

ATARI ST USER

*The
top-selling
Atari ST
magazine*

Volume 3
Number 2
April 1988
£1.75

**The ST at work . . .
Protext, Graphic Sheet
and Mailshot reviewed**

SOFTWARE

Captain Blood, Eco,
Super Sprint, Black
Lamp, Soloman's Key,
Wizball, Livingstone,
Karting Grand Prix,
Tonic Tile, Skyriider

ADVENTURES

Hints and tips, plus
Bard's Tale explored

MIDI

Music on the ST –
Pro Midi, Pro Light
Steinberg and Pro24

PROGRAMMING

MCC Assembler update,
GFA Vector plus GFA
Companion tested and
True Basic evaluated

HARDWARE

Video digitiser and
hard disc on trial

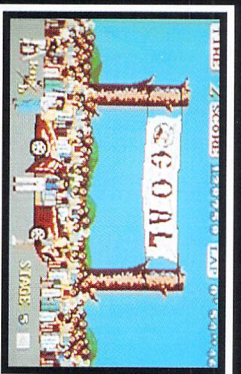
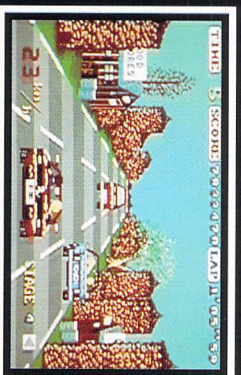
**Complete guide to
all ST software
and hardware**



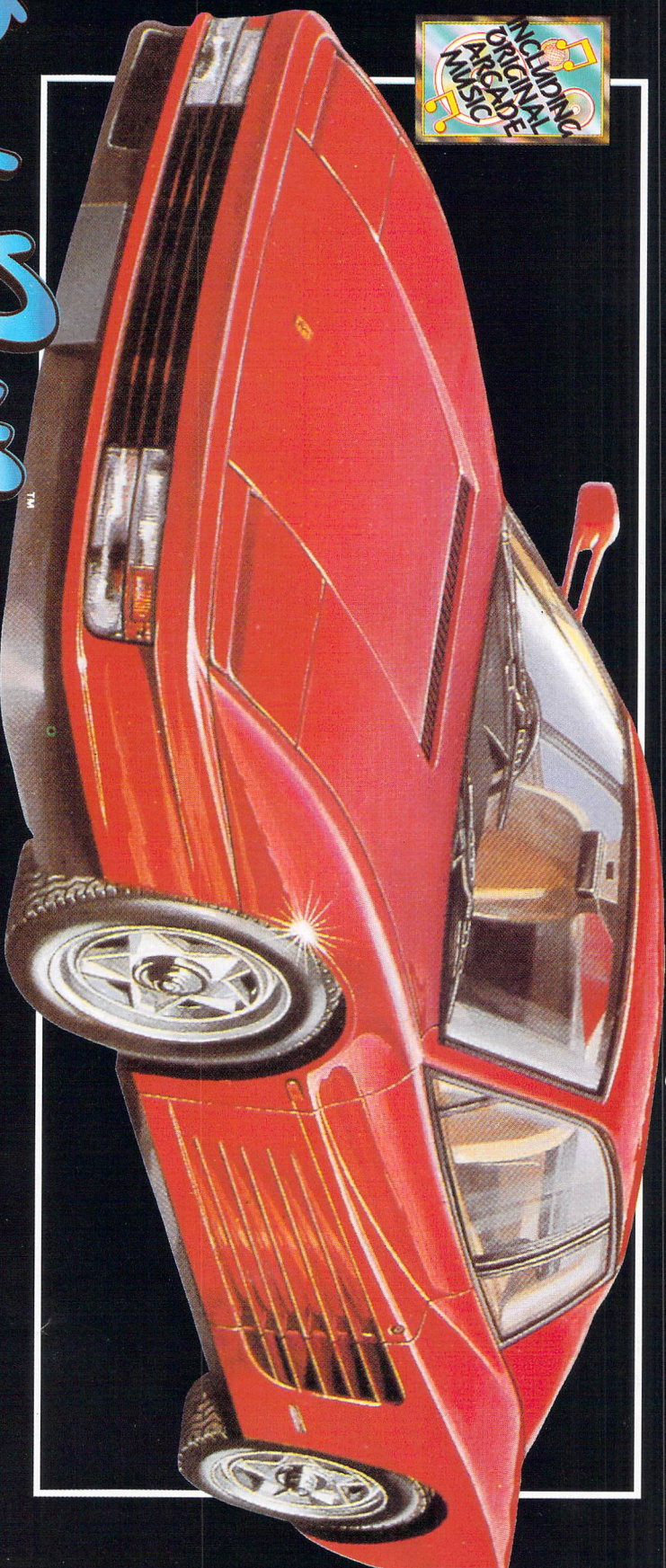
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ST into a Mac**
(But is it
legal?)

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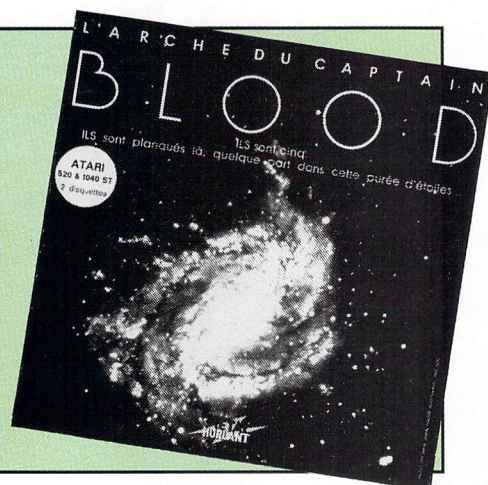
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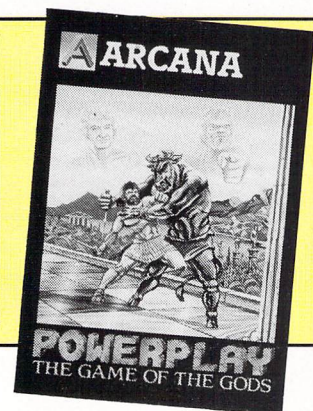
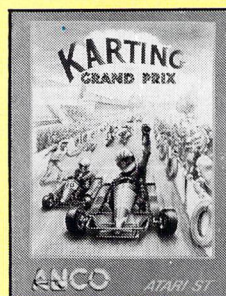
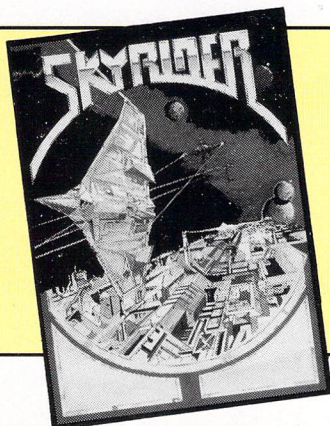
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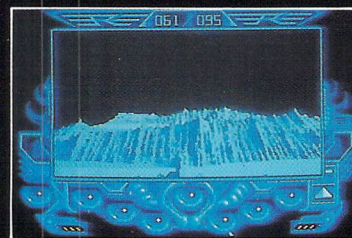
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PHILIPPE ULRICH / DIDIER BOUCHON

CAPTAIN BLOOD

MUSIC JEAN-MICHEL JARRE



A breathtaking galaxy on the outer rim of the universe. Worlds with astonishing creatures and animated 3D graphics. a thrilling scenario bursting with humour, the like of which you've never seen. Everything about CAPTAIN BLOOD makes it the type of game you just HAVE to play.

Hours and hours of discovery, exploration, dialogue, (hyperspace waps) and hotshot low-level flying through rugged mountain ranges and dizzying canyons.

New sensations are guaranteed in this tragic, moving, funny and thrilling adventure. CAPTAIN BLOOD is a game for everyone, breaking new ground in the universe of computer entertainment. Welcome to the age of the bio-game.



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It's going to be a bigger show than ever

THE Atari User Show – an event that just keeps growing like Topsy – comes to Alexandra Palace, from April 22 to 24.

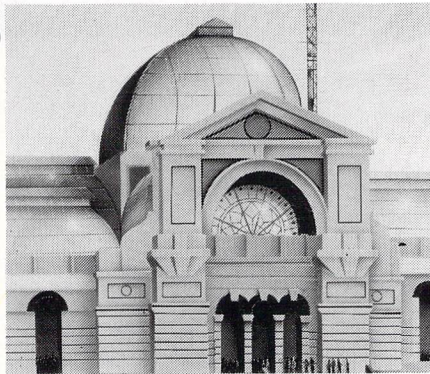
The transfer to a much larger venue has been necessitated by the demand from exhibitors and visitors alike.

Michael Meakin, head of organisers Database Exhibitions, explained the reason behind the show's latest move.

"Other venues that have coped well enough in the past could not meet our extra requirements this time", he said. "They quite literally had run out of space for expansion.

"But no Atari enthusiast will be less than delighted by our latest home – the impressive West Hall at Alexandra Palace. This has been completely renovated following a devastating fire in 1980 and is now one of the most flexible display areas in the UK.

"The new location has everything we



LEADING Atari distributor and long-time supporter of the shows Silica Shop is delighted with the change in venue. Marketing director Tony Deane said: "We believe the Atari User Show has become such an important event that we are now taking an active role in promoting it.

"We are carrying out a massive information program to ensure that all our dealers and our entire user base are aware of the Alexandra Palace event".

could have wanted – it's big enough to handle huge numbers of visitors, yet with sufficient prestige to complement the occasion".

Turn to Page 8

Mega ST sales are booming

WITHIN days of receiving the first batch of Mega ST desktop publishing bundles, Atari dealers had sold 60 per cent of them. Of the initial 500 systems, 300 were snapped up in less than a week, and the rest were expected to sell quickly in view of the response.

The basic system consists of an Atari Mega 2 ST, SLM804 laser printer, mono monitor, Mirrorsoft's Fleet Street Publisher, 1st Word word processing package, and on-site maintenance and training via dealers – price £1,999.

A more sophisticated bundle incorporates an Atari Mega 4 ST, laser printer, and a 20Mb hard disc – price £2,695.

The inclusion of Fleet Street Publisher – a coup for software house Mirrorsoft – ends months of speculation as to Atari's choice of DTP software.

Early reaction from the trade is that whichever configuration is chosen, the hardware and software combination represents tremendous value for money.

"Business has been booming on all fronts since Christmas", said Atari spokesman Peter Walker.

Going for a billion

ATARI is poised to chalk up its first ever billion dollar annual turnover.

Although the company's balance sheet will not be published for a few weeks yet, American sources are forecasting the magic figure will be reached with ease.

It marks an incredible turnaround since Jack Tramiel took over what was a technically bankrupt company in 1984.

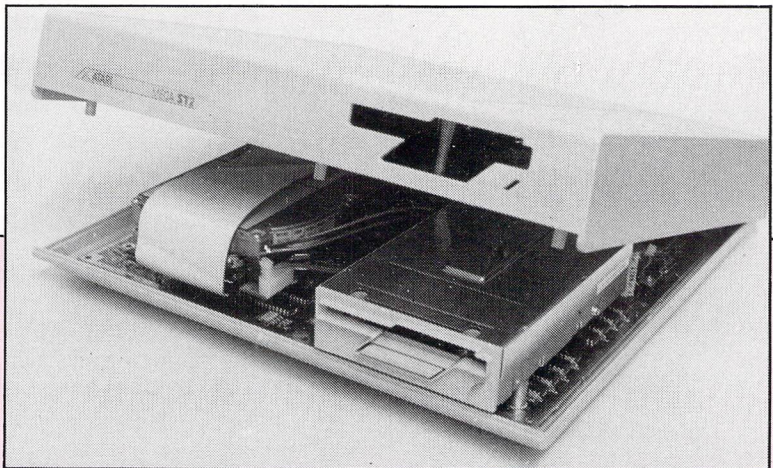
In the first nine months of the current financial year, sales have already risen by 30 per cent and income by 76 per cent.

A major factor in the soaring profits has been the success – particularly in Britain and Europe – of the ST series.

The rush to buy STs left UK dealers with a shortfall of 20,000 machines at the end of last year – despite the sales target of 100,000 being exceeded.

The 20,000 disappointed shoppers are now receiving their machines as ST supplies come into full flow.

Along with its official annual figures, Atari is expected to reveal its 1988 market strategy – a major feature of which will be the new Abaq supermicro.



More megabytes of memory

AN internal hard disc for the Mega ST is being distributed in the UK by Frontier Software.

MegaDrive comes from American firm Supra whose SupraDrive discs for Atari users were launched in the UK a year ago.

It is available in three versions – 20Mb, 30Mb and 40Mb – and offers autobooting and up to 12 partitions.

MegaDrive connects to the rear of the DMA port, leaving the external port for additional expansion such as

Atari's laser printer and CD rom. Power is provided by the computer and cooling by the ST's fan.

Prices, including dealer installation, are 20Mb version £589.95 and 30Mb £799.95. A price for the 40Mb version has yet to be announced.

Martin Walsh, marketing manager of Frontier (0423 67140), told Atari ST User: "Supra has a number of exciting ST products lined up for 1988 – MegaDrive is just the first to be launched".

Colours by the million

A NEW world-beating graphics adapter has been announced by Elmtch Research (0827 59566).

Top of the range Parsec Pixel+ will give a basic ST a palette of over 16 million colours, a resolution of 1024 by 1024 pixels and 256 colours per line. The base unit offers a resolution of 1024 by 512, and a palette of 4096 colours with 16 colours per line.

All models feature a 32 bit on-board processor running at 40MHz. This enables graphics processing speed exceeding six mips (million instructions per second), some 50 per cent faster than Acorn's Archimedes.

The base unit is expected to retail at under £575 and the full blown system for less than £700.

From Page seven

A survey of visitors to the last show revealed the astonishing depth of its popularity. Every one of them said their visit had been worthwhile and they would attend the next show in the series.

Main reason for this massive endorsement stemmed from the vast number of special offers to be found – a conservative estimate placed their value in excess of £100,000.

But, as well as overflowing with discounts, the next event will also be the launching pad for a large number of ST products.

Frontier Software will be displaying its new range of internal hard discs, the Supra FD-10 10Mb 5.25in floppy disc unit, and a DMA splitter which allows connection of multiple disc drives.

Also on show for the first time will be the Aerco Solderless Ram Board which is expandable from the supplied half megabyte to 4Mb.

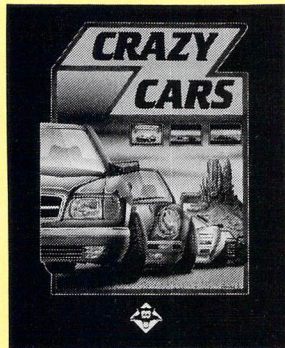
Kuma is planning to launch an entire series of ST products including an upgraded version of the popular K-Word2 word processing package, decision-making package K-Expert – a question-and-answer program to help doctors – and the K-Max2 transputer add-on with Helios operating system and 1Mb to 4Mb of ram.

Arnor is launching an ST version of the popular word processing package Protext. Features include dual file editing, a sophisticated mailmerge routine, auto indent, search, replace, cut, paste and calculator.

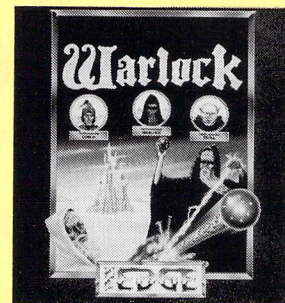
The Atari User Show takes place from Friday April 22 to Sunday April 24. A money-saving advance ticket order form appears on Page 9.

New on the games scene

NEW from Electronic Arts (0753 49442) is Test Drive. Priced at £24.95, it's a car simulation that puts the player in the driving seat of one of five of the world's fastest sports cars. Select from Lamborghini Countach, Ferrari, Lotus, Corvette or Porche 911 Turbo. The Countach looks fast standing still but can it out-handle the Porche on the winding mountain road?



ANOTHER car racing game comes from Titus/Entertainment International (0268 541126). Crazy Cars similarly puts the player in the driving seat of some of the world's most prestigious machines. Less of a simulation than Test Drive, the game is more for fun as the cars take off over the bumps. Price £19.95.



THE Edge (01-836 1801) has announced its release of Warlock. At £14.95, this conversion from the successful Amstrad title classifies as budget software. It puts the player in the unusual position of the aggressor trying to defeat the forces of good from destroying his evil stronghold.

★ ★ ★

JUST announced by Palace Software (01-278 0751) is a new game following in the wake of its highly successful Barbarian – The Ultimate Warrior. Rimrunner, price £19.95, is a shoot-'em-up featuring super high speed scrolling landscapes and high quality graphics and sound. In a departure from the company's normal course of development, the game was been originated on the ST and is being converted down to other formats.

ST ENTERTAINMENT GETS BIG BOOST

A MAJOR new software house has been launched with a budget of £1 million to provide exclusive games for discriminating ST users.

To be known as Mandarin, it will combine the marketing muscle of the Europress Group in a series of joint ventures with the UK's top programming teams.

The first link up will be the award-winning authors and designers of Level 9, Britain's best known adventure game creator.

"We believe that our programming ability combined with Mandarin's knowledge of the marketplace and understanding of the need to get products out on time will be an unbeatable combination", said Pete Austin of Level 9.

Mandarin's involvement with the adventure games house is the first of the joint ventures to be announced.

"We find ourselves in the position that, unlike many other publishers, we don't have to push out titles to maintain cash flow", said Chris Payne, spokesman for

the new company.

"Mandarin couldn't be more sound financially – we have £1 million in the kitty – so we are in a superb position to pick and choose not only our partners but also just what products we decide to release and when.

"It is our aim that the label will become synonymous with quality, providing the Rolls Royce of software games. And what better way to start that with Level 9?

I-APL for ST

A VERSION of the first all-machine portable language I-APL is being implemented on the ST.

The I-APL project was formed to write and issue a free international APL interpreter for home and school users. More can be done in less symbols with APL than any other computer language.

European I-APL project chairman Anthony Comacho (0727 60130) said software will be free, the only charge being for the disc, copying, books and manuals.

The phenomenal growth in demand for Atari computers means a much bigger home for the BIG show...

ATARI USER SHOW

Friday
22
April
10am-6pm

Saturday
23
April
10am-6pm

Sunday
24
April
10am-4pm

THREE action-packed days for Atari owners!

The spectacular Alexandra Palace represents a new showcase for the fastest-growing range of computers on the market.

From the exciting games console to the ever-popular 8-bit Atari and the sensational Mega ST, they'll all be there at the Atari User Show!

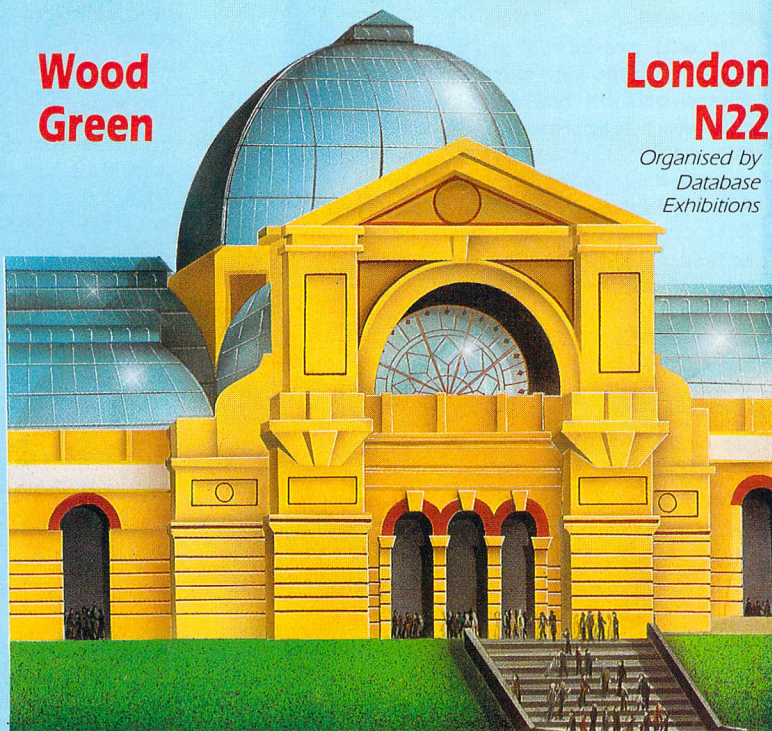
Some of the very latest software will be on show for the first time.

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And that means you can enjoy unique hands-on experience of programs everyone will soon be talking about.

You'll find some of the best prices around for blank discs, disc boxes and other accessories, learn about the many opportunities to expand your computer system, get helpful advice from some of Britain's leading experts, and so much more!

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It's so easy to get to the show – by car, rail, underground or bus. Alexandra Palace has its own British Rail station, whisking visitors to and from King's Cross in just nine minutes. And there's a free bus service shuttling between station and show every 10 minutes. If you're travelling by road the show is only 15 minutes away from junction 25 on the M25 – and all car parking is free.

Cut the queues and save £1 per head – with this advance ticket order

Your advance ticket order

Please supply:

☐ Adult tickets at £2 (save £1) £
(Order four adult tickets, get the fifth FREE!)

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must be received by
Wednesday, April 13.

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SHOW**

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April 22-24, 1988

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Please quote credit card number and full address

A317

ST info goes online

THE rapidly expanding MicroLink system – now one of the largest online information services in the UK – has announced a Closed User Group devoted exclusively to Atari ST owners.

It will provide chat, news and updates from the world of Atari, plus a bulletin board where users can leave messages and specialist queries for other users to read.

A spokesman for MicroLink (0625 878888) told *Atari ST User*: "For the first time ST owners will have access to a wealth of information tailored to their specific needs.

"Because the facility is devoted solely to the ST range, users won't have to waste time wading through pages of information that don't apply to them. We'll even be providing a host of free software to download – much of it unavailable elsewhere".

3D modelling on ST

TWO packages aimed at education and animation have been released by Electric Distribution. The first product from the range of Antic Software – Genesis – for the Atari ST1040 should be of interest to science students.

Genesis enables users to create and manipulate accurate full-colour molecular models. Essential building blocks of matter can be modelled far more accurately on-screen than by any conventional method.

Chemical reactions on particular molecular structures can be displayed. The data provided on the program disc enables students to create virtually any known molecule using the on-line periodic table of elements.

Molecules, displayed in 3D, can be rotated on any axis, using real time control. Chemical reactions can be observed by using the animation routines.

Liquid crystal StereoTek glasses can be worn to give an even more convincing 3D effect. Price £79.95 for Genesis and £149 for the StereoTek glasses.

Also from Electric Distribution (0954 61258) is Cyber Control, an animation tool

to enhance the 3D Cyber Studio program. It is claimed that the package will enable users to produce more complex animation sequences than were previously possible.

The program features Spline movements, the ability to simulate the natural path of objects, and object tree hierarchy – the ability to define the relationships between objects.

Cyber Control can also be programmed to draw shapes of any complexity, which in turn can be saved as a routine for future use. A minimum knowledge of programming is said to be required as the package uses a Basic-like language. Price £79.95.

DISC PRICES

AN advertisement for Cestrian Software on page 80 of the February issue of *Atari ST User* gave £18.99 as the price of a pack of 25 double-sided, double-density 3.5in discs. This should have referred to the 20 disc pack. The 135 TPI discs are also available in quantities of 10 for £9.99, 50 for £45.00 and 105 for £90.00.

Gallup Software Chart

This month	Last month	Title (Software House)	Price	Month reviewed in Atari ST User	Comments	Marks from 10
1	7	RAMPAGE <i>Activision</i>	19.95	April '88	Read the review in this issue.	*
2	10	BUBBLE BOBBLE <i>Firebird</i>	19.95	March '88	All the challenge and excitement that the hardened arcade player craves.	8
3	2	STAR WARS <i>Domark</i>	19.95	January '88	If you never buy another arcade game – buy this one you won't be disappointed.	10
4	•	UNIVERSAL MILITARY SIMULATOR <i>Rainbird</i>	24.95	March '88	Heralds the dawn of a new age in computer wargaming.	9
5	5	BARBARIAN <i>Palace</i>	14.99	January '88	You just can't go wrong if you buy this.	10
6	8	DEFENDER OF THE CROWN <i>Mirrorsoft</i>	29.95	January '88	There's no denying that this is a must for sheer entertainment value alone.	10
7	•	WIZBALL <i>Ocean</i>	19.99	April '88	Look for the review in this month's issue of <i>Atari ST User</i> .	*
8	•	ENDURORACER <i>Activision</i>	14.99	May '88	Watch out for our comments in the May issue.	*
9	1	STAR TREK <i>Firebird</i>	19.95	February '88	One of those games that belongs in every collection.	9
10	•	ECO <i>Ocean</i>	19.95	April '88	Read our reviewer's thoughts in this issue.	*

Atari ST Productivity Software from

You Can Count On
Abacus Software

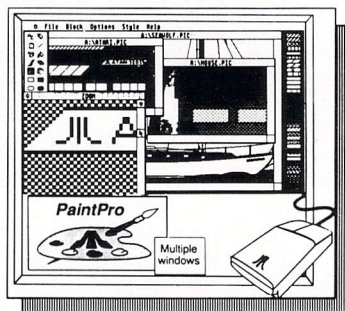


TextPro

"...TextPro is the best wordprocessor available for the ST." — Randy McSorley
Pacus Report Dec '86

The professional wordprocessing package designed for the ST by professional writers ST TextPro combines great features with flexibility, speed and easy operation – but at a very reasonable price! ST TextPro offers full-screen editing with mouse or keyboard shortcuts, as well as high-speed input, scrolling and editing. You can create multiple columns of text, and choose up to 180 characters per line. ST TextPro even generates an automatic index and table of contents! Other features include 30 user-defined function keys; flexible printer installation; sideways printing; loading and saving to RS232 port; and much more.

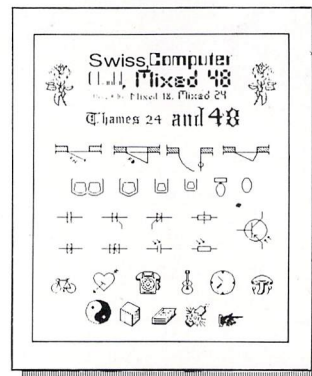
AB 490 Unbeatable value at only **£39.95!**



PaintPro

A true GEM™ among ST graphic design/paint programs. ST PaintPro is very friendly and economical – but very powerful. PaintPro supports up to three active windows, and has a complete toolkit of functions: free-form sketching, lines, circles, ellipses, boxes, text, fill, copy, move, zoom, spray, paint, erase, undo, help, as well as extensive text capabilities. You can even import "foreign" pictures for enhancement using PaintPro's double-sized picture format, and send hardcopy to most popular dot-matrix printers. Works with either monochrome or colour ST systems. ST PaintPro is a must for everyone's artistic or graphics needs.

AB 620 **£49.95**



PaintPro Library #1

A companion to the ST PaintPro package (and compatible with Degas as well). This complete graphics library includes five new original fonts that can be used with PaintPro – Swiss, Computer, Chantal, Mixed and Thames (Old English) – and hundreds of symbols, borders, ornamental lines, etc. for use in electronic, architectural and graphics design.

AB 622 only **£24.95**



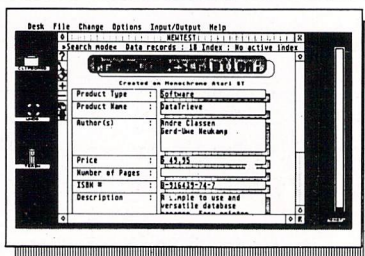
AssemPro

"The whole system is well designed and makes the rapid development of 68000 assembler programs very easy."

— Jeff Lewis
Input
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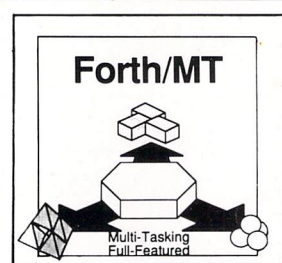


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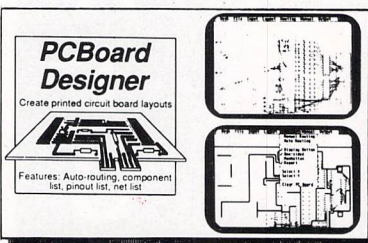
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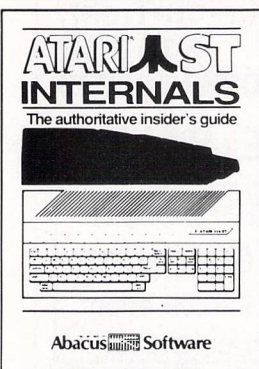
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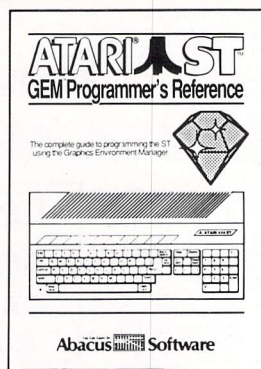
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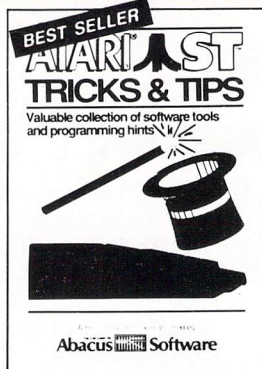


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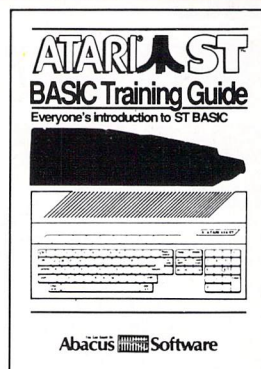
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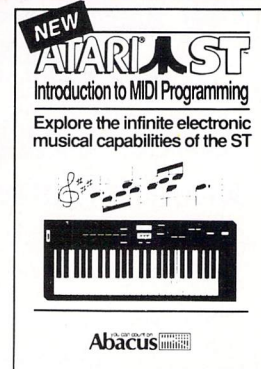
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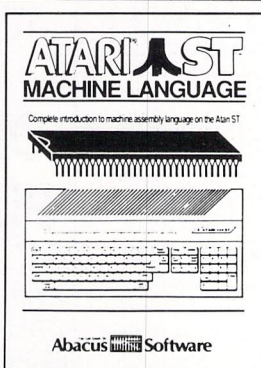
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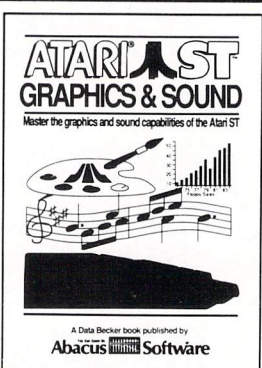
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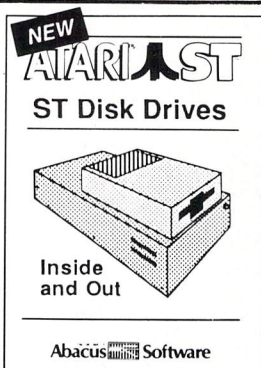
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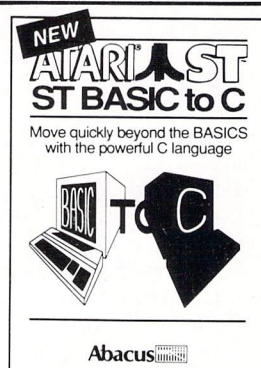
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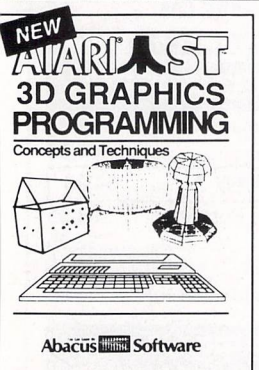
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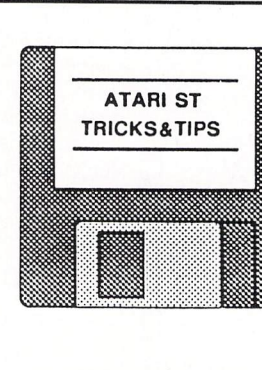
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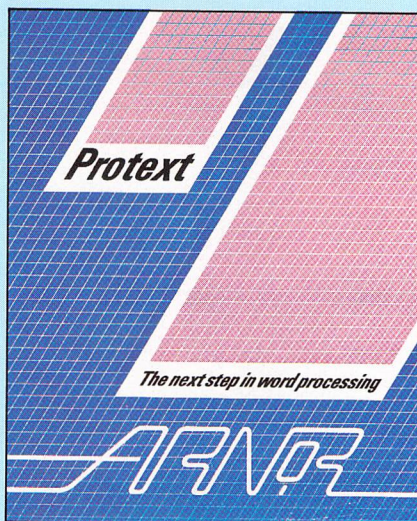
**Julie Boswell previews
Protext – a powerful, yet
flexible word processor
and mail merge package**

THERE is already an abundance of good word processors for the ST – 1st Word, 1st Word Plus (reviewed in *Atari ST User* May 1987), ST Writer, K-Word, TextPro (both reviewed in February 1988) and Word Perfect (reviewed March 1988) spring immediately to mind, and there are probably one or two other less well known ones too. This list doesn't include the text editors – there are even more of these.

With all these excellent word processors available, is there a market for yet another? Well, Arnor for one, clearly thinks there is, and it is due to release its Protext word processor and mail merge package very shortly.

Arnor and Protext will be unfamiliar names to ST users, as this is their first product for the Atari market. They originally started out with a Z80 development package called Maxam for the Amstrad CPC464 which proved to be a big success, and it was later updated for the CPC6128 and Amstrad PCW range.

