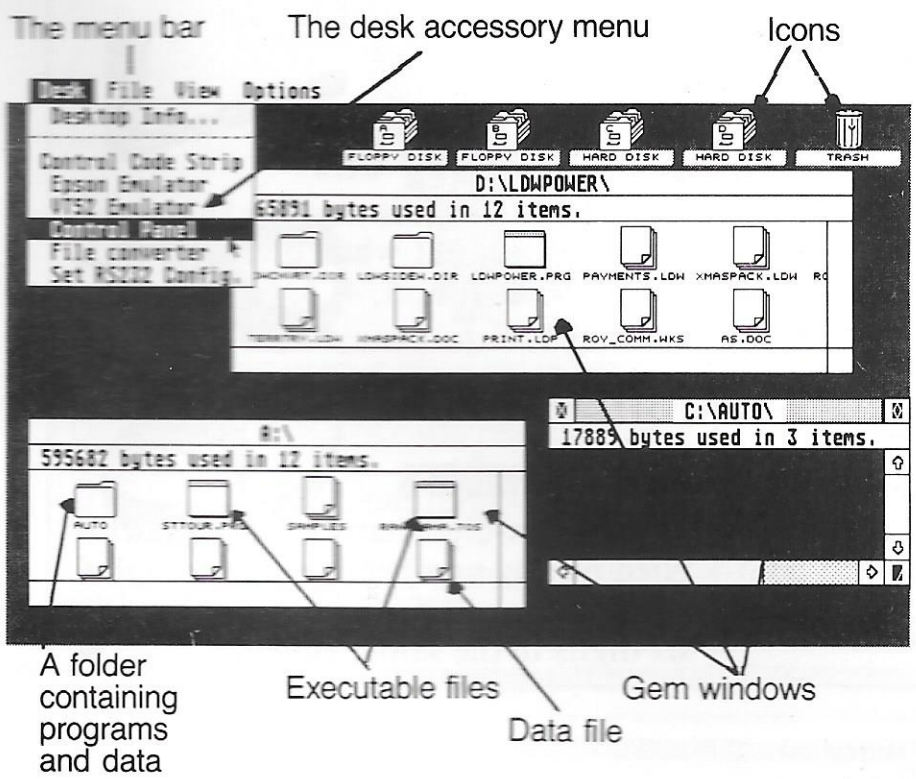
One of the major contributors to this project was Rank Xerox. Its Palo Alto laboratories invented, almost single handedly, the ideas of windows, icons, menus and pointers – wimps – as a way of providing an effective computing environment with a strong visual element. It allowed almost anybody to intuitively operate a computer.

This wimp technology was further developed by Apple into its innovative Lisa and Macintosh computers. Unfortunately it wasn't a great deal of help to the vast majority of business users who were using mainly IBM PCs.

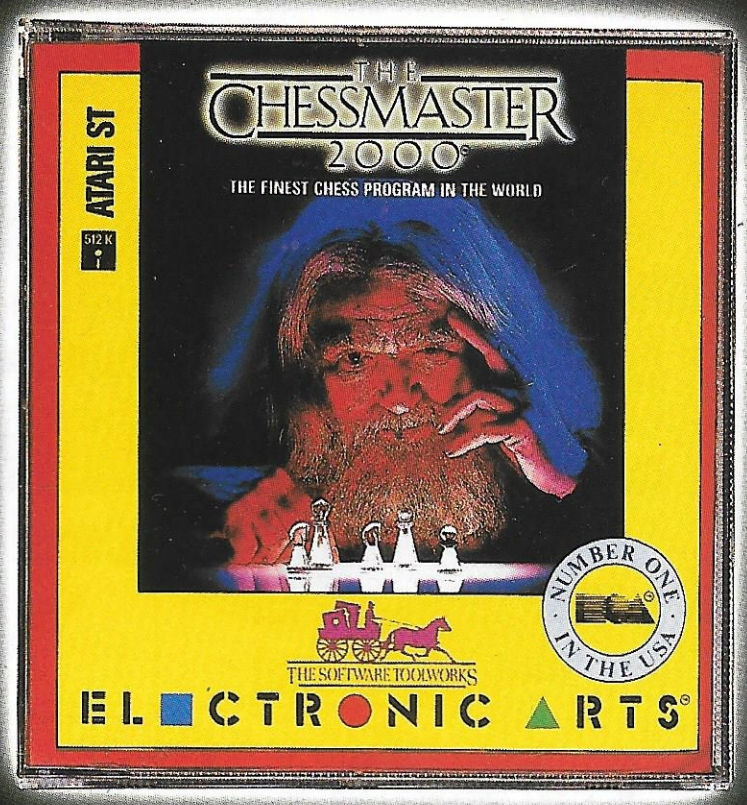
Digital Research eventually came to their rescue with its graphic environment manager, Gem. For the first time this gave PC users a powerful wimp system very similar to that supported by Apple.

Later, when Jack Tramiel was presiding over the development of his new 68000-based computer, he decided to make things easy for potential customers by incorporating a version of Gem into the machine, and the Atari ST as we know it was born.

The Gem desktop



MAKE A BETTER MOVE WITH CHESSMASTER 2000
software specially designed to exploit the power of the ST



THE MOST POWERFUL MICROCOMPUTER CHESS PROGRAM EVER. WINNER OF THE 1986 US OPEN PERSONAL COMPUTER CHESS CHAMPIONSHIP. 20 LEVELS OF PLAY, 71,000 OPENING MOVES AND STYLISH 3D BOARD VIEW.

CAST A BETTER SPELL WITH BARD'S TALE
software specially designed to exploit the power of the ST

EXPLORE THE LEGENDARY CITY OF SKARA BRAE. EXPERIENCE THE SNARES OF DEATH, 7 TIMED PUZZLES LIKE NOTHING YOU'VE EVER SEEN BEFORE. ENCOUNTER A NEW KIND OF MASTER MAGICIAN, THE ARCHMAGE.

For a full broadsheet describing the complete range or information on your nearest stockist write to: Electronic Arts, 11-49 Station Rd., Langley, Berkshire SL3 8YN England.
Or call our customer services Dept. on 0753 46465.

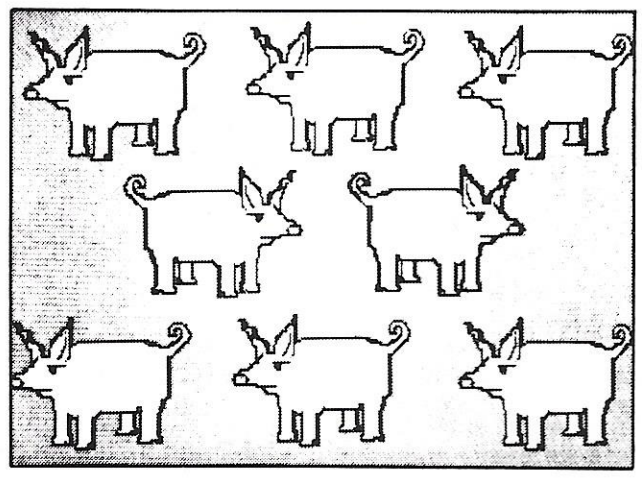
ELECTRONIC ARTS®

P&P Puzzles & Problems

By DAVID H. AHL

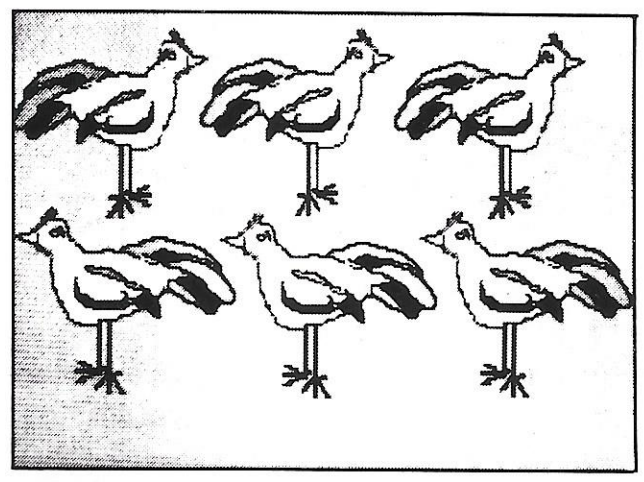
Some of these problems can be solved in your head, some require pencil and paper, and still others require that you write a computer program.

Answers are on page 30.



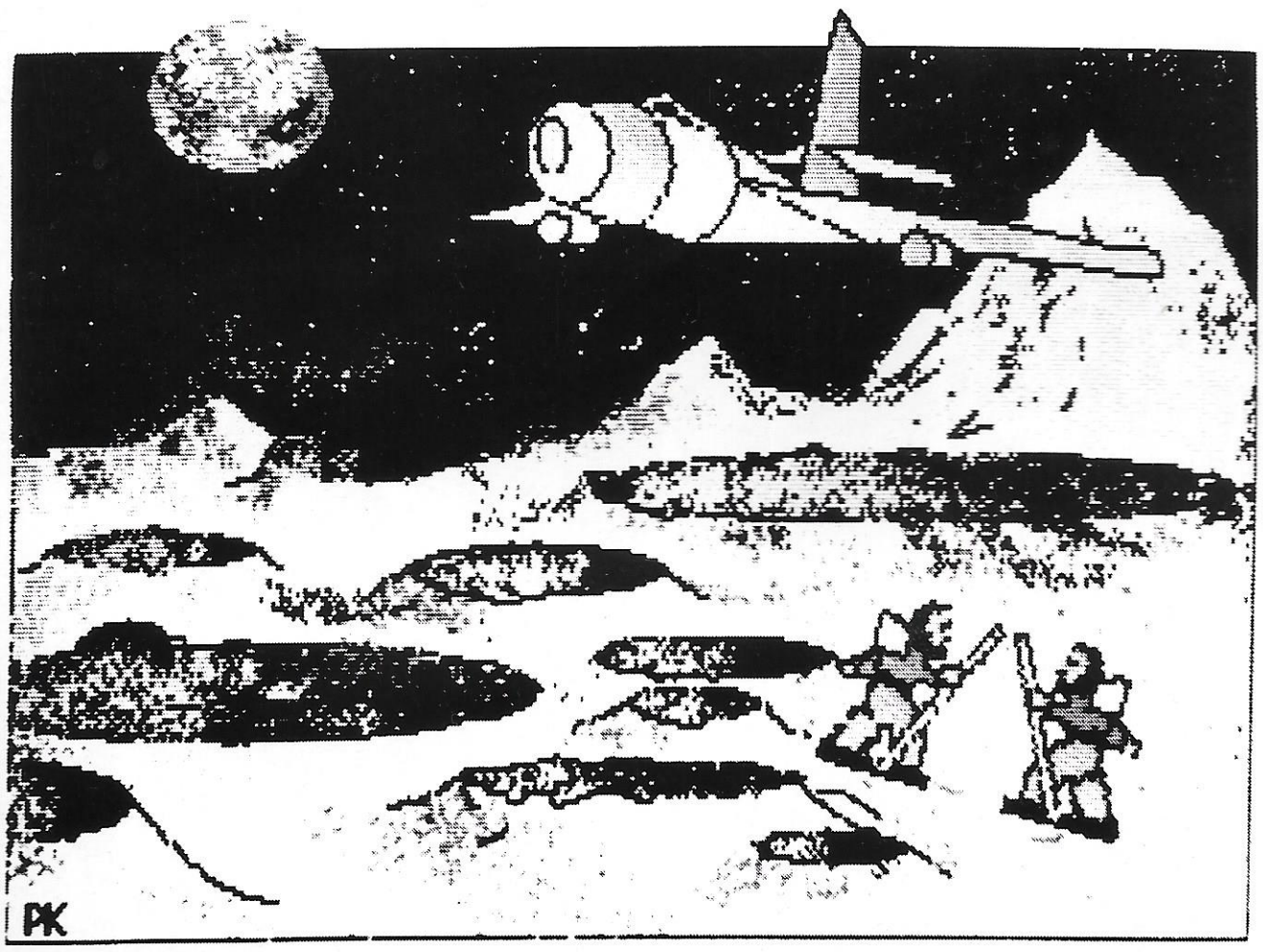
Count Closely

A city boy saw a farmyard in which pigs and chickens were freely roaming together. He asked the farmer, "How many pigs and chickens do you have?" The farmer replied, "Well, I count 60 eyes and 86 feet. You figure it out."



People Express

A People Express plane flies from Newark to Buffalo and back. There is no wind, and the pilot maintains a constant speed equivalent to a ground speed of 400 mph. The same trip is made the next day at the same engine speed, but there is a constant 50 mph wind blowing from Buffalo to Newark. Will the round trip take more, the same, or less time than the day before?



PK

Length of a Lunar

The moon creatures described by H. G. Wells live in underground caverns and use the *lunar* as their unit of distance. It was adopted because the surface area of the moon in square lunars exactly equals the volume of the moon in cubic lunars. The diameter of the moon is 2160 miles. How long is a lunar in relation to a mile?

Mountain Climber

A man climbs a mountain one day, reaches the summit in early evening, and camps there for the night. He goes down the next day using the same route by which he climbed up. Is there a spot along the route that he will occupy at precisely the same time of day on both trips?

How Old?

Last year my age was a square number. Next year it will be a cube number. How old am I now? How long will I have to wait before my age is both a square number and a cube?

Perfect Numbers

A *perfect number* is an integer, the sum of whose integral factors (including 1) equals itself. The first number is 6, a sum of 1 + 2 + 3. Find the second and third perfect numbers.

Broken 1000

Two numbers add up to 1000. One number is a multiple of 19, the other is a multiple of 47. Find the two numbers.

Orderly Remainders

Find the smallest number that when divided by 10 has a remainder of 9, when divided by 9 has a remainder of 8, when divided by 8 has a remainder of 7, and so on right down to division by 2 leaving a remainder of 1.

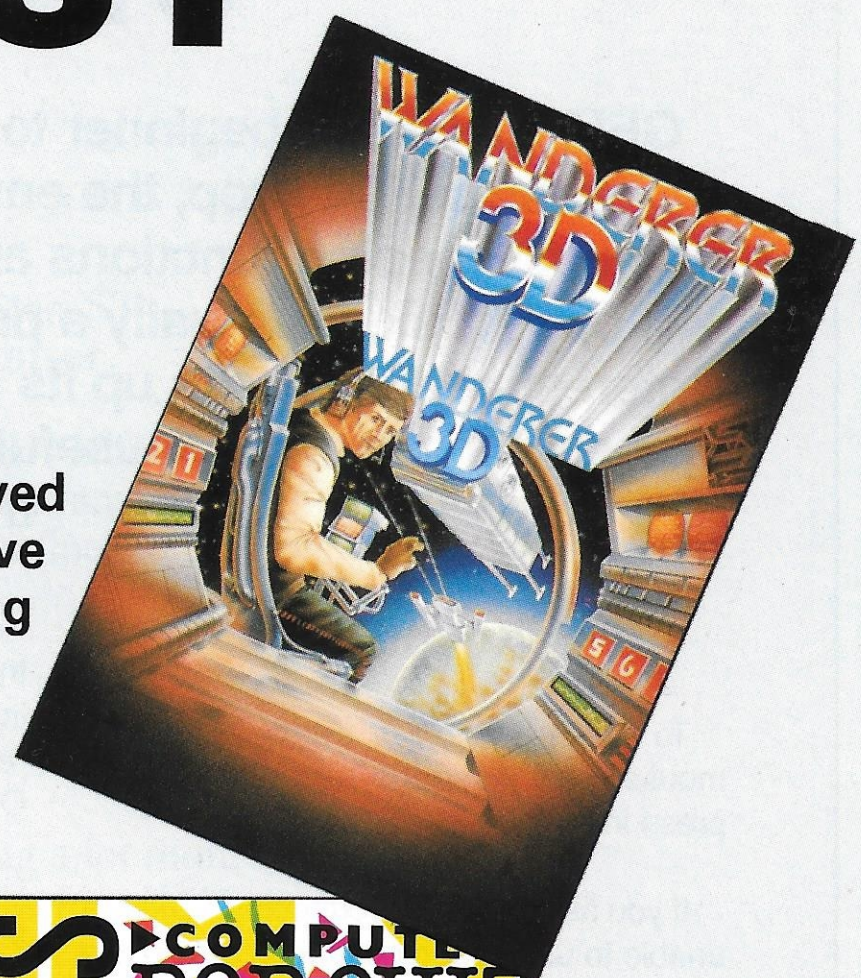
The Remaining One

Find the smallest number that is divisible by 13, but when divided by 12, 11, 10, 9, 8, 7, 6, 5, 4, 3, or 2 leaves a remainder of 1.