This had a rather nice text editor and it wasn't long before a full blown word processor was developed – Protext. Initially only available for the Amstrad



The very last word..

CPCs and PCWs, it was later re-written and upgraded for the much more discriminating PC – and clones – market where it was also well received.

Now it is in the final stages of conversion to the Atari ST range. In fact, by the time you read this, it may well have been finished. So what is Protext like? I must state here that this article is not intended to be a full review, as the software is far from complete.

It is in quite an advanced state of development though, and this preview is being written using a pre-production copy kindly lent by Arnor on the under-

standing that I don't mention any bugs. To be honest, I haven't found any serious ones worth reporting.

However, there are features missing which haven't yet been fully implemented, or else fully converted from the PC version. These are currently being worked on and I'll bring you an update when the package is complete.

The accompanying screen shots show Protext in action – not a Gem window, pull down menu or icon in sight. That's because Gem is simply too slow and

Turn to Page 16 ►

CLEAR	Clear text from memory.
DOC	Document mode for word processing.
PROG	Program mode for programming.
LOAD	Load a file.
SAVE	Save a file.
SAVEA	Save in Ascii form.
MERGE	Merge file with current one.
PRINT	Print file from memory or disc.
PRINTQ	Print in NLQ mode.
SPLIT	Split a large file.
SWAP	Swap between two documents in memory.
FIND	Find a word.
REPLACE	Replace a word.
SPELL	Spell-check a file.
ANAGRAM	Search for anagram of word.
FINDW	Find word with matching pattern.
LOOKUP	Look for similar words.
CALC	Calculator.
COUNT	Count words.

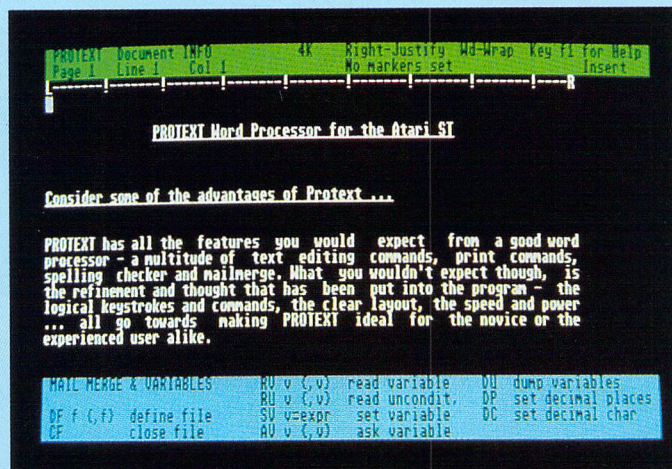
A selection of the available commands

AV v	Ask for variables.	RV v	Read variables, pad with nulls.
CF	Close data file.	SV v=expr	Set variables.
DC	Set the decimal character.	IF cond	If condition true, print block.
DF f	Define data file.	EL	Else print block.
DP n	Set number of decimal places.	EI	End IF.
DU	Dump currently defined variables.	ID v	Print block if variable defined.
RU v	Read variables unconditionally.	RP	Repeat
		UN cond	Until condition is true.

Some of the mail merge commands

BM n	Bottom margin.	LS n	Line spacing.
EM n	Even side margin.	NC n	Number of copies.
FN n	Footer margin.	OF text	Define odd page footer.
HM n	Header margin.	OH text	Define odd page header.
OM n	Odd side margin.	PE ON/OFF	Print even pages.
PL n	Page length.	PO ON/OFF	Print odd pages.
TM n	Top margin.	MS ON/OFF	Microspacing.
EF text	Define even page footer.	IN f	Insert file.
EH text	define even page header.	CE text	Centre line.

A few of the stored commands



The main editing screen

◀ From Page 15

becomes more of a hindrance than a help when trying to work quickly. No doubt you have witnessed the painstakingly slow scrolling of 1st Word, 1st Word Plus or K-Word 2.

The one exception here is Tempus (reviewed in the March 1988 issue of *Atari ST User*) which, by employing some clever machine code programming techniques, manages to use Gem and yet remain incredibly fast. However, the authors freely admit that the end product doesn't really justify the enormous effort involved in producing such software.

So Arnor has thrown Gem out of the window. This makes Protex just about the fastest word processor on the ST, and I'd say it has the edge over ST Writer, which isn't slow by any means. The scrolling is very fast, almost up to that of Tempus.

Although Gem isn't used, the display is near wysiwyg – or it will be when it is finished. At the moment you can only see the text layout, not the styles. It is hoped that italics, bold, underline and so on will be shown correctly on screen. However, on my unfinished version, an inverse i, b, u and so on, are inserted to mark a particular style. This is similar to the way ST Writer works. There are 26 styles in all.

At the top of the text editing screen is a status window providing information on the current file and state of the system. The top line shows the document name, its length, whether justify and word wrap are on or off and finally a reminder that pressing F1 brings up a Help menu.

The second line shows the page number, line and column of the cursor, whether any markers have been set and the edit mode – insert or overwrite. Immediately below this, just above the text, is a ruler showing the width of the text and the tab positions. The left margin is marked by L, while R marks the right.

This default ruler can be altered, replacing it with another with a different length at any time and as often as you

want. This enables you to have blocks of text with varying widths and positions on the page.

In the central part of the screen is the text, while at the bottom – if it is enabled – is the Help menu. This provides a summary of all Protex's commands in 15 four-line screens.

I won't dwell on the more mundane aspects of Protex – editing, search and replace, defining, deleting and moving blocks, setting markers and so on – I'll move on to examine some of the more advanced features.

Some unusual editing features are the ability to highlight all hard spaces, tabs and returns. One common typing error is to type two letters the wrong way round, like hta instead of hat. A single keypress will swap them the right way round.

The keyboard is almost completely redefinable and you can even place whole phrases on most keys. If you forget what these phrases are there's a command to list them, and tell you the token any key on the keyboard produces.

Special and foreign characters are available directly from the keyboard by holding down the Alternate key, and

include accents, ç, cedilla, á, ö and ü, umlaut, æ, diphthong and so on.

Soft hyphens can be inserted into very long words that are likely to fall at the end of a line. They tell Protex where it can split the word.

Sometimes however, you may want to hyphenate two words, yet they mustn't be split over two lines. In this case a non-break hyphen can be used instead, forcing Protex to move both the words on to the next line. Similarly, non-break spaces can be inserted in between two words, effectively making them appear as one to Protex.

A spelling checker is available at any time and although slow, does have some unusual features. The main reason for the sluggishness is the slow speed of ST drives. Although I didn't have a chance to try it, placing the 150k English dictionary on a ram disc should improve matters no end.

In addition to the standard dictionary, there is a separate one – searched automatically – into which you can add your own words. This could be used for technical jargon for a particular subject.

If the spell-checker encounters a word it doesn't recognise, the word is highlighted on the screen and you have the option to change it, ignore it, store it in the dictionary or ask Protex to guess what the word is. This last option brings up a list of alternatives, and one of these can be inserted automatically into the text.

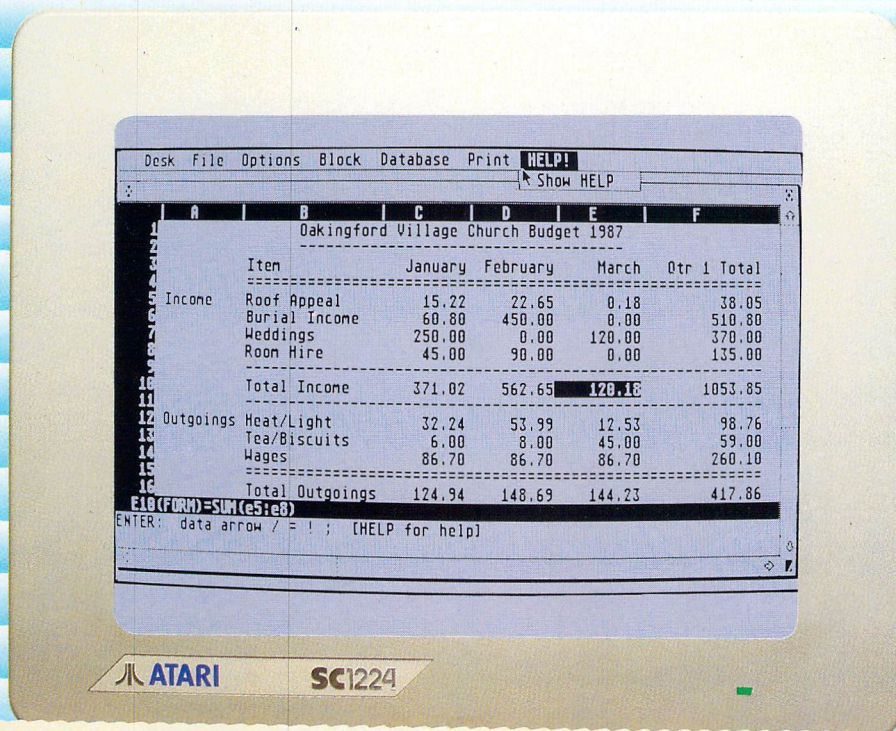
The spell checker can also be used to solve crosswords. For instance, you could ask it to find a word that goes T?B?E – T, something, B, something, E – and it'll correctly come up with TABLE. As if this wasn't enough, it will also solve anagrams.

Protex has a built in calculator mode which will accept an input like 25.6 x 57.3 and print out the correct result. It also asks whether you would like this inserted

Turn to Page 18 ▶



The main menu



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◀ From Page 17

in the text at the cursor position.

Protex can be set to execute an EXEC file on boot-up and this can contain anything that can be entered at the keyboard from command mode. You could, for instance, set up the default drive, get it to load a file, set up commonly used phrases on certain keys and so on.

Many of Protex's functions are accessed through stored commands placed in the text. There are far too many to list here, but the accompanying panel will give you a flavour of what is possible.

In many ways, Protex is almost like a programming language, and it's possible to do things which would be impossible in other word processors. Consider, for instance, the conditional printing: IF condition then print block, EL (ELSE) print other block, EI (ENDIF) where condition can be =, <>, >, < and so on.

To describe the mail merging features would take a whole article in itself – the scope is that large. You can create templates that produce invoices, calculating totals, net values and VAT. You can create a telephone directory and use Protex like a database, asking it for the number of a particular person, or all

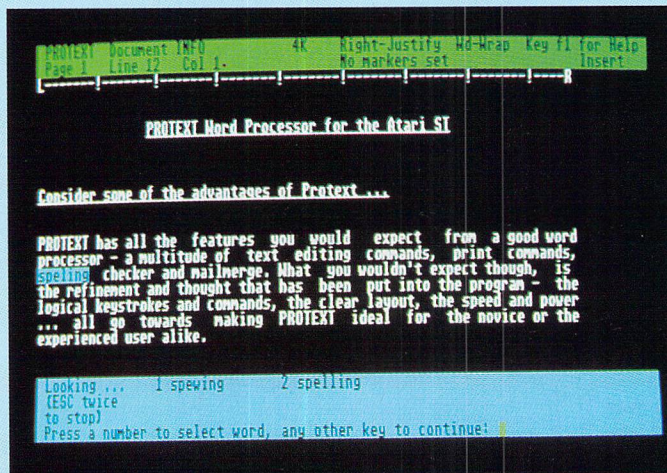
those who live in a particular area. You can even program Protex to calculate prime numbers.

The manual isn't finished yet so I can't comment on it. I used the PC version and if the ST version is anything like this – and I'm told it will be – then it will be excellent. It's about two inches thick and contains well-written explanations of all Protex's functions.

To sum up, Protex is probably the most

powerful word processor available on the ST and is quite likely to become the best selling too. It is packed full of features and many deserve whole articles to themselves (these are planned for the near future).

Every feature you could possibly want is here – word processing, Ascii text editing, mail merging and so on. There is only one addition I would ask for and that's a thesaurus. How about it Amnor?



Spell-checking a document

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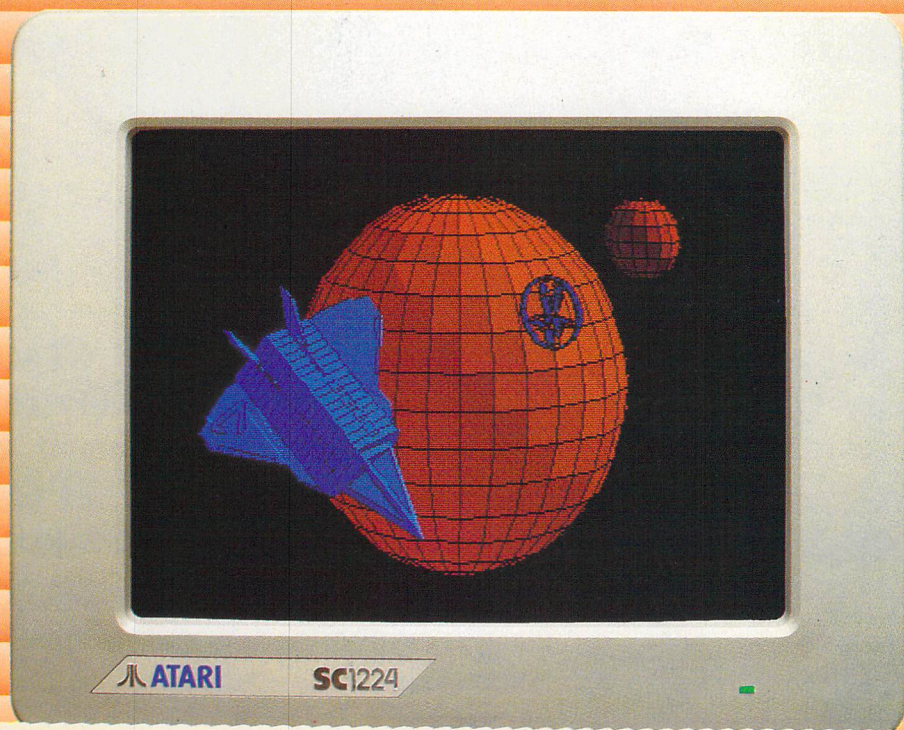
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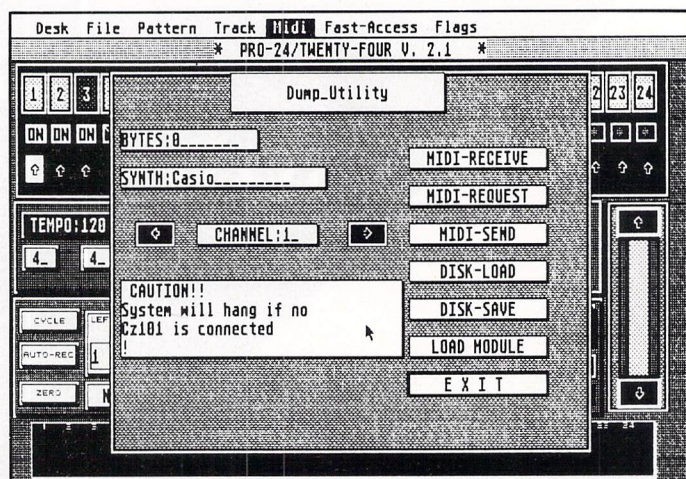
WE look this month at a star of stage, screen and TV – Steinberg's Pro-24. Of all the Midi sequencing programs on the market, the Pro-24 has probably appeared on more television programs than all the others put together.

Steinberg first made a name for itself with the Pro-16, a sequencing package for the Commodore 64, and was one of the first companies to produce a program for the Atari ST. As the ST has enormous music potential with its built-in Midi interface and massive memory, musicians were keen to snap up the program and the computer.

And which is your favourite word processor? The chances are it's the first one you used. So, I suspect, it is with Midi programs. There are an awful lot of musicians out there who wouldn't swap their Pro-24 for two packets of any other Midi sequencing program. Let's see why.

First of all, the manual suggests you

Pro-24 Midi
Dump Utility



gements, too. The majority of semi-pro users, however, are unlikely to have a mountain of equipment and 24 tracks will usually be enough.

It's enough for lots of professionals too, and the Pro-24 has been seen on TV in the company of such luminaries as Midge Ure who astounded us all (well, me at any rate) by saying, anyone can set up their own Midi studio for only £7,000. How true!

The program's 24 tracks are not restric-

on one track and apply functions either to the whole track or to selected patterns on it.

These include non-destructive quantisation (note timing corrections), shifting velocity information or setting it to an absolute value, transposition, delay, auto program change send, and routing through various Midi filters even though there is already a filter active during recording. There is also a split keyboard feature which directs all notes below a certain pitch to another Midi channel.

These facilities aren't new, and most can be performed with many other Midi sequencing programs, but they are part and parcel of the Pro-24's modus operandi and form a fully integrated method of sequencing.

The program can use its own internal clock or be controlled by an external Midi source such as a drum machine or by Steinberg's SMP 24, SMPTE Midi processor. It can read and send song pointers and it has a real-time counter which tells you exactly how long a sequence has been playing. Very useful.

Let's pull down a few menus. Under the Midi menu there are options to transmit the metronome click, switch Midi Thru on and filter incoming data. The Mode Setting menu lets you select Poly, Omni, Mono 1 and Mono 2 modes and Local

A star is born

Ian Waugh reviews the most famous of all Midi software – Steinberg's Pro 24 – and Masterscore

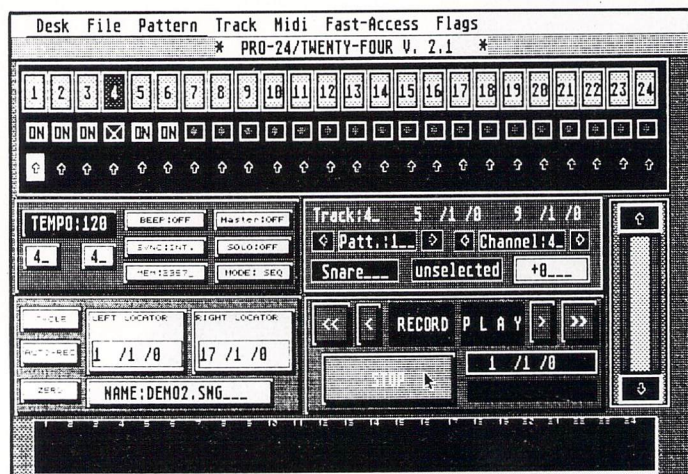
look upon the Pro-24 as a 24-track tape recorder. While other programs have impressed us with their 32, 64 – and more – tracks, it may seem strange that even after several updates the Pro-24 still only has 24.

That apart, I've often wondered how you would use all the tracks on say, a 64-track sequencer. If you have lots of Midi devices you'd know how, and lots of tracks are useful for building music arran-

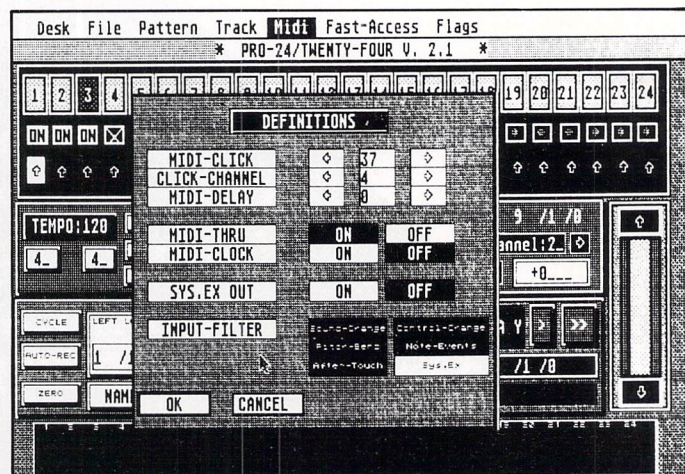
gements, too. The majority of semi-pro users, however, are unlikely to have a mountain of equipment and 24 tracks will usually be enough.

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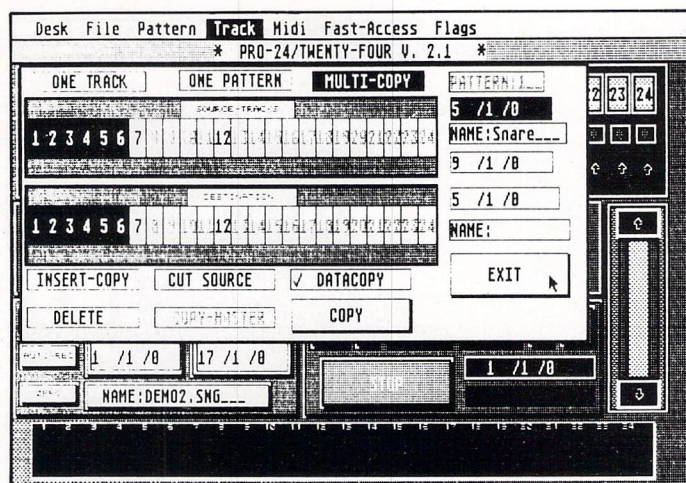
The program's 24 tracks are not restric-



Pro-24 Main page



Pro-24 Midi Definitions menu



Pro-24 Multi-copy menu

Control for each Midi channel.

You can also specify the note off mode for each channel. Some manufacturers have different commands for turning notes off (and you thought Midi was a standard!) so this could be very useful. The Dump menu allows you to dump Midi information (usually voices) to disc.

From the Track menu you can list all the patterns on a track. They can be dragged to function boxes which perform operations such as auto location of the pattern, deletion, copying, extending and repeating. This menu can also take you to the Grid Edit and Score Edit screens.

The Grid Edit screen displays notes as a series of horizontal bars which show their length and their position in time. It's a novel method and easy to implement and understand, so much so that similar grids have been adopted by other sequencer programs.

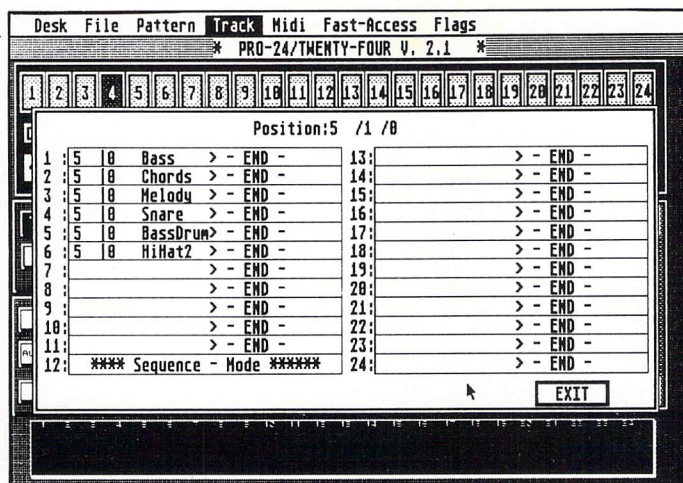
Notes and events can be edited in extremely sophisticated ways. One nice feature is the Dynamic Velocity function which creates crescendos and diminuendos across a specified range of notes. There's also an intelligent quantise option which tries to take into account the style of the music it's quantising. Interesting, eh?

The heart of the latest Pro-24 update is the Score Edit page which displays music in traditional notation, and again Steinberg is one of the first to offer this in an ST program. A range of notes can now be selected by clicking a box around them. New notes can be inserted by clicking on the staff and deleted by dragging to the trash can.

For a musician at home with traditional notation the Score Edit page is a boon although it is not without its idiosyncrasies. Editing is best, I found, using a combination of the Grid and Score Editors.

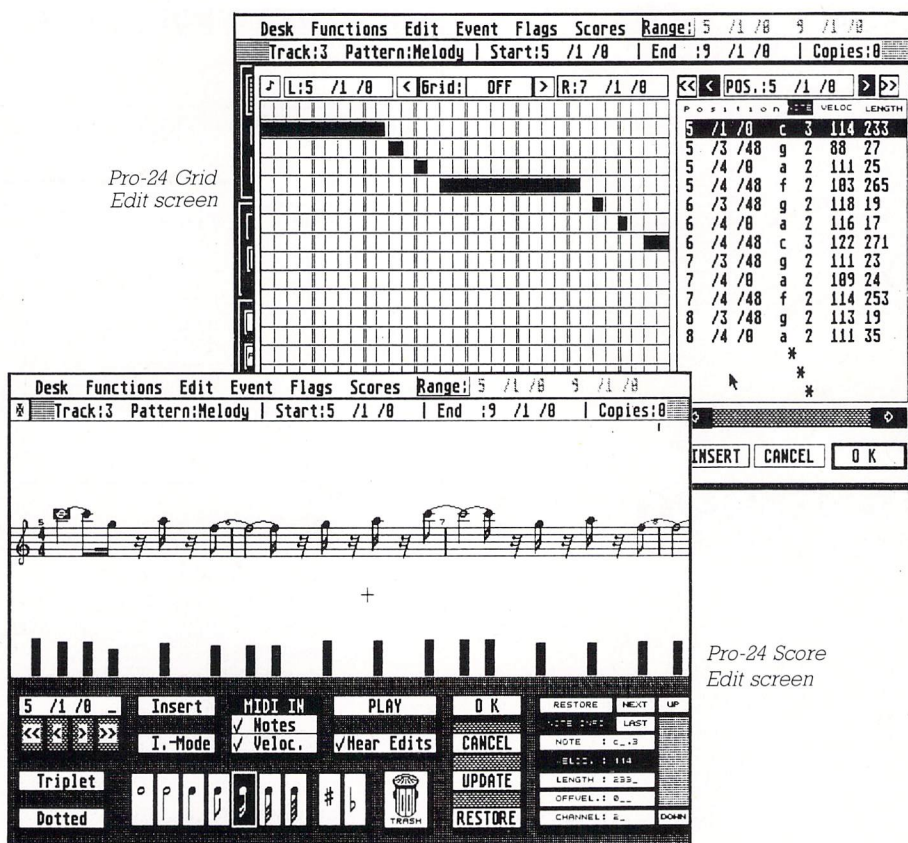
Flexible though these are, step-time note entry still has its problems (as it does on most other systems). Notes of the same duration can be input very easily, but lots of different durations require several clicks. There are however, several ways of entering information.

You can copy tracks with the Multi-



Pro-24 "Where Am I" display

Pro-24 Grid Edit screen



Pro-24 Score Edit screen

Copy facility. You can erase, append, copy and insert patterns within a track and even insert "blank tape". You can repeat or copy a pattern to itself like a sort of ghost track, a feature the Pro-24 calls Data-Repeat.

Although the Pro-24 was designed to operate like an electronic tape recorder, you can still chain patterns together in drum machine fashion in the Arrange Song mode.

To understand how to use all these copying and arranging facilities you must be prepared to burn the midnight oil. The complexity is partly a result of the sophistication of the program and partly, I feel, a result of the number of updates it has had. Still, powerful and flexible it certainly is, and a little effort will be well rewarded.

Another incredibly useful feature is

Master Track which lets you program tempo and time signature changes throughout a song, a facility not found on all sequencers.

The all-important merge operation is called by the Mix-down option from the Pattern menu. It allows you to build up a complex pattern from several smaller ones scattered over several tracks. Recording can take place at normal, half or double tempo allowing you to play hard bits at half the correct speed. You can also Remix a track and put each Midi channel's data on to separate tracks.

All the standard functions you would expect of a professional quality Midi sequencer are here - along with others you probably never thought of. Values

Turn to Page 24 ►

◀ From Page 23

can be altered by clicking on the relevant parameter (the usual method) or by moving the pointer up and down a data slider (shades of DX7 editing).

Most operations can be activated by the mouse or from the keyboard, although some of the newer functions in the latest version are only available from the keyboard. Individual Patterns can be saved and loaded as well as songs, another useful feature.

The only daunting moment I had while using the program was when it crashed with a system error. It was helpful enough to tell me to try to save my work however, which I managed to do successfully so nothing was lost other than a few cc's of sweat.

The manual is generally very helpful – especially so for a Midi manual – although it has more than its fair share of typos and sometimes confuses a track with a channel. It was written for version 1.1 and updates have now brought the program to version 2.1, during which time it has seen many changes.

A 36 page supplement is included with the manual to take you through the new features. This is fine for old hands, but not so helpful for newcomers. Would it take so long to do a rewrite? The contents are quite detailed, but there is no index.

Elegant notation

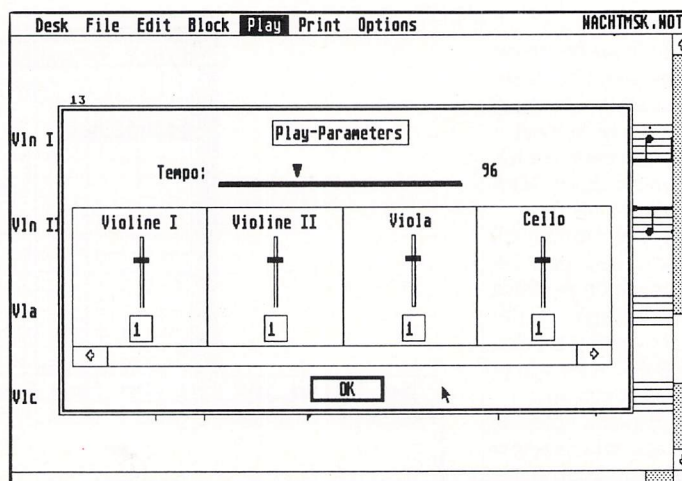
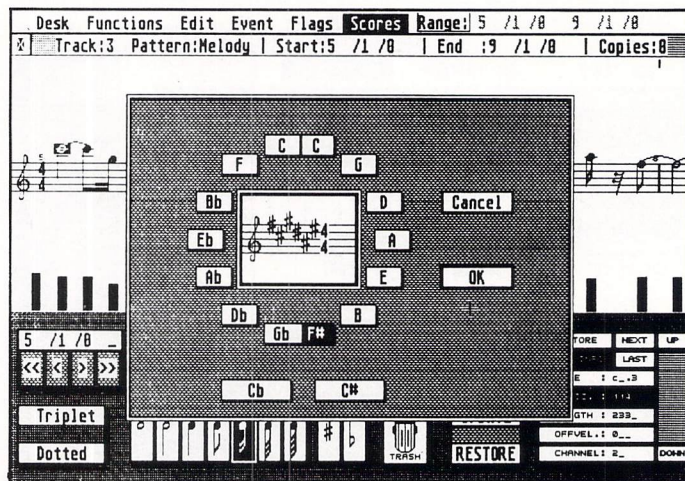
MASTERSCORE is the very latest Steinberg release. It takes a piece of music recorded by Pro-24 and turns it into traditional notation. This is not an easy thing to do.

If you have ever recorded something in real-time and then looked at it through an event editor or Grid Editor you'll know that what you play is never anything like the written music you play it from.

In order to get a satisfactory representation of the music you play therefore, you will probably have to spend a lot of time in the Pro-24's Grid and Score Editor pages, and there will be much quantising. This is a problem for any music-to-notation editor.

Masterscore handles the situation

Pro-24 Changing key in the Score Edit page



Masterscore's – Play Parameters menu

rather well and has facilities for further editing once the music is in score form. The printout is very impressive indeed, as you can see from the examples. You can add music markings and signs and place three types of text anywhere on the screen.

Notes are inserted by typing a sequence of note names and durations into a window and then inserting it. The length of the piece is determined in the Pro-24 and you can't increase or decrease the length in Masterscore.

The number of bars which appear across the width of a page are determined by the quantise resolution

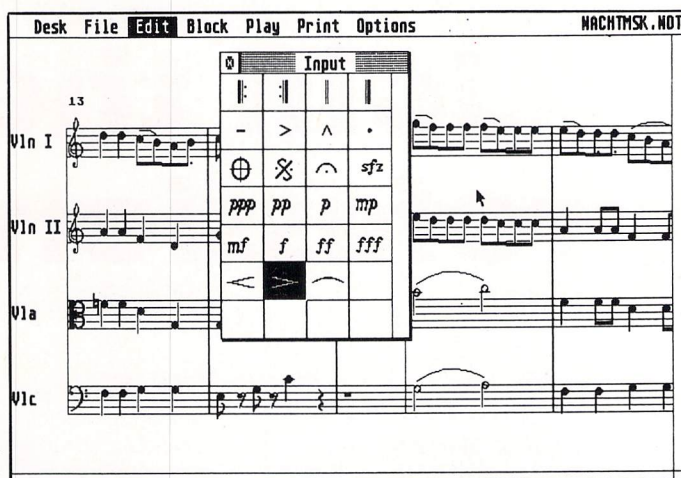
and a setting made in the Printer Menu. Often this limits the number of bars to two (or two and a half) when it would appear to be quite possible to squeeze three on to a line.

The review copy of Masterscore was version 1.0 (the manual was written for an even earlier version) and it's not quite finished yet. For instance, the Block Menu is inactive and more music signs are required. Sometimes the header wouldn't print. The only way to stop printing is to switch the printer off-line, and vertical printing hasn't yet been implemented.

Some attributes such as the Midi channel assignments aren't carried over from

Score printed by Masterscore





Masterscore
special symbols

the Pro-24 and must be inserted from the keyboard, not the mouse. Also, I did manage to make it hang up a couple of times. The program was however, relatively easy to use.

What Masterscore is not, though, is a music scoring program. That is, if you've written a piece of music which you either can't or don't want to play, you can't use Masterscore to print it out.

Well, actually you probably could, but you'd need to set tracks and bar lengths from Pro-24 first. It's not, at the moment, the ideal tool for the job although it could doubtless be made one.

Conclusion

It's no wonder the Pro-24 has become so popular. It's a powerful piece of software and it is indeed a pro program. It's not as immediately accessible as some other programs however, and you'll need to spend several days – or more likely weeks – to find your way around it.