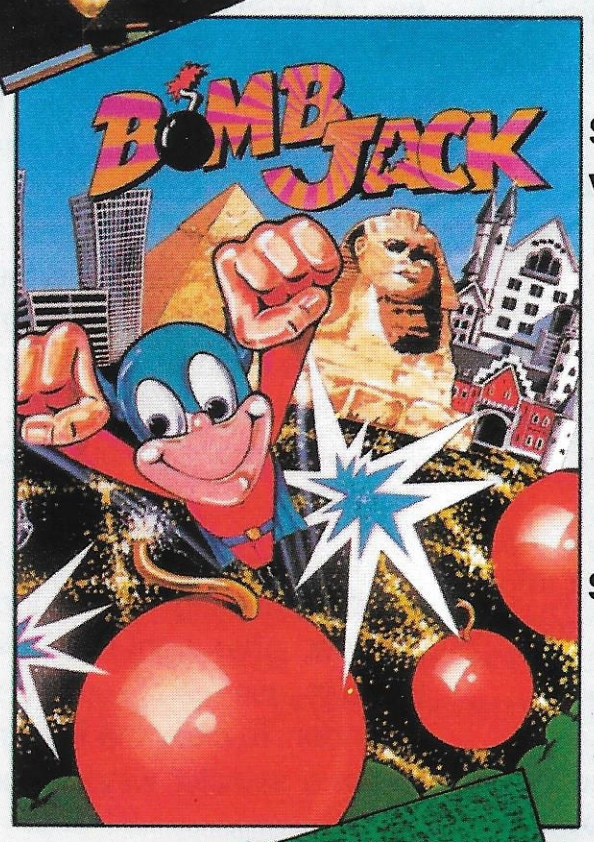
Same Numbers

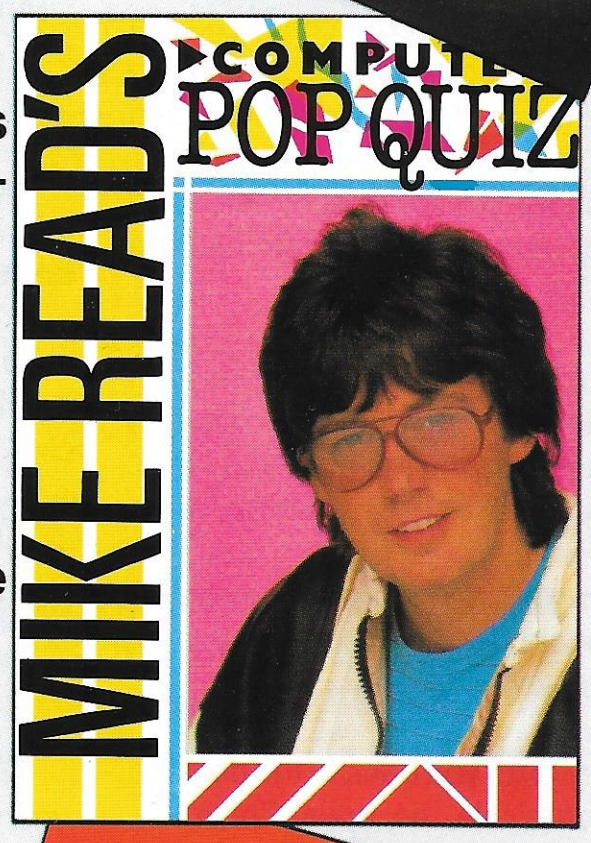
What six-digit number when multiplied by any number from 2 through 6 produces answers, all of which contain six digits in the same sequence. ■

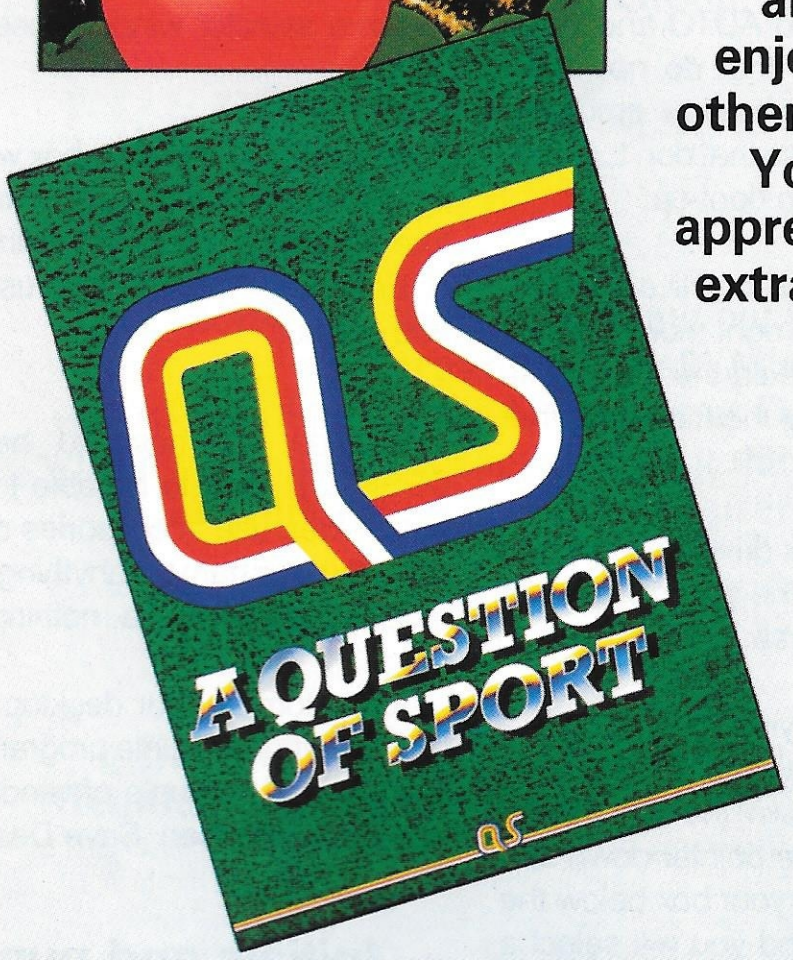
ATARI ST



Following the excellent reputation Elite have enjoyed on 8-bit machines, we have now used our outstanding design, programming, graphics and music resources, to bring you 6 titles for the Atari ST. As the spearhead of Elite's venture into the 16-bit market, these 6 games emphasise our total commitment to produce only the highest quality software to achieve the sort of reputation we've already enjoyed on other formats. You will appreciate our extra efforts.







FOR MAIL ORDER, PLEASE SEND CHEQUE OR POSTAL ORDER MADE PAYABLE TO ELITE SYSTEMS LTD. OR QUOTE AN ACCESS OR BARCLAYCARD NUMBER. POSTAGE AND PACKING ARE FREE.

TO BE ADDRESSED TO: CUSTOMER SERVICES, ELITE SYSTEMS LTD., EASTERN AVENUE, LICHFIELD, STAFFS. WS13 6RX.

WE WILL ENDEAVOUR TO SHIP ALL ORDERS WITHIN 3 DAYS OF RECEIVING ORDER.

elite

Elite Systems Limited, Eastern Avenue, Lichfield, Staffs WS13 6RX England Telex 336130 ELITE G

ST Hints and Tips

GEM allows the beginner to gain easy access to the power and versatility of ST software. Desktop, the environment which lets you perform various system housekeeping functions and gives access to the files stored on any 3.5 inch floppy disk, is actually a program written under GEM. The Desktop has many interesting little tricks up its sleeve, most of which are not documented. Here, we present a selection of useful hints and tips to help you get the most out of GEM, the ST, and the Desktop...

Keyboard

To select an icon or event without the mouse, hold down the Alternate key and press insert.

If you need to move your pointer and are unable to use your mouse then hold down the Alternate key and use the arrow keys in the required direction. To move the pointer in smaller steps, you must hold down the Shift and Alternate keys and then use the arrow keys.

If you want to select more than one icon or file, hold down the Shift key and click with the left mouse button on those you want. Deselect any mistakes in the same manner.

If you have just inserted a new disk and need to update the respective window, press the Esc key.

The 'Q' key exits you back to the desktop from a 'readme' file, as does Control-C. Return scrolls the 'readme' file one line at a time and the space bar one page at at time.

To drag an icon or file, hold down the Alternate and Insert keys and then use the arrow keys. Pressing the Alternate and Clr Home keys together simulates the left mouse button.

If you need to get out of a program without resetting the machine, try either control/Q, control/C or Esc.

To do a screen dump from the Desktop or GEM application, press the Alternate-Help key. Pressing Alternate-Help again stops the screen dump.

Desktop

Handling data with a floppy disk drive is quite fast. A hard disk is 30 times faster than a floppy. A RAM disk is 10 times faster than a hard disk. Never try to format a RAM disk: you could wreck all the disks you have in any drive.

You can have a maximum of 6 Accessories loaded at one time and a total of four windows open.

To change the name of a file, highlight the file name and then click on 'show info...'. Use Esc or backspace the cursor, re-type the new name and then click on O.K. Don't forget the extender.

An extender is a 3 letter combination that tells the ST the type of file (PRG, DOC, RSC, etc).

Highlight a file and then click on show info... This will tell you the space the file takes up on disk.

To check how much of a disk is filled and not filled, highlight the floppy disk icon and click on show info...

Put files in folders using the New Folder command. It will help you keep your information tidy and it will be easier to access the files you want.

Create a folder called AUTO and put in your programs (.PRG) that do not make calls to GEM (big application programs usually do). Most of those that don't. (.TOS) will run automatically on boot-up.

To copy files from an inactive window, click and hold down the right mouse button on the file. Press and hold the left mouse button as usual to drag the file to another window or icon.

You can drag the disk drive icon that you are copying from onto the window you are copying to and vice versa.

To select files for copying you can draw a box around as many as are in the active window by holding down the left mouse button and dragging the pointer down and to the right. If you draw your box below the active window, you'll find you will select a few extra files if present.

To protect a file from being over-written or delete, highlight the file, click on show info..., click on READ ONLY, then on O.K.

To copy files or disks with one disk drive, drag the files or floppy disk A icon to floppy disk B icon or a B window, then follow the prompts.

If you want more than one file with the same name, use the extender .DAT and you can have as many as you want.

Tired of drop-down menus falling down every time your mouse strays up into the top-left hand corner of the screen? Find the PD (Public Domain) program called Mousetrap (not the game). It locks out the windows until the right button is pushed.

To get more out of your ITEM SELECTOR, click you pointer on the Directory line and backspace over the nearest asterisk (*). Now type in any extender you want to look for or isolate (.DOC, .RSC, etc.) and click your pointer on any open space in the listings box.

When naming files in the item selector window, after you have your file name typed in, use the '.' key to go straight to the extender. To clear the File line or Directory line in a selector window, use the escape key.

In GEM, any question box which is heavily lined is the default setting and can therefore be chosen by simply using the Return or Enter key. You can also use the mouse and pointer.

You do not have to name a disk DESKTOP for it to be able to execute an auto folder, use accessories or work properly. You can name it anything you want or, as is usually the case, nothing at all.

To customize your desktop to suit yourself, find your favourite program or two on a disk, re-size a couple of windows to show just these and then 'Save Desktop'

Initials and numbers

MIDI stands for Musical Instrument Digital Interface.

WYSIWYG stands for What You See Is What You Get, a term used in applications such as wordprocessors that means you can see on screen is what you will end up with when it's printed.

Continued on page 14

For those who are just discovering the pleasure of using the ST-Organiser...

You've just received a great item of software with your Atari ST - a copy of Triangle's great new product, the **ST-Organiser.**

As we hope you're already discovering, the ST-Organiser will revolutionise the way you use your computer. No more constantly changing programs in order to do things the way you want to do them. Instead, well thought-out routines make everyday tasks a pleasure to carry out.

Introducing the ST-Organiser User Group

During the next few months, we're going to be producing a lot more where the ST-Organiser came from. **Utility tools** to make life easier for all ST users. **Print formats** which fit your favourite pocket organiser. **Business programs** to increase efficiency. And, of course, regular **upgrades and enhancements** to the ST-Organiser itself. Which is why we've formed the **ST-Organiser User's Group.**

Become a Founder Member and get these benefits

We're offering a whole bundle of benefits to buyers of the ST Christmas Pack who register with us for founder membership of the Group...**News** of all upgrades to the ST-Organiser and its family...**Technical Hotline** to handle your queries and suggestion for future product enhancements...**Regular Shareware and Public Domain Newsletters** giving details of all that's best in free and low-cost software...**33% Discount** off all new ST-Organiser products ordered through the Group. And, best of all...

FREE ST-Organiser Utilities Disk if you join before 31st December

Very shortly, we shall be bringing out the first valuable addition to the ST-Organiser family - the **ST-Organiser Desk Accessory Kit.** This will enable you to load the separate parts of the ST-Organiser as Desk Accessories, so that they are available from within your other packages without the need to reload. We're giving away a **free copy** of this valuable disk to all users who register before **31st December.**

Join Now!

Send **£9.95** to the address shown below and we'll rush you your **Founder Membership Pack.** You can also telephone or fax us with your credit card details (all major cards accepted). Send your remittance to:

Triangle Publishing Limited, 87 High Street, Tonbridge, Kent TN9 1RX

Telephone orders to: 0732 771344
Overseas order faxline: 0732 360178

THE KNOCK-

...Buy one of our knock-out ST games and

Once you have experienced the superior graphics, superb
you'll be falling over yourself

THUNDER BLADE™

The meanest fighting machine ever to hit the skies. Thunderblade is a fast moving, all action game that puts you in control of an advanced Helicopter equipped with incredibly accurate and sophisticated weaponry.

LED STORM™

The coin-op conversion of what is likely to be Capcom's biggest hit of 1989. You take the wheel of a supersonic car that has unbelievable power and incredible weaponry.

BLACK TIGER™

Long ago three evil dragons descended from the skies and destroyed a kingdom, bringing a nightmare of darkness and destruction. From this suffering kingdom emerged a great and brave fighter determined to bring light and goodness into the world. His name? Black Tiger. His quest? To destroy the three demonic dragons.

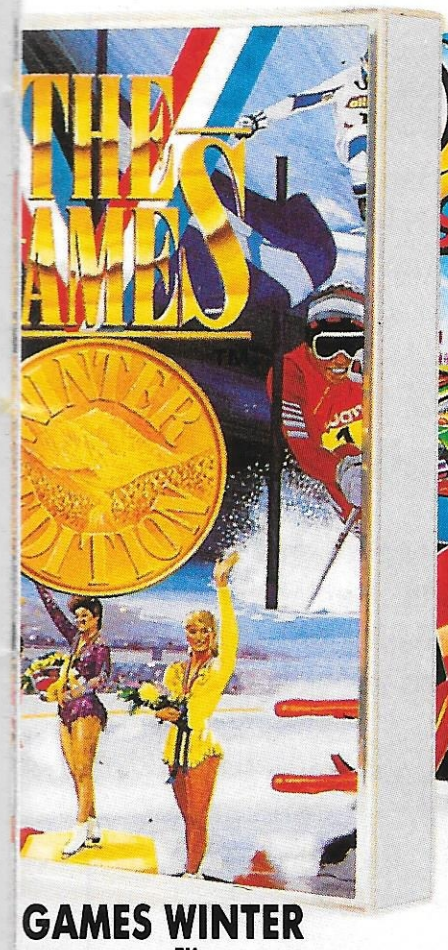
U.S. GOLD

**U.S. Gold Ltd., Units 2/3|Holford Way, Holford,
Birmingham B6 7AX. Tel: 021 356 3388**

-ON EFFECT...

you'll be falling over yourself to get the rest

sound and unmatched playability of our games
in an effort to get the rest...

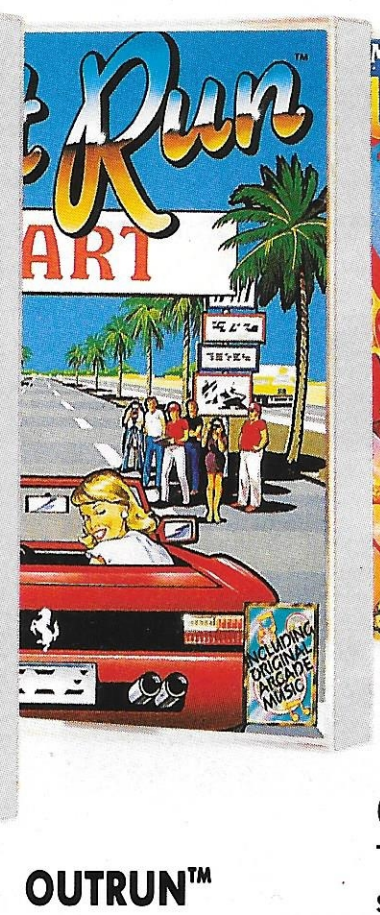


GAMES WINTER EDITION™

Fly like a bird in the Ski Jump, shoot down the Luge, speed at 30mph in the Speed Skating, battle through the cross country event, choreograph a few figure skating routines, become a human Shock Absorber in the Giant Slalom and go from 0 to 60 in the lightning fast downhill.
If you thought the games series could not get any better – just look out for the Games – Winter Edition, you will be amazed!

ROAD BLASTERS™

Super charged destruction ... the ultimate race against death, Road Blasters delivers all the gripping action and high speed thrills of this arcade spectacular. Get ready for an exhilarating fast action game ... the race is on!

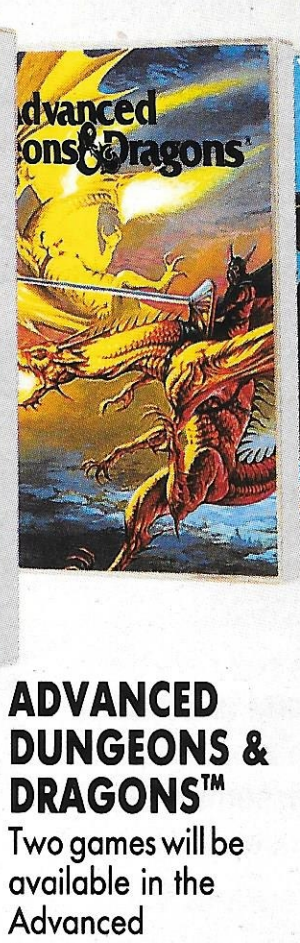


OUTRUN™

You're cool, the engine's hot, the girl's gorgeous, a tank full of gas and an open road ... the rest is up to you! The ultimate experience in motor sports simulation, the absolute challenge to nerves and reflexes. Experience the exhilaration and excitement of driving a high performance sports car in this teasing time trial where your co-ordination and nerve will be tested to unbelievable limits.