There is so much in Pro-24 and Masterscore that both programs need an ST with a full megabyte of ram. This gives Pro-24 a memory capacity in excess of 80,000 notes. In addition, Masterscore

requires a high resolution monitor, although Pro-24 runs in high or medium resolution.

Both programs use a dongle – a different one is required for each – but as Masterscore is almost useless without Pro-24 it would save some dongle-switching if one could be used for both.

The first Masterscore upgrade is free, but if you want others after that you must subscribe to their update service to the tune of £34.50 (Pro-24 subscription is £23). Added to the asking price of £325 I do feel this is a bit over the top, but if you are a professional composer/arranger it may well be worth it.

Meanwhile, anyone forking out for Pro-24 is getting a darned good piece of software. The semi-pro however, who would doubtless enjoy Masterscore may be well advised to await further developments both from Steinberg and other companies. Watch this space.

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Join the professionals

EIDERSOFT'S Pro Sound Designer was reviewed in the July 1987 issue of *Atari ST User*. It is one of three budget-priced samplers for the ST. Of the other two, ST Replay was reviewed in the same issue and we looked at the third, from Innovated Software, in last December's issue.

Now from the producers of Pro Sound come two new sampler programs – Pro Midi and Pro Light. These are designed to work with Pro Sound Designer (PSD) and ST Replay.

Producing software which is compatible with other companies' hardware is an excellent idea and can only help the business in the long term, and it certainly helps the consumer.

Pro Midi

Pro Midi lets you play samples via a Midi keyboard. Actually any Midi source will do, and you could connect it to a sequencer or a Midi guitar controller. You can store up to 10 samples in memory at once – depending upon the length of each – and switch from one to the other by pressing the function keys.

The output can be routed through your monitor, through ST Replay's output or through PSD's hi-fi output – you'll need the hi-fi upgrade kit (reviewed in our December 1987 issue) to take advantage of this. Output through Replay produces a slightly brighter sound but with a touch more noise, which would seem to indicate that the filters in PSD are a little more active.

The monitor output allows a higher maximum frequency than the other two, so you select your output and take your choice. All outputs however, give reasonable results.

Ten samples can be loaded, one at a time. Their names are shown on-screen and they can be saved out again to allow you to organise them in sets. Loading and saving is rather time-consuming, and the front panel has Load Set and Save Set commands to allow you to handle a set of 10 samples at once. Good idea, but it doesn't work.

A Read-Me file on the disc (dated October 1986) explains that the Settings options now only handle pointer settings, which isn't half as useful. A step backwards, I think, and a very odd update. To play a sample, you click on

Pro Midi and Pro Light are given a thorough workout by Ian Waugh

the keyboard icon and select the sample you want to play by pressing a function key. You can only play one at a time and monophonically (one note at a time), but you can manipulate it in many ways.

You can make the sample sound only while a key is held down, or you can make it play for its full duration or until another key is pressed. You can make the

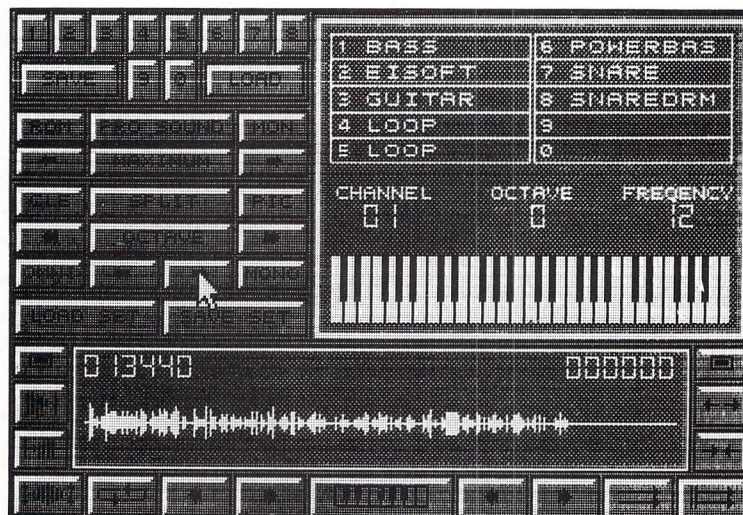
sample loop and set two pointers to define the section which repeats.

Finding a satisfactory looping point is one of the most difficult tasks in sampling. The length of the sample and position of the pointers are shown on screen, but the pointers move very quickly and there is no zoom facility, which makes setting them even more difficult. The Load and Save Set options save these pointers, so if you do get good looping points you can save them.

You can alter the sample's playback speed which effectively alters the pitch. You can also stretch and shrink the sample which has the effect of halving



Pro Midi's title screen



Using Pro Midi's sampled sound

and doubling the pitch. Shrinking increases the signal-to-noise ratio, which should improve the sound quality and it's worth experimenting with.

There are Fade In and Fade Out controls which impose a cone-shaped envelope on the section of sample between the pointers. Their effect is quite severe and irreversible, but fun to play with.

You can select the Midi channel, the system will respond to or set it to Omni so it will respond to all channels, and you can transpose the keyboard an octave up or down. A Keyboard Split function lets you divide your keyboard into up to 10 sections and assign different samples to each. This for example could be used to create a drum kit.

There appeared to be a bug in the playback routine, as samples wouldn't respond to the E and E flat above middle C. I tried different keyboards, different Midi channels and a variety of split points. The Read-Me file promises revisions to the program so I hope this will be sorted out soon.

You can load samples created with ST Replay directly into Pro Midi and it will accept samples designed for Digi Drum (reviewed in *Atari ST User*, July 1987), too.

Most of the samples supplied with Pro Midi are identical to those on the Digi Drum Sample Disc One which retails at £14.95. Where did they come from, I wonder and who's been pinching what from whom? Anyway, nice to see compatibility here, and it does mean you'll be able to load PSD samples into Digi Drum.

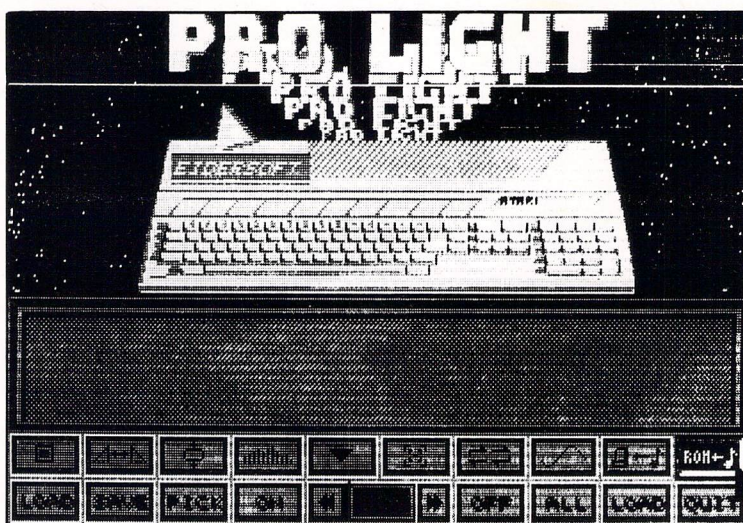
One aspect of this program which soon became clear is that you don't need a sampler to be able to use it. This would restrict you to the supplied samples or those on a sample disc, but it's one way of testing the potential before forking out.

Pro Light

Pro Light is a slightly different bottle of bongos in that its sole purpose is to entertain. It samples a sound and turns it into a graphic display. Like Pro Midi, it is compatible with PSD and ST Replay, but unlike Pro Midi you need one of the samplers, as the sound source must be plugged into one of their inputs.

The sound has nothing to do with sampling or Midi, it's purely an audio signal from a cassette deck or hi-fi. The program responds to the various audio frequencies and levels and changes the screen display accordingly.

The first display you are offered is a series of bars – rather like a continuously changing bar chart. It appears in the centre of the screen above a set of icons. You can alter the colour of the bars by holding down the right mouse button. Alternatively, you can get a waveform



Pro Light in action

display similar to that in PSD, but this is not terribly interesting.

When you get tired of this you can move on to the clever stuff. Behind the control panel is a picture the colours of which can be made to alter in response to the input. Options here are to pulse the colours to black and back again; you can make them pulse in monochrome, too.

Next control is colour rotation, which works on the same principle as animation programs which swap each colour with its neighbour in a loop. You can reverse the direction of the swapping and pulsing. Altogether you can produce some pretty head-banging, eye-straining effects.

During icon operation the picture is half hidden behind the control panel. You can scroll the picture up and down to see different sections and you can slide the control panel out of the way altogether to see all of it.

Pro Light also allows you to select which colours will be pulsed and by how much. You click on a counter to set the frequency threshold, then on the Pick icon, then on the colour and then select whether the pulsing is on or off.

It sounds a little complicated but is not, although the manual tells you to do things in the wrong order – which doesn't help – and the counter only goes to 127, not 255. Having picked and set the colours you can save the setting.

The threshold settings are not terribly sensitive. If you set all the colours to the same value you would expect them to pulse in the same way, but they don't. You can see the effect of very high and very low frequencies, but most music contains a broad band of frequencies and the display produced by one piece of music is very like another.

A sensitivity control would have been nice, and give more accurate control. It would have been useful too, to be able to relate the threshold setting to a particular frequency band. Often it's difficult to see

what effect, if any, a particular setting has. Input via Replay seems a little more sensitive than PSD – it gives you more pulse for less input.

One of the nice things about Pro Light is the ability to load in other pictures and apply these nefarious colour juggling processes to it. It can handle screens in NEO format and Degas or Eidersoft's own Quantum Paintbox. Eight screens are supplied on the disc.

Conclusions

In spite of a few niggles and a bug or two, these programs are great fun. I'm still a little amazed that such relatively simple packages can't manage to tie up the manuals with the programs, but their faults aren't severe and shouldn't cause much bother. They cost significantly less than your average ST program too, which makes them great value for money – 10 out of 10 here.

If you have PSD or ST Replay it's worth considering both these programs as potential additions to your collection. While Pro Light is for entertainment only, Pro Midi is genuinely useful for the musician wishing to use budget samplers in a musically useful way although, of course, they don't compare with professional samplers costing several hundreds of pounds.

Eidersoft is continuing its support for the PSD and budget samplers and will soon be releasing a drum kit program of its own called Pro Drum at the same amazing price of £16.95.

Product: Pro Midi

Price: £16.95

Product: Pro Light

Price: £16.95

Supplier: Eidersoft, Unit 4 Stannets, Laindon North Trade Centre, Basildon, Essex SS15 6DJ

Tel: 0268 541212

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Manipulating lists the 68000 way

Stephen Hill shows how to access arrays in the penultimate part of his guide to machine code

THE address register indirect addressing modes can be used to create a simple set of sprite manipulation routines, as I demonstrated in last month's article. However, the main problem of using these facilities in practice is simply being able to keep track of multiple sprites on-screen at any one time.

The system I've used previously required separate variables to store the position of every piece of sprite information. This works fine if we're trying to deal with just three or four sprites, but tends become unwieldy as the numbers increase.

The ideal solution is to store all our information in an array. This would enable us to use a simple loop to access the variables one after another. Fortunately, the 68000 processor supports two powerful addressing modes which allow us to do just that.

The simplest of these is known as address register indirect with offset. Its action is to temporarily add a number, in the range -32768 to 32767, to the value held by the address register thus computing a final address. The format of

this mode can be seen by the instruction:

```
MOVE.B 1(A0),D0
```

Suppose register A0 contains the address 1000. Let us also assume that the contents of the memory locations from 1001 to 1006 look like this:

Address	Contents
1001	5
1002	10
1003	15
1004	20
1005	25
1006	30

If we execute our instruction, D0 will be loaded with the contents of location 1+1000, which contains five. The address in A0 will remain unchanged at 1000.

This example uses byte-sized addressing. If we want to use word, or long word data, it is important to realise that this addressing mode takes no account of the extension used when it adds the number to the address register.

To access the first item in a table of long words, we would need to use the instruction:

```
MOVE.W 4(A0),D0
```

rather than:

```
MOVE.W 1(A0),D0
```

This is because each number will now take up four separate bytes. This is a common mistake resulting in address

errors and more often, bombs. We can simplify the instruction still further if we replace the index value with a label.

Before we can do this however, we will first need to have a way of setting a label directly to a specific value. Most 68000 assemblers provide the special directive, EQU meaning equate, especially for this purpose. For instance:

```
FIRST EQU 1  
MOVE.B FIRST(A0),D0
```

Something to be wary of when using labels in this manner, is that many assemblers expect you to use at least one space between the start of the line and your label. Otherwise they assume that the label refers to the current memory location, and then try to interpret the EQU statement as an assembler instruction, which causes an error.

This type of addressing is commonly used as an alternative to the stack, to transfer information from one part of a program to another. Like a stack, it requires the address of the start of your data to be placed in an address register before use.

Since the address registers A0-A3 inclusive, are altered every time the operating system is called, it makes sense to use one of the registers A4-A6 for this purpose.

Probably the most serious drawback with register indirect with offset addressing is that the offset we use has to be defined explicitly in the program text.

If this was true of arrays in Basic, we would only be allowed to use statements such as `array(5)`, where the number five was initialised before we ran the program.

In order to let us choose which array element to access at run time, the 68000 allows us to add the contents of another register to our address register before we use it. This mode is called indexed register indirect with offset.

You can specify the precision of this addition by using an optional extension of either W or L with the default being W. The difference between the two is that W only adds the bottom 16 bits of the register to the address register, whereas the long form uses the whole register.

The only real limitation of this mode is that the fixed offset you can use before the brackets, is restricted to between -128 and 127. Like the previous mode, none of the registers will have been altered in any way after execution of the instruction. A typical example using this is:

```
MOVE.B 1(A0,D1.W),D0
```

If this all seems rather complicated, don't worry, as it's really far simpler than it looks. To make everything a little clearer let's use another worked example. As before, A0 will contain 1000, and the memory locations between 1001 and 1006 contain the following data:

Address	Contents
1001	5
1002	10
1003	15
1004	20
1005	25
1006	30

It can be seen that the number which will be loaded into D0 after our last instruction has been executed, will depend on the contents of D1 and the fixed offset: If D1 contains zero, this instruction is identical to the previous example, and D0 will be loaded with the contents of 1001 - five in this case.

But what would happen if D1 held three? The instruction would first find the address of the data to be accessed by calculating the result of $1 + 1000 + 3$. The contents of 1004 would then be moved into D0 which would now equal 20. You can therefore consider this instruction to be effectively equivalent to the Basic line:

```
20 D0=PEEK(1+A0+D1)
```

So far we've only been dealing with bytes. Supposing, however, we wished to access a list of long words. We could now

use an instruction such as:

```
MOVE.L 0(A0,D1.W),D0
```

Before this would work, we would need the actual position of our item to be stored in D1. I've set up a typical list of such data starting from location 1004. Again, this has been arranged to allow us to begin our list from item one:

Address	Value
1004	50,000
1008	100,000
1012	150,000
1016	200,000
1020	250,000

Notice how the locations are incremented in fours. This is because it takes four bytes to hold each piece of long word data. If we wanted to load the third item from this list - 150,000 - we would have to place a 12 into register D1: 3 (item number) x 4 (number of bytes per item) equals 12 (the position of item 3).

This instruction is therefore equivalent to `array(item_no)`, where the variable `item_no` equals three. The only real difference between the Basic arrays and the assembly language version, is that 68000 does not automatically compensate for the differing sizes of the various data types. This calculation has to be performed directly by the programmer.

The ideal way of doing this in the last example is to use one of the logical shift instructions like:

```
LSL.W #2,D1
```

This multiplies D1 by four, and converts an item number or index into the position of our item in the list. The classic use of this mode in practice, is to allow us to access information stored in tables.

Complex graphics like 3D wire-frame displays, require a large number of sin and cosine functions to be computed at great speed. Unfortunately, such calculations invariably take up far too much time to allow the creation of any effective form of animation. We can, however, avoid this difficulty completely by storing preset data as part of a table, and then using this directly.

Since sine and cosine both generate floating point numbers, and the 68000 can only readily deal with integer arithmetic, we have an inherent problem with this approach.

The easy way to get around this dilemma is to use vulgar fractions. Such a method allows the use of integers. Consider the value for π - 3.141593. This is a very inconvenient value to use, so we could use the approximation 355/113,

which is correct to six decimal places.

However, since the divisor is not a power of two, this will involve using a

```
REM Floating point demonstration
REM By Stephen Hill
REM Written in Fast Basic

RESERVE code,500
FOR pass=0 TO 2 STEP 2
[
OPT pass,"L-W-"
ORG code
MOVE.L #table,A0      \ address of table
MOVE.W angle,D0       \ D0=angle
LSL.W #1,D0           \ D0=D0*2
MOVE.W 0(A0,D0.W),D1  \ D1=table(D0)
MULU number,D1        \ D1=number*33
LSR.W #7,D1           \ D1=D1 DIV 7
RTS

number DC.W 123
angle DC.W 15
table DC.W 0,2,4,6,9,11,13,15,18,20,22,
24,27,29,31,33
]
NEXT

CALL code
PRINT SPC(2)"Machine code: ";D1
PRINT SPC(6)"Estimate: ";123*33/128
PRINT "Close estimate: ";123*2120/8192
PRINT "Floating point: ";SIN(RAD(15))*
123
```

divide instruction. It makes sense therefore, to think up a divisor which is a power of two so we can use a multiple shift to perform the arithmetic.

Suppose for instance, we wanted to multiply the number 123 by the sine of 15 - 0.25882. A reasonable approximation of this might be 33/128. Consider the program above. Here, the top half of the fraction is multiplied by 123. Then:

```
LSR.W #7,D1
```

divides the result by 128. This neatly avoids the need to use any floating point operations at all and executes extremely quickly.

This routine is only intended as an illustration, and is not a full blown program in its own right. Before you could use it in real life, you would need to generate the rest of the sine table.

Furthermore, in the real world, 128 is much too low a divisor to produce an acceptable level of accuracy. For better results, you should experiment with higher powers of two such as 8192. As illustrated in the program, the fraction 2120/8192 gives a reasonably accurate result.

● Next month I'll end this series by describing how to get the most out of assembly language programs.

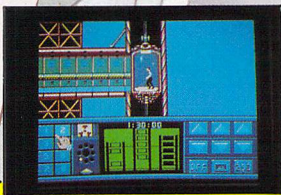
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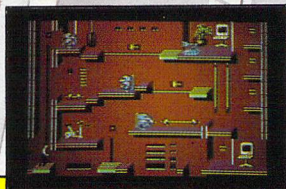
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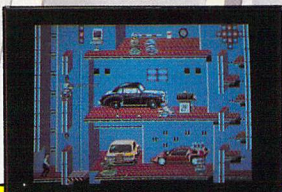
Successfully dispose of Elvin and your quest is half over! Now your Mission becomes truly Impossible as you strive to escape the towers, avoiding guards, robots, mines, trap doors and elevators without detection!



...From the lift you enter the first room...



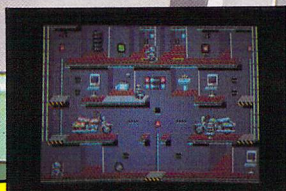
...But where to next?...



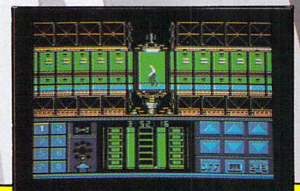
...Who or what is lurking behind these cars?...



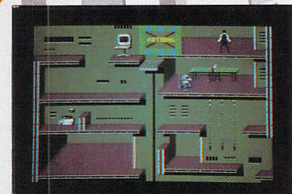
...Can you access the next tower?...



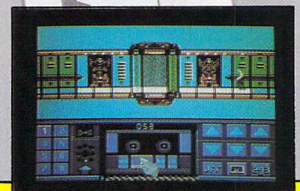
...Could the final P.I.N. number be here?...



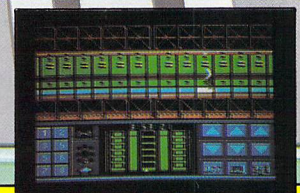
...Running into more trouble?...



...Why is the robot guarding that table?...



...A message on the tape recorder?...



...Quick! Escape from Elvin!...

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REVIEW

Mark Smiddy previews Aladin – the amazing Macintosh emulator



THE Apple Macintosh 512k is one of computing's legends, widely accepted as the most user-friendly machine of its day. Although now superseded by bigger and better Macs – like the Mac Plus and Mac SE – the original machine still stands up well. Indeed, many still regard it as the father of microcomputer desktop publishing.

Written by ProficomP of Germany, the Aladin Macintosh Enhancer is intended to turn an ST in to a surrogate Mac. Enhancer literally means improver – is ProficomP seriously claiming its product improves on the Macintosh or that it improves on the ST? Either way, any such claim must be worth investigating.

Although at first sight the Mac and the ST appear very similar – both employing a wimp system – they are in fact completely different animals. The real difference lies just under the surface and becomes apparent as soon as you use a Mac.

To begin with, the menus do not drop down as on the ST, they have to be pulled down – that is, selected by pointing to a title and clicking the mouse button. Furthermore, the Mac has a much wider selection of desk icons. The ST uses three – folder, program and file.

So how well does the Macintosh Enhancer fair? Aladin comes in a large plastic case containing an empty rom board, two single sided discs (one of those is Mac format) and an instruction manual. It runs on any system with Tos on rom, but works better with two drives and

at least 1Mb of ram. In addition to the software, you must also buy (beg, steal or borrow) two roms from a 512k Mac, costing an additional £49.95. Eidersoft can advise buyers where they can get them, although officially the roms are not available to the general public in Britain.

Incidentally, the manual suggests the roms must be removed from a Mac and installed on the Aladin board. Is

ProficomP serious? This seemingly pointless action can only be intended to protect the company from legal repercussions.

In addition to the roms, you must also obtain copies of two essential Mac files called System and Finder. These are Apple copyright and therefore can't be supplied with the package.

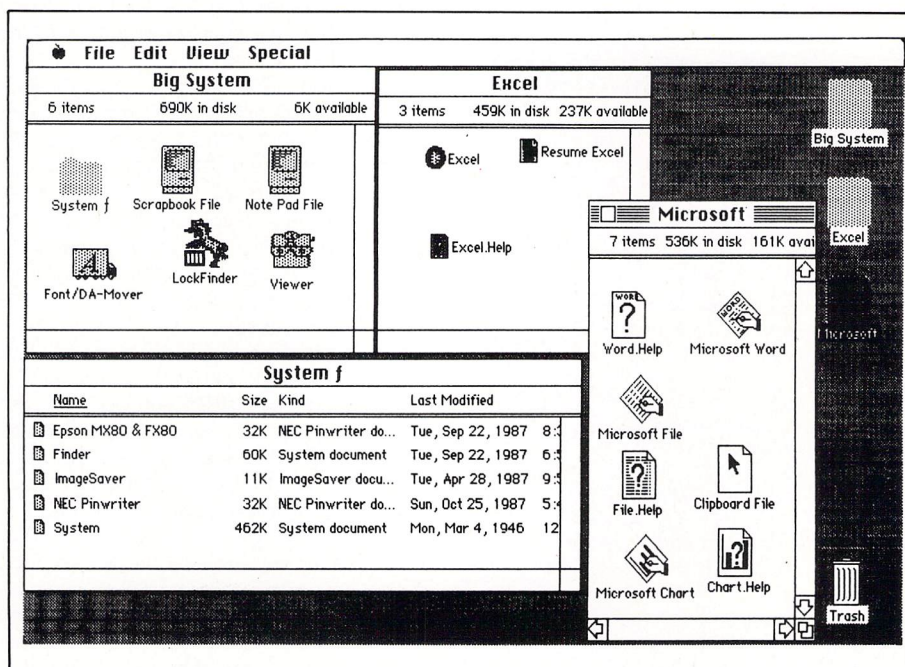
ProficomP gets round this problem by supplying software to transfer these files, and any others that you may require, to the ST over a serial link. Information on how to make up the required lead is supplied, but they are not as yet available ready made.

The transfer programs come in two parts. The transmitter – located on the Mac disc – and the receiver located on the Aladin boot disc. I should point out that single sided Mac discs hold about 50k more than the equivalent ST disc, so if you only have a single sided drive, Mac discs can't be transferred one-to-one. To alleviate the problem, one of the utilities supplied reduces a Mac disc's capacity to 350k.

By this stage you may have gathered that if you haven't got access to a Mac, you're well and truly snookered. For review purposes, Eidersoft supplied a startup disc and the Mac roms, thus overcoming the problems outlined so far.

The first time Aladin is booted it has to be configured. This is a simple matter of setting a few parameters. Once your

Turn to Page 32 ►



A typical desktop display

◀ From Page 31

system has been fingerprinted, so to speak, Aladin will always recognise it. If the machine is upgraded – to 1Mb ram, for example – reconfiguration is necessary or Aladin won't work.

While on the subject, it's worth pointing out Aladin's configuration program has a built in ram disc – called the SuperDisc, sized in 32k chunks starting at 128k. The maximum allowable size is just under 50 per cent of the available ram, 400k on a 1040.

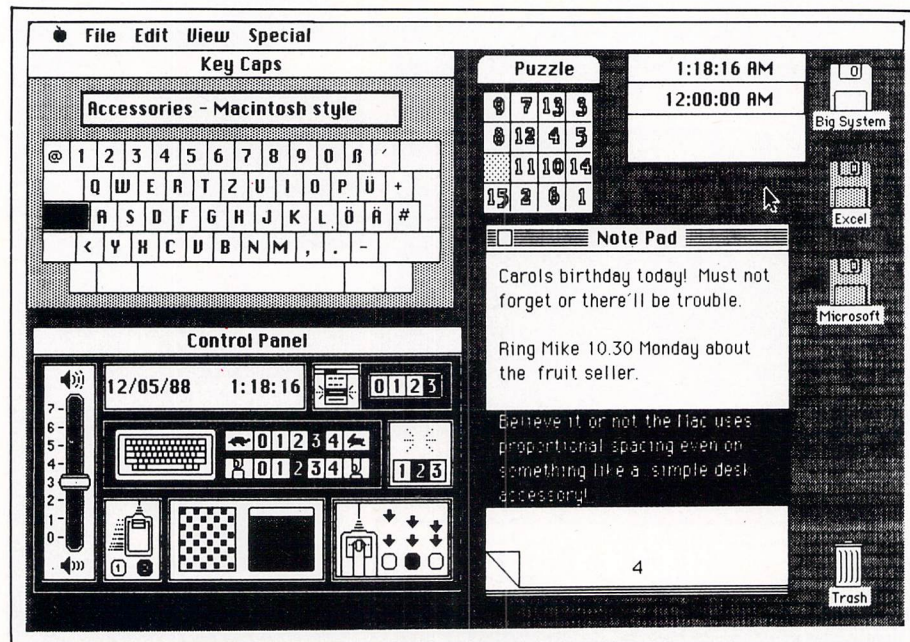
Once installed, the SuperDisc is an integral part of Aladin and remains on the desktop, complete with contents, even after a reset. This means that by copying the appropriate files into ram Aladin can be booted from memory drive. On a single drive system this can save an awful lot of disc swapping.

And so to the moment of truth, after a short pause (and a very pretty title screen) a message appears informing you to remove the boot disc and press Help to enter Aladin.

Press it and a bell sounds and the ST/Mac starts, showing a picture of a disc with a flashing question mark. Now insert an Aladin format disc containing Finder and System.

If all is well the system will welcome you to Aladin. I suspect that using an original Apple Finder will produce a slightly different result.

If Aladin can't locate System, or the disc is of the wrong format, a cross replaces the question mark and the system bleeps loudly in outrage. This is Aladin's only way of telling you to



Desk accessories running under Aladin

remove, replace or change a disc. The drive containing the offending one has its access light pulsed. A Mac would normally eject the disc at this point.

Aladin checks for the presence of a disc via the write protect tab. If the disc is write protected in the normal way Aladin won't know it's there. Discs can be locked by software using the desk accessory – Write Protect.

The rest is simple – assuming you aren't lynched by a mob of outraged Macintosh enthusiasts, Aladin does indeed run most of the older Mac software. Some however – Aldus Pagemaker is one – has to be patched first with the programs provided.

Don't be put off when I say older software, as much of the Mac's vast software support is of the very highest quality. Even now it puts most of what's available on the ST very much to shame. The snag is that you only get what you pay for and Mac software does not come cheap.

Needless to say, software costing hundreds of pounds is very likely to be protected. However, even if you are a bona fide customer you still won't be able to run Mac discs on the ST's drives.

Because of differences in the hardware, the ST can never read an unprotected Mac disc, let alone a protected one. Not to be beaten by a mere hardware problem though, the team at ProficomP expects to have a fully Macintosh-compatible drive ready very soon.

Similarly, Aladin will very soon interface to a hard disc, formatting one partition for its own use. Also in the near future, ProficomP intends to release a

hardware add-on to drive Apple's LaserWriter directly from the ST.

Without doubt, Aladin is a brilliantly written piece of software and it does emulate the Macintosh very well. A nice touch is the way everything has been worked out to maximise the system's performance. For instance, the disc drives run at twice normal speed under Aladin.

I suspect what makes Aladin so good is that it uses a lot of Apple's routines, patching them for ST hardware. Considering the version I had was pre-release, the whole thing worked superbly.

In the end though, I can't help wondering if it's really worth the time, trouble and expense, because at the end of the day, the complete setup isn't all that much cheaper than the basic Mac.

Remember too – Finder, System and the Mac roms are the sole copyright of Apple Computers. As far as I know, unless you already have a Mac, there isn't any reliable way of obtaining these items legally. In fact you may even be breaking the law by transferring the System and Finder files on to your ST.

All this seems a rather crazy situation, since the only people legally able to use the emulator are Mac owners. Most of those will be education authorities and businesses which can probably afford the real thing.

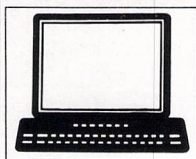
MACINTOSH HARDWARE

On the face of it, the ST with a monochrome monitor and the Macintosh 512 appear very similar since they both use a wimp (windows, icons, menus, pointers) environment. However, the ST drives the 68000 20 per cent faster than the Mac and has a larger screen. This serves to make the task of emulating the Mac feasible.

On the other hand, the Mac uses custom disc drives. These, apart from having a powered eject – no buttons to push – get more on a disc by constantly varying the speed of the spinning floppy disc (it spins faster as the head approaches the inside edge). Because the ST's drives can't vary their speed, it can never read a Mac disc.

Perhaps the most obvious difference is the Mac's keyboard layout. The original machines lacked numeric keypads and cursor movement keys. Even so, the Macintosh user guide gives the keycodes for them, and well written software can be ported across to the ST and make use of those keys.

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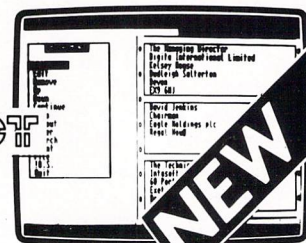
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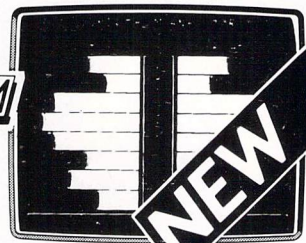
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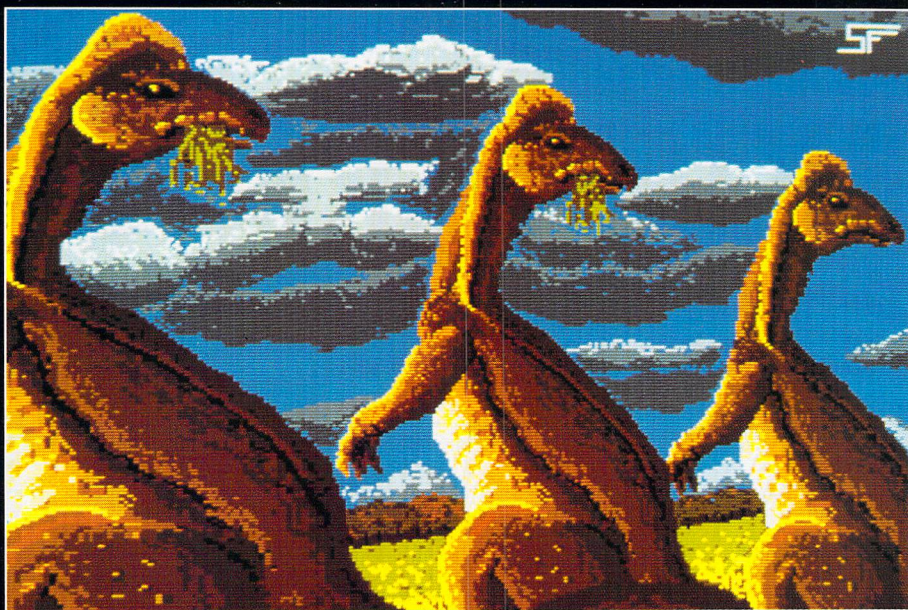
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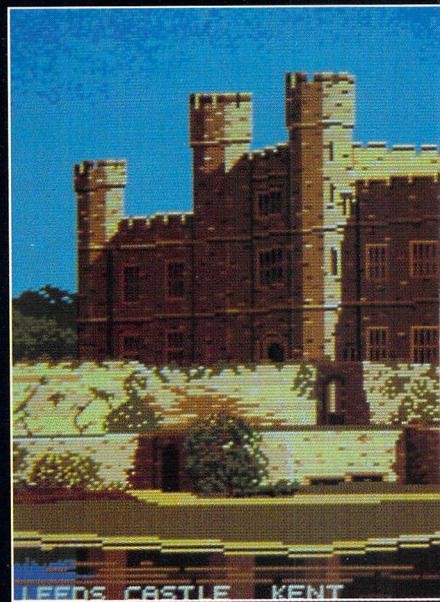
Simon Fincher

GALLERY



Fox: The young fox looks bright and alert on his first days lone hunting in the forest

John Thornton



Leeds Castle: Intelligent use of light softens the harsh stone lines



Whales: A stunning portrayal of two of nature's most beautiful creations, caught in the flickering sunlight

Shaun Davies

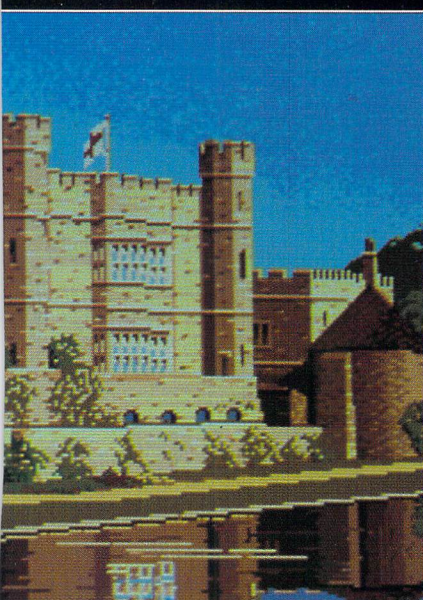


Autumn: The last vestiges of daylight cast a serene glow over this peaceful scene

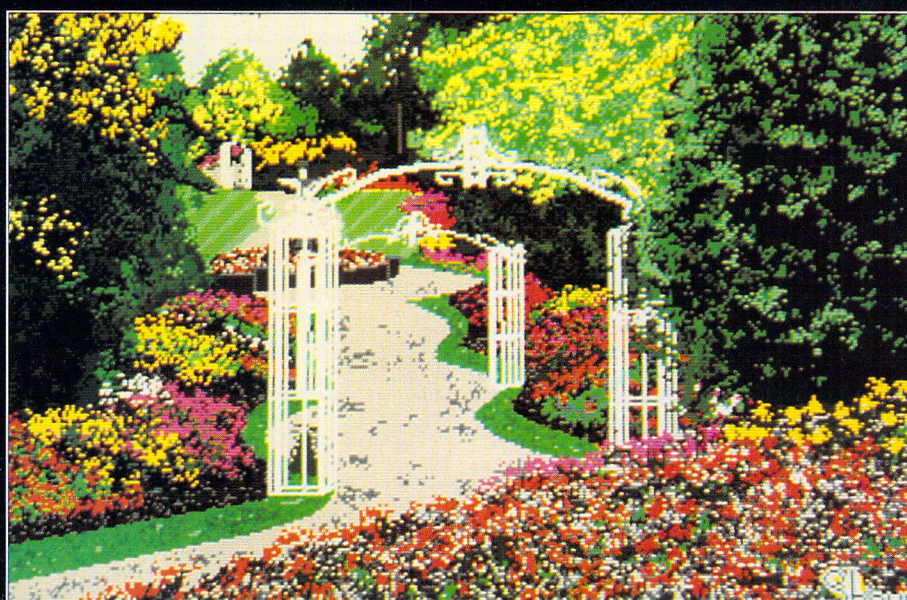
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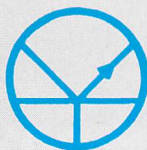


Park: Effective use of stippled colour creates an atmosphere of a park in full bloom

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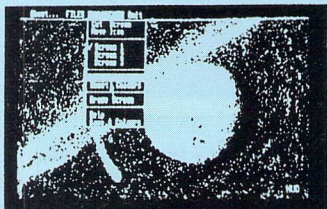
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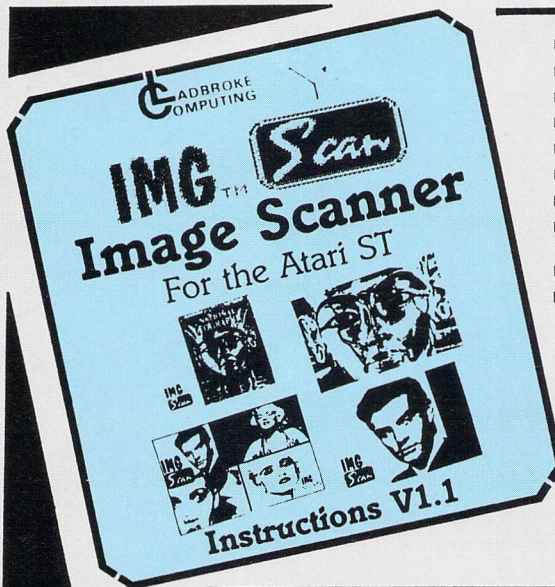
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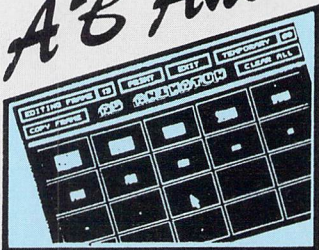
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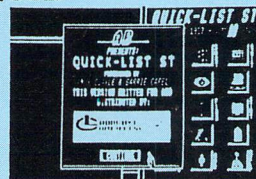
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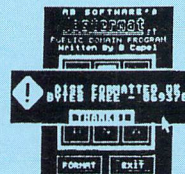
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Product: *Captain Blood*

Price: £19.95

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EVERY once in a while a new game arrives on the ST that leaves everything else drifting in its wake. Without doubt *Captain Blood* is one of those: The graphics are breathtaking and the digitised music – written by Jean-Michel Jarre – superlative. Even the scenario sounds like a plot from a Larry Niven science fiction bestseller.

The story goes something like this: Once upon a time, there was a penniless programmer called Bob Morlock. In a desperate attempt to save himself from starvation, he wrote the ultimate computer program – one capable of generating a living space vehicle – the Ark.

After a freak hyperspatial accident, 30 clones of Morlock's bioconsciousness – *Captain Blood* – were created. Scattered like wild seed across the heavens, they drifted on the solar winds and finally came to rest among the stars.

Using a creature called the Urk as his eyes, Morlock searched for the clones. Over the next 800 years he located 25 – now only five are left. The object of the

arrow is an alien hand and forearm clad in support tubing. A nice feature is the way the finger sparks wildly when a button is pressed.

The lower third of the screen is occupied by icons representing the available functions – Galactic chart, teleport, external vision and so on. When a particular feature is disabled the relevant icon is blanked out. The rest of the screen is dominated by the cryogenic support chamber and system monitors.

At the start of play the Ark is orbiting a planet – clicking on exterior vision brings this into view and gives a taste of what is to come. Selecting another icon removes the Ark from orbit and enters the landing sequence. Previously games of this sort have chickened out at this point and make do with some crudely animated trench.

Captain Blood, on the other hand, provides quite stunning effects. Reminiscent of *Rescue on Fractalus* on the 8 bit Ataris, the sometimes rocky, sometimes gently undulating landscape goes whistling past the ship.

After following the computer guidance systems for a while the craft comes to a gentle stop and a large alien appears. There are five races in the game: The only ones I met, the Izwal, seemed very affectionate and wanted to meet females.

The aliens speak to you in sign language and you answer back in a similar manner. To this end the game provides a

series of ever-more intricate puzzles, with the little Izwals sending me half way round the galaxy and back again.

The rest of the game features some very imaginative use of colour. The hyperspace sequences for instance, are particularly effective. There's even an option to blow up the planet you happen to be orbiting – use this with care though, the Izwal do not like violence.

At present *Captain Blood* must be the best game available for the ST. How long it remains so is debatable. Its designers are already working on another project – I await its arrival with baited breath.

Mark Smiddy

Sound	10
Graphics.....	10
Playability	10
Value for money.....	10
Overall	10

SECOND sight

Captain Blood's programmers have come up with a gem of a game. It features spectacular graphics, digitised speech and interesting gameplay. The review copy was entirely in French so conversing with the aliens wasn't easy – I found this gave the game more atmosphere and added to the puzzlement and frustration. Recommended.

Andy Richards

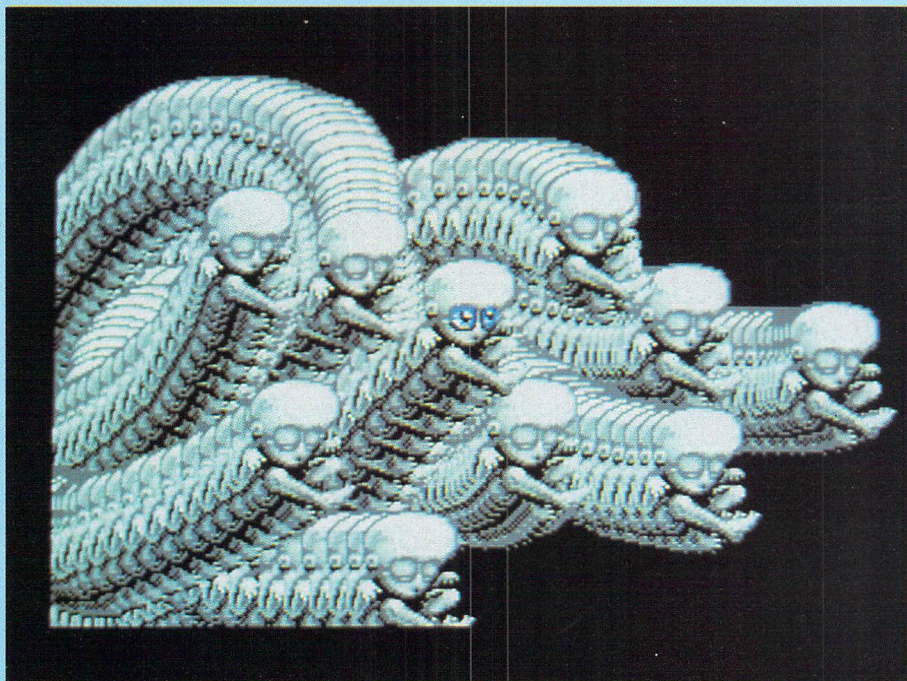
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game is to find the remaining clones and reassemble *Blood*. Fulfil this objective and Morlock will live forever.

If all this seems a little surreal – it is. The world of *Captain Blood* is quite unlike anything I've experienced before.

Supplied on two discs with sumptuous packaging, the game opens up with an eerie title screen representing, I assume, the clones of *Blood*. This is quickly followed by the main screen showing the Ark's cockpit. The design owes a lot to the work of Heavy Metal artist Moebius, who designed the alien spacecraft for Ridley Scott's film, *Alien*.

Everything is mouse-controlled, the alien feel being further enhanced by the mouse pointer – replacing the usual



Innovation isn't everything

Program: *L'Affaire...*

Price: £19.95

Supplier: Infogrames, Mitre House, Abbey Road, Enfield, Middlesex.

Tel: 01-304 0123

RAYMOND Pardon is out and he's looking for the rat who put the finger on him. Having just spent six years in the slammer for a crime he didn't commit and in the meantime losing Mylene, the only woman he ever loved, Pardon is in no mood for forgiveness. He wants the guilty party – someone is gonna pay for those lost years.

In this mouse-driven, graphic adventure, you scour seven European cities: London, Amsterdam, Paris, Barcelona, Cannes, Rome and Hamburg. During your trial, three people gave evidence against you – a Cannes barman, a Dutch citizen and a shady Parisian.

During your travels you also get to take on the guise of a gangster, a big chief (whatever that is) and a journalist, in addition to that of Pardon himself.

The screen is split into three sections. The top shows the current scene and a map of Europe. Top-right are two buttons for accessing the character pictures and your inventory, while along the bottom is a row of icons and a small window. When selecting a role to play, tiny digitised photos are overlaid on the map. The inventory also overlays it and is shown as a grid of boxes, each used to store an item.

To move from city to city the mouse is positioned on the map and clicked. The disc whirrs and the current scene is replaced by one in the new city. The icons are used for transporting between different locations in the same city.

Within a particular scene there may be objects which can be picked up and stored in your bag. You can't examine them though, all you can do is spot them, pick them up, discard or store them.

Many pictures have shadowy figures lurking within them. Clicking on them results in a digitised black and white photo popping up and the character speaking to you – displayed as a line of scrolling text below the main scene. You can't communicate with the characters other than by this one-way mechanism.

You collect objects, read speeches and continue until you amass enough evidence to convict the real criminals. And very boring it all is, too. The graphics are



In Paris at the start of the adventure



Your arrival in Barcelona

well done, though it is clear that this French program has a narrow impression of London – Tower Bridge and a sex shop in a red-light district. The only characters I spoke to in the latter area addressed me either as Mate or Dearie.

Infogrames continues to bring out games that are different from most, but innovation alone is no guarantee of success. *L'Affaire* is unusual, odd even, but it also completely fails to grip.

Bob Chappell

Presentation	5
Atmosphere	3
Puzzlement	4
Value for money	3
Overall	3

SECOND sight

I'm not normally an adventure fan, but I must admit to liking this one quite a lot. Maybe it's the offbeat and wacky Infogrames style that gives it its appeal. The screen display is good and I liked the mouse control. If you're looking for something a little different have a peek at this.

Andy Richards

Hunting for lost treasure

Program: *Solomon's Key*

Price: £19.95

Supplier: US Gold, 2/3 Holford Way, Holford, Birmingham B6 7AX.

Tel: 021-356 3388

SOLOMON'S Key returns you to an age of mystery and intrigue, to a place in which the fabled treasure of King Solomon shone brightly with its glorious wealth.

The game opens in a blue stone chamber, flanked by two large carved dragons. The only exit is patrolled by a floating guardian spirit and somehow you are going to have to find a way out. There is a key walled in across the screen and, not surprisingly, this is necessary to get out.

Appearing as a squat little green character, you more closely resemble the Munchkins in the Land of Oz than the scantily clad muscular hunk depicted on the packaging.

The problem is that you are near the bottom of the screen while the exit is at the top, and the visible platforms don't reach that far. More immediately, you are totally enclosed by blocks of stone.

Fortunately the solution to both problems is at hand. Pressing the joystick fire button causes an adjacent block to disappear and you can walk free. Firing again will make a new block appear and in this way you can build your own platforms, steps or protective walls.

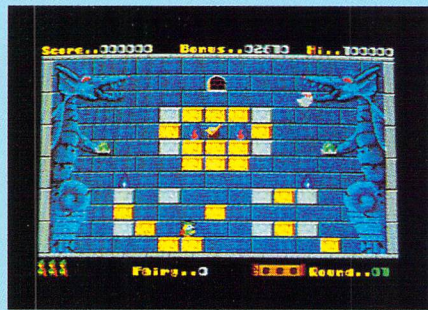
There are a couple of additional undocumented moves, which are essential to get through some screens – you should find these easily enough with a little experimentation.

The platforms on each screen are made of golden blocks and similar grey ones, the difference being that the grey ones are immovable. Thought and strategy is required when positioning blocks to collect useful objects scattered around, while avoiding the gremlins and beating the time limit.

Apart from the ability to move and remove blocks there is another weapon in your arsenal – you can initially hold up to three fireballs. These fizz around the screen, destroying all nasties in their path – pretty handy, although you'll have to find them first.

Other collectables include gems, treasures and magical items. Some are on

open view, others are hidden under blocks, so a bit of digging about is necessary. Some gems increase your score, some add fireballs to your supply, increase your capacity to hold more of



them, or give additional lives. You can also gain extra time.

Other objects can instantly change all gremlins into collectable objects. Still another sets free a fluttering fairy. Catching it won't increase your score or time limit, although the number of fairies caught is noted on the score board. I suspect they may come in handy later on in the game. Solomon's Key is simple in

Great graphics, poor game

Product: *Eco*

Price: £19.95

Supplier: Ocean, 6 Central Street, Manchester M2 5NS.

Tel: 061-832 6633

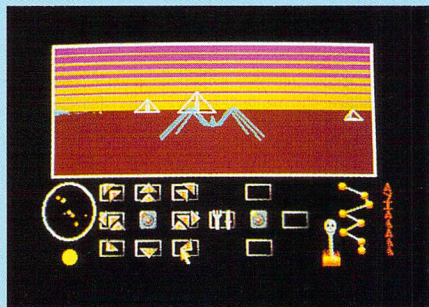
FROM Ocean comes *Eco*, a tale of the lives of generations of living creatures, their culinary preferences, love lives and descendants. "The contest of evolution ... in dramatic 3D vector graphics" is how Ocean puts it. And the graphics certainly are dramatic.

Essentially what happens is that you are presented with one of several possible biospheres or habitats, the choice being made by the humble ST (promoted here to god-like status) from tropical, temperate, desert, arid and frozen eco-spheres.

Various creatures are then generated by the ST, and colours suited to the biosphere chosen, for example, blues for the frozen bits, a reddish palette for the tropics. This colour scheme, by the way, is the only significant difference I can see between the various planets, aside from the desert landscape, which boasts

plenty of scorpions and pyramids.

Despite being only wire frame, the graphics succeed brilliantly in conjuring up the world of your creature as beetles scurry by, legs moving in rhythmic step, slugs squelch past, worms pop up to glance around, dogs gallop, birds soar overhead or strut around, humanoids run,



walk or jog and flies, well, fly. Even the scorpions scuttle menacingly and occasionally sting.

In short, the various creatures move very realistically and are animated as smoothly as can be expected as they go about their lives – eating, reaching matur-

ity and mating – passing, as they go, amongst beautifully drawn plant life.

You start off as a lowly insect – a beetle or, occasionally, a fly – and your goal is to evolve into a complex creature by unlocking all eight of your genes. The game screen consists of a view of your current creature. Initially, this is from behind, but you can move this view, rotate it, zoom in and out and pan around.

Below this window lies a radar screen and a climate indicator while on the right is a skull which hovers precariously above a jet of flame – indicating by proximity how long you have left to live. Between these are two joystick figures,

SECOND sight

This is a very strange piece of software – nothing to shoot, nothing to collect, no one to rescue and no puzzles to solve. It's not an arcade game or adventure – it's just fascinating to watch the superb 3D vector graphic creatures evolve.

If you've ever wanted to play God, then buy this game and live out your fantasy.

Andy Richards

concept, instantly playable and thoroughly addictive. The game has good graphics and sound and recommend it to Indiana Jones proteges everywhere.

Niels Reynolds

Sound	7
Graphics	8
Playability	9
Value for money	8
Overall	8

SECOND sight

This isn't really my cup of tea. However, I can see it appealing to puzzle fanatics. The object is to work out how to reach the door at the top of the screen by creating and destroying blocks. Lots of logical thinking and pre-planning are needed here. If you've got a mind like Spock you'll walk through this.

Andy Richards



each surrounded by up to eight icons selected by joystick or mouse.

And here lies the flaw. Two of them which will send you in search of food and a mate respectively, are the only ones you actually need to use in the game. Everything is done for you – even the screen which appears when you mate (and the Whitehouse brigade can relax, this is not depicted graphically) contains a die icon to randomise the unlocked genes and produce weird animals with little or no effort.

Nice sound. Great graphics. A game, rather than a programming exercise, would have been nice.

Roy Stead

Sound	10
Graphics	9
Playability	7
Value for money	6
Overall	8

Exploring in darkest Africa

Program: Livingstone I Presume

Price: £14.95

Supplier: Alligata Software, 1 Orange Street, Sheffield S1 4DW.

Tel: 0742 755796

YOUR task in this arcade adventure is to find the famous explorer Livingstone, lost in the African jungle. On booting the disc, within a blink of an eye I was dumped somewhere in the darkest continent, confronted by impenetrable bush. Luckily I had a few items which were to prove invaluable in my quest.

Using my vaulting pole (no self-respecting explorer should be without one) I leapt the bush in a single bound. Unfortunately I misjudged the power and landed head first on a man-eating plant. It grinned carnivorously as it tucked in to its surprise meal.

Using the sliding power meter scale on the bottom of the screen I soon got the hang of the pole vault. I landed on a high platform this time and saw that my exit was blocked by a threatening looking snake. I lobbed over a couple of hand grenades to alleviate the situation. Not particularly sporting, but highly effective.

As well the pole and grenades, I was equipped with knives and a boomerang, both of which were to prove invaluable. Carrying all this stuff meant there wasn't much space for food and I had to find what I could along the way.

At the next stage the ground gave way and I crashed headlong into a black pit. What seemed to be the only exit was solidly barred. To make matters worse, staring eyes flashed all around in the darkness – these proved fatal if touched.

There was a way out of this mess, although not particularly obvious. There are no clues in the manual, but any intrepid explorers to follow in my footsteps will find a way out with a bit of lateral thinking – desperation being the mother of invention, to misquote a well known phrase.

Snakes apart, there were pygmies, cannibals, alligators, scorpions, bats,

coconut throwing monkeys and piranha fish to contend with. Oh, and a sea eagle which proved to be a real pain, swooping down and carrying me off to the back of beyond.

Of course I now had to get back and this meant hopping on a log, avoiding the snapping piranhas and floating down river to dry land. Getting off was tricky (have you ever tried pole vaulting off a floating tree trunk?) and made even more



so by a particularly unsociable monkey which insisted on throwing coconuts at me.

I topped him with my boomerang and continued on my adventure – it was proving to be colourful, fun, frustrating and addictive – what more can an explorer ask for?

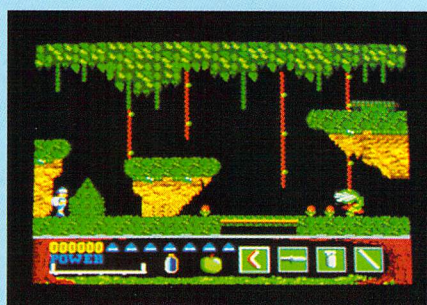
Niels Reynolds

Sound	7
Graphics	8
Playability	8
Value for money	9
Overall	8

SECOND sight

I first played this on the Amstrad CPC so I knew a few tricks before I started. It's an excellent multi-screen arcade adventure and great fun to explore. There are plenty of puzzles to solve, traps to avoid and wild animals and unfriendly natives to bash. Highly recommended.

Andy Richards



Drive yourself crazy

Product: *Karting Grand Prix*
Price: £9.95
Supplier: Anco, 35 West Hill, Dartford,
 Kent DA1 2EL
Tel: 0322 92513

Product: *Super Sprint*
Price: £14.99
Supplier: Electric Dreams, Terminus
 House, Terminus Terrace, Southampton
 SO1 1FE
Tel: 0703 229694

ONE of the problems associated with being a driver is that everyone expects you to excel at computer driving games. Because *Super Sprint* and *Karting Grand Prix* come under this banner it's time to jump into the driving seat and start my engine.

First on the starting grid comes budget-priced *Karting Grand Prix* from Anco Software. The blurb promises eight tracks with varying weather conditions, three levels of skill, even selectable tyre compounds and sprocket ratios.

The game sports a very nice title

screen, but afterwards things start slipping rapidly downhill. Just for starters, the options page features graphics that belong in a magazine listing. Anco could be forgiven for this, but the program has a nasty habit of jumping to the next option.

Once the selections have been made, you are presented with with an overhead view of the track and the race starts. Control is by joystick – forward to accelerate, back to brake and left and right to steer. Sadly this is where the game falls flat on its face. Attempting to keep up speed while steering at the same time is virtually impossible. The upshot is that the computer car streaks ahead at a terrific rate of knots leaving you miles behind.

The graphics depicting the tracks are nice enough, but the animation is poor. In fact judging by the speed and quality of the action I suspected that most of the code had been written in Basic and a quick check with *Disc Doctor* confirmed this. This is budget software and it shows.

Fear not, there is some good news for dedicated fans of racing games. It comes in the trailblazing form of *Super Sprint*, and surely must set the standard for all to



follow in this field. The game, licensed from Atari, to all intents appears faithful to the original arcade machine. The only major difference being in the controls – either joystick or keyboard. I've yet to see an ST equipped with steering wheel and accelerator pedal.

When the game starts you may select an options page to select the colour of your car, sound on/off and so on. Next a track is chosen by turning the on-screen steering wheel to the one of eight displayed and pressing the fire button.

Now, the three cars taking part in the race appear. Press accelerate to start.

Julie Boswell casts a fleeting eye over the latest software

F-15 Strike Eagle – Microprose

THIS puts you in the pilot's seat of one of the USAF's modern combat aircraft. You can fly one of eight different missions, including the night-time raid on Libya during April 1986. You either bomb targets on the ground such as the enemy airfields or enter dogfights with other planes.

The screen is split between the view from the cockpit window with the HUD (head up display) and sections showing your weapon status and radar. You can use the joystick to fly the Eagle, but the keyboard is used for special controls such as weapon selection, afterburners and so on.

The game comes with a well written manual describing the aircraft, the controls, options and the missions you have to complete.

Overall a great idea for a game. It has been well presented with lots of options available to the user. However, I found it rather dull and didn't experience any of the excitement normally associated with this type of simulation.

Diablo – Diamond Games

BILLED as the most original new game developed in years, *Diablo* is not quite original – I first saw it a couple of years back on the Amstrad CPC. It has now been upgraded and, converted for the ST, and a great little game it is, too.

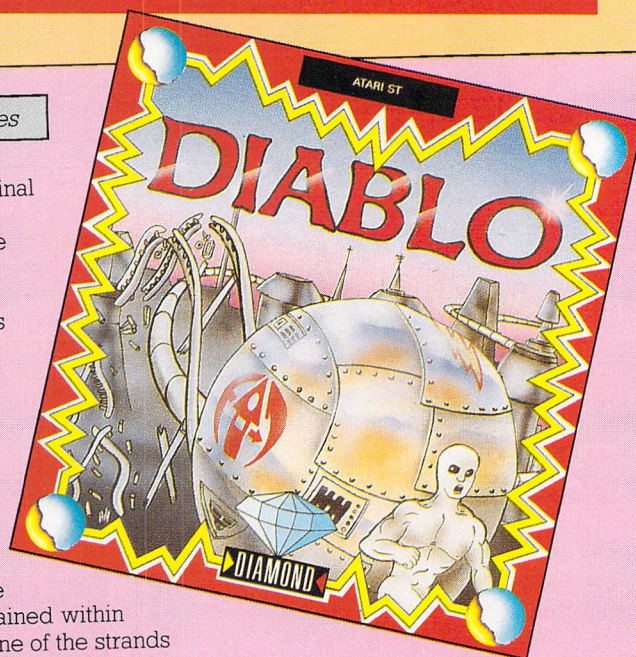
It's a mind-boggling puzzle that will have you tearing your hair out within minutes.

Displayed on the screen is what looks like a plate of spaghetti contained within a box. Travelling along one of the strands is a small ball and your task is to ensure that it does not hit the sides of the box or come to the end of a strand.

This is achieved by moving blocks of spaghetti around like one of those sliding block puzzles. So if the ball is heading for disaster, its course can be altered by

rearranging the strands in front of it.

If you like puzzles and are one of those geniuses that can solve Rubik's cube in seconds then this is the game for you. Otherwise, steer clear – you'll be bald within a week.



This gives you the option to join in or leave a game at any time, and can be useful if you fancy dropping out for a rest. Any car not controlled by a player – and up to three people can take part – is driven by the computer.

Joystick control is exemplary. The fire button is used as the accelerator, leaving the stick for steering. This simple control makes Super Sprint a real breeze to play.

Don't be fooled into a false sense of security though. Cars can only smash into

carrying a spare car. Luckily for maniacs like me, there seems to be a never ending supply. As the race progresses, a little artistic license crops up in the form of bonus score pads, golden spanners, hazards like oil and water slicks, tornadoes and poppers – strange mechanical ramrods that leap out of the ground.

Collecting three or more spanners results in a bonus custom job on the car. This means you can add super traction,

better top speed, turbo acceleration and increased scoring.

At the end of each race the winner's circle is displayed with the champion proudly displayed on the rostrum. The car bringing up the rear (which often seemed to be me) has a mechanic doing various things to its engine. This included attacking it with a hacksaw and hitting it with a large mallet. So even if you are last this provides some imaginative humour.

Super Sprint is by far the best of the two games. With far more features, much better sound, greatly improved graphics and infinitely better playability. Although it's slightly more expensive than Karting Grand Prix, the extra cost is well justified.

Mark Smiddy

Karting Grand Prix

Sound	2
Graphics.....	5
Playability	3
Value for money.....	6
Overall	4

Super Sprint

Sound	7
Graphics.....	8
Playability	9
Value for money.....	9
Overall	8



the walls at low speed without sustaining damage – too fast and the whole thing goes up in flames. Thankfully, the wreckage is quickly replaced by a helicopter

SECOND sight

Two completely different car racing games here – Karting is incredibly dull and isn't worth a second glance, but I got hooked on Super Sprint and had to be prised off the ST with a crowbar at the end of the day. Sprint has better graphics, faster action, more addictive gameplay – altogether a better buy.

Andy Richards

Tonic Tile – The Edge

I REMEMBER first playing this game six or seven years ago on my trusty old ZX-81. Way back then, it ran in just 1k of ram and used a strangled 8 bit Z80 processor running at a snail's pace. Now the same game comes on two 350k floppy discs and requires a 16 bit processor running at 8MHz and at least 0.5Mb of ram. What is the game? None other than Breakout.

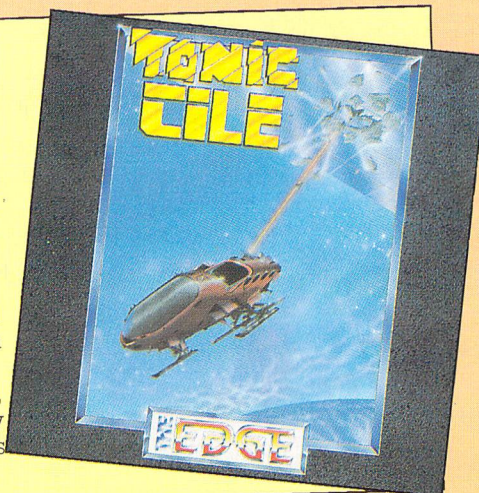
Admittedly, this variation of that old favourite is absolutely brilliant, but original it 'aint. However, it is still good fun and everyone who saw it just had to have a go. It has been brought up to date

by the addition of some very snazzy graphics and amazing music.

There are aliens flying about the screen and, when hit, certain bricks turn into cylinders and roll down the screen. Collecting them enables you to gain extra lives, weapons like lasers, super-large bats, glue and so on.

It gets quite hectic at times and requires a lot of concentration and much gritting of teeth.

If you haven't already got Arkanoid, Impact or Addictaball (or if you simply like collecting Breakout variants) this is highly recommended.



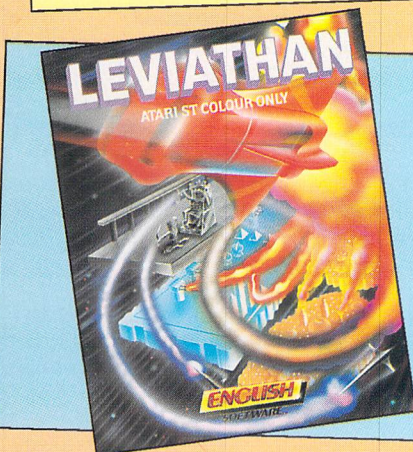
Leviathan – English Software

ALTHOUGH English Software claims Leviathan is based on ZZ Top's video Rough Boy, I would say it's a variation on that arcade classic Fortress. It is a diagonally scrolling shoot-'em-up with you in control of a spaceship hurtling over alien planets.

As the ground scrolls smoothly beneath, you can dive down to the surface and knock out towers and other assorted structures that get in your way.

Alien ships do their best to ram you as they wind their intricate path across and down the screen. However, your laser soon dispatches them to wherever aliens go when they're zapped.

There are three different planets and around 10 different types of alien. You have a limited amount of fuel and have to stop on screen two to fill up. The sound is good, the graphics, OK and the gameplay is fairly addictive.



Jest a medieval romp

Product: *The Black Lamp*
 Price: £19.95
 Supplier: Rainbird, 64-76 New Oxford
 Street, London WC1A 1PS.
 Tel: 01-379 6765

THE Black Lamp is basically a ladders and levels game – a theme that has virtually been done to death over the past few years. However, having said that, the high standard of programming, top quality graphics and delightful music of this arcade adventure from Rainbird breathes new life into a worn out scenario. This really is the best of its kind.

The action takes place in medieval times with you in control of a jolly jester named Jack. His life is devoted to keeping the court of King Maxim of Allegoria a happy and cheerful place. However, this is not as easy as it might otherwise be. A great catastrophe has befallen the kingdom and doom and gloom abounds.

Among the king's crown jewels were a set of enchanted lanterns, and in particular, one special black lamp. One dark night, they were stolen by dragons and ever since the land has been plagued by a strange phenomenon. All animals, birds, insects and even gentle village folk have been transformed into ferocious demons who attack anything and everything in sight. Clearly something must be done.

Jack's job is court jester however, and the loss of the lanterns doesn't really concern him – until he asks the king's permission to marry the woman he loves, that is. For it is none other than the King's daughter, the beautiful Princess Grizelda.

This was no joke for the King, and (to quote the accompanying blurb) "the idea of his beloved maiden daughter with that fool – it was virgin on the ridiculous!".

So King Maxim sets Jack an impossible task – find the dragons, slay them and return with the black lamp and he can have his daughter's hand in marriage. Of course, he doesn't think Jack has any



hope of succeeding with this near-impossible task.

This is where you come in. Your task is to guide Jack through villages, rooms, cellars, castles and dungeons in search of those thieving dragons. Once found, they have to be killed and each lantern taken and stored in an empty treasure chest.