GAUNTLET II™

The mind-blowing sequel to the No. 1 smash hit. Addictive, frantic and packed with so many new features it's a totally new game. Over 100 levels of pulsating action as you take on the powers of your favourite character even if they're already in play. Gauntlet II is not just a further episode in this enthralling crusade – it is a whole new experience in action packed adventure.

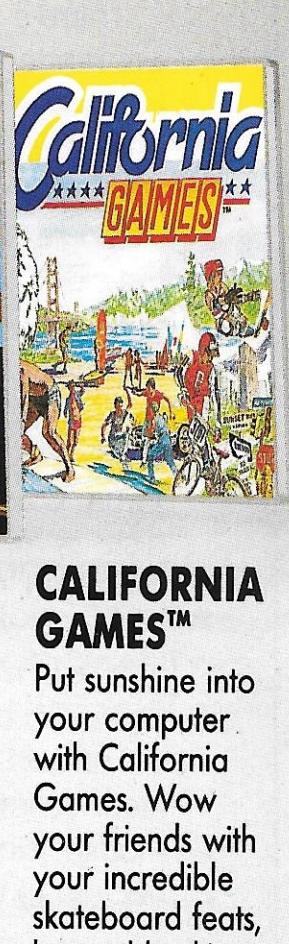


ADVANCED DUNGEONS & DRAGONS™

Two games will be available in the Advanced Dungeons & Dragons™ series – Pools of Radiance™ is a role playing adventure set in the forgotten realms worlds. Graphics have been enhanced and will include animated sequences as well as 3-D perspectives to add feel to the adventure. Heroes of the Lance™ is full of arcade style action with just a hint of strategy and will truly appeal to the arcade game player.

TIGER ROAD™

It will be no mean task to defeat the evil minions of Rye Ken Oh in this exciting martial arts arcade adventure. He has been raiding villages and kidnapping infants. As Lee Wong you must save the children and defeat Ryn Ken Oh. You'll need the help of your magic jacket, chains and sickle, spear and snake weapon to take on the dreadful hordes of Samurai warriors, giants, flying ninja warriors, dragons and acrobatic Sumo wrestlers!



CALIFORNIA GAMES™

Put sunshine into your computer with California Games. Wow your friends with your incredible skateboard feats, be cool hacking the sack, skate down the boardwalk, flip the frisbee, wheelie the BMX and then the ultimate test as you ride the huge Pacific rollers to decide which surfer truly rules the waves!

All games available for your Atari ST – £19.99 each

continued from page 10

STF means an ST with a built-in floppy disk drive and STFM is an ST with a built-in floppy disk-drive and a TV modulator.

The 260ST is a 520ST casing with 1 MEG of memory, no mouse or monitor and a German keyboard.

520 does not mean your ST has 520K of RAM. It actually has 512K, but it does have 524,288 free bytes of RAM. The 1040 does not have 1040K of RAM, it has 1024K. However, it does have 1,048,576 free bytes of RAM.

A kilobyte (K) is 1024 bytes. 1 Byte is 8 bits. A nibble is 4 bits. A peek reads from memory. A poke writes to memory.

Disks and Mice

There's a good chance that cheap, unbranded disks are the same as the expensive branded ones; same companies, same quality, just different prices.

Single-sided disks can be used as double sided disks. You must have a D/S disk drive though.

Use the write protect tab on your disks to protect valuable data and guard against the Virus. Closed (you can't see through), the disk is unprotected. Open, the disk is protected.

Is your mouse sick? On its belly is a door. Open the door by sliding in the direction of the arrows. Clean the ball and the stainless steel rollers and then reassemble your mouse. Now check the mouse cable connection to your ST.

With some public domain programs available you can format a S/S disk so that it will hold 500K of data. You can squeeze over 1 Megabyte out of a D/S disk.

Customising

If you want to customise your programs, get a Disk Editor (Tiny Stuff, ST Doctor, Disk Doctor), make a back-up and load that disk. In ASCI format work your way through until you find what you are searching for and re-type it to suit your own needs. Be careful, however.

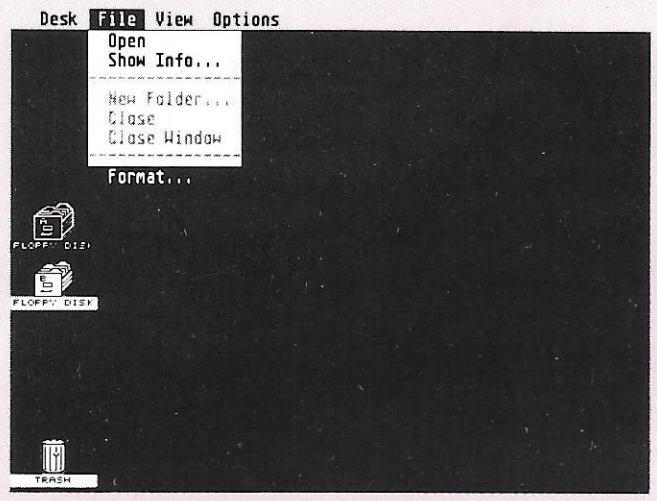
Want to rename your Trash Can as a Dust Bin? Use the above on your boot disk. Look in the Desktop Info... file. You can also use Install Drive... on your Desktop.

This and that

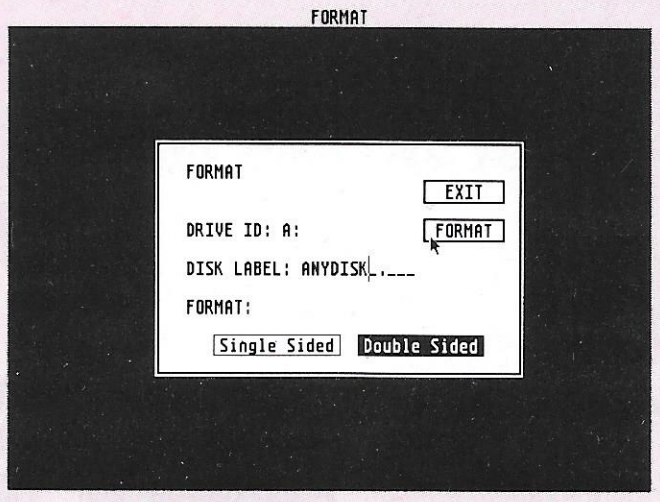
The Atari ST has 2 different versions of TOS in use. The early machines had TOS on disk which has to be loaded first. The majority of ST's have TOS on ROM (1985).

Newer ST's have a latest version of TOS, (86-87). If any of the tips do not work on your machine it may be because you have the latest version of TOS or it was loaded from disk.

Be extra careful with disk editors, magnets and original software. On the other hand, go ahead and experiment with your ST... curiosity is the first step towards creation.



Formatting a disk... (1), Choose Format from the File menu. (2) Pick a label if you want and choose single sided (if you've got an old 520 ST) or double sided (if it is a 1040, Mega, or new 520 with the bigger drive).



Compatibility With Other Systems

The Atari ST range is not directly compatible with other makes of computer or operating systems, so far as software is concerned.

The Atari ST can read and write data files to a 3.5″ floppy disk that was formatted under MS DOS on an IBM PC (or compatible) computer system. It is not possible for PC's to read disks formatted on the Atari ST.

It is not possible for the Atari ST to emulate the Acorn BBC micro computer, and thus not possible to run any BBC Basic or Machine Code program. BBC disk drives are not compatible with the ST.

There are now software emulators available which will allow Atari ST computers to run software created for a different micro computer. We would remind customers that these products have not been tested or endorsed by us, and we cannot testify to their level of compatibility.

PC Ditto. This will turn the ST into a PC Compatible computer, and will allow you to use most applications programs found on the PC.

Aladin and Magic Sac will allow you to run many of Apple 'Mac' programs.

A CP/M 2.2 emulator is available for the Atari ST. This product is available at a small charge from dealers and Public Domain Software Libraries.

Taking ST's Abroad

Generally speaking, the ST will work in most countries around the world. The main problem areas that are likely to be encountered are Television standards and AC Mains Supply.

The television system used in the U.K. is PAL I, all ST's sold in the U.K. with a television modulator fitted will be PAL I. ST computers cannot be converted from or to SECAM (France) or NTSC (USA). However it is possible to swap PAL I modulators with PAL B modulators. (Most European countries).

Power Supplies

Atari ST computers/peripherals with external power supply units. Replace the power supply with one suitable for use in the country to which you are travelling.

Atari ST computers/peripherals with internal power supply units. Generally speaking, we recommend the use of a step-up or down transformer unit. Some power suppliles can be modified or replaced with a unit suited to use in the country to which you are travelling. You should contact the relevant Atari Agent or Subsidiary for details. (Computers sold in the U.K. are suitable for 240V AC, 50Hz.)

The exact television and power supply requirements for the country to which you are travelling can be found from the appropriate national diplomatic delegation.

Atari U.K. is only able to supply parts used on computers sold in the U.K. Adjustments or Upgrades to suit specific country conditions are not covered by any warranty offered by Atari.

Auto Folders

If your Hard Drive 'C' or the floppy contained in drive 'A' contains an Auto Folder, it is possible to make certain programs 'Auto boot' i.e. Load and run when the computer is switched on, automatically.

After performing various checks and initialisation processes, your ST will examine

Continued on page 21

Magnification, multiple drawing screens, color-cycling, and many more outstanding features adorn the newest paint program from Atari.

Hyperpaint

System: Atari ST
Price: £24.99
Summary: Colour and Monochrome Painting Package

Manufacturer: Atari Corp. (UK) Ltd
Atari House
Railway Terrace
Slough
Berkshire
SL2 5BZ

A few disks are sofware essentials in any Atari ST library. One is a word processor; another a spreadsheet program. The third is a paint program of some kind. After all, what's a computer like the ST for if not to produce some eye-popping graphics on the screen?

After a wait that had computer artists champing at the bit, Atari has finally brought us Hyperpaint. It includes all the features you could ever need, plus a whole lot more. It is logically organized and intuitive to use, and features a smoother, surer mouse interface than its contemporaries. Hyperpaint allows you to draw in any graphics mode. You can draw freehand or make use of tools that let you draw perfect lines, rectangles, circles, ellipses, polygons, boxes, discs, triangles, rays and curves.

Another feature, Smear, allows you to semi-randomly mix-up the pixels within an area the size of your selected brush. It is handy for smoothing boundaries and smudging sharp contrasts into fuzzier ones.

Mirror allows you to draw symmetrically across up to six axes, while Outline draws an outline around whatever shape you specify.

Smooth is one of Hyperpaint's most powerful features allowing you to choose an area of your picture and enhance it automatically by rounding off all jagged edges.

In addition to single color fill patterns, pleasing and sophisticated multicolor fills are available (in low-res color mode). Or, you can design your own. The fills are fast and repeatable – you can always fill an area, even if it has been solid-filled before, as long as your fill pattern is of a contrasting color.

The palette and text functions are immensely powerful. Colors can be moved from one paintbox to another, and "tweaking" between shades of a single color has been made much easier.

Palettes alone can be loaded and saved, leaving the graphics screen intact. Conversely, images can be loaded, leaving the palette intact. Text fonts can be loaded as well; and text can be underlined, thickened, lightened, skewed (italicized), or outlined.

Most impressive, however, are the additions that remove Hyperpaint from the ranks of the very good and make it superlative.

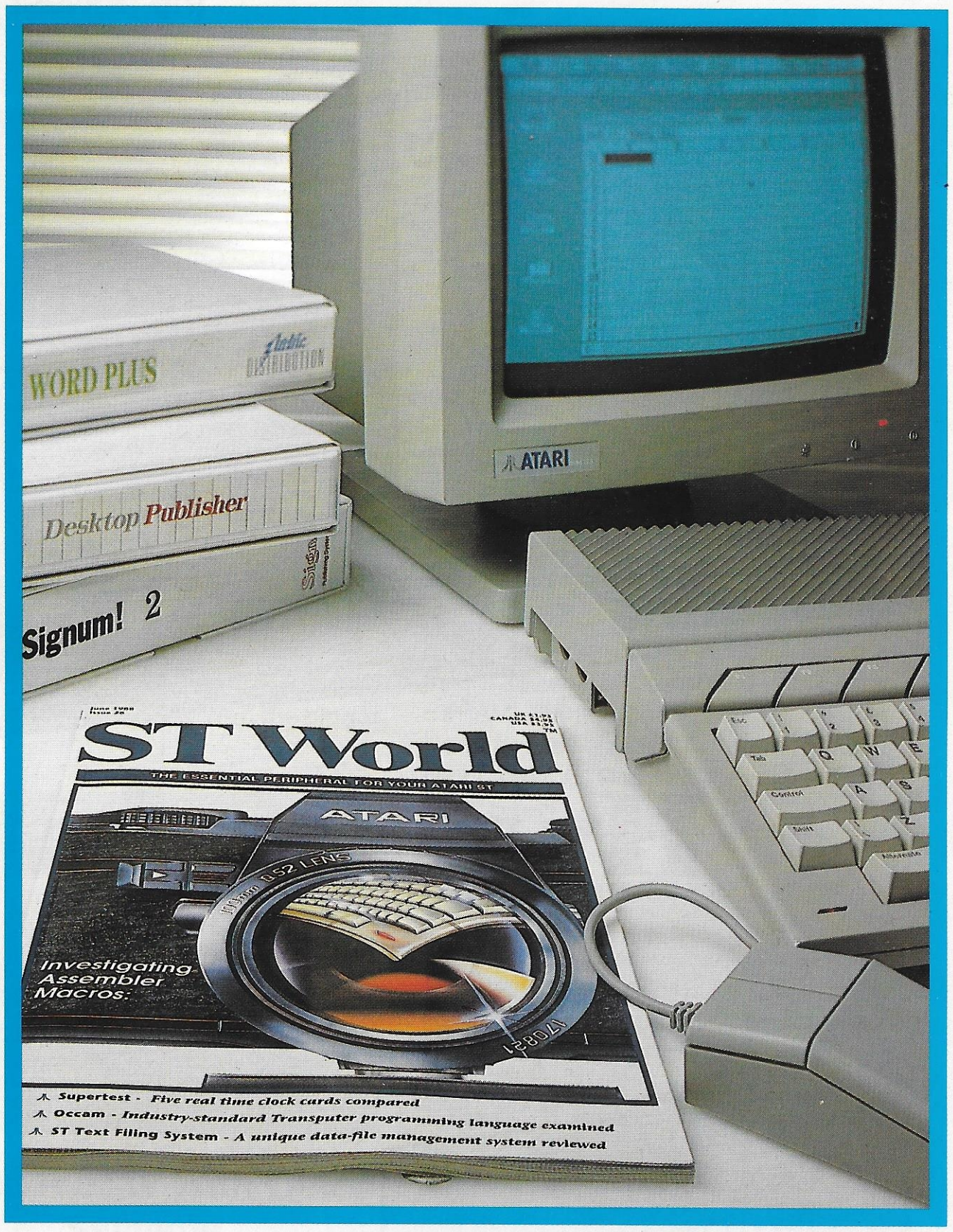
Magnify expands an area of your drawing to about a half of the full-screen size, so you can work on it in more detail. By pressing a key, you can move from 2 × to 16 × magnification. (At 16 × magnification, each pixel is nearly the size of a penny.)

In the magnification mode, the bottom of the screen displays a palette, scrolling arrows, and a toggle for the level of zoom you want. The left side of the screen shows the real size of your graphics, while the right side displays the magnified version.

Continued on page 18

DEDICATED MAGAZINES ...

The power and speed of the Atari ST computer makes it an excellent productivity tool. No matter in what area your interest lies: be it business, programming, graphics, sound or any of the many other applications, you know that the ST is more than a match for the task. ***ST World*** is a magazine dedicated to enabling its readers to use every last byte of the ST's enormous power, with page after page of fact-packed editorial, up-to-date news, in-depth programming information, industry insights and our invaluable ***ST World*** Supertest comparisons. If you are serious about your ST, then ***ST World*** is the only magazine you need. To see just how good ***ST World*** is, fill in the form below and we will send you a copy free of charge.



SEND NOW FOR YOUR FREE COPY OF ST WORLD MAGAZINE

PHOTOCOPIES OF THIS FORM WILL NOT BE ACCEPTED

OFFER SUBJECT TO AVAILABILITY

Name .....