The action takes place both indoors and outside. When walking outside, the screen scrolls smoothly and continuously as you approach the edge of the playing



area. There are village houses, huts, gates into fields and so on. Each can be entered by walking into or out of the screen.

If you enter a building, the game format changes slightly. Each room is screen-sized and as you pass through a door the next screen flicks up after a short delay.

Many of the rooms are also interconnected by a series of ladders as well as doors, so you can go up and down as well as left, right, into and out of the screen. All this makes it very difficult to keep track of where you are and you'll wander aimlessly around for quite a while.

There are a lot of assorted monsters, demons and other nasty creatures out to get you, including dragonflies, wasps,

vampire bats, werewolves, crows, goblins, slime witches, trolls and the dreaded dragons themselves. These fill the screen and home in on you within seconds of entering a room. Many can fire projectiles at you from a distance – fireballs, arrows, spitballs, bolts of lightning and so on.

Your only protection, apart from your natural jester's athletic jumping and tumbling ability, is your belt buckle. Sounds strange, but Pratweezle the magician has endowed it with special powers and it can emit bolts of pure magic. This enables you to disintegrate everything in your path, though some of the more powerful monsters require several hits before expiring.

This well-produced arcade adventure is fast, fun and very addictive. The graphic backgrounds and large sprites are drawn in fantastic detail and the characters' animation is good, though not quite excellent – a few more frames in each sequence would have helped smooth things out a little.

The music is among the best I've heard, consisting of some nice atmospheric pieces including Greensleeves during the game and (I think) Elizabethan Serenade (I'm not too hot on Mantovani) during the title screen.

Julie Boswell

Sound	9
Graphics.....	9
Playability	9
Value for money.....	9
Overall	9

SECOND sight

I thought we'd seen the last of ladders and levels games, but no, here's yet another. This however, is brilliantly programmed and I for one, am prepared to put up with the well-worn theme because the action is amazing. I just wish Rainbird had made it a bit easier – I constantly got battered by all manner of fiendish foes and didn't last five minutes.

Andy Richards





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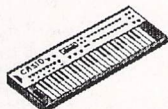
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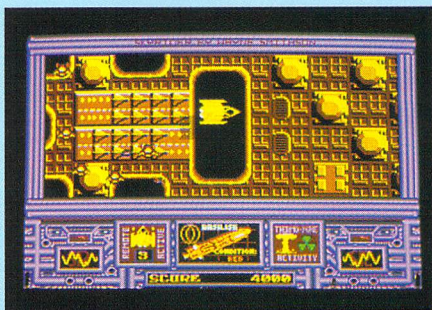
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Program: Skyriders
Price: £14.95 (Mail order only)
Supplier: Creation, 36 Salisbury Road Hod-
desdon, Herts EN11 0HX.

EARTH is under attack once again, not by any common or garden alien, but by radiation. Scientists have noticed a dramatic increase in natural radiation levels and an interstellar probe has pinpointed the source as a gigantic spaceship circling the globe.

The superpowers get together and



decide on a plan of defensive action. Soon a prototype strike craft is ready – the Skyriders. Now where could a courageous, dauntless, indomitable and heroic pilot be found? Know anyone who fits the bill? No? Well, in that case, you'll just have to go yourself. So that's how you find yourself being ejected into the black void

of space, twisting and turning to confront the alien Longcruiser.

You are immediately attacked by some seemingly ineffectual alien craft. They roll down in small groups, dropping floaters on you which chip away at your protective force field – too many hits will destroy you. Luckily, those thoughtful superpower chappies have managed to cobble together a number of these Skyriders craft, so you have a few to play with. Even more are supplied for every 50,000 points scored.

The well detailed Longcruiser scrolls horizontally below as you dodge space mines and floaters. Time is of the essence – your radiation indicator is turning from green to brown. If it gets to red, well that's your lot.

Controlling the Skyriders with ease you wonder what the big red button on the joystick does – oops, there goes an alien weapons dump – hope they're insured. Pulling back on the stick helps you slow the ship to a snail's pace, making the destruction of ground targets a slightly more relaxed affair. The laser gates are easily knocked out and, after a couple of prangs, you realise that objects with big shadows can't be destroyed or flown over.

Dodging through the maze of buildings at the far end of the Longcruiser you fly off to mangle the next. It's obviously the

same make as the first, but a different colour and a model or two up the range. The factory fitted extras include a couple of missile silos, which launch a rather unfriendly homing device as you come into view. Some nifty dodging or shooting is called for here.

Passage through the first couple of levels isn't too difficult, but if you want to make things a little trickier you can switch to inertia drive. This makes for a slightly wobblier ride.

How can you refuse to save the world from a fate worse than all out superpower confrontation for the sake of a measly £14.95?

Niels Reynolds

Sound	7
Graphics.....	7
Playability	8
Value for money.....	8
Overall	8

SECOND sight

Fantastic shoot-'em-up – just wish I knew what on earth was going on. Still, it's great fun scrolling left and right while blasting everything in sight. If it moves – shoot it, if it doesn't shoot it anyway. I had trouble seeing the enemy ships and missiles on my colour TV and constantly got zapped or rammed.

Andy Richards

Program: Rampage
Price: £14.99
Supplier: Activision, 23 Pond Street,
Hampstead, London NW3 2PN.
Tel: 01-431 1101

THIS was one of the big arcade cult smashes of last year, and most people went barmy over the thought that it was to be converted to home machines. Well, here it is, and is it as good as people thought?

The story concerns three people, George, Lizzie and Ralph, who ate hamburgers contaminated with radioactive sludge and grew into large monsters bearing uncanny resemblances to King Kong, Godzilla and the Wolfman.

In a mindless rage, the three creatures went on the rampage – hence the title – wrecking cities, crushing people and generally having a monstrously good time.

The army was called out, and tanks and choppers were ordered in to deal with the monstrosities. So it was up the monsters to defend themselves in order to survive.

Budget bashing

You control one of the three monsters – the other two are either controlled by the computer or two other players. You have to climb up the sides of buildings and literally smash the living daylights out of them. Sometimes something or someone will appear where you've just hit. You can eat humans, but it's downright unhealthy to chew on TVs, cacti, baths, and other such inedibles which damage you.

While all this is going on, the army is doing its darndest to kill you. Soldiers fire from windows, lob dynamite and other stuff, helicopters blow you away from heights (although you can jump and smash them to the deck), tanks blast at you with heavy calibre weapons inflicting a lot of damage. And if you're not careful, your allies slip in one or two crafty pun-

ches and slam you to the pavement.

The graphics aren't quite as good as they could have been, the sound is enough to drive anyone straight up the side of a building whether they've eaten a radioactive hamburger or not, and the gameplay is pretty repetitive. If you're playing it on your own, the game gets boring very quickly. Even if you're playing it with two friends, it is average, not totally enthralling.

The arcade game was great, it was absolutely hilarious to play and I just couldn't help shovelling in 10ps like there was no tomorrow. But this lacks that certain oomph that gave the arcade machine its deserved cult status. If you must have Rampage, the price is quite attractive – almost a budget title as far as the ST is concerned. But if you're not too bothered, put your money towards something else.

Robert Swan

Graphics.....	7
Sound	5
Playability	6
Value for money.....	6
Overall	6

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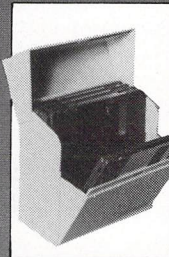
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Exciting trivia challenge

Product: Powerplay

Price: £19.95

Supplier: Arcana, 2 Clare Street, Bristol, Avon BS1 1XS.

Tel: 0272 297162

ALTHOUGH Powerplay is claimed to be a "stunningly original quiz game", it is in reality a variation on Trivial Pursuit. I wasn't too impressed when TP was released for the ST, and made up my mind that all computer-based trivia games were deadly boring. However, after spending some time with Powerplay I've changed my tune, it's excellent.

Basically, it is a board game like TP, and every time you move your piece to a new square you must answer a question on one of four different topics depending on the square's colour. The topics are general knowledge, sports and leisure, science and technology, history and geography.

What makes this so much better than TP is that it is based in ancient Greece and is played by the Greek Gods. You, and up to three friends, take control of a whole family – Apollo, Hermes, Hecate or

Aphrodite – consisting of four warriors each. Each family has different members and each member has different qualities.

To start, you can move any of your four pieces to a vacant square. You are then presented with a question and four possible answers – three are wrong, you have to choose the right one. There's a time limit of a few seconds – barely long enough to read the question – so there's no time to sit and think, you must react swiftly and choose the correct answer.

If you get it right you gain wisdom points – the amount depending on how fast you answered the question. When 25 points have been accumulated you have the option of mutating your piece to a higher life form.

You can challenge another player to a duel by attempting to move on to an occupied square. You are then both taken to either a cave full of molten lava or a high mountain top where a huge rock is precariously balanced above your heads.

Multiple choice questions are flashed up on the screen and the first to hit the correct answer button (separate controls are used) drags the other towards the

lava or under the rock. Eventually one will be either boiled or crushed. This doesn't necessarily mean the end though, as the piece is transformed back down to a lower life form. Only if it is already the lowest will it be taken off the board.

You can move round the board answering questions and mutating to higher life forms before issuing a challenge to an opponent. If you lose, you won't be killed off, simply reduced in rank. The object is to completely wipe out the opposition through issuing challenges.

This is an exciting game due to the quick-fire multiple-choice question technique. It reminds me of TV quiz shows: "Fingers on the buttons ready for the next round, here's your starter for 10...".

Julie Boswell

Graphics	6
Sound	6
Playability	8
Value for money	8
Overall	7

Wiz of a game

Product: Wizball

Price: £19.95

Supplier: Ocean, 6 Central Street, Manchester M2 5NS.

Tel: 061-832 6633

WIZBALL is a successful game on other micros which has been converted – and enhanced in its transition – to the ST. As with most Ocean games, its presentation is slick, sleek and professional – with a good opening graphical sequence depicting Wiz releasing Wizball on his mission.

The title screen is one of the best I

was a place called Wizland. And a jolly nice place it was too. The sun shone all the time and everything was hunky dory. But then the evil Zark and his spritey henchmen captured the spectrum and made all the land drab and grey.

Wiz in his Wizball transporter, accompanied by his faithful companion Catelite, is trying to restore the colours to Wizland. And that is where you come in.

It falls to you to control the Wizball of the title in its quest for colour. When you kill one of the many aliens they mutate into pearls of different colours, each causing weird and varied side-effects depending on their colour.

White ones give you an extra life for Wizball, grey gives Catelite 128. Magenta pearls mutate Catelite, black cause – naturally – a blackout and collecting a blue pearl results in a filth raid – I don't know what this is as I haven't witnessed one yet. Sounds interesting though.

Green pearls are the most common, and collecting one causes the next in a line of seven icons to flash. The flashing one is selected by wagging the joystick. They affect movement, firepower, Catelite, spray protection, smart bomb and shields. All in all, quite a few options.

Wizball is that rare item – an involving game which is likely to last more than a couple of hours. Although it takes a little

time to get into (Wizball was a touch awkward to control at first, but I soon got the hang of it), patience and perseverance were their own rewards as I delved deeper into this wonderfully addictive game.

In short, Wizball definitely has that "Just one more go" factor which has marked only a very few games for lasting appeal. But what are you still reading this for? Go out and buy it!

Roy Stead

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



have seen, with effective music accompanying the transition from black-and-white to full colour in an echo of the game's object.

A long time ago, on a world far away,

SECOND sight

I've always been a fan of Pete Johnson's games – you can guarantee they'll be superb – so I rushed out and got this as soon as it was available. I wasn't disappointed – it's another great arcade game. The controls are weird and take some getting used to and it's difficult to play, so don't expect to complete it in one sitting.

Andy Richards



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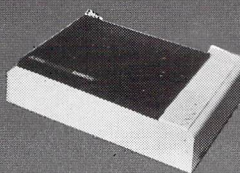
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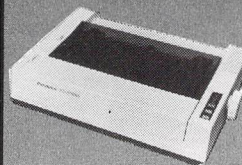
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CYBER PAINT is an extraordinary graphics animation program, even more powerful than impressive packages such as Aegis' Animator, reviewed in the June 1987 issue of *Atari ST User*.

It is a cel animation program, which means that it works by showing a series of predefined pictures in sequence over a background, giving the illusion of continuous movement.

Compatibility reigns supreme here, as the program can be used in conjunction with Antic's other packages to produce very sophisticated animations combining cel and 3D techniques. These include the animation language Cyber Studio and the solid design program CAD-3D II. Apart from that, it's a very well-specified still graphics program.

Cyber Paint requires at least a one megabyte system as well as a colour monitor. The program operates in low resolution only.

On loading you are presented with a somewhat daunting white cursor on an otherwise black screen. Clicking the right button brings up the main menu at the top of the display. At the bottom is the playback bar, a set of controls resembling those of a video recorder. These include play, rewind, fast forward, frame count and other functions.

In order to create your own cel animation, or improve images designed with CAD-3D, you use the functions under the

Copy, which makes the background colour transparent.

Moving to the colour menu we find a selection of working colours and you can define your own palette. Apart from the standard RGB method, there's an alternative called HLS (Hue, Luminance and

Saturation) which some may find easier to use.

In addition there's also a useful function called Tint, which slightly nudges all the colours of the palette towards the currently selected colour. This is obviously useful if you want to recreate complex



The result of drawing while in the zoom mode

Robotic animation

Draw menu. Having selected one, click the right button to get to the workscreen.

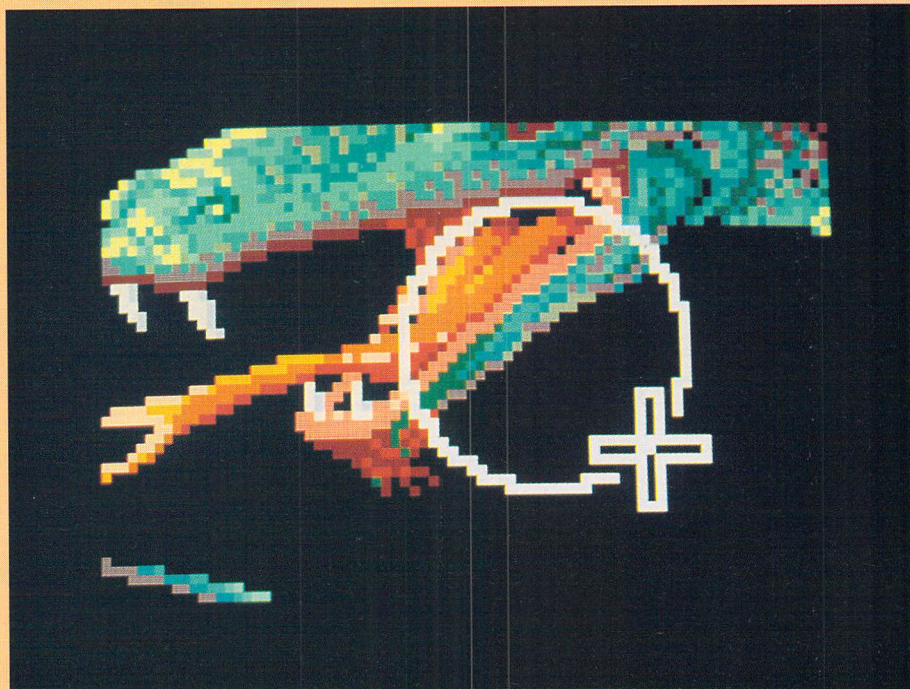
Once there, Draw creates single points, and Streak creates broken lines to give a brush-like effect. Stipple draws randomly distributed pixels in a small swathe, while Airbrush is similar but has user-definable speed and spread.

Functions such as Fill, Line, Circle and Box are self-explanatory, although it is worth noting that they even work in Zoom mode – something which can't be said of Degas Elite or NeoChrome.

The Polygon function on the other hand, is more unusual. This produces rubberbanded lines which can be doubled back to reveal the background colour. In this way you can form polygons with hollow centres.

Under the Modes menu lies the Filled option, which selects whether circles and boxes are full or empty. Also found here are Distinct, Concentric and Connected, which affect the way circles, lines and boxes are drawn, singly or in series.

Finally there's Ping-Pong, which plays the animation back and forth, plus X-Ray



Shapes can even be drawn while zoomed in

effects of light and shade. The Colour Cycle feature can be used in conjunction with any of the drawing functions. The Text options allow the system fonts, or any of the many Gdos fonts supplied on the disc, to be manipulated in size and style then placed on the drawing screen.

These then, are the main drawing tools. On top of this there are several advanced manipulation facilities which make it particularly easy to create the slight variations of each frame necessary to produce convincing animation.

The Clip command cuts out a portion of the screen, displaying its coordinates in a small box. Clipped boxes can be moved, copied, rotated through X, Y or Z axes, stretched, shrunk, inverted, recoloured, used as brushes, or turned into a single colour to create shadow effects behind the original image.

The Frame menu contains complex functions such as Separate, which replaces any given colour with another, and Defocus, which averages the pixel colours at borders to reduce the jagged



Using Cyber Paint's rotate feature to create special effects

Cyber Paint from Antic is much more than just an art package as Chris Jenkins reveals

aliasing effects which make computer graphics look unrealistic.

A finished frame can be saved to either floppy or hard disc in several formats: NeoChrome/Art Studio, Degas compressed and uncompressed. When a picture has been drawn, you move on to the exciting bit – creating the animation.

The playback bar at the bottom of the screen now comes into its own. The Create Frame, Previous and Next icons allow you to insert a workscreen into the sequence at any required frame number.

You can then go to the start or end of a sequence, run through it backwards or forwards (or alternately), display the total number of frames, duplicate them, delete frames or blocks of frames, and so on.

In order to create convincing animation, you need to be able to see the previous image while you are working on the current one. This is done using the Blue function (from non-repro blue, a technique used in printing) which copies your previous frame on to the workscreen in a single colour which can then be erased.

By slightly altering the image on the workscreen, using the blue image for reference, you can create a whole series slightly different, and that's animation.

While the Blue function works automatically, you can also control it manually. This allows you to choose which segments of the image are blue. The result is that while some sections of your cha-

racter or picture can remain identical in a whole series of frames, others can be animated.

Another function called Get Changes will transfer only the changes you have made on an image into the next frame. For a quick look at the animation you have created, Scratch allows you to zip back and forth through the images by moving the mouse left and right.

A series of images can be saved as a sequence file with the extension SEQ. You can then load a previously drawn background picture using the Underlay function, which places the new picture underneath the animation.

Bear in mind though, the colour palette will change to that of the animation. There's also an Overlay function, which of course, works the other way around to the underlay.

The crucial function of any animation program which takes the drudgery out of creating a series of near-identical images, is Tweening. Named after the process of drawing the stages inbetween major animation points, this is the kind of thing the ST is great at.

For instance, you can draw an image, assign it a frame number, and place a rotated version of the same image in a later frame.

The Tween option from the submenu takes a look at the beginning and end frames and creates the in-between images of you. Nice touch that.

The most powerful block of functions are saved until last. ADO (Antic Digital Omni-Mover) imitates the functions of multi-thousand pound systems like Quantel Paintbox.

Selecting the ADO menu allows you to

create a clip box and rotate it around any given axis, X, Y or Z (horizontal, vertical or depth), with any chosen centre of rotation. You can also combine rotations to create spins around a diagonal axis.

The Size option lets you define a vanishing point and expand or shrink the subject image, while Move allows a whole image to negotiate a set path, either defined as a series of points or drawn out in real time using the mouse.

All these ADO effects can be incorporated into the series of frames already containing your animation. The results can be staggering, as hordes of writhing, flying, contorting images whirl around your screen without a jot of incomprehensible machine code in sight.

Cyber Paint can incorporate Degas blocks, Aegis Animator strip files, and even Amiga image files, so it's of particular use if you already use any of these products.

While Aegis Animator features some wireframe polygon animation features which Cyber Paint does not, the ADO facilities more than make up for this.

However, you must remember that an enormous amount of work has to be put into a really convincing animation, and there is still no substitute for artistic ability.

Cyber Paint is a staggering demonstration of the ST's graphics potential.

Product: Cyber Paint

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FREE GAMES COMPENDIUM: ATARI ST ☐ MONO ☐ COLOUR ☐ AMIGA ☐

GFA Vector and GFA Companion have been written to complement GFA Basic to the full. Mark Luckham finds them useful utilities

Two friendly approaches to better Basic

GFA Basic is one of the most modern, not to mention fast, implementations of Basic you can buy for any personal computer. But even so there are limits that pure Basic cannot surpass unaided.

Two products have recently been released, by Microdeal and Glentop, to help break down these barriers, and to help make programming in an already user-friendly language, even easier.

GFA Companion

This is the Microdeal product, and it works on two levels. Primarily, the package contains a dialogue box source code generator which is used to produce the code to duplicate many Gem dialogue box types. This code can be customised to suit requirements and can then be merged into a standard GFA Basic program.

There are two advantages to this: It is so much easier than programming everything yourself, and the boxes are more flexible than the Gem originals.

The secondary function comes in the form of a series of tutorial files, designed to supplement the material given in the GFA Basic manual – an excellent idea for anyone just getting to grips with the language.

However, back to the main subject – the code generator. The program uses

three drop-down menus, Desk, Dialogs and Quit, of which only the middle one is of any great importance.

Underneath Dialogs is a list of box types you can create. They are, in order, credits, error, function key, help text, and the following with a customised tag: Long style, radio button, text only, and wide style boxes.

Selecting the desired option lets you get straight on with the job of designing that particular style of box. You are prompted for a style of text from normal, bold and italics, to use on a number of the boxes, and apart from filling in text, that is all you have to do for many options.

The error box is a neat idea, as it is friendlier than the one provided by Gem. The error number is displayed, along with a comment as to whether it is fatal or not, and you are presented with the option of continuing or aborting.

The major routine in the Companion package is the custom design option. This features something called resolution overlays – very useful in checking that a box under construction will be viable in

both medium and high resolution modes.

After sorting that out you can go ahead and design the shape and content of a dialogue box, complete with slider, options and quit box. The way the drawing and text positioning works is inspired by Degas, and the manual acknowledges the fact, so anyone familiar with that art package will be quite at home here.

You can do many more things with the various types of box, and they are all useful and time saving. So once a design meets the required standard you can save it to disc as an LST file which can be merged back into a GFA Basic program and called as a procedure whenever you want to use it.

GFA Vector

Starglider in Basic? Well, maybe not, but with GFA Vector you can certainly create three dimensional objects and animate them from within GFA Basic.

Objects can be defined by using the editor in one of two ways: By entering the coordinates of the points and lines used in the object, or creating it using a 3D graphics editor.

The object created can have up to 1024 points, 1024 lines, can be rotated about three axes, and you can have up to 32 of them in your program. Rotation can be from one degree upwards – the cruder it is the faster the resulting object rotates.

A demonstration program on the disc gives some idea of the system's capabilities. The manual clearly explains the concepts necessary to produce an object and uses an example of a pyramid to make the point. Essentially all the points of the object must be defined in terms of the three axes, and then the connecting lines are added.

This is fine for simple objects, but for anything more complex than the pyramid mentioned, it is easier to use the graphics editor and draw them.

Once you've made the initial calculations, the Display object function brings



GFA Companion's opening screen

Turn to Page 54 ►

ATARI \$ USER

Guide to Atari ST software & hardware

Applications

Product name	RRP inc VAT	Distributor/Supplier
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CP/M Emulator	FOC	Atari
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CBasic Compiler(CPM)	511.75	Software Toolshop
Devpac	49.95	Hi-Soft
Fast Basic	89.95	Computer Concepts
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4xForth Level I	99.95	Silica
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Forth Accelerator	74.95	Silica
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GST C Compiler	59.95	Electric Software
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Henry's Basic	56.35	Silica
Hi-Soft Basic	79.95	Hi-Soft
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Hi-Soft Devpac-80(CP/M)	39.95	Software Toolshop
Hi-Soft Modula-2(CP/M)	49.95	Software Toolshop
Hi-Soft Pascal-80(CP/M)	39.95	Software Toolshop
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Microsoft Fortran (CP/M)	632.50	Software Toolshop
Microsoft Macro80	130.00	Software Toolshop
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Nevada Basic (CP/M)	99.95	Modula-2
Nevada Cobol (CP/M)	39.95	Software Toolshop
Nevada Fortran (CP/M)	39.95	Software Toolshop
Nevada Pilot (CP/M)	39.95	Software Toolshop
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Personal Pascal	345.00	Software Toolshop
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Pro Fortran-77	39.95	Hi-Soft
Pro Pascal	148.35	Prospero
ST Basic	148.35	Prospero
ST Developer's Toolkit	FOC	Atari
ST Logo	373.75	Atari
UCSD Pascal	FOC	Atari
Work-Forth	74.75	Grey Matter
ZBasic (CP/M)	99.95	Microprocessor Eng.
Zurich Modula-2	89.95	Software Toolshop
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Frontier Software , PO Box 113, Harrogate, North Yorkshire HG2 0BE. Tel: 0423 63400		

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VIP Professional Gem	228.85	Silica
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GST Edit	24.95	Electric Software
H&D Toolbox - Volume I	29.95	Silica
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Protext	79.95	Kuma
Regent Spell	49.95	Arnor
Regent Word	49.95	Silica
Regent Word II	99.95	Silica
Spell-IT!	19.95	Frontier
ST Writer	FOC	Atari
Textpro	39.95	Adamssoft
Timeworks Word Writer 3	79.95	Electric Distribution
Word For Word	39.95	Silica
Word Processor	345.00	John Uings Software



Radio Button Box How Defined

Save

Abort

Five Radio Buttons

Enter the function for button 4:
 > option 4

Defining a
 dialogue box

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the image to life by rotating it, viewing it from any position and changing the scale if needs be. Usually you find that instead of an intergalactic spaceship you've actually produced a crumpled piece of origami.

However, should everything be fine you can save the object to disc ready for

inclusion in your own programs. This is where the going really gets tough, as incorporating the finished design takes no little effort. A number of parameters and variables must be set correctly, and great care is needed to avoid making a total shambles.

Though the results can be quite impressive, arcade games like Starglider and others really are out of the question.

Conclusions

Both products are valuable additions to the GFA Basic programmer's arsenal, but whereas GFA Companion is aimed at the beginner to intermediate level, GFA Vector is only recommended for those in the intermediate to expert category.

GFA Companion's value extends beyond its proclaimed function by providing tutorials, and so can be said to be required reading for programmers of the proficiency mentioned above.

GFA Vector treats a complex subject well, and provides accomplished Basic programmers with the means to produce spectacular effects from within their favourite language.

Product: GFA Vector

Price: £34.95

Supplier: Glentop Press, Standfast House,
 Bath Place, High Street, Barnet, Herts
 EN5 5XE.

Tel: 01-441 4130

Product: GFA Companion

Price: £29.95

Supplier: Microdeal, 41 Truro Road, St
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Tel: 0726 68020



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A shot in the arm

HAVE you ever considered the amount of mail that goes through the Post Office every year? Over the Christmas period more than a million letters are processed daily. Just consider that if a company had to mail just 50 letters each day, in a year it would have posted 13,000. And imagine writing or even typing out that many envelopes.

Many companies which have large client mailing groups like banks, mail order catalogues, book clubs, publishers and so on often use professionally designed mailing list programs to aid production and distribution.

A mailing list like Mailshot Plus is a customised database whose primary function is to produce masses of labels for addresses. Other uses include book labels, plant and disc labels to name just a few.

Let's have a look at some of the features to be found in Mailshot Plus. For a start, although not Gem-based, it follows the wysiwyg (what you see is what you get) concept.

It is ram-based so there is a maximum number of labels it can hold in memory. On a 520ST this will be about 1500 and a 1040ST can hold approximately 3000. You can have one file and one subset, both of which are held in ram.

Running on medium and high resolutions, you can start entering data from boot-up. On the left side of the screen is a menu of available options. The right side of the screen is taken up by a facsimile of a roll of printer labels one web wide on tractor feed.

There is a status line at the top right of the screen, which gives information on the number of the current label being edited, the number of labels in the file, whether the file is a whole unit or a subset and the percentage of labels displayed.

The method of entering data is quite

Mailshot Plus from Digita International is ideal for the business user, says Alan Goldsbro

simple: Select Add from the menu by highlighting it with the mouse or cursor keys, type in your data in the same way you wish it to be printed out, and press Return at the end of each line.

The characters are displayed on the centre label as you enter your data. The information is input as if you were actually typing out a label on a typewriter, the major difference being that this is stored in the computer's memory. As each label is finished, the screen display scrolls up and you're ready for entering the next one.

Because this is a specifically designed program, there is no need to define field widths as you would in a database. Instead, you choose the number of lines from 3-12 and alter the width from 10-48 characters. Then you select the pos-

itioning of the text choosing from left, right and centre alignment for both horizontal and vertical axis. Whatever style is displayed on the screen is echoed to the printer at the time of output.

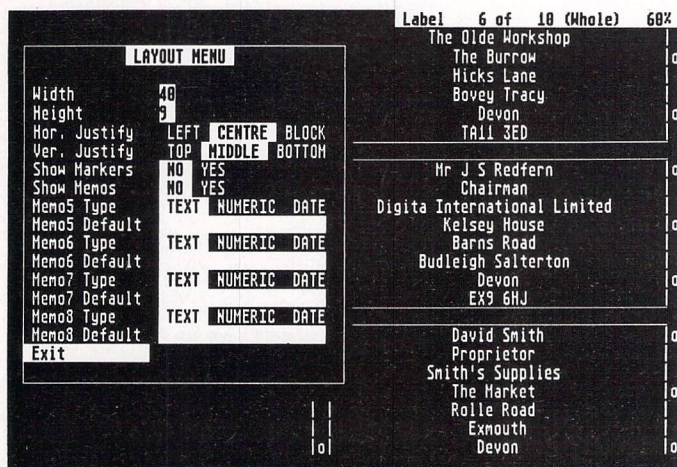
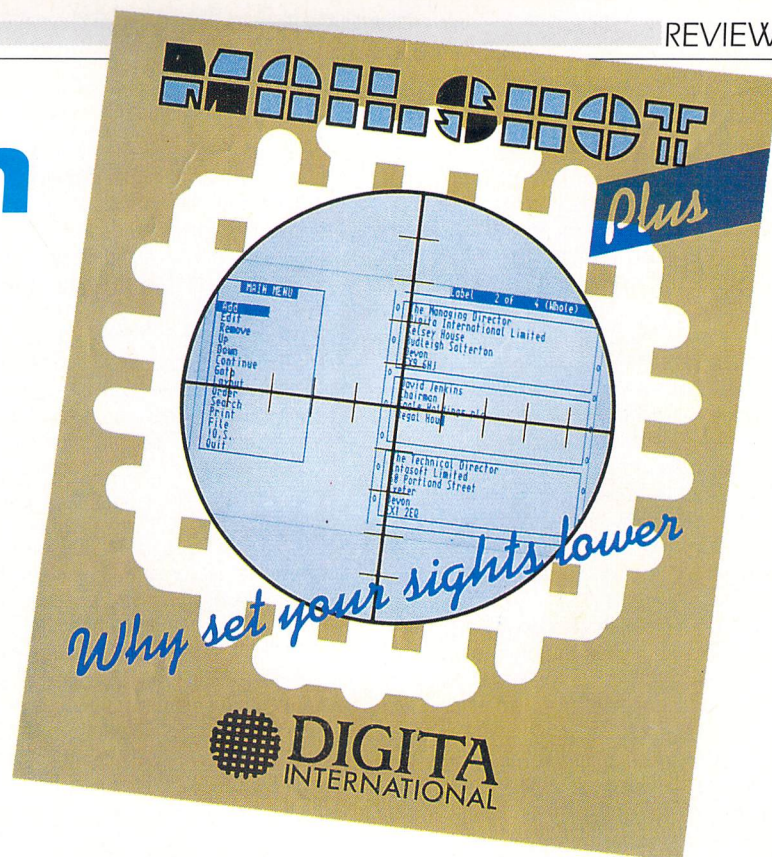
As you enter labels they are inserted into the list in the same order they were entered, irrespective of alphanumeric order, but they can be sorted or searched on any part of the data and use multiple criteria plus the Boolean operators AND, OR and NOT. You can sort on any line alphabetically or by using the memo lines, by date or number.

Because of the wysiwyg principle, the first item on the line is usually the person's title, such as Mr. To overcome the data being sorted on this, a system of markers has been designed. For instance, enter the title, first name or initial and before you type in the surname, press the F1 key then enter it.

This ensures that the data after the F1 marker is the one on which the sorting and searching is carried out. The really clever part about this is that if you decide to put the surname on the second or any other line, then as long as you press F1 before inserting the surname, the same principle of sorting still applies.

Up to four of these markers can be used in any label, but only one marker per line. They can be placed at the creation stage or at any time when editing. If you wish, markers can be displayed or hidden to aid input. Regardless of what you choose, they will not be printed on the labels, only the text will show. Markers can also be deleted by reversing the F1 process.

Searching is much more comprehensive. There are three parts to the search criteria - location, condition and requirement. The location is where within the



Mailshot's main editing screen

Turn to Page 60 ►

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label you wish to search, either on a specific line, marker, memo line or any line. The condition part makes use of an operator like =, <>, <, <=, >, => and clash.

Requirement is the last part of the criteria. In this section you can be quite specific in what information you wish to extract. For instance, requirement works on a sliding search basis and will look for a group of characters matching the input. This can be made specific by including spaces at either or any side of the input. All criteria can be linked together by using the operators AND, OR and NOT.