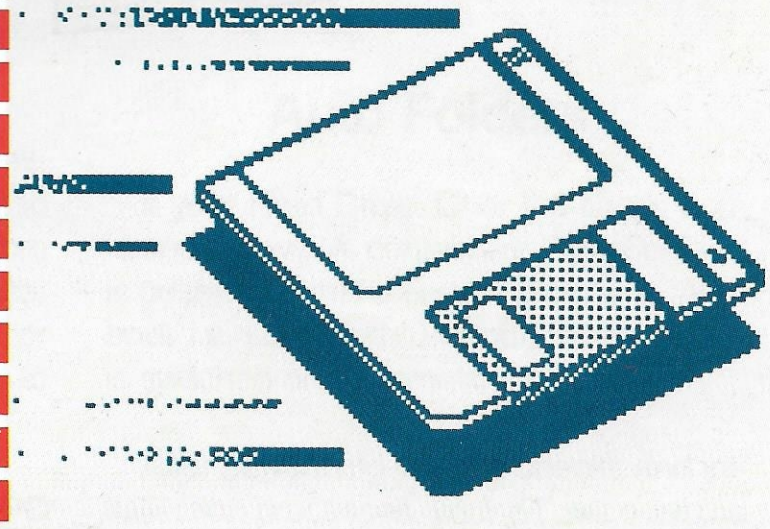
Address .....

.....

.....

Post code .....

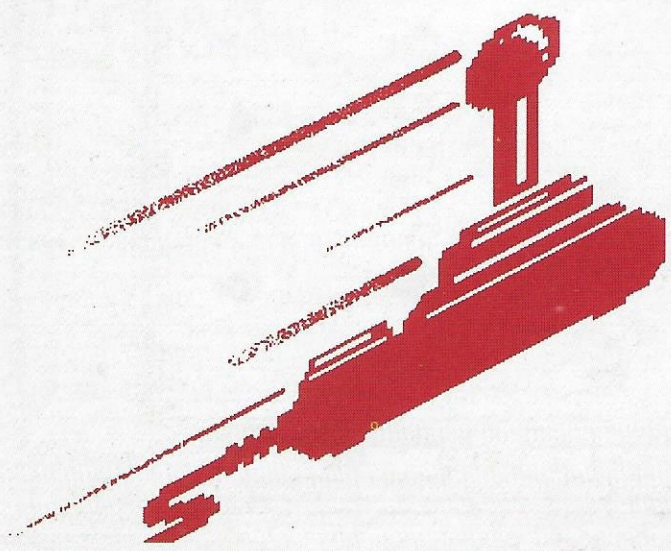
Send to:
Gollner Publishing,
DEPT URGENT VIP,
10 Theatre Lane,
Chichester,
West Sussex, PO19 1SR



...FOR DEDICATED USERS

ST Action is THE definitive games magazine. Each issue contains over 70 pages of action-packed games reviews, news, interviews, playing hints and cheats, competitions, as well as stunning innovations, such as, our unique ST Action Megatest game comparisons. The specification of ST Action is so high that you'll wonder how we ever produce it for only £1.30. So, if you want a monthly magazine that's 100% games, 100% full colour, 100% ultra-sharp screen shots, 100% up-to-the-minute, accurate editorial and 100% dedicated to your ST - you should read ST Action. So how can you get your hands on the definitive guide to ST games? Just fill in the form, and we will send you an issue absolutely free.

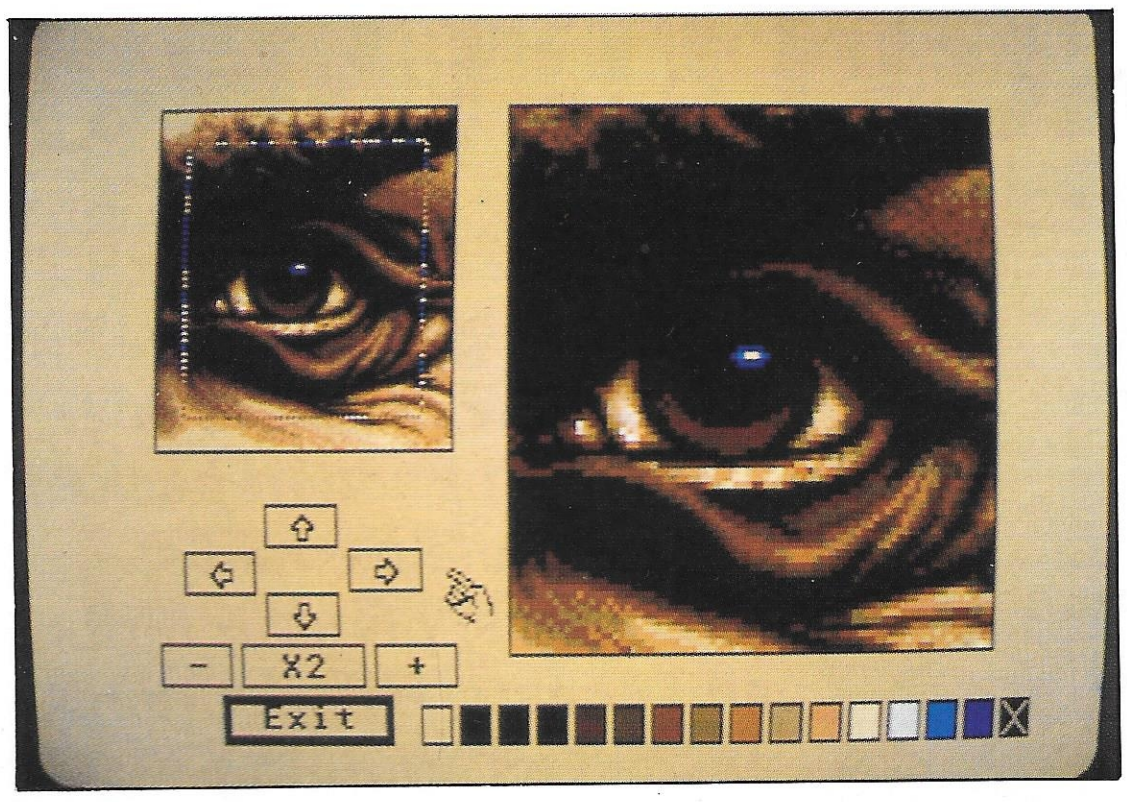
Send to:
Gollner Publishing,
DEPT URGENT VIP,
10 Theatre Lane,
Chichester,
West Sussex, PO191SR



SEND NOW FOR YOUR FREE COPY OF ST ACTION MAGAZINE

PHOTOCOPIES OF THIS FORM WILL NOT BE ACCEPTED
OFFER SUBJECT TO AVAILABILITY

Name .....
Address .....
.....
.....
Post code .....



A small section of the picture on the left is magnified 2 times on the righthand side of the screen, allowing subtle changes to be made.

You can draw in the magnify mode just as you would upon the regular drawing screen. Magnify gives you total control over every pixel on the screen of your Atari ST.

Blocks

The concept of Blocks has been considerably expanded in Hyperpaint and offers a whole new range of capabilities.

Selecting the Cut Block option allows you to mark a block on the screen. In this way, graphics can be moved, copied and manipulated.

The Stretch command allows you to scale a block up and down vertically and horizontally. Rotate allows you to turn a shape to the angle you specify. Horizontal and vertical Skewing allow you to offset either the top and bottom or sides of a block whilst Rescale lets you change the size of a block while retaining its original aspect ratio. In addition, individual blocks can be saved to and loaded from disk or even used as a paintbrush.

One of the most powerful features in Hyperpaint is the ability to provide color-cycling animation to graphics screens. This form of animation permits you to cycle a selection of colors in your palette automatically. If your imagery and palette are carefully orchestrated, the effect can be extremely effective.

This feature, which was once available only on graphics workstations costing thousands of pounds now literally shines on your Atari ST.

Multiple Drawings

Perhaps most importantly Hyperpaint supports multiple drawings or workscreens, depending on your memory configuration. A 520ST will support three simultaneous screens; a 1040 or MECA will support up to ten. To select a screen to work in, you need only press the function key that represents the screen you wish to work upon.

Multiple screens give you the ability to work up a library of graphics primitives for use in creating more complex drawings. You can load a number of screens simultaneously and move graphics between them. The only limitation is that pictures larger than the screen must be placed in workscreen number one.

Disk Options

Hyperpaint can load pictures from *Degas* and *Neochrome* formats, as well as IMG format pictures (using the Digital Research file format)

Hyperpaint also features an automatic compression routine which reduces the size of a standard picture file from roughly 34K to anywhere between 10 and 24K. Several factors should be considered in deciding whether or not to use compression: Some word processors now allow you to include graphic files such as IMG pictures in them. These may or may not require pictures to be saved in a compressed format.

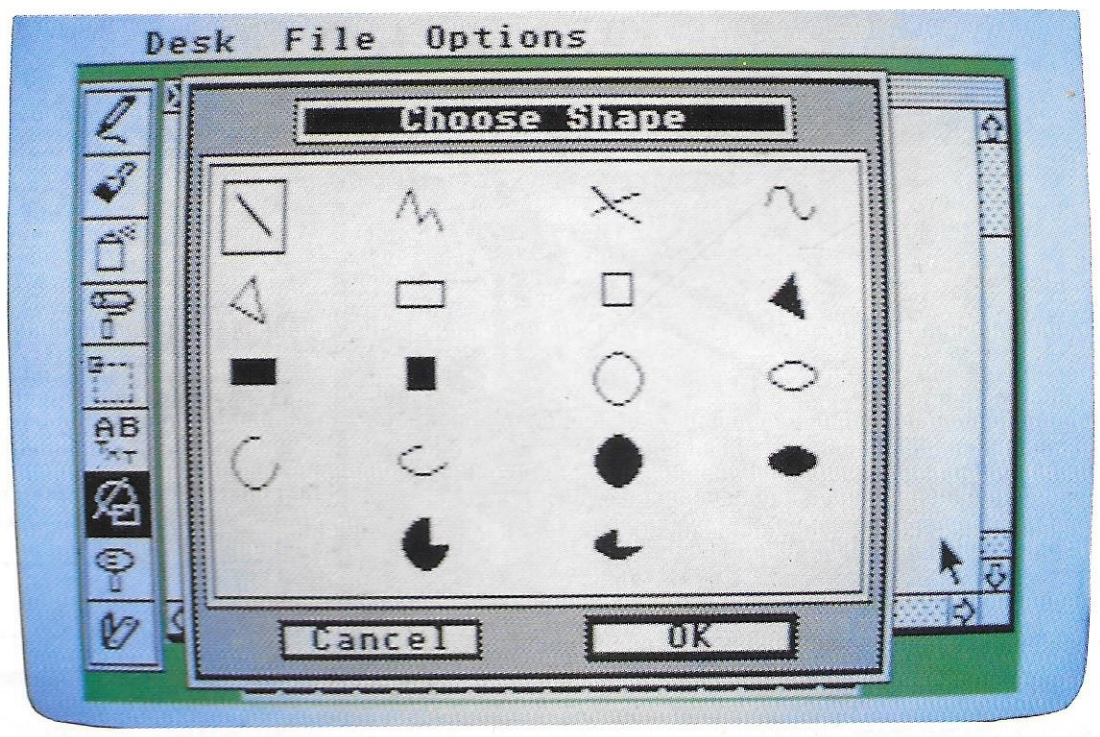
You can fit many more compressed pictures on a single disk, and Hyperpaint can read them without modification. If you are putting together a slide show, for example, the compression feature of Hyperpaint can increase the scope of your presentation quite a bit.

Most commands can be activated from the keyboard. This is an excellent feature, and one we have come to expect from Atari. It ensures that as your proficiency increases, the point-and-click interface that initially made the product easy to learn does not itself become a hindrance. You can move from point-and-click to selected keyboard commands at your own rate.

Documentation

The documentation accompanying the package is clear, well-written, well-organized and carefully indexed. The documentation is also spiral bound, which means you don't have to break its spine to get it to lie flat and open.

But it is the software that counts, and Hyperpaint is probably the best piece of painting software that has appeared for the Atari ST to date.



SILICA SHOP

THE UK's No1 ATARI SPECIALISTS

THE FULL ST STOCK RANGE

Silica Shop are the UK's No1 Atari specialist and have stocks of every product you could possibly require for your Atari computer. The products below are just a few of the many thousand which we keep in our warehouse. If you would like a complete list of our product range, call us now on 01-309 1111, or alternatively write to our Mail Order department (details below). Our staff will be pleased to send you a copy of our latest price list along with our current ST literature pack.

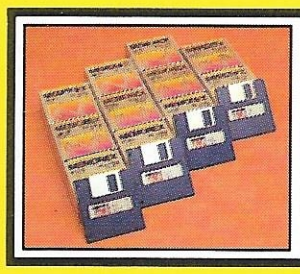
JOYSTICKS

Silica Shop have a complete range of accessories for the ST (contact our mail order office on 01-309 1111 for a complete list). This range includes a massive selection of joysticks, some of which are featured here.

A: JOYSTICK CONTROLLER - hand held **£4.95**
B: SLIK STICK - hand held **£6.95**
C: STARFIGHTER - hand held **£8.95**
D: TAC-3 - microswitches **£11.95**
E: QUICKSHOT II TURBO - microswitches, autofire **£13.95**
F: TAC-5 - microswitches **£12.95**
G: TAC-2 - hand held **£10.95**
H: PROF AUTOFIRE - microswitches, autofire **£18.95**

EPSON LX 800 ..... **£269.00**
9-pin dot matrix, 180cps (draft), 25cps (NLQ), 3K printer buffer, friction and tractor feeds, 2 correspondence fonts (Epson Roman and Sans Serif).

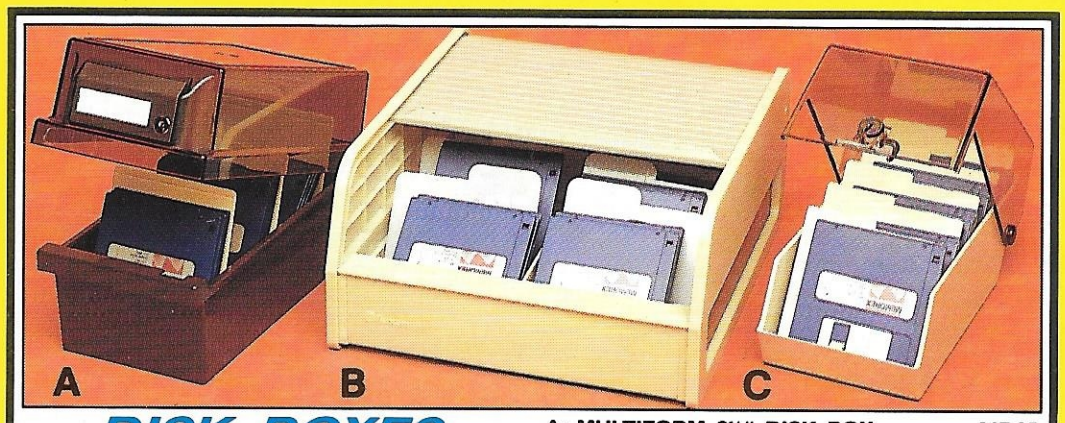
NEC P6 PLUS **£649**
24-pin dot matrix printer, 265cps (draft), 90cps (NLQ), 80K printer buffer, friction and tractor feeds, 20 built-in fonts. The PLUS model supercedes the old NEC P6 (as pictured above).



QUALITY 3½" DISKS

Silica Shop currently supply two main brands of disk. They are Memorex and SKC. As you now own an ST, one of the most used items will be disks, to hold all your data. Your new machine has a 1 megabyte double sided disk drive, so you will need to purchase double sided disks.

1 unlabelled bulk packed Memorex 2S/2D disk **£1.00**
Box of 10 SKC MF2DD 3½" 2S/2D disks **£14.95**



DISK BOXES

Disk storage boxes are very important for keeping your disks dirt free and protected from accidental damage.

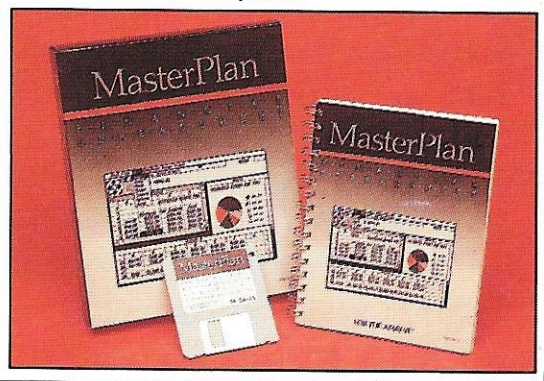
A: MULTIFORM 3½" DISK BOX **£17.95**
holds 40 disks - 3 section dividers
B: DISKIT 3½" DISK BOX **£18.95**
holds 100 disks - 12 section dividers
C: DD-40L 3½" DISK BOX **£8.95**
holds 40 disks - 5 section dividers

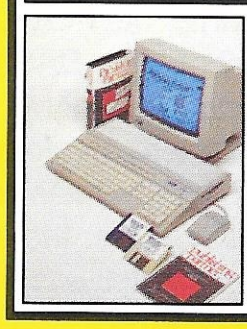
PROFESSIONAL SOFTWARE

Of the vast range of professional software which we stock, two titles stand out above the rest. These are MasterPlan and Publishing Partner. Both offer the home user powerful and easy to use facilities, as well as being suited to the business environment. Further details are available on request.

MASTERPLAN £89.95

MasterPlan is an inexpensive, powerful, easy to use spreadsheet written totally within Digital research's 'GEM' operating system. It is based on Lotus 1-2-3™, the industry standard and is compatible with files created using Lotus. MasterPlan boasts a spreadsheet grid of 8192×256 and offers full graphing facilities including pie charts, line graphs, histograms and scatter graphs. MasterPlan can be used at home, in education, or in the office, for organising and calculating data. For further details, contact our mail order office and ask for our free MasterPlan leaflets.





PUBLISHING PARTNER £99.95

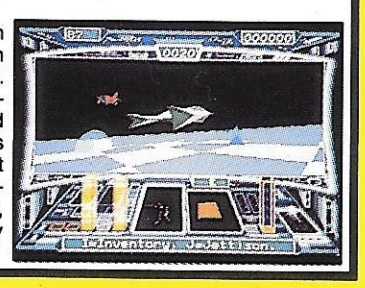
Publishing Partner offers you the ultimate in user-friendly desktop publishing, at a fraction of the cost of DTP software available on most other computers. Be the editor of your very own newspaper! Become the publishing magnate of your local clubs by producing the newsletters, posters and invitation cards for your events! A multitude of fonts and typefaces are at your command, to enable you to produce high quality printed output which can incorporate graphics and import work produced from word processing programs such as 1st Word. For only £99.95 you will be able to unleash a new life for your printer. Publishing Partner comes with a wide range of dot matrix and laser printer drivers.

ENTERTAINMENT SOFTWARE - SAVE £5!

The ST is now firmly established in the UK as a top class entertainment system. We are pleased to boast the largest range of ST entertainment software in the country. Contact our mail order office for a complete list.

STARGLIDER 2

Your mission is to annihilate the Ergon army and destroy the mighty beam projector aimed at your home planet. Encounter over 80 characters all depicted in superbly animated 3D solid graphics. The colour, speed, graphics and entertainment in Starglider 2 must make it one of the most complex programs written. As an introductory offer, you can buy Starglider 2 for only £19.95 instead of the normal £24.95!



SEND FOR A FREE PRICE LIST!

MAIL ORDER: **Tel: 01-309 1111**
Silica Shop, 1-4 The Mews, Hatherley Road, Sidcup, Kent, DA14 4DX
OPEN: MON-SAT 9am - 5.30pm *24Hr ANSWERPHONE SERVICE*

SIDCUP: (HATHERLEY ROAD) ..... **Tel: 01-302 8811**
Silica Shop, 1-4 The Mews, Hatherley Road, Sidcup, Kent, DA14 4DX
OPEN: MON-SAT 9am - 5.30pm *LATE NIGHT: FRIDAY 9am - 7pm*

LONDON: (OXFORD STREET) ..... **Tel: 01-629 1234 (ext 3914)**
Silica Shop At Selfridges, (1st Floor), Oxford Street, London, W1A 1AB
OPEN: MON-SAT 9am - 6.00pm *LATE NIGHT: THURSDAY 9am - 8pm*

LONDON: (TOTTENHAM COURT RD) ..... **Tel: 01-580 4839**
At Lion House, (1st Floor), 227 Tottenham Court Rd, London, W1P 0HX
OPEN: MON-SAT 9.30am - 5.45pm *LATE NIGHT: NONE*

TOTTENHAM COURT ROAD: From the end of October 1988, we will be moving from our 750 sq ft premises in Lion House to a larger 3,000 sq ft premises at 52 Tottenham Court Road. There may be a short period between Lion House closing and No 52 opening, so please phone 01-580 4839 to check before visiting.

SILICA SHOP
THE PROFESSIONAL COMPUTER CENTRE

FREE OWNERS CLUB & TECHNICAL HELPLINE
01-309 1111

Silica Shop Ltd, 1-4 The Mews, Hatherley Road, Sidcup, Kent, DA14 4DX 01-309 1111

The Power of Basic

The Basic language has come a long way since its conception in the early 1960s. Here we look at BASIC of the Eighties and show you what to look out for when getting a BASIC for your Atari ST.

One of the first things you may have noticed about your new Atari 520ST computer is that it does not come with a version of the BASIC programming language. Far from being a drawback this is actually a positive advantage since you are now free to choose your own version of the language from the many packages available for the Atari ST. The purpose of this article is to explain (albeit briefly) some of the features to look out for when choosing from the various interpreters and compilers on the market.

Interpreters versus Compilers

First of all, should you buy an interpreter or a compiler? What's the difference? Well, put simply, whenever you run a program from within an interpreter, it looks at everything you've done as if it had never seen it before, it has to work out what you want from scratch every time you run your program and this can take quite some time. A compiler, on the other hand, looks at your program once, works out how to run it quickly and then remembers it, as compact and speedy machine code. Then you can run the compiled program again and again and each time you are executing the fast code that the compiler has created for you.

This is a simplification but generally the advantages of using a compiler over an interpreter are:

- your programs run much more quickly,
- your programs are protected because they are compiled into difficult-to-understand machine code,
- your programs usually work once they are compiled.

The advantages of using an interpreter are:

- normally easier to use,
- quicker program development time,
- often available in ROM, permanently built into your computer.

In fact, the first two pluses for interpreters are becoming blurred nowadays as easy-to-use, interactive and super-fast compilers are becoming readily available. Also, you will hardly ever see a Pascal, C or FORTRAN interpreter since it is generally reckoned that the performance of interpreters is too sluggish for most professional applications... so why should you use a BASIC interpreter?

On balance, if you can find a modern, fast, interactive compiler system for BASIC you will be better off than with an interpreter.

The rest of this article will explain how BASIC has developed over the last 25 years and show you what to look out for in a BASIC of the Eighties and Nineties.

BASIC (Beginners All-purpose Symbolic Instruction Code) was invented in 1964 by John Kemeny and Thomas Kurtz as an easy-to-use language that would bring programming to the people. For a long time since then BASIC has been heavily criticised by the programming academia because it encourages poor programming, has few data structures (ways of organising different types of data) and is generally too simple and sloppy for serious work. This may have been fair criticism in the early days (although BASIC has done more than anything else to get people programming) but developments in the eighties have put BASIC on a footing with the language heavyweights like Pascal and C.

A name that most people associate with microcomputer BASICs is Microsoft, the American company that wrote the first BASIC interpreter for microcomputers back in 1975. Bill Gates and Paul Allen wrote Altair BASIC for the first commercial 8080 microcomputer and then formed Microsoft who moved on to implement their BASIC on many 8080, and hence Z80, machines in the 70s before converting it to 6502, 6809 and finally to the 8088 chip which was the heart of the first IBM PCs. This was known as GW BASIC (or BASICA) and they soon produced a compiler for the language called QuickBASIC; but QuickBASIC was far more than just a compiler for GW BASIC, Microsoft set about improving the BASIC language dramatically, adding many structured ideas borrowed from 'modern' languages like Pascal and C.

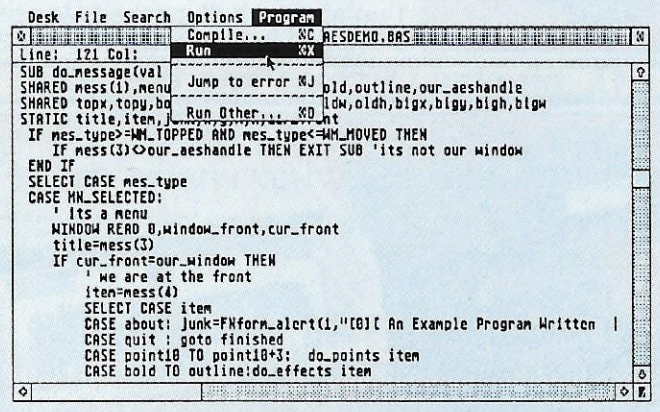
To begin with, QuickBASIC was purely a compiler i.e. you were expected to produce your working program with the GWBASIC interpreter and then submit it to QuickBASIC for conversion to machine code. However, QuickBASIC 2 changed all that, modelling itself after the hugely successful development environment of Borland's Turbo Pascal with an integrated screen editor, menus and auto-entry to the editor on finding an error. BASIC was at last moving forward and becoming a real language.

Since 1985, quickBASIC and Borland's lookalike product TurboBASIC have changed how people feel about the BASIC language; it is still as easy to use as it was originally, if not easier, but now real language features are there, structured loop statements, powerful procedures and functions, flexible control over variables and all in an interacitve editing and debugging environment that knocks spots off many other language systems.

What's this got to do with my Atari ST? Well, Microsoft have established a new standard for BASIC and, now you are free to choose the BASIC for your 520ST, it makes sense to look at the systems that come close to this standard – not only because the new BASICs are amazingly powerful but also because you will then be able to transfer programs between an ST and a PC, with very little change. So, what should you look out for?

The New BASICs

We shall use HiSoft's Power BASIC to illustrate the features of modern BASICs since this product was written to be QuickBASIC-compatible from the beginning.



The easy-to-use environment of HiSoft's Power BASIC

The first thing of course is an easy-to-use environment. We've already said that interpreters do not have much going for them nowadays so you're looking for a compiler that works quickly, flexibly and interactively, reporting errors clearly and efficiently. Quickly means compiling at least 2000 lines per minute, interactively so that you don't have to leave the editor to compile and run or correct errors and with flexible options so that you have control over what happens. On the ST, it makes sense to look for a GEM environment, firstly because it is standard and therefore there should be little to learn (why get stuck working out how to use the editor when all you want do do is program?) and secondly because you will be able to use desk accessories easily.

Now, let's move on to language features: we'll look at new loop structures, the CASE statement, sub-programs and variables.

Originally, if you wanted to do something a number of times in BASIC, you would use the FOR statement which repeats everything between the FOR and the NEXT statements a number of times. The problem is that you need to know how many times you want to do the loop before you enter it and also the loop will be obeyed a fixed number of times and the only way out in the middle is to use GOTO, which is confusing. So the REPEAT and WHILE loops were invented and, more recently, DO... LOOP. The idea is that REPEAT loops allow to repeat something until a certain condition happens and WHILE loops repeat while the condition remains the same; the more modern DO loop combines both of these in one. The program segments to the left show the DO statement in action.

```
Desk  File  Search  Options  Program
A:\EX1.BAS
Line:    1 Col:    1 Mem:19524

' Here's a DO loop with the test at the end
' Written in HiSoft Power BASIC 16/8/88

DO
    INPUT "A number, please";num
    PRINT "The VAT on ";num;" is ";num*.15
LOOP UNTIL num=0

'Find the quotient and remainder of two numbers
' without using DIV or MOD. Shows DO with a test
' at the beginning ...

INPUT "Two numbers, please";num,divisor
r=num : q=0
DO WHILE r>=divisor
    r=r-divisor : q=q+1
LOOP
print divisor;"divides into";num;q;"times, remainder";r
```

Decision-making is an important part of programming; you often want to take different paths through the program depending on the value of a variable or on a particular condition. Formerly, most of the work had to be done by the IF... THEN statement which could get very messy if there were many choices to be made. The, newer, CASE statement allows very easy and efficient selection as shown in the example opposite.

Often, when programming, you will find that you can split the task up into a number of smaller, self-contained sub-tasks which can be called upon to do their job as many times as you need. Older BASICs allowed this idea through the use of GOSUB but its use was primitive – often you couldn't name your sub-task and the sub-task could not use its own variables. Modern BASICs have changed that with the introduction of sub-programs and multi-line functions; you can pass values and variables to them and they can use their own local variables or share variables from outside themselves. In addition they can call themselves just as if they were the main program (this is called recursion). An example is shown below:

Other things you should look out for when buyng your BASIC are flexible array

```
Desk  File  Search  Options  Program
A:\DEMOS\HANOI.BAS
Line:   21 Col:    25 Mem:8077
DEFINT a-z
'Some constants
CONST pole1=110,pole2=320,pole3=530,space=50

'A sub-program to draw a ring on a pole
SUB draw_ring(which_pole,size,start)
SHARED ring_height,full_height          'global variables
STATIC xstart,ystart                    'local variables

 SELECT CASE which_pole
    CASE=1  :   xstart=pole1-(size)\2
    CASE=2  :   xstart=pole2-(size)\2
    CASE=3  :   xstart=pole3-(size)\2
 END SELECT
 ystart=full_height-space-start*ring_height
 VR_RECFL xstart,ystart,xstart+size,ystart+ring_height-2
END SUB

'Call the sub-program to draw a ring on pole 2
draw_ring 2,ring_width,5
```

handling (so that you can redimension arrays easily and extend them to any size), unlimited variable size, the ability to extend the language through the use of libraries and full support for the ST system, including the ubiquitous GEM.

Conclusion

In conclusion, the absence of a BASIC interpreter with your 520ST is a positive advantage, for now you have the chance to choose a modern, easy-to-use, super-fast system packed with all the latest features that will make BASIC programming a joy. Have fun!

```
Desk  File  Search  Options  Program
Power BASIC Compiler Version 1.21
Line:    1 Col:    1 Mem:9462
'An example of how the CASE statement works
INPUT "Which day of the week (1 to 7) ",day
SELECT CASE day
    CASE 2 TO 6 :   PRINT "A weekday, boo!" : wk=0
    CASE 1,7    :   PRINT "The weekend, hooray!" : wk=1
END SELECT

'A more detailed example of SELECT CASE

DO
    INPUT "Which month ";m$
    SELECT CASE m$
        CASE <"A", >"Z"
            PRINT "Capital letter first, please"
        CASE "June", "July", "August" : EXIT LOOP
        CASE ELSE
            PRINT "A summer month please"
    END SELECT
LOOP
IF wk=1 THEN PRINT "Wow! A weekend in summer!!"
```

continued from page 14

either Drive 'C', (if you have a hard disk attached) or Drive 'A'. If an Auto Folder is found, any programs contained in it will be loaded and executed if:

1) The program has the extension .PRG

2) The program does not contain any GEM, VDI or AES calls. (I.E. Does not make use of Windows, Icons, Mice and Pull Down Menus.

3) It is not an ST Basic or other Interpreted Basic program.

Joysticks

The Atari ST can support most joysticks with a 9 way D connector. Please note that a few joysticks can cause some programs to crash or make the keyboard respond with incorrect characters if attached when the computer is turned on.

Some customers have experienced difficulty in connecting and disconnecting the Mouse and Joysticks from the Atari STf/fm upper case. Most computer shops now stock a joystick extension cable which can be attached to the joystick ports, thus enabling easier connection of the peripherals.

Support

DON'T PANIC!!! In the first instance you should call your dealer. We have more than 1 million users in the U.K., and the effect of so many people calling this office can jam our Technical/Consumer Departments telephone lines.

If your dealer can't answer your question we recommend that you try one of the dedicated Atari Magazines or the Atari Helpline, on 01-309 7770.

Lastly, if your problem or question is software related, you may find the software houses own support department is better equipped to help. (we aren't able to help with non Atari products.)

Modems

The Atari ST can support most modems. Although we do not recommend or support any particular brand of modem, we have found Pace and Miracle Technology products to be of a high quality.

Most retailers can supply a modem cable, the ST pin details being given in the rear of your owners guide.

There are several communications packages available for the ST, however we recommend Fastcom for most general purpose applications. Fastcom can support Viewdata Databases such as Prestel as well as those which only use ASCII codes.

Monitors

Connecting Atari monitors is straight forward. Connecting other manufacturers products requires the right signals and the correct cable to be made. Due to the large range and differing specifications that can be found in the U.K. market we are only able to give very general advice.

Colour

The ST requires it's colour monitor to be able to receive RGB analogue signals. RGB TTL monitors (Such as those used on IBM PC's and Acorn BBC machines) will not function correctly with the ST.

ST Consumer News Page 2 Issue 1 15th June 1988

Continued on page 23

SILICA SHOP

Mention the name 'Silica Shop' to any Atari computer owner and they will know exactly who you are talking about. We visited Silica 'The UK's No 1 Atari Specialists' to discover what makes their service so special.

The Atari range of computers has been with us for some years and many computer dealers have taken on this popular and highly successful product line. Most of these dealers also stock computers from several other manufacturers, supporting each one with a limited range of software and ancillary products. Because many of these dealers' commitment is spread across a range of manufacturers' products, they are unable to offer real in-depth support for any individual range.

The Atari Specialists

There is one company that is unique amongst these dealers, as that company specialises in a limited range of products. The company is Silica Shop and alongside Atari, they have grown from strength to strength in a tough and uncompromising market. Although the British public are becoming increasingly computer-aware, there remains a need for specialist services to guide people through the decision, purchasing, use and maintenance phases of both computer hardware and software ownership. Sadly, many dealers, jumping into the computer sales arena fail to realise, or even choose to ignore, the importance of this. Silica has now become one of the better known computer retail chains in the UK. Their high Atari profile, aggressive advertising and unrivalled service has contributed to their success.

Three Retail Shops

From the early days of their commitment to Atari over 10 years ago, Silica Shop have traded from their head office and shop in Sidcup, Kent. They now have three shops. One in Sidcup, and two in London (One in Tottenham Court Road and another at Selfridges in Oxford Street). In addition, they have a large mail order department with FREE delivery serving Atari owners throughout the UK. Their mail order department processes over four thousand orders a month and offers a 24 hour delivery service.

No 1 In Atari

Silica are firmly established as the UK's No 1 Atari Specialists and can offer the Atari Owner a full range of specialist services. On this page we would like to introduce you to Silica Shop, and to look at some of the things this specialist company can offer you as an Atari owner. We visited Silica's main offices in Sidcup, Kent to see how they operate and to ask them why they chose Atari as their main product line.