The selected data can be displayed in the order first chosen, or alternatively sent to a subset. This subset can then be saved to disc or printed out on to labels. Mailshot Plus has a way of detecting duplicate labels – clash search criteria.

Four memo lines associated with each label can hold information other than addresses, such as phone numbers, order dates and general comments. These lines are not normally printed out on the labels, but can be used for sorting and searching.

The memo lines can hold three types of information – text, numeric and date in

either European or American format. Default values can be placed in the memo lines to save repetitive typing.

Mailshot Plus is primarily a mailing list program intended for output to labels of any size. The Print menu has a good range of commands available to take advantage of diverse arrangements. An initialisation code can be configured for virtually any printer, so condensed or expanded text can be easily defined.

The labels can be laid out in a range of styles and there is a printer command to customise print quality. The left margin can be set up to 99 characters and you can have up to nine labels wide and 999 copies of each label which can be sent either to the printer or disc.

Every label can carry a default message on the bottom line and they can be numbered sequentially. There is a limited form of summary output in tabular format – you have to select which lines you require and where they will be situated across the page.

When I first looked at Mailshot Plus I was ready to dismiss it as an expensive luxury, but having taken the time to get into the program I am more than happy to reconsider my original impression. The program has good capabilities, far more than I had originally expected.

It is not without its faults though, such as the time it took (four minutes) to save 1500 records. You can only have one file and one subset in memory at one time, and while the label output is good, the summary report could do with headers, footers and so on. None of the search or sort criteria could be saved unless you made subsets out of the file.

Mailshot's compensatory factors are the speed of searching and sorting, the ability to import and export Ascii files, and the flexible label structure. The manual is some 40 pages long with tutorial and reference sections and handy tips about mailing. There's also a quick reference card.

My overall impression is that Mailshot Plus will be well worth buying for the business sector. The savings in duplicate labels and time should repay the cost within a few months depending upon the volume of mailings. If the price was lowered to under £40, it could pick up a few sales from the everyday user.

Product: Mailshot Plus

Price: £49.95

Supplier: Digita International, Kelsey House, Barnes Road, Budleigh Salterton, Devon. EX9 6HJ. Telephone: 0395-45059

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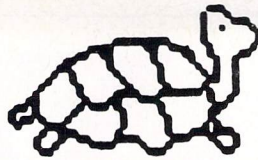
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ADVENTURES

Brillig lends a hand in solving problems for fantasy fans

Sierra's Sludge strikes again

JUST when you thought it was safe to go back into space, Sludge Vohaul returns. That may be bad news for mankind, but it's good news for fans of Sierra/Activision's animated Space Quest adventure.

The sequel, unsurprisingly called Space Quest II (alternatively, Chapter II – Vohaul's Revenge), has just been released and once again you play the part of the intrepid hero and sanitation engineer Roger Wilco.

Vohaul, that demented scientist, king of carnage, emperor of evil, granddaddy of grossness and more hideous than your great-aunt Hidegarde, is looking for vengeance.

His devilish plan to conquer Earth involves flooding the planet with an unspeakable invasion of pushy, obnoxious (genetically engineered) insurance salesmen. The fiendish swine.

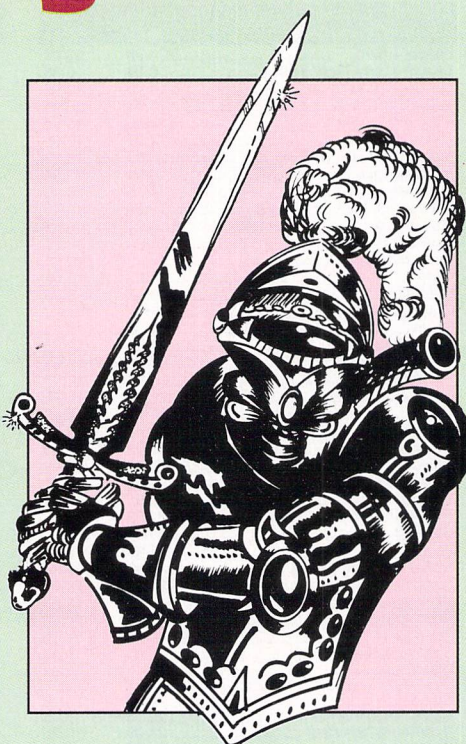
So don your interplanetary, sanitary space mittens, grab your wet mop and prepare to scramble through the humid stenchlands of a jungle planet and blunder your way into the asteroid fortress of the nausea-inducing Vohaul. Watch these pages for the full lowdown.

Must briefly mention Incentive Software's exciting and forthcoming ST Adventure Creator (STAC). The software is an extension of its successful Graphic Adventure Creator which has been available on other micros for a while now.

STAC looks to be a powerful and flexible utility which will allow you to design your own text and graphics adventures with ease. Price is likely to be in the region of £30. More details anon.

Turning now to some of your letters (will I ever catch up with my mail, I ask myself?), Brian O'Connell from Coleraine in County Derry is having difficulty with Zork I and II. Help is at hand, Brian.

Incidentally, he wonders if I really dislike Mitch (of a certain other publication)



as much as I imply. Well, I'll let you into a secret – Mitch and I are actually very good friends.

However, the Intergalactic Council of Adventure Columnists, to which we are both mandatory subscribers, has for some obscure reason decreed that all members must remain rivals, on pain of being compelled either to write only about financial packages or to play Not A Penny More Not A Penny Less for the rest of their natural lives.

So there you have it – we're really only going through the motions. But for goodness sake don't tell a soul otherwise we'll both be forever listening to the voice that says "Stop dawdlin' and return to Magdalen", a fate too horrible to contemplate.

From Tamworth, Mark Waterhouse writes to say that he is well into Knight Orc and wonders why I didn't give it a

higher puzzlement rating than 8 out of 10, because a lot of the puzzles are really tough. Well, Mark, the rating for puzzlement is meant to reflect not only the difficulty of the puzzles, but also their originality and how well they fit in with the story.

Knight Orc is far from being an easy game, I have to agree, and I hope my rating did fairly indicate that fact. Judging by the progress you've made, you sound like a pretty skilled adventurer.

I didn't play as far into the game as you obviously have, but then reviewers don't usually have enough time to play new adventures thoroughly and still meet their deadlines.

Like most things in life, it all boils down to personal opinions, and in the case of adventures people's different skills in problem solving.

When reading your letters, it never ceases to amaze me that what is a simple puzzle for some adventurers is an infuriating stumbling block for others and yet the position is completely reversed on another puzzle.

And on that observation, I'll bid you farewell for another month. Exciting adventuring!

HINTS AND TIPS

ZORK I

Can't move the grating?

You'll find the key and the grating in the maze – the grating can only be unlocked from below. Map your way through the maze by dropping objects, but beware the thief. Remember you can also go up, down, SE, and so on.

Want to go over the waterfall in the boat?

You can't – read *ARAGAIN* backwards. You can get out of the boat by saying *DISEMBARK* or *GET OUT*. You could try waving a sceptre at the rainbow.

Program: *The Bard's Tale*
 Price: £24.95
 Supplier: Electronic Arts, Langley Business
 Centre, 11-49 Station Road, Langley,
 Slough, Berkshire SL3 8YN.
 Tel: 0753 49442

ROLE-playing games come in many shapes and sizes, and this new one from Electronic Arts is possibly the most attractively presented yet. The Bard's Tale features scrolling 3D graphics, animated monsters, sound and more magic items and objects than you've seen in a month of Sundays.

The idea is to explore a city with your hand-picked group, doing battle and gaining treasure as you endeavour to progress through the game's 16 levels. Before you start, you'll need to create a character disc on which all the details of your party will be stored.

Members can be chosen from seven races (human, dwarf, hobbit, to name a few) and can be one of 10 character classes such as warrior, bard, wizard and so on. Each one is assigned five attributes including strength and intelligence and is given certain other objects such as armour class, hit points, gold, dress and weapons.

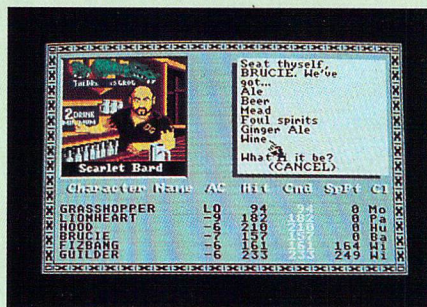
The party can be added to, amended or swapped around as much you like and whole parties or individual characters can be saved for future duty.

The screen is divided into three portions with a picture of the current scene shown at top left. Movement of the mouse brings up a direction pointer and when the mouse button is pressed, the picture changes or scrolls to reflect movement in that direction.

The top right section is used for the game's prompts, messages, statistics, descriptions, lists, commentaries and

other text output. No text input is required – the entire game is driven by single-key commands or by mouse. The bottom half of the screen lists all members of the party together with their relevant statistics.

A picture of each member in your



party can be summoned up and replaces that of the current location. Similarly, on encountering a monster (and there are many types such as kobolds, mercenaries, orcs and so on), the location display is replaced by a minimally animated picture of the foe.

At such an encounter you may fight or run. If combat ensues, each member may attack, defend, hide, use an item, cast a spell or sing, depending on that member's abilities. Members can even attack each other.

The progress of the fight is displayed

as a running commentary and the eventual outcome, including updates of the characters' statistics, is displayed. Members gain points and treasure (as well as damage) from such encounters.

A pop-up menu allows access to such facilities as identifying exactly where you are and what time of day it is, getting one of the bards to sing a song, establishing a new marching order, being able to go up or down through a portal and casting spells. The speed of scrolling can be adjusted too.

The game plays a little on the slow side and you are required to swap discs from time to time. The graphics are first rate and the addition of musical effects adds to the atmosphere. The fact that there are lots of items to collect, plenty of places to explore and a host of magic spells to acquire make this a product that is unlikely to be tired of quickly.

The Bard's Tale is a large and well-presented fantasy game whose depth is sufficient to satisfy even the most particular of ardent role-players.

Brillig

Sound	7
Graphics.....	8
Playability	8
Value for money.....	7
Overall	8

ZORK II

Can't open the door to the tiny room?

The key is still in the lock on the inside. Try putting something under the door to catch the key then push it out using another object.

Don't know what the bucket is for?

It was made by the Frobozz Magic Well Company. Read the engraving. Stand in it and pour water into it.

Want to launch the balloon?

Inflate it with hot air by burning something in the receptacle.

Guarded room a problem?

You'll need a key from the unicorn and a box of candy from the pool of water.

THE PAWN

continued from last month

From the staircase room, go down to the low ceiling room. Go West and Southwest to lounge. Get the hard hat and wear it. Search the cushions for a coin.

Go to the lift and press the button. Enter and close the door then press the second button. At the rockface, get the lumps with the trowel. Return to the lift and press the first button. Get the rope.

Return to grassy plain. Buy whisky and beer bottles with the coin and chit. Go to the narrow track and climb over the rocks. Go to the cavern and find the small cave. Go North, North to

the laboratory. Give the rice and lumps to the alchemists.

Examine the tea chest and jars. Drink the liquid. Cast a spell on the tomes. Go NE to the store room and get aerosol. Go SW,NW, W and cross rope bridge. Go NE to tunnel and N to room. Tear the paper wall with the trowel.

Tie the rope to the hook. Climb down. Keep knocking on the doors. Give the whisky bottle to the porter. Go E, D and N to the annexe. Give the beer bottle to Jerry. Go S,E,N and E to hell.

Ask the devil about the wristband. Get the potion bottle. Go to the dragon in the chamber via rope bridge and high ledge.

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Tuning up for efficiency

Dale Hughes and Mark Jones assess a useful hard disc drive utility

THE ST is an incredibly fast computer. With a clock speed of 8 MHz and dedicated operating system, the ST is top gun when it comes to moving and utilising large amounts of information with the click of a button.

It is accepted though, that the weakest link in this technological ballet between storage and screen is the floppy disc drive. Although fast and dependable enough for our everyday use, many users with large information requirements are turning to a hard disc as the optimum practical way of storing and retrieving vast amounts of information quickly and safely.

This hardware approach does create its own special problems for the hard disc owner. The problem which we will be addressing here concerns loss of performance.

This slowing down develops as more and more information is added and files are shifted in and out of the drive over a period of time. Part of this reduction is due to the amount of data contained in the system, but an even greater factor is the way the data has become arranged or the degree of fragmentation.

When any disc is freshly formatted,

information can be written to it in complete blocks of data. Eventually as these blocks are manipulated by the user they become broken up and occupy different locations.

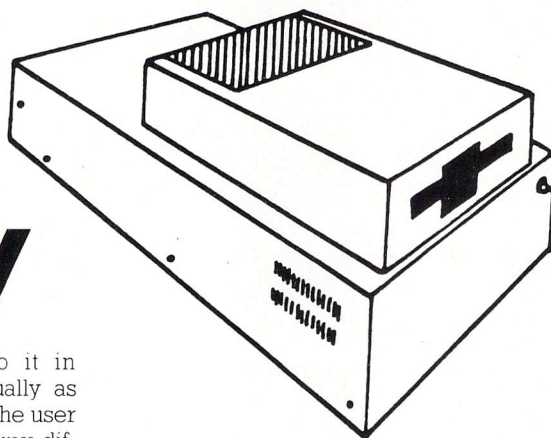
As new data is entered the spaces between blocks are filled and any read or write commands will entail greater disc head searching. This results in loss of hard drive speed and an increased chance of errors and lost information.

It is for this reason that most hard disc users regularly reformat their system. This is a time-consuming, sometimes frightening and tedious way to spring clean the hard drive and why Microdeal has introduced their hard disc optimiser, TuneUp.

This is a Gem-based program running on colour or monochrome monitors and is completely mouse controlled. The disc comes with a 12 page manual sufficient to convince buyers they have made the right purchase and to get them started. It also contains a complete listing of what can go wrong.

When up and running four Help screens are available. There are five menu selections, the most important being the two Optimise for ... functions.

When TuneUp goes to work, you are given the option of optimising your disc for mostly read operations. This rearranges as much data as possible back to contiguous blocks for faster program loading and places any free space



at the end of the disc. The second option is for optimising for mostly write operations, and here files are rearranged contiguous and free space is placed at the beginning for faster file writing.

Other menu commands allow a complete listing of disc contents, disc statistics including fragmentation and a graphic screen which shows the location of any individual file. All these menu commands can be viewed on screen, and all but the graphic screen sent to printer. The optimising screen also gives a running commentary on the work in progress.

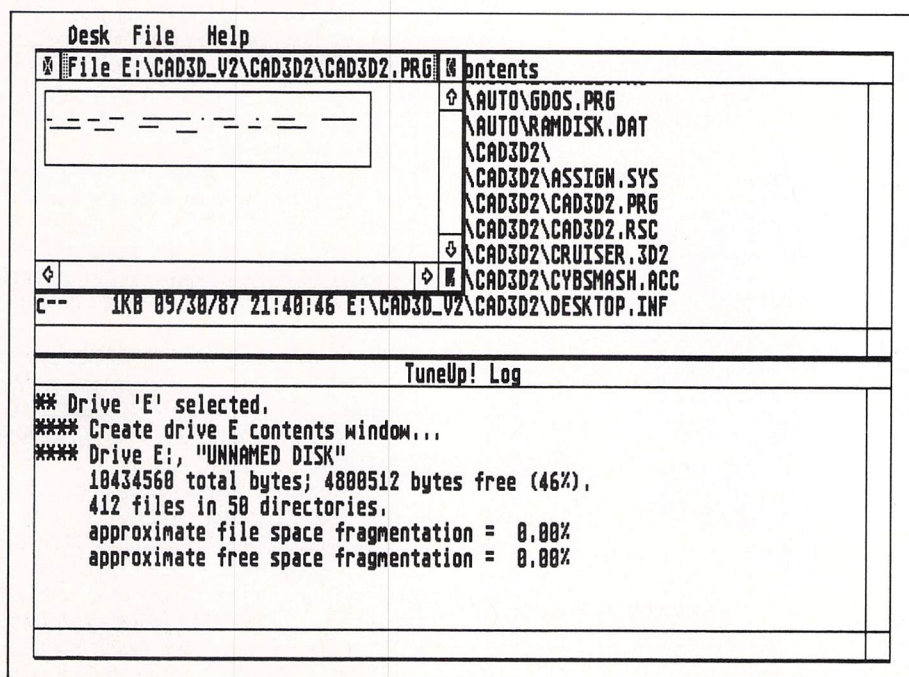
Does it work? The answer unfortunately, has to be yes and no. In our benchmarks, we formatted a 5Mb partition and then proceeded to move files in and out until we had reached .25 per cent file fragmentation and 10.09 per cent free space fragmentation.

When optimised for read access TuneUp completed the task in 30 seconds and a check showed no fragmentation; access time was improved by 8 per cent. When another 5Mb partition was heavily manipulated until 2.84 per cent of files were fragmented and there was 5.98 per cent free space fragmentation, TuneUp was unable to complete its write optimising task and reported 12 errors.

Although the program has the ability to view and repair minor disc errors, structural and fatal errors are beyond its capabilities. It would appear that in a worst case scenario such as we created, a more sophisticated editor would be required.

As a final note, floppy disc users may utilise TuneUp to check disc contents, list or print directories and check disc structure and fragmentation. No attempt should be made to optimise a 3.5in disc.

TuneUp is a good, economical and hard working program. Because most of its magic is happening on the hard disc, the user is mainly a spectator. It's not Superman but then again a 20 megabyte hard disc operating at 3,000 RPM is not exactly a gramophone.



TuneUp! In action

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AN excellent introduction to the world of fractals and the Mandlebrot set was given by Roland Waddilove in the May 1987 issue of *Atari ST User*. The accompanying program generated a picture of the complete set, but had limited facilities for examining it in detail.

The program presented here is a greatly enhanced version of the original, allowing exploration of the set almost to infinity. Its main feature is its ability to zoom in on any part of the set with ever-increasing magnification.

When each picture is saved a short datafile is created, so when a picture is reloaded at a later date the variables are restored. The zoom box can then be positioned anywhere on the screen to pixel accuracy and varied in size to select precisely the area to be magnified. Once the new coordinates have been calculated drawing starts.

Remember, colours in Mandlebrot pictures are totally false and it is up to you to assign them as desired. To make this easier, some attempt is made to allocate colours automatically. However, this is not always completely successful, since it is very difficult to predict in advance the range over which iterations may vary.

Colours are allocated by the formula:

$$N\% - \min_it\% + 1$$

This ensures colour one is used to represent the lowest number of iterations on the picture, and other colours are set upwardly from this point.

The accompanying programs have been written in Fast Basic. Line numbers

Robert Davidson zooms in on the fascinating graphic Mandlebrot set

are provided solely to aid readability and should not be entered. Before saving or running either, the memory allocation should be increased. To do this, select the file option and click on Show info. Now change the 32k workspace to 100k.

When Program I is run you will be given the opportunity to load a previous picture. Since you do not have any pictures at this stage, click in the No box. To draw the complete Mandlebrot set enter the coordinates as:

```
x=-2
y=-1.2
side=2.8
```

You will then be prompted for a filename which will be used to save the picture, datafile and array. A file extender is not necessary since PIC will be added for the picture filename, DAT

for the datafile and ARR for the array. Note – each picture requires almost 100k of disc space. Lack of space will be reported automatically.

A black line will be drawn around the edge of the screen while the minimum iteration is checked. You will now be offered the chance to set the upper limit of iterations. The default is 255, however, there is little advantage to be gained at low magnification so press Y and enter 50. The picture will take about 45 minutes to complete.

After a picture has been drawn or loaded the coordinate information is displayed. Pressing the right mouse button restores the picture, this time with a crosshair cursor.

Move the cursor to the centre of the area for zooming, press the left mouse button and a box is drawn. Pressing the + or – keys will increase or decrease the size of the box. Click the right button to cancel this operation.

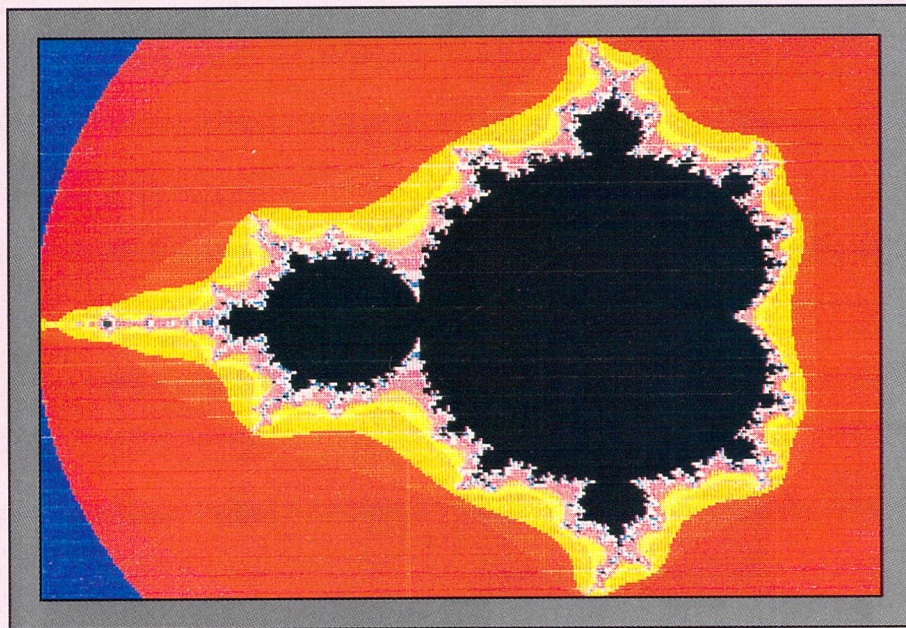
Each picture can be zoomed in on very closely. However, after four or five zooms the single precision arithmetic starts to lose accuracy. When this happens the picture will be drawn with a portion missing from the extreme left and bottom edges. Although it's possible to convert the program to use double precision arithmetic, the subject is beyond the scope of this article.

Program II is not essential, but can be used to replot featureless zooms into beautiful pictures. The key aspect to using this program is knowing the minimum iteration value of the picture and how this relates to the colours plotted.

When run it prompts for an array to load. Firstly select a file, then assign the new iteration limits to each colour. When the picture is drawn press a key to save it or start another plot.

Have patience when using Program I. It can take 12 hours or more to plot a picture with an iteration limit of 255. This should be regarded as an upper limit for most circumstances, because greater resolution is obtainable when replottng. As long as there isn't too much black in the picture, drawing is still reasonably fast.

Fractals revisited



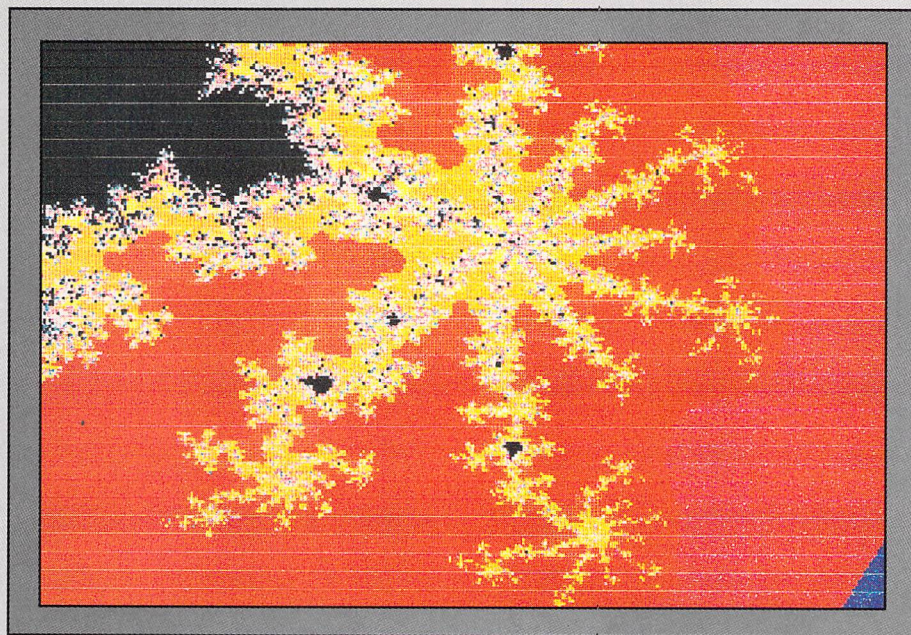
The basic Mandlebrot set

Program I

```

10 REM Mandelbrot zoom
20 REM By R Davidson
30 REM (c) Atari ST User
40 REM Requires 100k workspace
50 REM Do not enter line numbers
70 IF SCREENMODE THEN PRINT "Low res o
nly":END
80 ON ERROR GOTO here
90 PROCinitialise
100 REPEAT
110 PROCmandel
120 PROCzoom
130 UNTIL FALSE
140 END
160 DEF PROCmandel
170 CLS:PRINT "I'll save the screen whe
n finished"
180 PRINT "Type in a new name"
190 PROCfile
200 WHILE DISCFREE(-1)<100000
210 PRINT ALERT("[1][Not enough disc s
pace]Insert a new disc][OK]",1)
220 WEND
230 PROCset_colours
240 CLS
250 I%=0
260 FOR i=Lx TO Rx STEP (Rx-Lx)/321
270 J%=0
280 FOR j=By TO Ty STEP (Ty-By)/201
290 N%=-1:x=0:y=0
300 REPEAT
310 y2=y*y:x2=x*x
320 y=2*x*y+j:x=x2-y2+i
330 N%=N%+1
340 UNTIL N%=limit% OR x2+y2>=4
350 al(I%,J%)=N%
360 N%=N%-min_it%+1
370 IF N%<9 THEN MARKCOL N%
380 IF N%>8 THEN MARKCOL 9
390 IF N%>10 THEN MARKCOL 10
400 IF N%>13 THEN MARKCOL 11
410 IF N%>17 THEN MARKCOL 12
420 IF N%>23 THEN MARKCOL 13
430 IF N%>33 THEN MARKCOL 14
440 IF N%>49 THEN MARKCOL 15
450 PLOT I%,J%
460 J%=J%+1:IF J%>200 THEN J%=200

```



Zooming in on an area of the original picture

```

470 NEXT
480 I%=I%+1:IF I%>320 THEN I%=320
490 NEXT
500 BSAVE pic$,PHYSBASE,32000
510 handle%=OPENOUT data$
520 PRINT# handle%,Lx,By,hside,min_it%
,limit%
530 CLOSE# handle%
540 BSAVE array$,@al(0,0),64521
550 PROCprint_info
560 ENDPROC
580 DEF PROCinitialise
590 DIM al(320,200)
600 RESTORE
610 FOR i=0 TO 15
620 READ A%,B%,C%
630 PALETTE i,A%*1000/7,B%*1000/7,C%*1
000/7
640 NEXT
650 TXTRECT 0,0,SCREENWIDTH,SCREENHEIG
HT

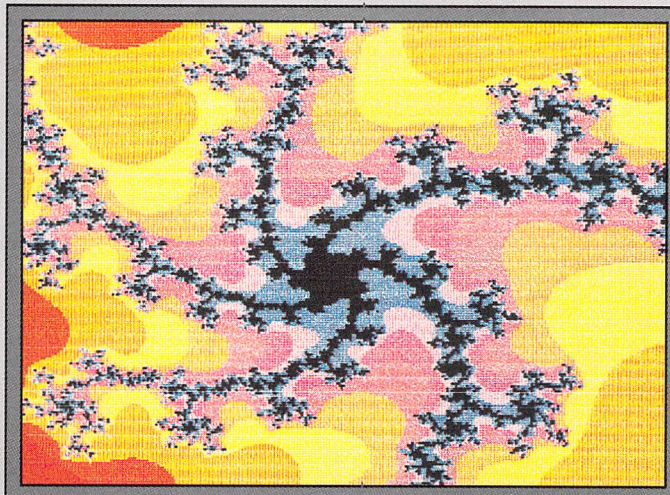
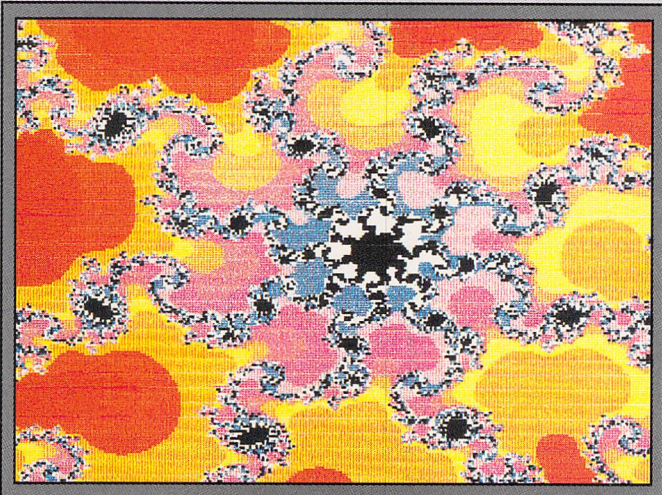
```

```

660 GRAFRECT 0,0,SCREENWIDTH,SCREENHEI
GHT
670 MARKTYPE 1
680 INK 14:CLS
690 choice=ALERT("[2][Do you wish to s
tart from an existing picture][YES/NO]",
1)
700 HIDEMOUSE
710 IF choice=1 THEN PROCpicture ELSE
PROCcoord
720 ENDPROC
740 DEF PROCcoord
750 CLS:PRINT "Enter X and Y values (t
op left corner)"
760 INPUT TAB(15)"X: "Lx
770 INPUT TAB(15)"Y: "By
780 INPUT TAB(4)"side (horiz): "hside
790 vside=hside*24/28
800 Rx=Lx+hside:Ty=By+vside

```

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```

810 PROCmandel
820 PROCzoom
830 ENDPROC
850 DEF PROCpicture
860 CLS:PRINT"Select a picture"
870 PROCfile
880 BLOAD pic$,PHYSBASE
890 handle%=OPENIN data$
900 INPUT# handle%,Lx,By,hside,min_it%,
limit%
910 CLOSE# handle%
920 vside=hside*24/28
930 Rx=Lx+hside:Ty=By+vside
940 PROCprint_info
950 PROCzoom
960 ENDPROC
980 DEF PROCprint_info
990 GRAB 0,0,320,200
1000 CLS:PRINTTAB(4)"PICTURE INFORMATI
ON : ";pic$
1010 PRINT"
1020 PRINTTAB(16)"X: ";Lx
1030 PRINTTAB(16)"Y: ";By
1040 PRINTTAB(12)"hside: ";hside
1050 PRINTTAB(3)"min iterations: ";min
_it%
1060 PRINTTAB(2)"iteration limit: ";li
mit%
1070 PRINT"
1080 PRINTTAB(2)"Press the right button
to continue"
1090 PROCwait
1100 PUT 0,0,3
1110 ENDPROC
1130 DEF PROCzoom
1140 SETMOUSE 5,0
1150 LINECOL 14
1160 dx%=20
1170 REPEAT
1180 SHOWMOUSE
1190 PROCclear_buttons
1200 REPEAT
1210 MOUSE mX%,mY%,mB%,mK%
1220 UNTIL mB%=1
1230 HIDEMOUSE
1240 GRAB 0,0,320,200
1250 PROCbox
1260 PROCclear_buttons
1270 WHILE INKEY$<>"":WEND
1280 REPEAT
1290 MOUSE x2%,y2%,b2%,k2%
1300 key$=INKEY$
1310 IF key$="+" THEN dx%=dx%+1:BEEP:PR
OCbox
1320 IF key$="-" THEN dx%=dx%-1:BEEP:PR
OCbox
1330 UNTIL B2%=1 OR B2%=2
1340 PUT 0,0,3
1350 UNTIL B2%=1
1360 hside=hside*(2*dx%/320)
1370 vside=hside*24/28
1380 mX%=mX%-dx%
1390 xinc=(Rx-Lx)*mX%/320
1400 Lx=Lx+xinc
1410 Rx=Lx+hside
1420 mY%=mY%-(dx%*200/320)
1430 yinc=(Ty-By)*mY%/200
1440 By=By+yinc
1450 Ty=By+vside
1460 ENDPROC
1480 DEF PROCset_colours
1490 CLS
1500 MARKCOL 15
1510 M%=255
1520 I%=0
1530 FOR i=Lx TO Rx STEP Rx-Lx
1540 J%=0
1550 FOR j=By TO Ty STEP (Ty-By)/201
1560 N%=-1:x=0:y=0
1570 REPEAT
1580 y2=y*y:x2=x*x
1590 y=2*x*y+j:x=x2-y2+i
1600 N%=N%+1
1610 UNTIL N%>M% OR x2+y2>=4
1620 IF N%<M% THEN M%=N%
1630 PLOT I%,J%
1640 J%=J%+1
1650 NEXT
1660 I%=I%+319
1670 NEXT
1680 J%=0
1690 FOR j=By TO Ty STEP Ty-By
1700 I%=0
1710 FOR i=Lx TO Rx STEP (Rx-Lx)/321
1720 N%=-1:x=0:y=0
1730 REPEAT
1740 y2=y*y:x2=x*x
1750 y=2*x*y+j:x=x2-y2+i
1760 N%=N%+1
1770 UNTIL N%>M% OR x2+y2>=4
1780 IF N%<M% THEN M%=N%
1790 PLOT I%,J%
1800 I%=I%+1
1810 NEXT
1820 J%=J%+199
1830 NEXT
1840 min_it%=M%
1850 limit%=255
1860 CLS:PRINTTAB(3)"Min iterations =
";min_it%
1870 PRINTTAB(2)"Iteration limit = ";l
imit%
1880 PRINTTAB(2)"Change limit ? ";
1890 REPEAT
1900 K%=GET AND 223
1910 UNTIL K%=78 OR K%=89
1920 PRINT CHR$(K%)
1930 IF CHR$(K%)="N" THEN ENDPROC
1940 min=49+min_it%:IF min>255 THEN min
=255
1950 PRINTTAB(2)"Enter value ('min'
- 255) : ";
1960 REPEAT
1970 INPUT limit%
1980 UNTIL limit%>= min AND limit%<256
1990 ENDPROC
2010 DEF PROCbox
2020 PUT 0,0,3
2030 IF dx%<1 THEN dx%=1
2040 IF dx%>159 THEN dx%=159
2050 xlo=mX%-dx%:xhi=mX%+dx%
2060 ylo=mY%-(dx%*200/320):yhi=mY%+(dx%
*200/320)
2070 LINE xlo,ylo TO xhi,ylo
2080 LINE xhi,ylo TO xhi,yhi
2090 LINE xhi,yhi TO xlo,yhi
2100 LINE xlo,yhi TO xlo,ylo
2110 ENDPROC
2130 DEF PROCfile
2140 SHOWMOUSE
2150 path$=PATH$+".PIC"
2160 name$=""
2170 FSELECT path$,name$,status
2180 IF status=0 THEN END

```