Early Potential

Silica Shop first saw the potential of Atari products when the Atari VCS games console was introduced into the UK in 1978. Silica took on the VCS and helped establish Atari as a household name in the UK, enabling Atari to achieve sales of one million VCS units in the UK in the first years of trading. Subsequently, as Atari introduced their range of 8-bit computers (400/600/800/XL/XE), Silica took on each computer as it was released, offering total support by supplying a complete range of peripherals, accessories, and software. This policy of 'total support' for the Atari product range established Silica Shop as the UK's largest and most dedicated Atari dealer with an annual turnover which runs into several millions. Silica Shop has always had complete faith in the quality of the product produced by Atari: confident that its place in the market was assured by their innovative and aggressive approach to computing. Even during 'the quiet Warner Communications years' in the period just before Jack Tramiel took over the Atari Corporation, Silica kept faith with Atari and its customers by continuing to support the range when less committed dealers decided to cut and run.

Total Support

This faith in Atari was justified soon after the Jack Tramiel takeover, when Atari launched the ST range of 16-bit computers with the slogan 'Power Without The Price'. Silica again adopted the approach of 'total support' and rapidly became the leading source of information and supplies for this revolutionary product. This position continues today when, although many more dealers now stock Atari computers, few are able to carry the same wide range of supporting product that Silica offers its customers. The buzz-word that permeates all aspects of Silica's operations is a single word that is often used by dealers, but rarely understood or given, that word is 'SERVICE'.

Free Brochure Service

To enable Atari owners to keep up to date with developments in the Atari market and to see what is available for their computer, Silica produce newsletters, product catalogues and price lists several times a year. These are the most comprehensive Atari brochures available anywhere in the market and include all the latest news and software release details. Silica automatically mail their brochures to all owners who are registered on their mailing list. This list has now become the largest Atari mailing list in the UK. They do this as a service to customers on a 'FREE Of Charge' basis. Copies are also available from all branches of Silica Shop. Any Atari owner can register on the Silica mailing list 'FREE of charge', by writing to or phoning the Sidcup branch on 01-309 1111 and giving details of which computer (XE, ST or PC) they own.

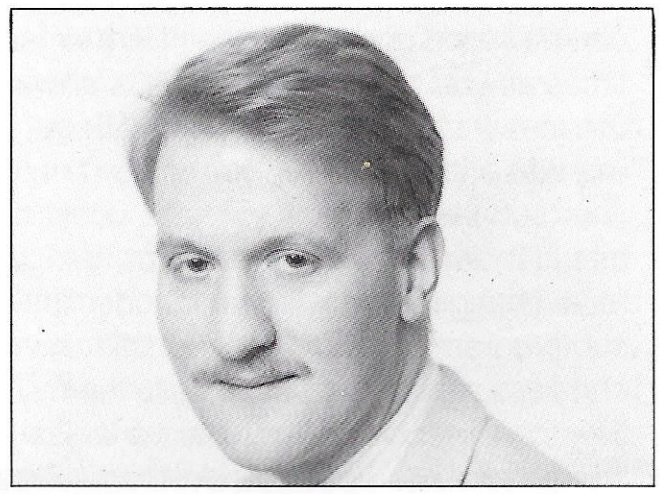
Technical Helpline

Part of Silica's after sales support service to Atari owners is a technical helpline. Any Atari owner can use this facility. If you would like any technical help, or advice on which software to use, call 01-309 1111 and ask us for technical help. The helpline at Silica is manned by five full time staff who are experts on all aspects of the entire range of Atari computers. There is no charge for the helpline service.

Dedication

Martyn Moore, shop manager of the Sidcup branch of Silica Shop says.

'Our success and growth over the past years is due largely to our dedication to the Atari line and to our heavy orientation towards providing our customers with a high quality service. Customers throughout the UK know that we thoroughly understand the Atari range and can provide them with any product they require which is relevant to Atari computing. We look forward to being of service to our Atari customers.



MARTYN MOORE: Manager – Silica Shop, Sidcup

Silica can be contacted at:
Silica Shop Ltd.,
1-4 The Mews, Hatherley Road,
Sidcup, Kent, DA14 4DX
Tel: 01-309 1111

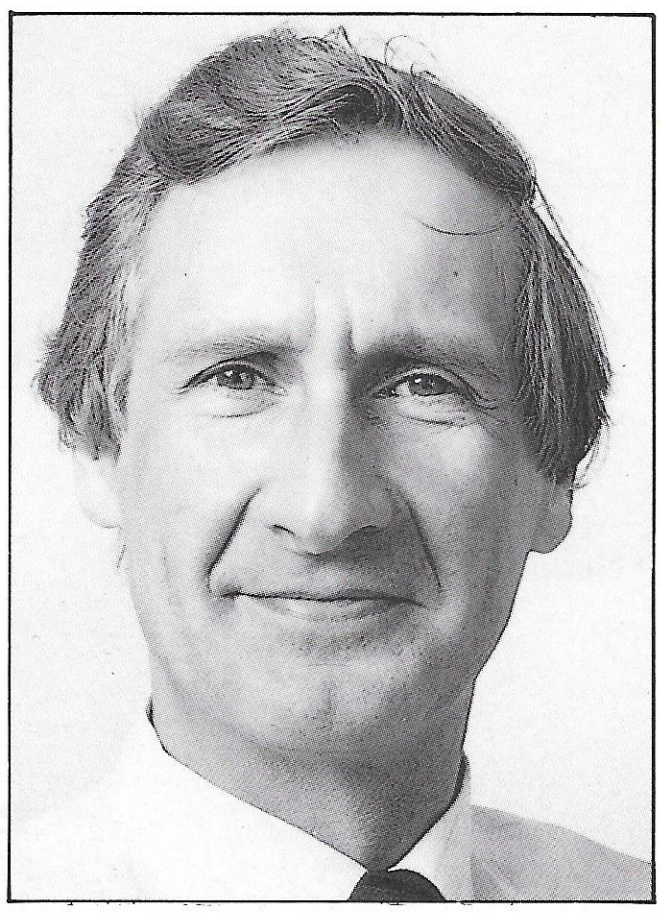
Elite Systems

Elite Systems was incorporated in 1984 by Steve Wilcox and his father Brian. In four years they have developed a reputation for producing some of the best 8-bit software around, with no less than seven Gallup No.1. hits to their name, and prestigious awards such as Software Publisher of the Year (Computer & Video Games 1986), and Game of the Year (ESTA 1987).

O.K., so Elite can write pretty good Spectrum games; what are we doing writing abut them in an Atari ST magazine?

Elite are one of the few software publishers that have a complete in-house development facility – from game concept through to final playtesting and marketing, Elite do it all themselves. What is more extraordinary is that all these resources are built around our very own favourite computer – the ST.

We spoke to George Yapp, who heads the Software Department:

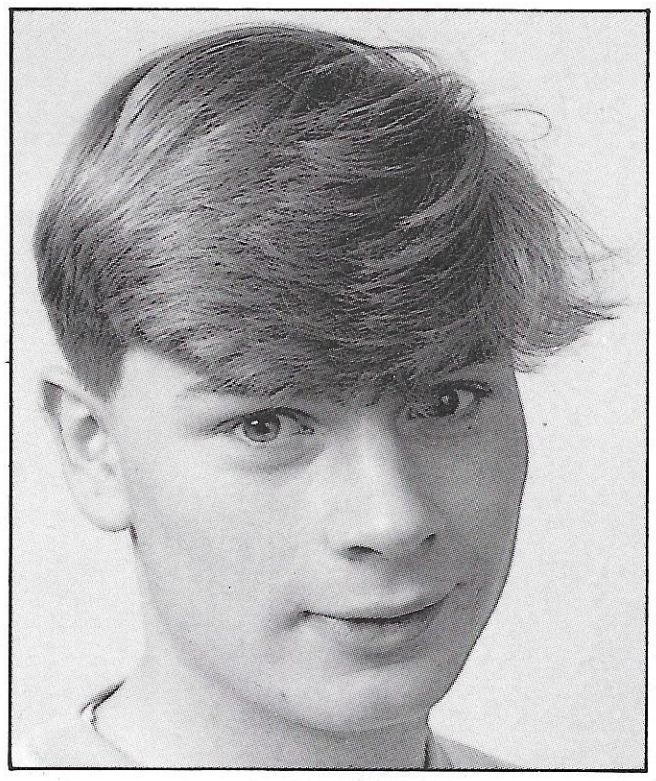


GEORGE YAPP
Software Development Manager

'We've spent 18 months now building a software department that can handle graphics, music, original program development, conversion programming, we even have our own design department. We use the Atari ST as our basis for software development,

a) because we think the Atari ST format is one that we can sell worldwide and
b) because the ST is so good we're able to develop games to arcade machine quality for our conversion programmers to work from. That's much better for them than working from a lengthy design document that can be open to so many interpretations.'

Next we paid a visit to the various departments to see how a game makes the tortuous journey from an idea in a designer's mind to a new release on your local ST dealers' shelf. First off, I spoke to Simon Cooke one of the designers.



SIMON COOKE
Designer

'When an idea is conceived, designers provide several designs from which we choose one final design document. This has to be discussed in conjunction with the developers and graphic artists to ensure that everything within the document is feasible.'

Once this has been agreed, the graphics department and programming department begin; next stop, Paul Walker, Graphics Supervisor.

'The programmer, in conjunction with the designer, will tell me precisely what Graphics are required: how big, descriptions, animation, the number of character sets and so on. I will then work with the programmer to make sure that my data and the programming data can "talk to each other".'

Music is added in much the same way, and hey presto you've got a finished game.

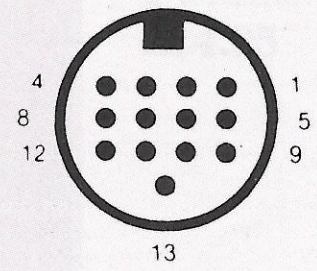
'Unless of course Steve Dean and his team find a bug in it' adds George.

'Thanks George'.

continued from page 21

Composite Video

If your computer is fitted with a T.V. modulator, you will be able to use Composite Video Colour, Green or Black and White Monitors. Pin 2 on the ST monitor port is a combined sync line for Composite Video output. (This can also be used as sync for RGB analogue monitors)



Monitor

1 — Audio Out
2 — Composite Video (where applicable)
3 — General Purpose Output
4 — Monochrome Detect
5 — Audio In
6 — Green
7 — Red
8 — Plus 12-Volt Pullup
9 — Horizontal Sync
10 — Blue
11 — Monochrome
12 — Vertical Sync
13 — Ground

Wiring Up

Generally speaking you should make 'like signal to like signal' connections between the monitor and ST. You must always have a ground line. If the picture obtained on power up is weak or fuzzy, you may need add a resistor to the lead. Further advice should be obtained from your dealer or Monitor Manufacturer.

A Short Glossary of Abbreviations

MIDI Musical Instrument Digital Interface
SCSI Small Computer System Interface
DMA Direct Memory Access
RAM Random Addressable Memory
ROM Read Only Memory
IO Input/Output
OS Operating System
RGB Red Green Blue
TOS The Operating System

HAS YOUR ATARI ST EVER

Gunship
Climb into the cockpit of the AH-64A warrior helicopter, one of the most fierce and elusive weapons in the modern military arsenal. Missions torn from today's headlines take you to the world's hottest trouble spots.
£24.95

F-15 Strike Eagle
The stunning realism of this simulation challenges your ability to outfly, outfight and outthink the enemy on historic missions over Iraq, Egypt, Southeast Asia and Libya.
£24.95

Experience some real excitement and action. Gunship, F-15 Strike Eagle and Silent Service are outstanding combat simulations which take full advantage of your Atari's capabilities.

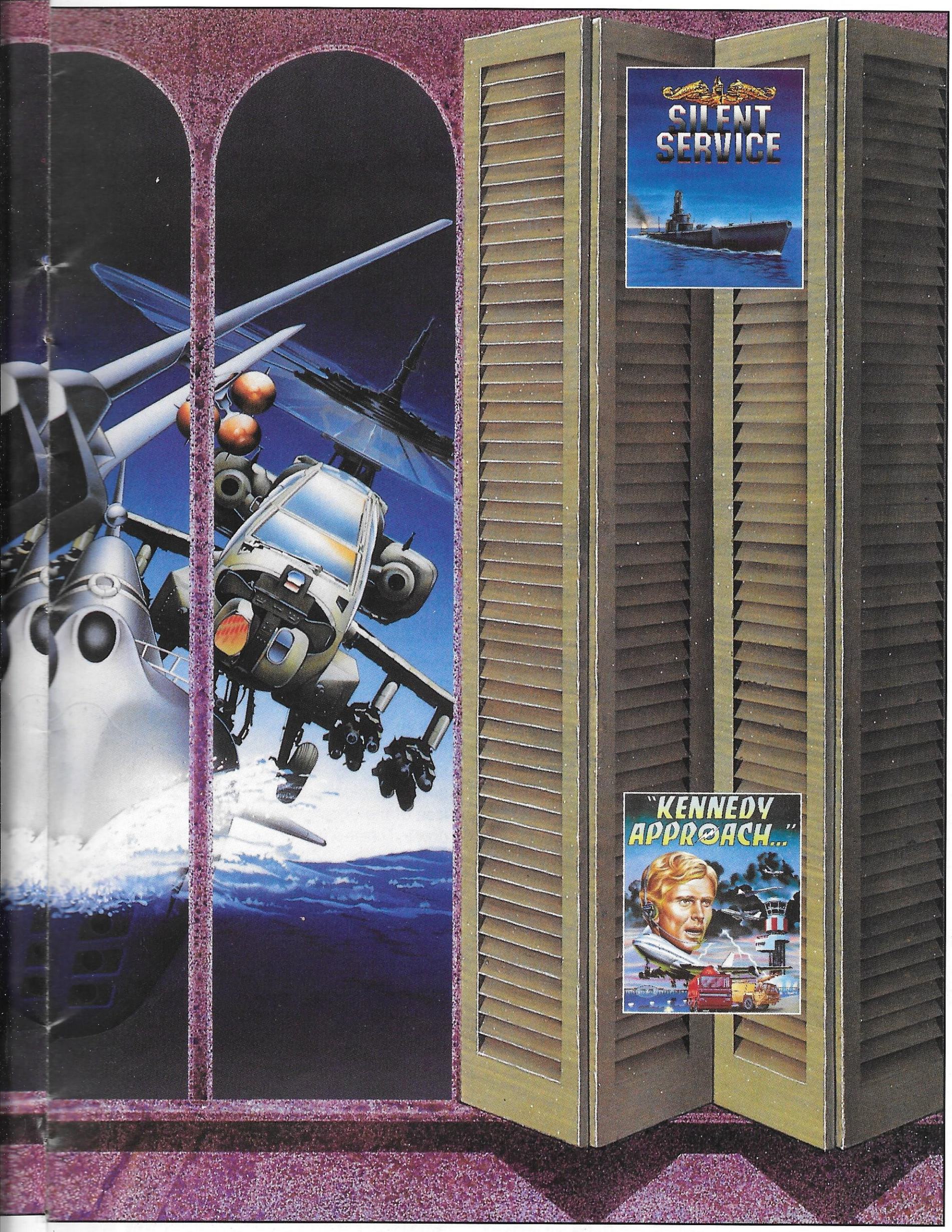
Incredible realism, coupled with unmatched depth and playability, have won these titles numerous awards and accolades. All three put you in dangerous and challenging environments, presenting you with the rare opportunity to accomplish the same goals and feats as actual fighter pilots and submariners.

Whether you're flying the world's most advanced attack helicopter in Gunship, piloting the high performance F-15 fighter plane, or controlling a World War II submarine, you'll need to master your vehicle's authentic control, information and weapon system.

Daunting missions constantly test your intelligence, skill and split-second decision making. So, if you want to enjoy the thrilling action of these all-time classics send off the order form today.

MICRO PROSE
SIMULATION • SOFTWARE

SEEN ANY REAL ACTION?



Silent Service
As captain of a World War II submarine stationed in the South Pacific, your duty is to find, attack and sink Japanese shipping. All the critical battle stations are accurately replicated, so get ready to take the helm.
£24.95

Kennedy Approach
If you've ever wondered just how difficult it is to be an Air Traffic Controller, you can now find out. Kennedy Approach gives you the chance to control the action in the skies above America's busiest airports.
£24.95
NOW AVAILABLE

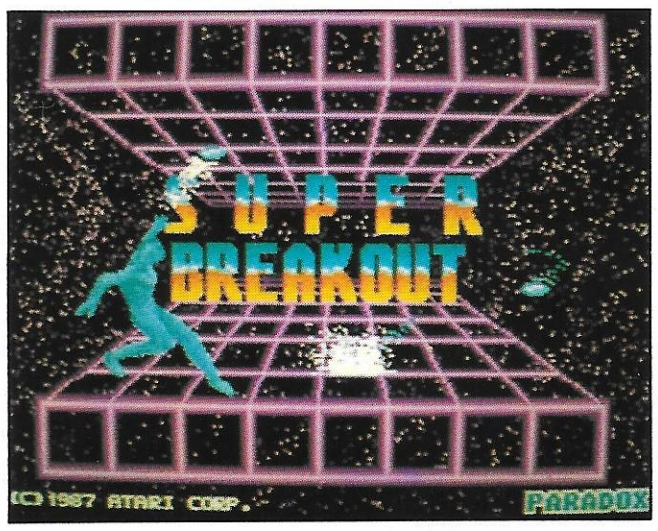
MicroProse Software Ltd., 2 Market Place, Tetbury, Glos GL8 8DA. Tel: 0666 54326

A Return to Software Development

Under the Warner management and the subsequent sale to Namco, Atari became the premier game company in the arcade, with titles like Breakout, Asteroids, Missile Command, Pole Position, Championship Sprint, Star Wars, Gauntlet and A.P.B. – the list goes on! By way of an introduction of this re-emergence into software development, Atari have released some of the favourite games from the arcade and eight-bit market.

Super Breakout

Can the numerous Breakout clones be justified as variations on an excellent theme of arcade entertainment, or do they demonstrate that certain members of the software industry are often devoid of originality? When Atari introduced Breakout into the arcades over a decade ago, the luxury of coloured graphics was afforded with the aid of coloured strips of plastic which were stuck to the screen to give the effect of multicoloured bricks. Breakout seemed to symbolize the imprisoned capabilities of the computer and as it captured our undivided attention, we slowly broke down the barriers, brick by brick, until the dawn of the space invasion.



Partly from public demand and partly out of respect for this ageing classic. Atari present an updated adaptation called Super Breakout in their range of arcade blockbusters. But thanks to progressive graphic techniques, you won't have to stick coloured plastic to your monitor screen. There are four variations on the theme in Super Breakout which can be selected on the option screen at the start of the game, which include basic Breakout, Cavity, Progressive and Double. Traditionally, Breakout is an excellent multiplayer game and in this version, up to eight can take turns to participate.

As an introduction to the basics of brick busting, you could do no better than select the Basic Breakout option. You are presented with a solid wall of multicoloured bricks and a generous bat to intercept the ball. With mouse controls, clicking the button sends the ball from the top of the screen and, moving the bat with the mouse, the ball must be intercepted before it drops to the bottom of the screen. Initially, the ball travels painfuly slowly as you eliminate the first two rows of bricks, but this somnolent pace only serves to emphasize the change in pace which is waiting in the next section of bricks. As the ball hits the third row of bricks, its speed doubles and the pace of the game quickens considerably. Further difficulty presents itself as the ball makes contact with the final row of bricks, where the size of the bat reduces by half. You begin the game with five bats and any losses in the first screen are not replenished in the next.

'Cavity' is thus named because two additional balls are incarcerated within the wall. Once you have penetrated the wall, the balls are released and it is a matter of keeping all three balls in play for as long as possible. 'Progressive' is by far the most difficult level in the game, offering even more frantic brick-busting with regenerating bricks that advance down the screen. In the more difficult levels, you can choose to play with two bats which are fixed together. In theory, what you miss with the first bat you should be able to hit with the second, but in practice this causes more confusion that it's worth.

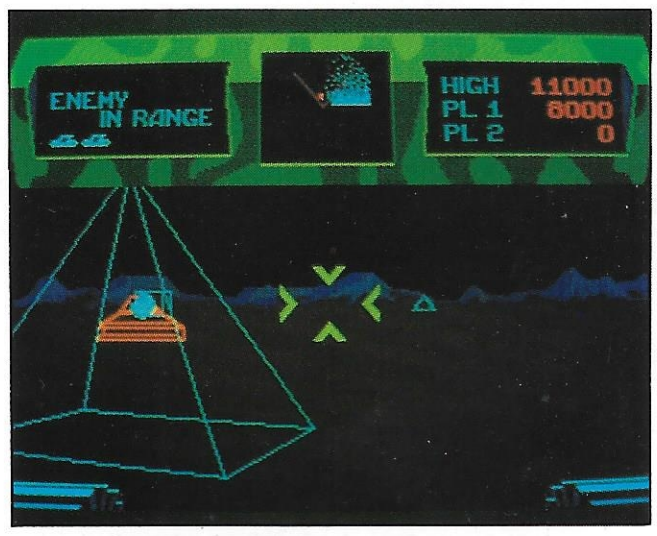
Comment

With half-a-dozen so-called Breakout clones available for the ST, which are packed to the cavities with enhanced features such as adhesive bats, why bother with the original? Super Breakout is somehow unspoiled, unpretentious, man and bat against wall. If anyone is justified in enhancing the original, it is Atari!

Battlezone

Moving the Battlezone machine in any amusement arcade would reveal a very clean patch of carpet and those distinctive vector-graphics must be permanently burnt on to the monitor tubes by now. This enduring game was introduced in the arcades when alien-blasting was at the height of its popularity. Atari brought the action down to ground-level by replacing the statutory quick-firing spaceship with a cumbersome tank, and the ST version of the game is, as far as I can recall, identical to the arcade original. As if you are looking from the turret of the tank, the game-screen shows 3D vector-graphic shapes which represent buildings highlighted on a black moonscape, with a mountainous terrain in the background.

The tank is controlled entirely by the joystick, and pushing forwards sends it trundling across the terrain. Redirecting the joystick to the left and right, halts the tank and the turret continues to turn horizontally a full 360 degrees until you centralize the joystick again. As the turret moves, a sweeping radar shows the changing position of the enemy, while a message window indicates whether the enemy tank is to your left, right or within firing range. The enemy tanks come into view at different distances; some appear on the horizon, which forces you to move forwards into firing range, while others emerge from behind buildings with their guns already locked on to you.

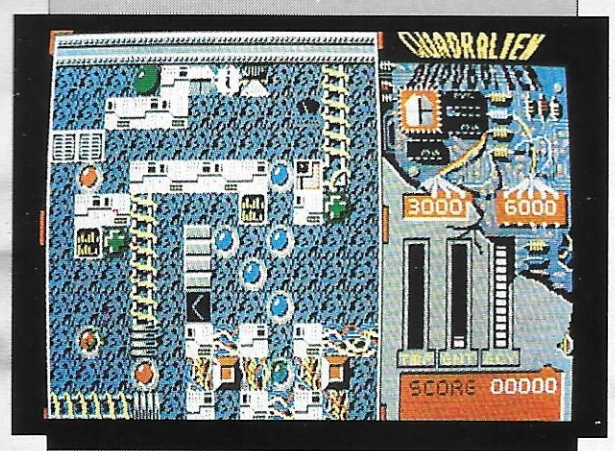


As you negotiate a passage across the terrain, the buildings and objects can be used as cover, but these same buildings can also conceal the enemy tanks. As the turret pans across the terrain, the enemy tanks lurk unseen behind the buildings and wait until you have moved past before emerging and turning their turrets towards you. Warned by the message window that

Continued on page 28

The games they said couldn't be written

QUADRALIEN



ST Screen Shot

You are entering Jupiterspace. Your destination, Astra , the vast cybernetic nuclear-fission complex they orbited mid-21st century. Something strange has happened there. Astra has sealed itself off from the outside world, the control mechanisms won't respond, the temperatures rising. Meltdown is nigh. But it's worse than that, for in the very heart of the reactor itself, the sinister QUADRALIEN forces have established their foothold in our solar-system. You have just six droids to sort it out.
QUADRALIEN is ACTION-STRATEGY-TENSION-JEST

ST, Amiga £19.95
PC £24.95

STARGOOSE!

Amiga Screen Shot

What happens when a team that's notched up two 16-BIT number ones decides to tackle the classic theme of the vertical scroll-and-blast ? The result is StarGoose!, the latest from Steve Cain and GP (Kenny) Everett, and boy is it wierd!
Until you've tackled the mind-boggling variety of defence forces in the 3-D world of Nom , you're still in Straight City. StarGoose! ingredients include: The beefiest scroll-FULL screen width and Variable speed, Unique relief landscapes, Unique supply tunnels and The Eyes!

ST, Amiga £19.95
PC £24.95

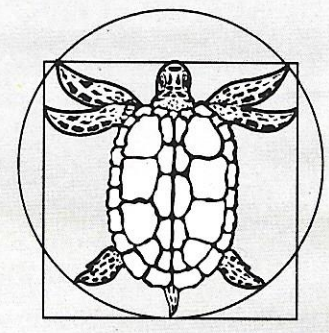
STARRAY

Amiga Screen Shot

We won't mention the super-smooth parallax scrolling...the stunning backdrops...the amazing hi-res graphics...the never-heard-before sounds...the gameplay that turns humans into jelly...the aliens that just get wierder...the unique Last Game Option...
We'll just say:
"**Quite possibly the best arcade action yet written for any micro** "
Amiga (2 disks + Audio Cassette) £24.95
ST £19.95
C64 (Disk + Audio Cassette) £14.95
PC £24.95

MASTERWORKS FOR THE MILLENIUM

WHY NOT PHONE OUR CREDIT CARD HOTLINE FOR PROMPT DELIVERY :
(0933) 79300



LOGOTRON RECREATION

LOGOTRON LTD, DALES BREWERY, GWYDIR STREET, CAMBRIDGE, CB1 2LJ

you have passed the enemy tank, you must change the direction of the turret, aim the gunsights at the target and fire a missile. It is a race to see who can aim and fire the quickest and success results in the enemy tank splintering into vector-graphic pieces; failure, however, is a harrowing experience as the missile approaches and smashes the monitor screen indicating rather dramatically that your tank has been destroyed. Eventually, the cumbersome and somewhat obtrusive enemy tanks can be defeated with ease and so star-shaped missiles are introduced into the game. These missiles hurtle across the planet surface from an unseen but accurate source, their task is to divert your attention from the tanks.

Comment

Battlezone's longevity in the arcade is proof that the game is entertaining, but its subsequent popularity in the VCS market confirms this. When Battlezone was created, vector-graphics afforded results which were impossible to achieve with solid graphics and, in this case, it is certainly not detrimental to the game-play.

Joust

Arcade fans were gripped by Pacmania and Phoenix had just risen from the ashes when Atari released Joust into the arcades. This hybrid game was far removed from the popular arcade pursuits of the day, but its subsequent success proved that it was a welcomed respite from space wars. The game-screen shows six islands of varying size which are suspended in mid-air. These strips of land act as platforms for the extraordinary battle which commences as soon as the knights and their buzzard mounts trot on screen. In the sudden flurry of feathers, you must quickly establish which buzzard is under your control.

The joust is fought with the joystick, but with some unusual variations to the standard controls. When the buzzard has landed on an island or on the bridge which stretches across a molten lava lake at the base of the screen, pushing the joystick to the left or right moves the bird accordingly, while continuously pressing the firebutton flaps the buzzard's wings causing it to take off. Once airborne, the speed at which you press the firebutton regulates the bird's flight. If two players are participating, you can either work as a team against the computer-controlled buzzards or compete against each other.

Engaging in a joust on the ground requires directing the buzzard at the enemy at full trot and, just before the lances collide, pressing the firebutton for some elevation parts the enemy knight cleanly from his mount. Jousting whilst airborne, however, is a combination of continuously pressing the firebutton to keep the bird aloft and avoiding a collision with other air traffic and the islands, as well as ensuring that you are above the enemy at the crucial point of the joust. If you manage to knock the enemy knight from his buzzard, you are either informed of the point-value of the joust, or the enemy buzzard lays an egg which drops to the bottom of the screen. This egg must be collected for bonus points before it hatches an enemy knight who can mount the next riderless buzzard that comes along. If your buzzard disappears off one side of the screen, it immediately appears on the other side and so you must ensure that you do not collide unfavourably with an enemy buzzard.

Each so-called wave or level of the game introduces an increased presence of enemy, and bonus points are given if you adapt to the suggested method of play. For instance, if two players are participating in level two, bonus points are awarded for teamwork. But as you progress, the molten lava slowly burns the bridge at the base of the screen, which means that the buzzard must be kept in the air or landed on one of the islands in order to rest your firebutton-clicking digit and take stock of the game.

Comment

As described, Joust is a piece of arcade history which has stood the test of time through the arcade, the VCS game console and the eight-bit market. But in its fourth generation of conversion, what does it have to offer sixteen-bit users? If Joust was released as a new game today, it would still be considered highly original and it is certainly excellent for two-player participation.

Missile Command

As this review demonstrates, Atari have attained unprecedented success in the arcades with certain formulas. But that has not dissuaded them from experimenting with new themes and Missile Command is a case in point. Its explosive graphics have been lighting up the determined faces of game-players in the arcades for years. But its longevity is not wholly due to the highly original game-play, as it is reputed to be the first game to adopt the so-called 'control ball' instead of the usual joystick game controls. This tennis ball-sized sphere is set in the arcade machine console and can be rolled in any direction – it certainly proved to be a popular form of control for the game. Naturally, the similarities between the control-ball and mouse-ball action makes the mouse an excellent substitute, and it is for this reason that Missile Command is perhaps the most faithful conversion in this arcade series.

Six buildings at the base of the game-screen must be protected from destruction by ballistic missiles, which drop from the top of the screen and leave a trail behind them. Your weaponry consists of two lasers which are positioned between the buildings and each of the lasers is limited to only fifteen blasts. Clicking the left or right-hand button activates the corresponding laser and the mouse itself controls a cross-shaped gunsight cursor. Allowing time for your laser to travel to the interception point with the incoming missile and guessing the expected path of the falling projectile, the cursor should be positioned a little way ahead, then clicking either mouse button anchors a small cross on the screen. Immediately, a laser is emitted from the corresponding base, travels to the interception point and explodes and if the fire from the explosion envelopes the very tip of the tracer, its descent is halted.

There are nine levels in the game and, on an option screen at the beginning, you can select to skip any number of screens in order to play a specific one. Additionally, you can vary the ferocity of the attack with optional hazards including the tracers multiplying and fanning out like fingers, or numerous large missiles which drift down and require a direct hit to stop. Additional force comes from satellites and aircraft which fly across screen firing extra laser tracers. At the end of each wave of attack the points are accumulated with bonus ammunition given for economic use of weaponry.

Comment

As described, thanks to the similarities between the control-ball and the mouse, Missile Command is a very faithful interpretation of the arcade original. Again, the graphics are relatively simplistic and uncomplicated, but the game-play is terrific!

Public Knowledge

The ST has a growing corpus of Public Domain programs from Britain, the States and Europe. Picking the best bits can save pounds, as Elliott Stein discovers when he ventures into the libraries.

Atari ST Public Domain software is a potpourri of programs, varying quite dramatically in quality.

Some PD software was actually sold commercially once. *Typing Tutor*, an excellent educational package from Academy Software, is very effective at teaching and re-enforcing touch typing skills. This is supplied with another program, called *Word Invaders*, a game to test your touch-typing skills.

ST Public Domain is finally at a point where it warrants a serious look – and where else to begin a serious look and than the group of titles which may be the most useful of PD software: Utilities and Desk Accessories.

Utilities and desk accessories

RAM disk, print spooler and DA calculators appear to be the first stop-off for ST Programmers, and there is a ridiculous over-abundance of them in the Public Domain.

The best RAM disk out of the legions is *Intersect* by Randy Mears, an ingenious program which cleverly sits in the desk accessory window and can therefore be turned on or off or resized at any time during a session. It is far more versatile than most of the others which have a fixed size and can only be removed when the computer is switched off or reset.

DC Format by Paul Lee and Keith Gerdes is probably the best of all disk formatting and copying programs. Not only will it format a disk in an extended format yielding more space, but, through its attractive user-friendly shell, it even formats and copies disks in PC or Magic-Sac formats (Magic-Sac is a Mac emulator for the ST)

Mono Emulator by Mick West (as provided on Format's issue 2 cover disk) can save users of colour monitors the price of a high-res monochrome one, as it persuades mono-only programs to run on a colour monitor. Though not as good as the real thing, it's certainly better than not being able to use mono programs at all.

There are several multi-function DA programs, like the well-designed *System* by Paul Camilleri, which features Printer configuration, RS232 set-up, colour palette, notepad, mouse and keyboard speed, clock and date set, disk formatter and even a command shell.

In business

Unlike PD for PC compatibles and the Macintosh, the ST has yet to establish a wide selection of quality word processors, databases and financial programs. The best of PD word processors on the ST include *ST Writer Elite*, an updated and altered version of a non-GEM WP, originally bundled with early STs. Since the original ST Writer's release, programmer Bruce D. Noonan has added a GEM interface to it and cleaned up some of its early bugs. ST Writer is also available in French, Spanish and German versions.

There is one PD Database of commercial quality – *DB Master 1*, a program also originally bundled with early STs. It is a fully GEM-driven program in two shells, MAKEONE and USEONE, and features many of the facilities you'd expect from a good database, as well as some you wouldn't. Because of its convenient scrolling, its ability to handle large amounts of text and print out in ASCII, it is a perfect tool for writers who wish to outline and break down a novel or script.

Graphics

Now here is an area where PD certainly holds its own. There are several programs which rival commercial titles like *Degas* and *Art Director.*

Master Palette is a colour program which lets you use up to 512 colours on the screen at the same time (just like *Spectrum 512* and *Quantum Paint*). Though its features are limited, it's perfect for altering the limited colours of works originally created on Degas or Neochrome. There is also a wealth of graphic utilities which support and enhance well-known graphic packages, as well as programs which convert files from one graphic program to those of another.

AIM (Atari Image Master) by Frans Groen from The Applied Physics Department of Delft University of Technology isn't a drawing program but a technically advanced image manipulation processor of industrial quality. Running under GEM and featuring multiple windows and importation of Degas and Neochrome pictures, it is a must for any graphic artist interested in getting the most out of his/her art. WARNING: this is a very complex program and its use is made more difficult by its highly technical documentation.