```

2190 count=0:temp$=""
2200 REPEAT
2210 count=count+1
2220 temp$=temp$+MID$(name$,count,1)
2230 UNTIL RIGHTS(temp$,1)=". " OR temp$
=name$
2240 IF RIGHTS(temp$,1)<>". " THEN temp$
=temp$+"."
2250 pic$=temp$+"PIC"
2260 data$=temp$+"DAT"
2270 array$=temp$+"ARR"
2280 HIDEMOUSE
2290 ENDPROC
2310 DEF PROCclear_buttons
2320 REPEAT
2330 MOUSE X%,Y%,B%,K%
2340 UNTIL B%=0
2350 ENDPROC
2370 DEF PROCwait
2380 PROCclear_buttons
2390 REPEAT
2400 MOUSE X%,Y%,B%,K%
2410 UNTIL B%=2
2420 ENDPROC
2440 here:
2450 PALETTE 0,1000,1000,1000
2460 PALETTE 1,0,0,0
2470 SETMOUSE 0,0
2480 IF ERR=4 THEN END
2490 LASTERROR
2510 DATA 0,0,7
2520 DATA 2,0,5
2530 DATA 4,0,3
2540 DATA 5,0,2
2550 DATA 7,0,0
2560 DATA 7,3,1
2570 DATA 7,4,0
2580 DATA 7,5,0
2590 DATA 7,7,0
2600 DATA 7,5,2
2610 DATA 7,3,5
2620 DATA 7,0,7
2630 DATA 7,4,7
2640 DATA 3,4,7
2650 DATA 7,7,7
2660 DATA 0,0,0

```

Program II

```

10 REM Replot
20 REM By Robert Davidson
30 REM (c) Atari St User
40 REM Requires 100k workspace
60 IF SCREENMODE THEN PRINT "Low res
only":END
70 ON ERROR GOTO here
80 DIM c(15)
90 DIM al(320,200)
100 RESTORE
110 FOR i=0 TO 15
120 READ A%,B%,C%
130 PALETTE i,A%*1000/7,B%*1000/7,C%*1
000/7
140 NEXT
150 TXTRCT 0,0,SCREENWIDTH,SCREENHEIG
HT
160 GRAFRECT 0,0,SCREENWIDTH,SCREENHEI
GHT
170 MARKTYPE 1
180 INK 14
190 CLS:PRINT"Select a file"

```

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```

200 path$=PATH$+"*.ARR"
210 name$=""
220 FSELECT path$,name$,status
230 IF status=0 THEN END
240 HIDEMOUSE
250 BLOAD name$,@a(0,0)
260 REPEAT
270 REPEAT
280 CLS
290 PRINT"Set max iterations for each
colour"
300 PRINT"(in ascending order)"
310 PRINT
320 FOR colour=1 TO 14
330 PRINTTAB(5)"Colour ";colour;
340 IF colour <10 THEN PRINT " "; EL
SE PRINT " ";
350 INPUT c(colour)
360 NEXT
370 PRINT"TAB(10)"Is this OK?"
380 REPEAT
390 K%=GET AND 223
400 UNTIL K%=78 OR K%=89
410 UNTIL CHR$(K%)="Y"
420 CLS
430 FOR X%=0 TO 319

```

```

440 FOR Y%=0 TO 199
450 N%=a1(X%,Y%)
460 MARKCOL 1
470 FOR G%=1 TO 14
480 IF N%>c(G%) THEN MARKCOL G%+1
490 NEXT
500 PLOT X%,Y%
510 NEXT
520 NEXT
530 GRAB 0,0,320,200
540 WHILE INKEY$<>"" :WEND
550 BEEP
560 Key=GET
570 CLS:PRINT "Save the picture (Y/N)
?"
580 REPEAT
590 K%=GET AND 223
600 UNTIL K%=78 OR K%=89
610 UNTIL CHR$(K%)="Y"
620 CLS:PRINT"Type a new name"
630 SHOWMOUSE
640 path$=PATH$+"*.PIC"
650 name$=""
660 FSELECT path$,name$,status
670 IF status=0 THEN END
680 HIDEMOUSE
690 PUT 0,0,3
700 BSAVE name$,PHYSBASE,32000

```

```

710 PALETTE 0,1000,1000,1000
720 PALETTE 1,0,0,0
730 SETMOUSE 0,0
740 END
760 here:
770 PALETTE 0,1000,1000,1000
780 PALETTE 1,0,0,0
790 SETMOUSE 0,0
800 IF ERR=4 THEN END
810 LASTERROR
830 DATA 0,0,7
840 DATA 2,0,5
850 DATA 4,0,3
860 DATA 5,0,2
870 DATA 7,0,0
880 DATA 7,3,1
890 DATA 7,4,0
900 DATA 7,5,0
910 DATA 7,7,0
920 DATA 7,5,2
930 DATA 7,3,5
940 DATA 7,0,7
950 DATA 7,4,7
960 DATA 3,4,7
970 DATA 7,7,7
980 DATA 0,0,0

```



THE ATARI DUST COVER COLLECTION



Tailored in soft grey nylon fabric that has been treated with an anti-static inhibitor. Attractively finished with royal blue piping. Can be washed and ironed without fading or cracking.

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Tel: 041/43.99.33

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*All floppy disks are American Branded, and come with a Life Time Guarantee

The ultimate art package for the ST

The Advanced OCP Art Studio offers fully-implemented graphic tools for both home and professional use, plus an animated sprite designer and map creator – all in one package.

Special features include:

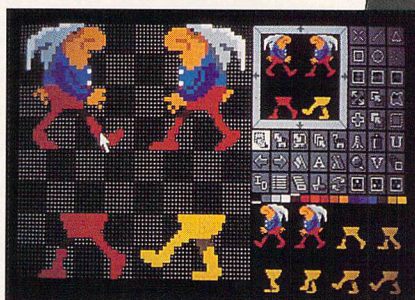
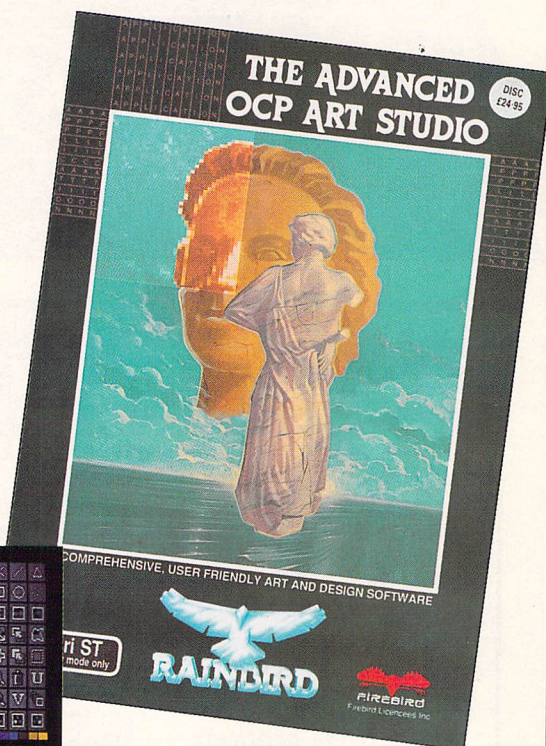
Icon-driven toolbox with on-screen help for each item

Two work screens (10 on the 1040ST)

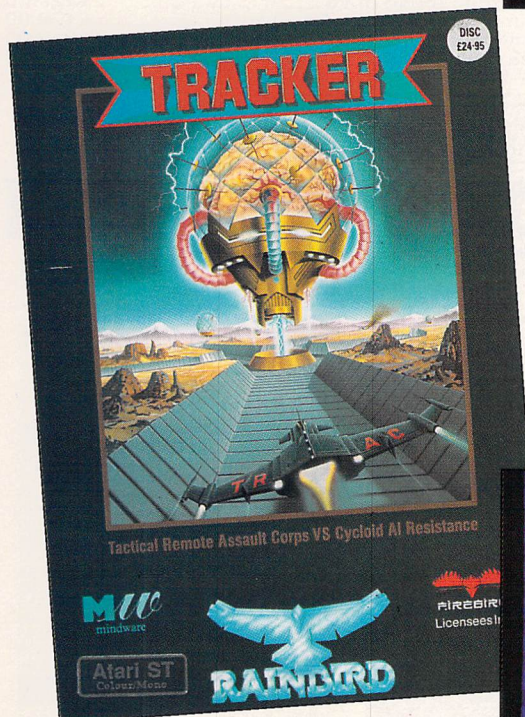
Sophisticated window routines including mask, stretch, squash, flip, smooth and rotate

Colour priority, exchange colours, fat pixels, RGB analysis, undo and much more.

And to round off this superb package there's a real-time demonstration on disc and an excellent 83 page user guide.



NB: Suitable for low resolution colour only.

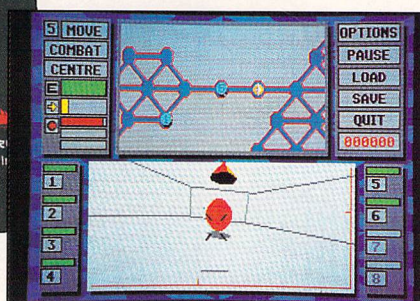


On the right track

Tracker is a totally original, exhilarating game combining arcade action with tactical warfare.

You control up to eight Skimmers in an assault on the Cycloid Communication Centre where the central computer has turned renegade. You'll need needle-sharp wits to outmanoeuvre the intelligent Cycloids.

The package comes complete with colourful poster, Playguide and a short story by James Follett.



'The latest blockbusting game from Rainbird ... very addictive'

Hugh Michaels,
Atari ST User, August 1987

NB: Suitable for both colour and monochrome machines.

Suitable for	Product	Format	RRP	Special reader offer	YOU SAVE	Offer including subscription	YOU SAVE
Atari ST	Advanced OCP Art Studio	Disc	£24.95	£19.95	£5	£29.95	£10
Atari ST	Tracker	Disc	£24.95	£19.95	£5	£29.95	£10

TO ORDER PLEASE USE THE FORM ON PAGE 111

Evesham Micros

STOP! STOP!
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inc.VAT



We can supply you this ultra neat, quality 2nd Drive for the Atari ST for an ultra low price !

- ★ Very Quiet
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- ★ 726K formatted capacity
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All prices include VAT/Delivery

Disector ST

A POWERFUL set of Disk Utilities

FEATURES INCLUDE:

- ☆ **SOFTWARE BACKUP** - handles most software. Uses all available drives and memory
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- ☆ **EXTRA FORMAT** to maximise space on your disks provides over 15% additional user storage per disk!
- ☆ **UNDELETE** to recover accidentally lost files
- ☆ **RAMDISK** and **SET DATE/TIME** Accessories
- ☆ **DISK ANALYSIS**
- ☆ **DIRECTORY PRINTOUT**
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Only £24.95

Regular upgrades will be available in the future.

For all Atari ST Models

PRINTERS

All prices include VAT/delivery & cable

We use and recommend Star printers we find that they offer an unbeatable combination of features, print quality, reliability and value. Don't make the wrong decision, get it right with a Star printer at our special, all in, prices.

star
LC-10

The NEW No.1



- Four NLQ fonts, yes FOUR
- Paper Parking (use single sheets without removing tractor paper)
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- 144/36cps print speed

Many similarities with the highly popular NL-10 that it replaces plus some new features not seen in this price range before combine to produce the outstanding printer in this price category.

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Star NB24-10 includes 2 extra ribbons free of charge £469.00
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Star ND-10 180/45cps high quality 10" £299.00
Star ND-15 wide carriage version of ND-10 £419.00
Star NR-10 240/60cps professional 10" £379.00
Star NR-15 wide carriage version of NR-10 £499.00
Star NB24-15 wide version of NB24-10 £599.00
Star Laser, very high spec. for cost, send for details/samples (price inc. 1 yr on site maint) £1795.00
NEC P2200 new budget 24 pin, great value 168/56cps plus many features £349.00
Cut Sheet Feeders available for above dot-matrix printers at low, low prices - phone for details.

ATARI Spring Special! 520 STFM only £269.00

520 STFM with 1 meg memory upgrade	£345.00
520 STFM memory upgrade kit (requires soldering)	£69.00
1040 STF	£429.00
1040 STF with SM125 mono monitor	£549.00
Mega ST2 with mono monitor	£869.00
Mega ST4 with mono monitor	£1169.00
Atari SLM804 laser printer, great value at	£1199.00
Atari SM125 mono monitor	£134.00
Atari SC1224 colour monitor	£349.00
Atari SH205 hard disk, new style	£539.00
Atari DTP system 1 - includes Mega ST2, Mono Monitor, SLM804 laser printer, Fleet Street Publisher & 90 day on site maintenance	£2059.00
Atari DTP system 2 - as above, but with Mega ST4 & includes 20mb Hard Disk Drive	£2775.00
Cumana CSA354 1 meg drive	£129.95
Cumana CDA358.2 meg (dual) drive	£229.00
Pace Linnet Modem Pack inc.cable & software	£179.00
Phillips CM8833 colour monitor c/w ST lead	£279.00
Phillips CM8852 as above, higher resolution	£299.00

(Extra £10.00 discount on Phillips monitors if bought with an ST)

All ST prices include: mouse etc. PLUS 5 disks of s'ware including wordpro, utilities, graphics, game and demos.
We can quote you for any combination of hardware.

software

Timeworks		Sage	
Data Manager	£37.95	Book Keeper	£84.95
Swift Calc	£37.95	Accountant	£129.95
Data Manager + Swift Calc	£59.95	Accountant Plus	£171.95
Partner ST	£37.95	GFA	
Desk Top Publisher	£74.95	GFA Basic	£37.95
Word Writer	£59.95	GFA Compiler	£37.95
Desk Top Publisher + Word Writer	£114.95	GFA Draft	£74.95
GST		GFA Vector	£25.95
First Word Plus	£59.95	Miscellaneous	
GST C Compiler	£15.95	Fleet Street Publisher	£86.25
Macro Assembler	£15.95	Signum 2	£149.95
1st Mail (for 1st Word only)	£15.95	Easy Draw 2	£44.95
Antic		Fast Basic ROM	£69.95
Cyber Studio (CAD 2.0)	£67.95	Fast Basic Disk	£37.95
Cyber Control (animator)	£44.95	Calligrapher	£55.95
Cyber Paint	£54.95	Mark Williams C	£99.95
CAD 3D 1.0	£18.95	Superbase Personal	£79.95
Architectural/Human/Future	£22.95	Degas Elite	£19.95
Design Disks	£22.95	Super Conductor	£37.50
Genesis molecular modeller	£22.95	PC Ditto	£69.95
Stereotek glasses	£145.00	Logistix	£89.95
GIST (sound editor)	£26.25	Word Perfect V4.1	£149.95
Gunship	£44.95	FTL Modula-2	£55.95
COLR (sprite editor)	£18.95	Lets make...	
Simulations		Signs and Banners	£8.95
Flight Simulator II	£37.45	Greetings Cards	£8.95
F - 15 Strike Eagle	£16.95	Calendars & Stationary	£8.95
Gunship	£16.95	Art Library 1 (clip art)	£8.95
Silent Service	£16.95	Art Library 2 (clip art)	£8.95

GAMES SOFTWARE...Buy any item from this advert and we will match ANY price in this magazine on your requirements.

All prices VAT/delivery inclusive. Next day delivery £5.00 extra.

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Send cheque P.O. or ACCESS/VISA details
Phone with ACCESS/VISA details
Govt., educ. & PLC official orders welcome
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25...£27.95 in 40 cap case £34.95

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NEWS...NI

Wanted – a disaster

IF anyone out there has recently found disaster turning into a crisis, there could be a silver lining to their troubles.

A company on MicroLink specialising in providing locations for films and still photography is asking other users to help.

"We've got a stinker of a job", says spokesman Kell Gatherer.

"Our brief is to find a location for a photo to illustrate an advert for a smoke detector.

"We need a recently burnt-out detached house whose roof timbers are charred and standing out against the sky – we're so desperate, any part of the country would do.

"We're offering a small reward to any MicroLink user who finds the building we eventually use".

Laying it on the line

WHISPER it if Mary Whitehouse is about, but MicroLink subscriber Keith Channing is looking for people who like to take their clothes off.

Not that there's anything naughty going on. Keith is membership secretary of CORAL – standing for Clothes Optional Recreation and Leisure – which is a beach, camping, and general outdoor naturist group.

At present he is trying to bring together all those MicroLink subscribers who are naturists so that they can chat about their pastime via electronic mail.

Modems move will cut comms costs

MICROLINK has launched its own range of modems in a dramatic move to drastically reduce the cost of computer communications.

At the same time it says it wants to demystify the process of going online by including with each modem easy-to-use communications and word processing software specially tailored for a specific machine.

First MicroLink Communications Packs that have been announced are for the Atari ST, PC and BBC Micro.

The MicroLink dual-speed modem offers two operating speeds – 1200/75 and 300 baud. Together with lead, communications and word processing software, it costs £99.

The top-of-the-range MicroLink multi-speed modem

includes the faster 1200/1200 baud. It is fully Hayes-compatible and in addition offers many sophisticated functions such as auto-answer and auto-dial. Also with lead and software package, it costs £169.

A unique feature of both packs is that purchasers will be entitled to one month's unlimited use of Britain's most popular electronic mail service, Telecom Gold.

They will be given free registration on MicroLink/Telecom Gold, allocated their own Telecom Gold mailbox and be allowed one month's free connect time to the service.

"This is not just a demo mailbox as on Prestel, which is restricted to demonstrating what is available, but a personal, password-protected

mailbox which can be used for sending and receiving messages via electronic mail and directly accessing a host of other services", said MicroLink head Derek Meakin.

"This is the first time free access has ever been offered to a public Email service. But we feel it is only right that newcomers to communications should be encouraged to freely explore this vast database at their leisure and find out for themselves all the exciting things it contains".

For Atari ST users, the software accompanying both modems is Fast, a package that has received critical acclaim on both sides of the Atlantic. It contains its own built-in full-function word processor.

Used in conjunction with the auto-dialling multi-speed modem, it has many advanced features. For instance you can instruct it to dial MicroLink while you are asleep, collect whatever mail or telex messages are waiting for you and log-off, then sit and wait patiently until 7.30am when it will ring its bell to wake you up before printing out a hardcopy for you to read over your coffee.

"The intention is that you have everything you need in one pack", said Derek Meakin. "All part of our aim to simplify communications for everyone".

LINK FOR DISABLED

PHYSICALLY disabled people in London are being helped toward employment with the aid of MicroLink.

Over the next three years 60 housebound residents of the Borough of Greenwich will be given the chance to study computing and information technology in their own homes.

Aim of the scheme, funded by the Urban Aid Programme and Greenwich Council, is to enable trainees to eventually

either gain employment as outworkers for businesses or to become self-employed.

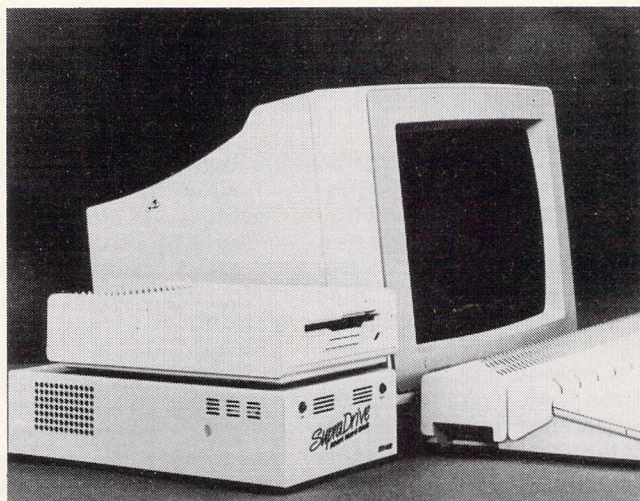
Each trainee is being provided with a computer, modem and printer. A tutor will regularly visit each trainee to sort out any problems.

"But there will also be a constant 24 hours a day computer link to the base at Greenwich ITeC through MicroLink", said tutor Marion Robeson.

SHIFT INTO...

SupraDrive

Atari ST Hard Disk



- 20, 30, 60 and 198 Megabyte drives available
- Includes cables and hard disk utilities
- Attach more than one SupraDrive to your system
- Up to twelve partitions
- Comprehensive twelve month guarantee
- Free back-up and caching software
- Can boot directly from the hard disk
- All models have built-in fan
- Supplied ready to go
- Built-in power supply

20MB £599.95

30MB £849.95

60MB £1499.95

ALL PRICES INCLUDE VAT AND NEXT DAY DELIVERY

"The SupraDrive is the necessary peripheral for any serious Atari ST User"
– Tom Hudson (Author of Degas and Degas Elite)

**Frontier
Software**

P.O. Box 113, Harrogate, North Yorkshire, England HG2 0BE
Phone (0423) 67140. Telex 265871 MONREF G Quoting 72:MAG 402 40

Atari ST User has been an unprecedented success since its launch two years ago. Now we need your help to make your magazine even better.

We want to know all about you, your likes and dislikes. So we devised this simple questionnaire to

give us the information we need. Please complete it and return as soon as possible – we'll even pay the postage.

If you don't want to spoil your magazine you may send a photocopy instead.

WIN *one of these super prizes!*

HELP us to help you – and you could win one of these super prizes! If you fill in the name and address panel in our Reader Survey you will be included in the draw.

● The sender of the first entry drawn will receive the complete Psygnosis range: Its latest game – *Obliterator*, along with *Terrorpods*, *Barbarian*, *Deep Space*, *Arena* and *Brataccas*. Plus limited edition posters

signed by artist Roger Dean.

● The next five will each receive *Obliterator* and *Terrorpods*.

● The following 10 will receive an annual subscription to *Atari ST User*.

● The next 15 will receive an *Atari ST User* binder which holds 12 issues.



READER SURVEY

Please answer the following questions or tick a box as appropriate:

ABOUT YOU

Name C. S. Price
Address 10 ADDISTON PARK
Post Code _____
Age _____
Sex _____
Occupation _____

Where do you live?

- | | | |
|-------------------------------------|-------------------------------------|-------------------------------------|
| <input type="checkbox"/> North West | <input type="checkbox"/> North East | <input type="checkbox"/> Midlands |
| <input type="checkbox"/> Scotland | <input type="checkbox"/> South West | <input type="checkbox"/> South East |
| <input type="checkbox"/> Wales | <input type="checkbox"/> N. Ireland | <input type="checkbox"/> Elsewhere |

As far as your ST is concerned, how do you consider yourself?

- | | |
|---|---|
| <input type="checkbox"/> A beginner | <input type="checkbox"/> Highly skilled |
| <input type="checkbox"/> Slightly experienced | <input type="checkbox"/> An expert |
| <input type="checkbox"/> Moderately skilled | |

How do you find the articles in *Atari ST User*?

- ☐ Too simple ☐ Too technical ☐ Just right

What do you use your ST for?

- | | | |
|---|--------------------------------------|----------------------------------|
| <input type="checkbox"/> Business | <input type="checkbox"/> Programming | <input type="checkbox"/> Leisure |
| <input type="checkbox"/> Education | <input type="checkbox"/> Graphics | <input type="checkbox"/> Music |
| <input type="checkbox"/> Desktop publishing | | |

If your ST's main use is for business, what do you use it for?

ABOUT YOUR SYSTEM

Which type of ST do you own?

- ☐ 520 ☐ 1040 ☐ Mega ST

What type are your floppy disc drives?

- ☐ Single sided ☐ Double sided

Which hard disc drive do you have?

- ☐ None ☐ 20Mb ☐ 40Mb ☐ 60Mb

What type of display do you use?

- ☐ Television ☐ Colour monitor ☐ Mono monitor

Apart from Tos and Gem, do you use any other operating systems?

- ☐ No ☐ Yes _____ (state which)

If have a 520ST, have you expanded its ram?

- ☐ No ☐ Yes

Where did you buy your ST?

- | | |
|--|---|
| <input type="checkbox"/> A computer dealer | <input type="checkbox"/> A high street store |
| <input type="checkbox"/> An exhibition | <input type="checkbox"/> Mail order |
| <input type="checkbox"/> Second hand | <input type="checkbox"/> Other _____ (where?) |

How long have you had your ST?

- | | | |
|---------------------------------------|-------------------------------------|-------------------------------------|
| <input type="checkbox"/> 0-3 months | <input type="checkbox"/> 4-6 months | <input type="checkbox"/> 7-9 months |
| <input type="checkbox"/> 10-12 months | <input type="checkbox"/> Longer | |

ABOUT YOUR SOFTWARE

Do you write your own programs?

- ☐ Yes ☐ No

If yes, which of the following languages do you use, or are interested in learning?

- | | | |
|---------------------------------------|-------------------------------------|------------------------------------|
| <input type="checkbox"/> ST Basic | <input type="checkbox"/> Fast Basic | <input type="checkbox"/> GFA Basic |
| <input type="checkbox"/> HiSoft Basic | <input type="checkbox"/> True Basic | <input type="checkbox"/> Pascal |
| <input type="checkbox"/> Modula 2 | <input type="checkbox"/> Fortran | <input type="checkbox"/> C |
| <input type="checkbox"/> Cobol | <input type="checkbox"/> Lisp | <input type="checkbox"/> Forth |
| <input type="checkbox"/> Logo | | |

Do you use public domain (PD) software?

- ☐ Never ☐ Seldom ☐ Often

Where do you get your PD software from?

- ☐ PD libraries ☐ Friends ☐ Dealers

Here we'd like you to tell us which packages you prefer and how often you use them. It would also help if you supply the name of your favourite programs.

TYPE	USAGE			PACKAGE
	Never	Seldom	Often	
Arcade game	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
Adventure game	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
Art package	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
Music	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
Word processor	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
Spreadsheet	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
Database	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
DTP	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
Payroll	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
Invoicing	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
Integrated packs	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
CAD	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
Communications	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
Languages	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____

What was the last piece of software you bought?

What are the next three items of software you intend to buy?

1. _____
2. _____
3. _____

ABOUT YOUR HARDWARE

Do you have a printer?

☐ No ☐ Yes _____ (model?)

If yes, is it?

☐ Dot matrix ☐ Laser ☐ Daisywheel ☐ Other

Do you use a modem?

☐ No ☐ Yes _____ (model?)

Do you own a Midi synthesiser?

☐ No ☐ Yes _____ (model?)

Of the following items, which do you intend to buy?

	This year	Next year	Never
Joystick	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Second disc drive	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Colour monitor	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Monochrome monitor	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Hard disc drive	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Printer	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Modem	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Image scanner	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Digitiser	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Midi synthesiser	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Graphics tablet	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Extra ram	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Blitter chip	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

ABOUT ATARI ST USER

Why do you read Atari ST User?

- ☐ To see what's on offer in the advertisements.
- ☐ To glean the latest product info from the news pages.
- ☐ To use the reviews as an aid to buying software.
- ☐ To use the reviews to aid buying hardware.
- ☐ To learn more about programming.
- ☐ For applications advice on hardware and software.
- ☐ To take advantage of the special offers.
- ☐ To find technical information unavailable elsewhere.
- ☐ For the easy-to-read style.

How long have you been a regular reader of Atari ST User?

- ☐ 1-3 months ☐ 4-6 months
- ☐ 7-9 months ☐ Longer

How do you obtain your copy of Atari ST User?

- ☐ Newsagents - "off the shelf" ☐ Newsagents - "by order"
- ☐ Subscription ☐ Computer dealer ☐ From a friend

Have you ever experienced trouble getting it regularly?

- ☐ No ☐ Yes

Of the following subjects, please enter a number (0-9) which most matches your interest in:

- ☐ Music (Midi) ☐ PD software
- ☐ Utilities ☐ Languages
- ☐ Hardware ☐ DTP
- ☐ Word processing ☐ Comms
- ☐ Spreadsheets ☐ Databases

Please indicate by number (0-9) your level of interest in the following regular features:

- ☐ Games software ☐ Serious software
- ☐ Book reviews ☐ Hardware reviews
- ☐ Gallery ☐ Games listings
- ☐ Mailbag ☐ Scrapbook
- ☐ News pages ☐ Adventures

ABOUT OTHER MAGAZINES

Which of these magazines do you read?

	Never	Seldom	Often	Subscribe
ST World	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
ACE	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Games Machine	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
ST Update	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Page 6	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Start	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
PCW	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Byte	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Monitor	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Antic	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Analog	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

ONLINE COMMS

Which of the following online databases do you subscribe to?

- ☐ MicroLink ☐ Prestel ☐ Micronet
- ☐ One-to-One ☐ Mercury Link ☐ Other

YOUR MAGAZINE

Atari ST User is your magazine and, as you can tell from this survey, our editors and writers want to ensure that it gives you all you need to exploit your ST to the full.

Thank you for filling in this questionnaire - it will go a long way to determining the future contents of *Atari ST User*. Of course, you may have ideas for series or features on topics that we haven't thought about. So if you think there's something we've missed, or just want to give us your feedback on the magazine, why not use the following lines:

Return your completed form to:

**Survey, Atari ST User, Freepost,
Europa House, Adlington Park,
Adlington, Macclesfield SK10 4NP.**

OPEN 9AM TO 5.30 MONDAY-SATURDAY
MAIL ORDER & CREDIT CARDS WELCOME



HARDWARE

COMPUTERS

CBM Amiga A500 with nearly £200 of free software & accessories	£499.00
CBM 64C Starter Pack with cassette recorder, joystick and £100 free software	£179.95
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With MicroLink you can receive free telesoftware programs over the phone to feed into your ST. You can use it to turn text into typesetting or Braille. You can link in seconds to a database in New York, or key into the 400,000-word Great European Dictionary in Luxembourg. And it gives you direct access to up-to-the-minute financial information on every company in Britain.

The communications software that comes free with each modem is one of the best available for the ST – Flash. To simplify preparing messages off line it also includes a complete word processor with full cut, paste and delete functions. It allows you to create any number of macro functions. Used with the MicroLink multi-speed modem, it allows an entire log-on sequence to be automated to a single keystroke.

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Spreading the word

WHEN it comes to business software, all too often the Atari ST winds up as the poor relation to the IBM PC. The PC's stranglehold on the mainstream business market means that software is frequently written for that machine first, and later ported over to the ST. The result is software which doesn't make full use of the Atari's built-in features, such as Gem.

Graphic Sheet – Glentop's new spreadsheet – has avoided that trap. Although it is also available for PCs, the ST package doesn't make any compromises, and uses Gem to the full.

As the name suggests, Graphic Sheet's greatest strength is its ability to present the figures as a variety of graphs and charts. Other spreadsheets do this too of course, but you'll find that you need the memory of a 1040ST for many of them.

Heart of the program is a straightforward spreadsheet, of the type that has been around for years. You can't really say the program has pushed back the barriers of spreadsheet design, but it does have some intriguing little extras that should help sell it.

One of the main attractions of working under a windowing environment like Gem is the facility to have more than one

Need a spreadsheet? Try Graphic Sheet – tested by Steve Mansfield – and find fast solutions to many simple problems

job on the screen at any time. Naturally, this means you can work on several spreadsheets without constantly saving and loading. And it also means you can have a few on-screen utilities.

There are three useful extras in Graphic Sheet. The notepad is a crude text editor which is saved with the spreadsheet and is intended for making brief notes. It doesn't have word wrap, but basic block operations are provided, and it's possible to embed printer control codes in the text.

You can also import data from spreadsheet cells, so you could, for example, use the notepad as a quick and dirty way of printing out estimates for a job, based on data in the main part of the spreadsheet.

There's also a calculator, although it isn't the snazzy, pseudo-pushbutton type

you generally find in Wimp-driven software. In fact, it's just a plain looking window, with one line reserved for entering formulae in text format.

If you want to know the result of 2+2 then you type 2+2, hit Return and the answer appears in the main part of the box. I'd have liked something a little more sophisticated, but as extras go it's not bad.

The other main utility really is useful. It's called the scrapbook and is used for moving data around, transferring it between spreadsheets, or moving it from a spreadsheet to the notepad. Any section of a sheet can be marked out and cut, just as most word processors allow you to take out part of the text.

The cut section goes into temporary storage – the scrapbook. You can then paste it into another sheet, the notepad or save it to disc. Similarly, a section can be read from disc into the scrapbook, to be pasted wherever you want it. If you have several sheets on-screen in separate windows, the scrapbook is handy for moving data or sections between them.

Creating graphs

But the windowing really comes into its own when you start using graphs. Of course, many spreadsheets have graph facilities, but with this package you can have the data in one window and a graph representing the data in another.