DEMOS

Let's face it – some commercial titles are pretty expensive. Unfortunately, you must often try a title before discovering its worth – and in order to discover its worth you must use it – AND BUY IT.

Not always so.

A large number of companies place demo copies of their products into public domain. These are often copies of the actual program with a few of its features disabled (often the 'Save File' options). This allows you to have actual experience with* VIP Professional, Zoom Racks, Tempus, Trimbase, EZ Track, DB Man, Superbase, Timelink, Graphic Artist, Campus CAD *and many other commercial titles, all of which offer demo versions.

Many games also do this, such as* Time Bandit, Flight Simulator II, Shanghai, Zork 1, Airball *and* Star Wars, *all of which offer limited game play to help you get the feel of them before you lash out your hard earned money.

Perhaps the best demos come from graphic packages which merely display slide-show of work created from the actual program. The best of this type must be* CAD 3-D 2.0, Cyberstudio, Film Director *and* Aegis Animator, *featuring dazzling shows of various moving images.

To complement the wide variety of art packages, there is a good supply of sample pictures in Degas and Neochrome formats, as well as plenty of digitised images.

Games

One of the most popular areas of ST PD. The micro's advanced features make it an attractive challenge to any games programmer. There are many ST versions of traditional games: Blackjack and other card games, Connect 4, Backgammon, Yahtzee, Othello, Tic-Tac-Toe, as well as a realistic simulation of the popular board favourite *Monopoly.*

Krabat is an excellent chess program from Germany, featuring attractive board icons, mouse operation, GEM menus and varying levels of difficulty. Though the documentation is in German, the program is easy to use and compares well with com-

Continued on page 30

mercially produced computer chess games.

Laserchess is a two player variant of chess, featuring chess pieces armed with lasers and others with mirrors to deflect the beams. There are also ST versions of popular old computer/video games: *Megaroids* – a superior version of Asteroids (as supplied on the first Format Cover disk), *Pacman* – the best version of the grand video game yet, *Diamond Digger* – a Bolderdash clone with 25 levels, dozens of Breakout type games and traditional space shoot-em-ups such as *Azarian, Damonoid* and *Orion's Run.*

As well as the games, there are utilities for commercial games, such as the *Arkanoid Construction Set* which lets you design new *Arkanoid* screens. There are also special 'cheat' utilities for popular titles like *Gauntlet, Barbarian* and *Time Bandit.*

Another fine selection of PD games are the Infocom-style text adventures like *Monty Python and the Holy Grail* and *Once a King.* For those who don't want to play other people's text adventures there is *The Adventure Writer* system by David Betz, a complete programming language to design text adventures of your own.

Many of the PD games are of excellent quality and would probably be sold commercially on 8 bit computers. Though many PD titles like *Daleks, Stone-Age* and *Firestorm* are challenging and well-thought-out games of skill, they haven't the dazzling graphics and innovative play of the more popular commercial ST games.

LIBRARIES

Luckily for PD enthusiasts there exist several libraries which specialise in collecting the best PD and shareware software from around the world.

For a reasonable fee all of the titles mentioned in the article are readily obtainable. Five libraries which have proven reliable and which constantly scout for the best in ST PD software are: FLOPPYSHOP ST, 50 Stewart Crescent, Northfield, Aberdeen AB2 5SR (0224) 691824 PAGE 6, PO Box 54, Stafford ST16 1DR (0785) 213928 SOFTVILLE, 55 Highfield Avenue, Waterlooville, Hants PO7 7PY (0705) 266509 THE SOUTH WEST SOFTWARE LIBRARY, 5 Barn Owl Way, Stoke Gifford, Bristol, Avon BS12 6RZ STAR UK, 50 Bridge Street, Aberdeen, Scotland AB1 2JN (0224) 593024

Languages and comms

You can find a PD version of most computer languages: BASIC, Logo, Lisp, C, forth, Pascal and others, many with helpful documentation on disk. There are also assemblers and disassemblers, text editors for programmers and other utilities, such as one to convert GFA BASIC to *ST BASIC* or *Fast BASIC* (and vice-versa). In addition to the languages themselves, there are hundreds of sample source programs. For modem users there are full-featured communications programs like *Uniterm*, which contain most of the features of commercial programs. *FST104* simulates Prestel graphics and *DTE* is a VT100 Terminal Emulator for Compuserve B – protocol. In addition to the many terminal emulators, there are versions of *Kermit*, utilities for compressing and de-compressing files and even full-featured BBS programs like *Starmet BBS* for those considering their own bulletin boards. In short, there's everything you'll need in PD for communications except the modem itself.

Others

There are also animation programs, children's games, label makers, icon construction kits, hard disk utilities, magazines on disk, ham radio utilities, biorythms, multi-tasking, digitised music, fractals, Desktop fonts and many others. The best way to find out for yourself exactly what is available is to send for the catalogues offered by the PD suppliers.

Article printed courtesy of ST/AMIGA Format Magazine.

RECOMMENDED READING

Beginners Books

1001 things to do with your ST – M Sawusch & L Schreiber, TAB Books.

Atari ST Basic Training Guide – Kampow & Szczepanowski, ABACUS Books.

Atari St Explored – Braga, CUMA Books.

Elemenatary Atari ST – Saunders, COMPUTE!

Presenting the Atari ST – Englisch & Walkowiak, ABACUS Books.

The Atari ST Users Guide – John Heilborn, McGRAW HILL.

Second Stage Reading

Introduction to Sound and Graphics – T Knight, COMPUTE!

Mastering Sound and Music on ST – SYBEX.

Mastering the Atari ST – John Hughes, SIGMA Pubs.

Advanced Reading

68000 Assembly Language Programming – SYBEX.

Atari ST Machine Language – Grohmann, Siedler, ABACUS Books.

Atari ST Advanced Programmers Guide – Harrison, SIGMA

Atari ST Internals – Bruckmann, ABACUS Books.

General Interest

Home Computer Wars – The story of Jack Tramiel, COMPUTE!

Puzzles & Problems Answers

Length of a Lunar

A lunar is 360 miles long.

Count Closely

There were 13 pigs and 17 chickens.

People Express

Because the wind boosts the speed of the plane in one direction and retards it in the other, it might be thought that these effects would cancel each other out and that total travel time would be the same, wind or no wind. Actually, this is not the case, because the time during which the speed of the plane is boosted is shorter than the time during which it is reduced. Thus, the round trip in the wind is longer.

Mountain Climber

The answer is yes, but the problem is not easy to solve unless you think of two people making the ascent and descent on the same day. Obviously, they must meet; thus, the problem is solved.

How Old?

My present age is 26. In 38 years, when I am 64, my age will be both a square and a cube.

Perfect Numbers

The second perfect number is 28; the third is 496.

Broken 1000

The two numbers are 342 and 658.

Orderly Remainders

The number is 2519.

The Remaining One

The number is 83161.

Same Numbers

Original number: 142,857.
Multiplied by 2: 285,714.
Multiplied by 3: 428,571.
Multiplied by 4: 571,428.
Multiplied by 5: 714,285.
Multiplied by 6: 857,142.

SILICA SHOP

THE UK's No1 ATARI SPECIALISTS

FREE! ST OWNERS CLUB

PHONE: 01-309 1111 NOW FOR YOUR FREE MEMBERSHIP PACK

If you are looking for any Atari related product to complement your new Atari ST computer, then Silica Shop is the place to go. Wherever you live, our speedy mail order service means we are only as far away as your nearest telephone or post box. In addition to our mail order department, which is situated in Sidcup, we also have three retail shops. One in Sidcup (Hatherley Road), and two in London; one in Tottenham Court Road and one at Selfridges in Oxford Street. Silica Shop have been supplying Atari products ever since they first became available in this country and have more Atari experience than any other UK company. We are now well established as the UK's No1 Atari specialists and provide an unbeatable service to Atari owners nationwide (plus a few overseas). All of the Silica Shop services featured on this page are available to any Atari owner. To take advantage of what Silica have to offer, telephone 01-309 1111 or write to our Sidcup branch. We will be pleased to add your name to our FREE owners club mailing list. This will entitle you to receive our free newsletters, brochures, offers and price lists as they are produced, keeping you fully up to date with what is happening on the Atari scene and giving you valuable information about new releases and developments.

THE FULL STOCK RANGE

PHONE FOR A FREE PRICE LIST

Unlike most dealers who may only stock selected titles, we endeavour to hold stocks of every single Atari compatible accessory, peripheral and software title that is available. Our total range of ST software is in excess of 700 titles. In addition, we stock a wide range of over 50 books which have been written specifically about the ST. Our range of products is not limited to Atari's own lines. We also carry the full range of products manufactured by third party companies for Atari computers. With over 2,000 Atari product lines in total, we are confident that you won't find a larger range anywhere else in the country. The list below gives a summary of the categories of products we stock for the ST:

PERIPHERALS
Cartridge Expanders
Clock Cards/ROMs
Disk Drives - Hard
Disk Drives - Floppy
Emulators
Graphic Tablets
Midi Keyboards
Modems
Modulators
Monitors - Colour
Monitors - Mono
Mouse Controllers
Plotters
Printers - Dot Matrix
Printers - Laser
Scanners
Scientific Equipment
Sound Digitisers
Teletext Adaptors
Transputers
Video Digitisers
Upgrades

ACCESSORIES
Cables
Cleaning Kits
Disks
Disk Storage Boxes
Dust Covers
Joysticks
Labels
Paper
Printer Ribbons
Stands
Transformers

BOOKS
Subjects Include:
Beginners Guides
GEM
Graphics
Languages
Programming
Sound
Technical Data

SOFTWARE - ENTERTAINMENT
Adventures - Graphic/Role Playing
Adventures - Graphic/Text
Adventures - Text Only
Arcade Games
Board & Strategy Games
Advanced Simulations
Sports Simulations

SOFTWARE - PRODUCTIVITY
Accounts
Art & Animation
Assemblers
Communications
Compilers/Interpreters
Computer Aided Design (CAD)
Databases
Desktop Publishing (DTP)
Educational
Graphics
Languages
Music
MIDI Packages
Spreadsheets
Utilities
Word Processors

SILICA ST CATALOGUES

PHONE FOR YOUR FREE COPY

To make sure that Atari Users are kept up to date with what is available for their computer, Silica Shop produce price lists and newsletters at various intervals, which we send to all Atari owners who are registered on our mailing list. We normally have an up to date price list which includes every Atari ST related product available in the UK. You can order a copy FREE OF CHARGE by telephoning our sales office on 01-309 1111. You do not have to place an order, simply ask for a copy of our latest price list and current literature to be mailed to you. If you have a specific area of interest, mention that too, we may be able to provide you with some additional specialist leaflets.

SPECIAL OFFERS

EXCLUSIVE TO ST OWNERS CLUB

From time to time, we are able to offer some very special discounts on selected product lines including peripherals, accessories and software. These offers, which provide considerable savings to Atari owners, are not made known through our normal advertising to the general public. Instead we mail details of the offers to the Atari owners who are registered on our mailing list. That means that we can keep our special discount prices exclusive to the Silica Shop ST Owners Club. So that you don't miss out on any of the forthcoming Silica Atari offers, phone 01-309 1111 or write to our Sidcup branch and register on our ST Owners Club mailing list, FREE OF CHARGE.

DEDICATED SERVICING

FOR ALL ATARI REPAIRS

Silica Shop have a dedicated servicing department of eight full time Atari trained staff. This team is totally dedicated to servicing Atari products. Their accumulated knowledge, skill and experience makes them second to none in their field and you can be sure that any work carried out by them is of the highest standard. In addition to providing full servicing facilities for Atari ST computers (both in and out of warranty), our team is also able to offer memory upgrades as well as modulator upgrades to earlier models.

TECHNICAL HELPLINE

CALL THE ATARI EXPERTS

One of the specialist services which Silica Shop offer to Atari Owners is a technical support helpline. The experience and expertise of Silica's five strong technical advice team is such that they are able to provide aid to any Atari user requiring assistance in technical matters, or in selecting the correct hardware and software configuration for their particular application. And, because the technical helpline is made up of Atari enthusiasts, they are all keen to help you to get the very best from your computer. The helpline number is 01-309 1111, and is manned during normal working hours. Outside of these hours, it is answered by a telephone answering machine which will take your message.

MAIL ORDER: **Tel: 01-309 1111**
Silica Shop, 1-4 The Mews, Hatherley Road, Sidcup, Kent, DA14 4DX
OPEN: MON-SAT 9am - 5.30pm ***24Hr ANSWERPHONE SERVICE***

SIDCUP: (HATHERLEY ROAD) ..... **Tel: 01-302 8811**
Silica Shop, 1-4 The Mews, Hatherley Road, Sidcup, Kent, DA14 4DX
OPEN: MON-SAT 9am - 5.30pm ***LATE NIGHT:*** *FRIDAY 9am - 7pm*

LONDON: (OXFORD STREET) ..... **Tel: 01-629 1234 (ext 3914)**
Silica Shop At Selfridges, (1st Floor), Oxford Street, London, W1A 1AB
OPEN: MON-SAT 9am - 6.00pm ***LATE NIGHT:*** *THURSDAY 9am - 8pm*

LONDON: (TOTTENHAM COURT RD) ..... **Tel: 01-580 4839**
At Lion House, (1st Floor), 227 Tottenham Court Rd, London, W1P 0HX
OPEN: MON-SAT 9.30am - 5.45pm ***LATE NIGHT:*** *NONE*

TOTTENHAM COURT RD: From the end of October 1988, we will be moving from our 750 sq ft premises in Lion House to a larger 3,000 sq ft premises at 52 Tottenham Court Road. There may be a short period between Lion House closing and No 52 opening, so please phone 01-580 4839 to check before visiting.

SILICA SHOP
THE PROFESSIONAL COMPUTER CENTRE

FREE OWNERS CLUB & TECHNICAL HELPLINE
01-309 1111

Silica Shop Ltd, 1-4 The Mews, Hatherley Road, Sidcup, Kent, DA14 4DX 01-309 1111

Easy-to-use Solutions • Easy-to-use Solutions

– Data compatible – convenient – easy to use – fully supported

Available from all good ST and software dealers, or from Kuma.

UTILITIES

K EXPERT NEW — £79.95 *incl. VAT*
Expert Systems Generator. A swift way to reach intelligent decisions.

K RESOURCE — £39.95 *incl. VAT*
Simply the best ST Resource Editor.

K RIKKI NEW — £19.95 *incl. VAT*
Powerful, easy to use Graphics Generator operating in Degas format. Its impressive features include Move, Resize, Animation and the ability to load Neochrome, Art Director and Doodle files.

K MINSTREL — £29.95 *incl. VAT*
Easy Music Composition and Editing.

K SEKA — £49.95 *incl. VAT*
High speed 68000 Assembler.

K SWITCH 2 NEW — £29.95 *incl. VAT*
Holds up to 5 applications in RAM simultaneously. Includes RAM disc.

BUSINESS APPLICATIONS

K SPREAD — £24.95 Incl VAT
Entry Level Spreadsheet, ideal introduction to financial planning, upgradeable to version 2.

K DATA — £49.95 *incl. VAT*
A powerful Database combining ease of use with a high quality product. ".. a working example of what user friendly software is all about.." (ST World), ".. the best flat card database available for the ST .." (Atari ST User).

K SPREAD 2 — £79.95 *incl. VAT*
A truly easy to use professional Spreadsheet.

K GRAPH 2 — £49.95 *incl. VAT*
Business Graphics and statistics package.

K COMM 2 — £49.95 *incl. VAT*
Communications package including Prestel, VT100 and terminal emulation.

WORD PROCESSING

K ROGET — £49.95 *incl. VAT*
Rogets Thesaurus containing over 150,000 words and phrases, essential for all serious Word Processor or DTP users. Requires minimum Disc/RAM combination of 2 Megabytes.

K INDEX NEW — £19.95 *incl. VAT*
Easy Index Generation from any ASCII or K-Word file, ideal for manual or instruction book writing.

K RHYMES — £19.95 *incl. VAT*
Rhyming Dictionary operating as a Desk Accessory.

K WORD 2 NEW LOWER PRICE — £39.95 *incl. VAT*
Easy to use WYSIWYG Word Processor including Spell Checker and Mail Merge, K-series compatible.

HARDWARE

K MAX — £699.00 *plus VAT*
Transputer System based on Inmos T414 with 256K RAM.

K MAX 2 NEW — £1795.00 *plus VAT*
Transputer with T800 + 1-4Meg RAM.
ST and PC versions available.

K SCOPE NEW — £195.00 + VAT
Enables the ST to be used as an Oscilloscope.

K SPECT NEW — £195.00 + VAT
Enables the ST to be used as a Spectrum Analyser.

TRANSPUTER SOFTWARE

K OCCAM·ST — £59.95 *incl. VAT*
Explore the world of parallel processing using only an ST.

K CASCADE·XP — £199.50 *incl. VAT*
Produces true transputer Occam code.

Phone or send for full details NOW:–

Kuma

PROFESSIONAL • SOFTWARE

12, Horseshoe Park, Pangbourne, Berks RG8 7JW 07357-4335 Telex: 846741 KUMA G Telecom Gold: 81:KUM 001