If you're in automatic recalculation mode, the graph is automatically updated every time a figure in the spreadsheet is altered, giving a fast and effective demonstration of the effect of changing the data.

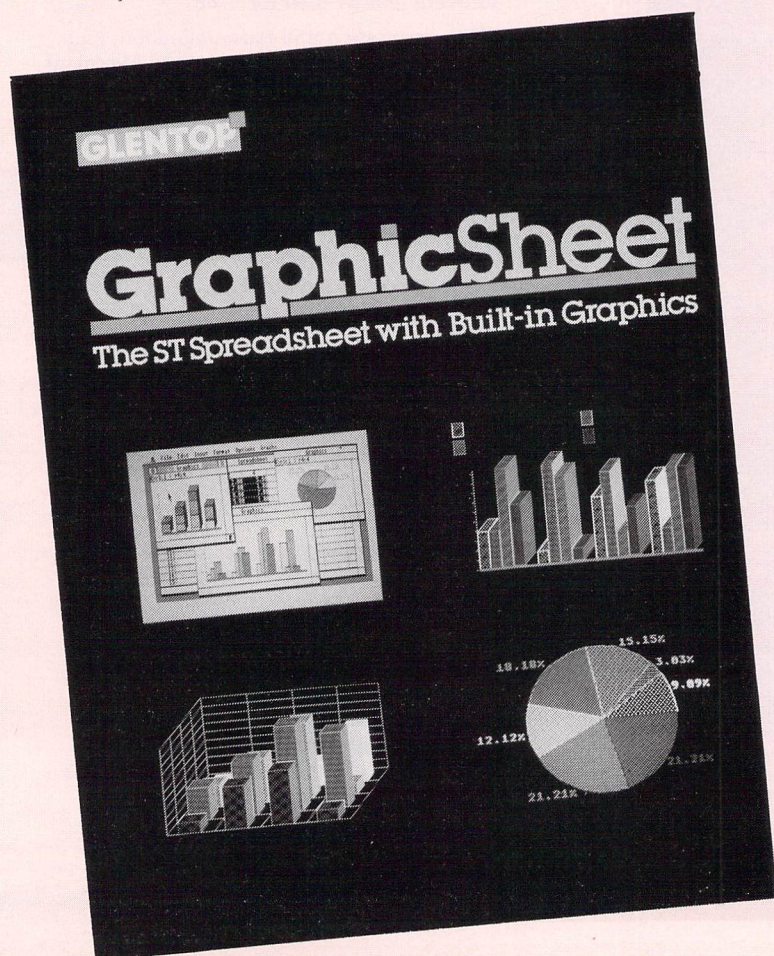
Eight different graphic styles are on offer, including both flat and 3D versions of bar charts and stacked bars, line and area graphs, pie charts and the exotically-named Manhattan.

You select the data to be represented by highlighting an area of the sheet. If you want a more permanent record of the graph, you can dump it to a printer or save the window to disc in Ascii format.

Gem doesn't just provide windows. The Wimp environment also proves useful when you start messing around with stuff like slot formats – whether you want integers or decimal numbers, how you want the text ranged, and that kind of thing – file handling, and operations such as replication and recalculation.

Most spreadsheets demand that you learn obscure sets of commands, and even with online help and menus, it's often a slow and difficult task finding the function you want. Eventually you learn what the commands are, but it takes time, and that time could be better spent actually working with the data.

Everything you need in Graphic Sheet is available from the drop-down menus. If you're not sure how to access a function, you can simply bumble around until you find it. The alternative is to read the manual, but that's boring and should be



necessary only for the more advanced or obscure features.

Indeed, the manual is the worst part of the package. For anyone new to spreadsheets, the use of many of the sheet's features will remain a mystery.

The general explanation at the start is inadequate, and the explanations of individual features and operations are sometimes too brief. You won't have any problems if you've used a spreadsheet before, but if you haven't, occasionally you might find yourself struggling.

A few nice touches

Hardened spreadsheet users will find several features to their liking. There are a few nice touches, some of them visual – like the optional grid which makes finding cell references easier – and others concern formatting. One of these concerns text.

Spreadsheet programmers tend to adopt one of two policies when approaching text in the cells. There's never any problem if the string you want to enter is smaller than the width of the cell.

But if it's larger, the text either spills over the cells to the right (if they're empty) or is truncated to fit the cell, depending on the whim of the programmer. Both methods have their advantages, and both are available in Graphic Sheet – you toggle between them from one of the drop-down menus.

The other feature I liked is the ability to name cells. If you can't remember the cell reference for, say, a total of a column of figures, then simply call the cell where the figure appears by the name Total and then refer to it by that name elsewhere.

These are just small and not necessarily unique details, but they can make the program easier to use when you spend hours poring over the micro. And they illustrate that Graphic Sheet's programmers have gone for ease of use rather than sophistication.

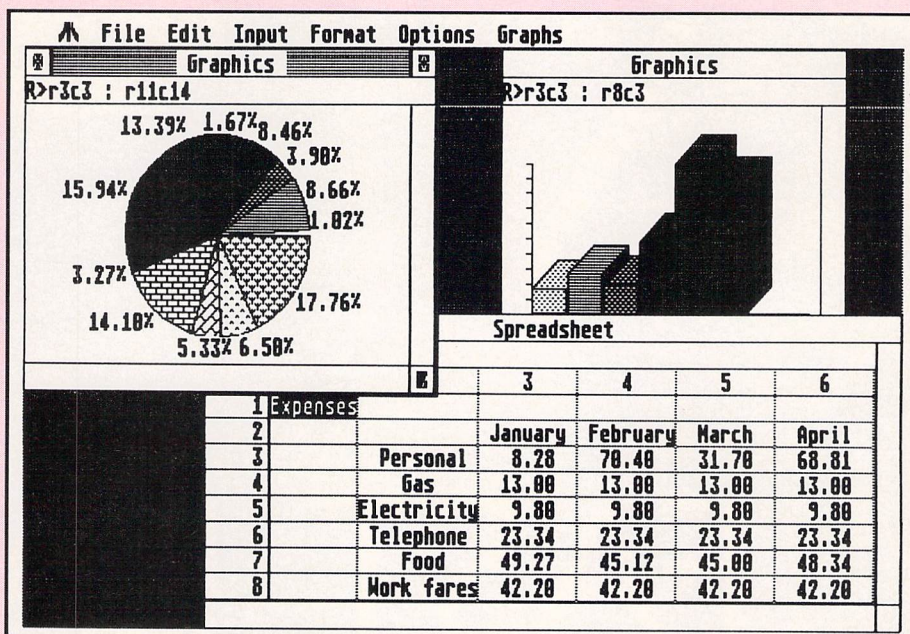
The program offers the basic set of operators for cell formulae, including random numbers and trig functions. It isn't as sophisticated as, say, Logistix, and advanced spreadsheet users might find it a little primitive in places, but it performs all the mathematical operations that most users need.

Once you've set up the spreadsheet the way you like it – the types of unit you want it to use, text justification and so on – you can save those parameters to disc in a separate file. That means you can reset the parameters the way you like them next time you load the sheet, or set up another one. However, I would have preferred the system to save the parameters with the sheet itself.

Naturally you can print the sheet, and as with most spreadsheets, this can be to disc. In other words, you can save the data as a text file for loading into a word processor, sending over a modem, or whatever your heart desires. Printer control is basic, but adequate. It doesn't use

File Edit Input Format Options Graphs								
Spreadsheet								
Expenses	1	2	3	4	5	6	7	8
1	Expenses							
2		January	February	March	April	May	Jun	
3	Personal	8.28	78.48	31.78	68.81	13.54	188	
4	Gas	13.88	13.88	13.88	13.88	18.43	18	
5	Electricity	9.88	9.88	9.88	9.88	12.43	12	
6	Telephone	23.34	23.34	23.34	23.34	25.28	25	
7	Food	49.27	45.12	45.88	48.34	58.78	58	
8	Work fares	42.28	42.28	42.28	42.28	42.28	45	
9	Car	8.88	8.88	8.88	55.88	128.88	8	
10								
11	Mon. Tot.	145.89	283.86	165.84	268.49	274.58	251	
12								
13								
14								
15								
16								

A sample spreadsheet



Producing graphs and charts

advanced printer drivers like some software.

Simple sorting

Simple sorting is also available, which means you can arrange data, alphabetically or numerically, in ascending or descending order. This kind of feature is often touted as a database facility.

That's stretching credibility a bit far, but there may be applications where you would normally have considered using a database, but can now use a spreadsheet instead, with all its excellent number manipulating capabilities.

I must admit to being a spreadsheet junky. Ever since I discovered them, I've used spreadsheets to organise my life and my finances. I took to Graphic Sheet very quickly.

Having lots of menus means you don't

have to resort to the manual too often, and the program is perfect for fast solutions to simple problems. It lacks the sophistication of many of the professional packages like VIP Professional, which is Lotus 1-2-3 compatible, and is also available in a Gem version, or Logistix, which has advanced programming and time management features.

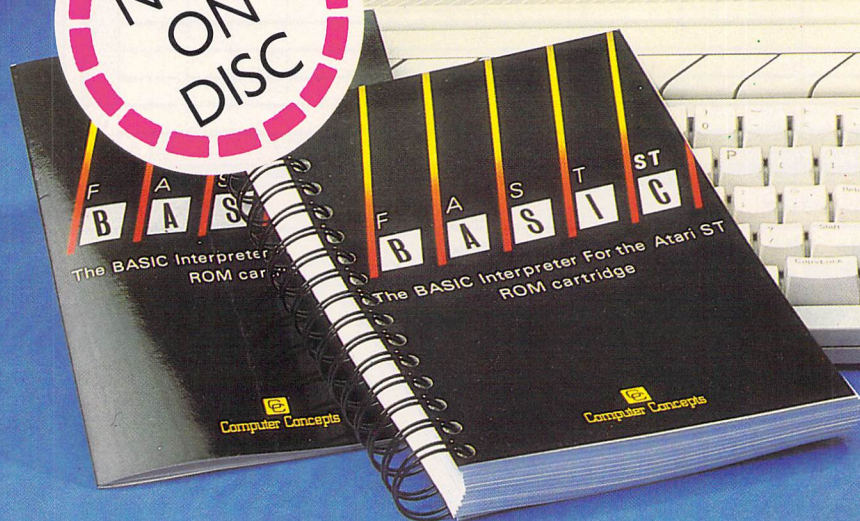
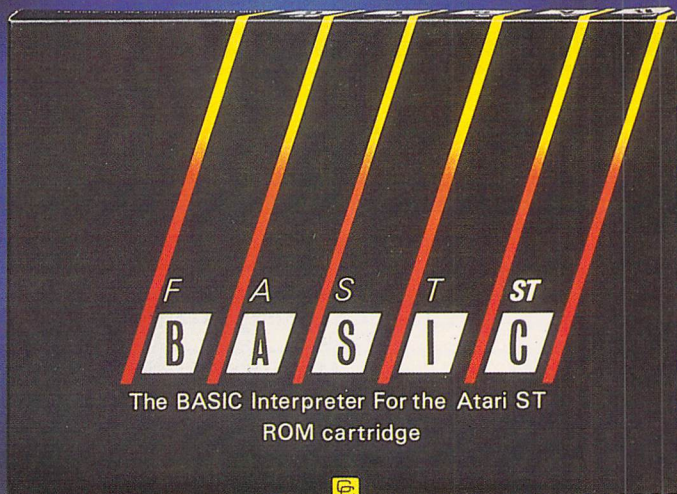
I suspect however, that few people ever use the more advanced features of spreadsheets, and Graphic Sheet is an attractive proposition for anyone wanting some basic number-crunching facilities linked with the ability to produce snazzy graphs.

Product: Graphic Sheet

Price: £45.95

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FAST BASIC

JUST LOOK AT THE REVIEWS IT HAS RECEIVED IN THE PAST—NOW IT'S HALF THE PRICE!

REVIEW

Computer Concept's Fast ST BASIC is the most powerful of the currently available BASICS. It sports a tremendous number of commands, giving the user unprecedented control over the program. It is also simple to use, provided on cartridge and totally GEM-driven... Fast BASIC also has the best GEM support of any of the BASICS.

START, the ST Quarterly

REVIEW

BASIC really is phenomenal value for money.

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ST User magazine—Oct 86

REVIEW

'The execution speed has to be seen to be believed.

If you own an ST even if you are a C or machine code programmer you should own a copy of FAST ST BASIC.

I don't know of a BASIC on any other machine which is so feature packed and yet still easy to use.'

Atari User—Nov 86



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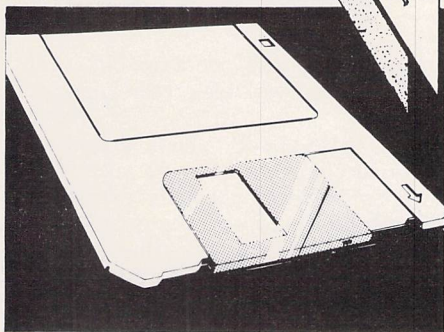


Fast BASIC has now
been released on disc
at the amazing price of
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SOFTWARE FOR THE ATARI ST

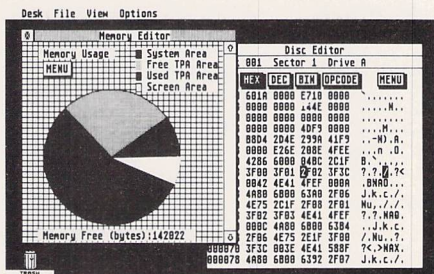
ST Doctor

The utility disc for the Atari ST. ST-Doctor is a Window-based desk accessory, available at any time whilst using other application programs.



Main features include:

- Complete scrolling window-based memory editor, allowing any area of ST memory to be examined in ASCII, Hex, Decimal, Binary or Disassembly listing. Associated features include Copy memory block, Print block, Save block, Fill block, Search, and a pie chart showing memory usage.



- Disc Editor: Similar editor to above, plus load/save file or sector, Advanced formatting, Search disc, Recover deleted file, show file size, show free disc space, etc...

- Key recorder: A unique 'function key definer', this allows up to ten sequences of key-strokes to be assigned to any keys.

- Supplied with fully illustrated instruction manual.

REVIEW

ST Doctor has to be described as one of the best, if not, THE best, low level programmer's utility.

ST WORLD

Price £19.95 incl VAT.



Back-Pack

A cartridge-based pack of general purpose utilities for every ST owner. When plugged into the cartridge port of any ST, all Back-Pack facilities are available whilst using GEM compatible applications and, because it resides in ROM, it occupies no valuable RAM space.



Scientific calculator

More comprehensive than most real calculators, this offers all the usual features such as Sin, Cos, Tan, Log, π , $X \wedge Y$, $X \sqrt{Y}$, $1/X$, a memory store, etc. However, it also has programmer's features such as operation in Hex, Binary and Octal, plus logical operations. The result can easily be transferred into the current application.

Price: £49.00
incl.

Clock and alarms

Analogue/digital clock showing time and date. Two time zones, four separate repeatable alarm settings, etc.

Diary

A comprehensive diary allowing categorised entries on any day of the year. Simple controls make it easy to move forward or backward one day, month, or year.

Note Pad

Thirty selectable pages of any information can be stored in the note pad with cursor controlled editing and the ability to transfer information back to the current application or accessory in use.

Typewriter

A simple utility allowing direct output to a printer at any time.

Printer Buffer

Uses memory to 'queue' output for the printer, leaving the computer ready to use, whilst Back-Pack feeds the printer when it is ready.

Address book

A computerised database of names, addresses and telephone numbers, allowing fast 'search' facilities to locate any entry.

Ramdisc

Uses an area of memory, of specified size, to act as an extremely fast disc drive. A startup disc is easily configured to copy any list of files into the Ramdisc automatically.

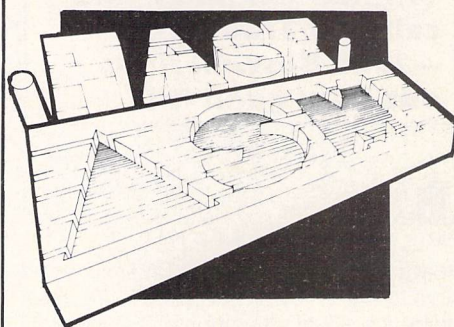
FAST ASM

Fast ASM is an ultra fast assembler, it provides a user friendly environment for both writing and assembling 68000 programs.

REVIEW

It is an excellent assembler, and at £19.95, sensational value for money too. I wouldn't SWAP it for anything!

ST WORLD



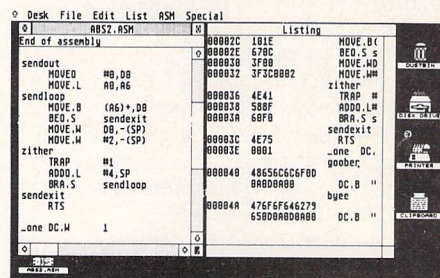
Main features include:

- Assembles up to 50000 lines per minute
- Program files are compatible with Fast Basic
- Able to run assembled programs without leaving assembler
- Provides fully relocatable PRG files
- Allows up to 10 source files in memory at one time
- Powerful GEM-based editor with mouse controlled cut, copy and paste facilities

REVIEW

Fast ASM is a very pleasant assembler to use, and at 50,000 lines per minute, it certainly is fast. The environment is good, thanks to an outstanding editor.

ST WORLD



- Detailed source and object code listings
- Includes full instruction manual

Price £19.95 incl VAT.



Computer Concepts

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Basic improvements

The authors of Basic have updated their original language and called it True Basic – Julie Boswell finds out how good it is

BASIC was originally developed around 1963 by John Kemeny and Thomas Kurtz at Dartmouth College – that's Dartmouth USA, not England – and it has since become one of the most widely used of all computer languages.

It was originally designed for the beginner and this is perhaps the reason for its great popularity. There are many dialects of Basic and each computer manufacturer seems to supply its own version. The authors call this Street Basic, and aren't too happy at all, claiming it to be a horrible dialect of a beautiful language.

This, and the increased power of modern computers, has prompted them to update their original Basic specifications, adding many new functions and features. It is now called True Basic and is available across a range of popular micros, including the ST, Amiga, Macintosh, and IBM PC and compatibles.

True Basic consists of one single sided disc and two manuals. The disc contains 290k of programs, utilities, Help files and demonstrations. The largest manual is a programmer's reference guide which is not micro specific. The second, much smaller, manual is a supplement specifically aimed at ST owners.

The Language

Although True Basic is billed as an up-to-date version of the original language, it is so different to any other implementation I've used it can almost be classed as a new language in its own right.

Take the matrix commands for instance, which are amazing and almost display artificial intelligence at times. MAT can be placed in front of commands like READ, PRINT, INPUT and so on. MAT READ *a* will automatically read items of data and place them into the array *a* until it is full. MAT PRINT *a* will

print out the entire array. Similarly, MAT INPUT will input the entire contents of an array.

Also arrays can be equated to each other, so if *a*, *b* and *c* are arrays then MAT *a*=*b*+*c* will make the array elements of *a* equal to the sum of the corresponding elements of the arrays *b* and *c*.

Note that this may mean redimensioning the array *a* to match the size of those on the right-hand side of the assignment statement. As if this wasn't enough, you can also multiply one or two dimensional arrays.

Subroutines and functions can be either internal or external. An internal one is placed within the main body of the listing, Pascal-like. When the program is executed these are skipped. Alternatively, they can be placed outside the main body of the program, even in a separate file. These are external.

The difference between them is in the way they handle variables. An internal subroutine or function can access any of the variables within the program – they are global – unless they are passed as parameters. An external subroutine or function however, has its own set of variables – these are local – and can't access

the ones in the main program. But, it can be passed the variables' values as parameters.

In the case of subroutines, arrays are passed as parameters by reference. With functions, however, they are passed by value – the entire array is copied to a temporary variable and this is used instead of the original. A side effect of this is that it does consume a lot of memory and is quite slow.

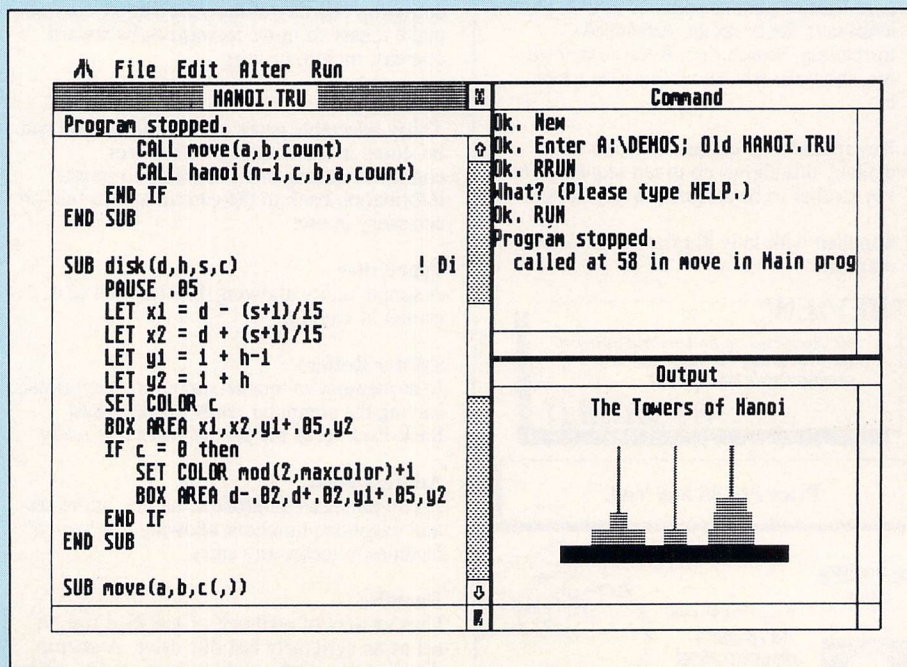
Graphics

True Basic has a fair selection of graphics commands, including plotting points and drawing lines, ellipses, circles and boxes.

The graphic coordinate system is unusual in that it is completely user-defined. In other words, you specify how many points across and down the screen is and True Basic converts whatever coordinates are given with graphic commands into real pixels before plotting them on the screen.

So no matter what the size of screen is, or its resolution, the graphics commands will still produce the same output – they are automatically scaled.

The only fly in the ointment is that you



Editing a True Basic listing

must be careful to get the aspect ratio right when setting up the graphics coordinates. If it's wrong, a circle will turn out looking like an ellipse.

The MAT command can be used in conjunction with graphics commands to extend their function to cope with arrays. It is possible to store all the points to be plotted in an array and plot the lot with a single MAT PLOT POINTS, LINES or AREA.

This means a whole graph can be drawn with a single MAT PLOT command. For instance, suppose a company's sales figure were stored in *sales(year,amount)*, then to plot these results on a graph all that is needed is a

GRAPHICS COMMANDS

SET WINDOW	Define a graphics window
SET COLOUR	Set the graphics colour
PLOT POINTS	Plot single points
PLOT LINES	Draw lines
PLOT AREA	Draw an outline then shade it
BOX LINES	Draw a rectangle
BOX ELLIPSE	Draw an ellipse
BOX AREA	Draw a filled box
BOX CLEAR	Clear a box
BOX KEEP	Store the contents of a box
BOX SHOW	Display contents of stored box
PLOT TEXT	Print text at any point

single MAT PLOT LINES: *sales*.

A series of graphic commands to create a screen display of some sort can be grouped together as a block and called a picture. It's rather like a subroutine, and can be called with *DRAW picname*. It differs from a subroutine however, in that one of several transformations can be applied to it. It can be scaled in size, shifted over or down, rotated or sheared.

True Basic's file handling is good, and you can access text, record and byte files. Text files consist of ordinary Ascii characters and are the sort of file produced by all text editors. Byte files can be any format and can contain any byte values.

Record files are commonly used for constructing databases. The file consists of a number of fixed length records con-

data in one operation.

The error messages are good. For instance, typing in a string in response to a request to input a number results in the error message "String given instead of number. Please try again from bad item."

The advantages of True Basic are clear enough, but what about the disadvantages? Well, there are some, but fortunately, they aren't too serious. Unlike the many dialects of Basic in current use, True Basic can be fairly inflexible at times.

For instance, only single statement lines are allowed, the program must end with END, NEXT must be followed by the loop control variable and LET must be used when assigning a value to a variable.

As far as speed goes, True Basic isn't particularly fast. It is roughly the same speed as Computer Concepts' Fast Basic – sometimes faster sometimes slower. HiSoft Basic, however, is so fast you'll wonder what on earth True Basic is up to as it chugs away at a snail's pace.

True Basic is not compiled to machine code, only an intermediate code which is then interpreted. This makes it machine-independent, but clearly slows down program execution.

You can't access Gem very easily – it's no better than ST Basic in this respect. You have to poke values into control and

ADVANCED COMMANDS

ANGLE(x,y)	Angle between x axis and point x,y
LTRIM(a\$)	Trim leading spaces
RTRIM(a\$)	Trim trailing spaces
TRIM(a\$)	Trim leading and trailing spaces
EXIT FOR/DO	Jump out of FOR/NEXT or DO/LOOP
ASK	Get system variables and parameters
PLAY a\$	Play the musical notes in a\$
MAT	Prefixes all matrix commands
LIBRARY	Access subroutines in another file
PICTURE	A block of commands to draw a picture
WHEN ERROR	Error handler
WHEN EXCEPTION	Error handler

intin then call the AES or VDI. An ST developer's kit is available and this adds all the Gem routines for creating pull-down menus, windows, forms, dialogue boxes and so on.

The Editor

True Basic is 137k long and boots up into the editor. Three screen windows are available and are accessed by pressing function keys F1 to F3.

The first is the source window, used for entering the program source text. The second is the command window, for entering direct commands. And the third is the output window where all graphic and text output appears.

Taking the source window first, this occupies the full screen by default, though it can be resized to enable you see the others underneath. You can type in or load a program (compiled or uncompiled) off disc.

The cursor can be positioned using the mouse or cursor keys, and text is entered by default in insert mode. The Insert key toggles between insert and overwrite, while the function keys enable you to move through the text a page at a time and delete to the start or end of the current line.

It's not a particularly fast text editor and feels pretty much like any other – Tempus excepted.

Find and replace are available from a pull-down menu and their scope can be restricted to the currently marked block if desired. The Undo key has been set up to restore the current line to its original state before you started editing it. This can be quite a useful feature at times.

You can format the program in memory automatically, converting the Basic keywords to capitals and indenting loops. Line numbers can be added – though True Basic doesn't need them – or removed. Blocks can be marked either by pressing F4 at the start and end, or by

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The matrix commands ... are amazing!

taining either a string or number. A pointer can be moved to any record and data can be read from or written to the file.

The matrix command – MAT – can be used when writing to files. It can prefix PRINT#, READ#, WRITE# and INPUT# in order to read or write whole arrays of

The competition

The alternatives are *ST Basic*, *Fast Basic*, *GFA Basic* and *HiSoft Basic*. These are over £20 cheaper than *True Basic*. *ST Basic* – supplied free – is regarded as a bit of a dead loss and is best forgotten.

Fast Basic is a popular language and provides quite easy access to *Gem* routines. It also has an excellent 68000 assembler built in making it ideal for mixing machine code subroutines with *Basic* programs.

GFA and *HiSoft Basic* can be compiled to extremely fast machine code programs that are capable of being run directly from the desktop. Accessing *Gem* isn't too difficult either. *GFA* provides many built-in commands and functions, while *HiSoft* supply a series of libraries.

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dragging the cursor along with the mouse. The block is highlighted by inverting it. This can then be cut, copied or pasted.

Command mode enables you to enter instructions like *LOCATE* (search), *CHANGE* (replace), *MOVE*, *COPY* and so on. By default, these, and other commands like them act on the whole file in memory.

Their scope can be limited to within a certain section or block. This can be specified on the command line like *COPY 100-150,500* which copies the lines between 100 and 150 to 500 on.

There is an alternative though. Instead

of giving line numbers, if the block is a subroutine or function it can be referred to by its name. So *DELETE fred* would delete the function or subroutine called *fred*. Similarly, *EDIT fred* tells the editor to automatically restrict all further editing commands to the block – subroutine or function – named *fred*.

KEY allows you to redefine the *ST*'s keyboard. Not only will it let you place any *Ascii* value on any key, but it will also allow you to assign whole strings to a single key. This feature enables you to

“It has a wealth of advanced commands...”

put most of the *Basic* keywords on single keys.

Error messages are good, with a typing slip like *PINT* instead of *PRINT* prompting a “What? (Please type *HELP*.)” message. Typing *HELP* accesses a series of *Help* screens stored on disc. These cover

every command mode command and menu item, and are handy to have around when you are unfamiliar with the language.

Basic source code can be compiled to memory by accessing a pull-down menu item. However, this has the unfortunate side effect of destroying the source code, so it must be saved first. Pressing *Control+R* runs the program in memory – compiled or uncompiled – and it doesn't trash the source code, either.

The compiled code can be saved to disc, but must always be run from within *True Basic*. Although the execution time remains the same, the advantage is that the program is secure – no one can see or tamper with the listing, only load, save or run it.

Conclusion

My first impression of this new implementation of *Basic* wasn't too favourable – it's non-standard, sluggish, inflexible and so on. After getting to know it, my opinion changed however, and I now rate it as an excellent language and a worthy successor to the original.

It has a wealth of advanced commands not found in other *Basics*, and the way it handles arrays is nothing short of amazing.

Although I didn't have chance to test the compatibility of *ST* programs on the *Mac*, *PC* or *Amiga*, judging from the intelligent way it handles the *ST*'s different screen resolutions, colours, number of pixels and so on, I would guess that programs will run with few, if any, changes.

Overall, it is an excellent piece of software, and if you need compatibility across four of the most popular micros around then it is definitely worth considering.

Product: *True Basic*

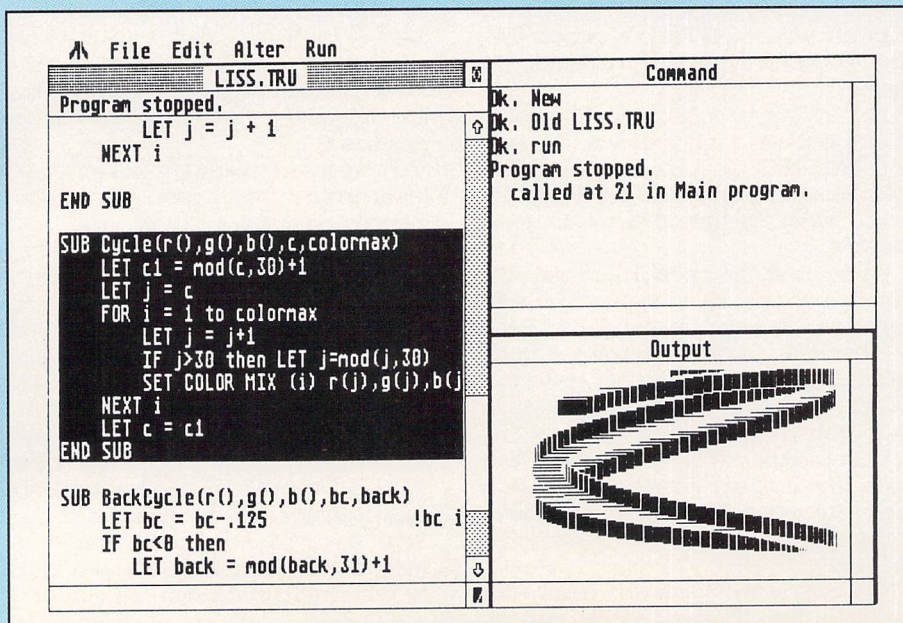
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FILE HANDLING COMMANDS

OPEN	Open a file
ACCESS	Specifies input, output or both
CLOSE	Close a file
ERASE	Move file pointer to beginning
UNSAVE	Delete a file
CREATE	Create a new, or use and old file
ORGANIZATION	Type of file – text, record or byte
RECSIZE	The size of each record
ASK	Get various file parameters
SET	Set various file parameters
RESET	Move the file pointer in record files



Highlighting a block of text

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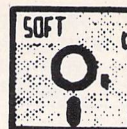


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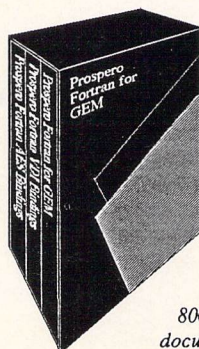
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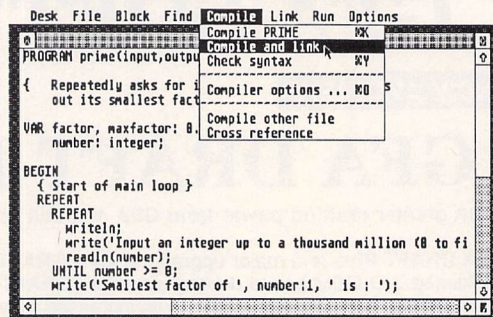
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Stephen Hill enthuses over Metacomco's upgraded assembler but decides it's just not for the beginner

METACOMCO, one of the leading suppliers of quality development software for systems based around the 68000 processor, has over the past few months been upgrading most of its packages for the ST to take into account the special needs of the Gem programmer. Latest offering is a new version of its popular 68000 assembler.

It comes on two single-sided discs which contain an assembler, an editor, a linker and a wide variety of other development tools and utilities.

Minimum system configuration needed to use this package to the full is a 520ST with at least 720k of disc space, and either a monochrome, or a medium resolution monitor. I encountered no real difficulty however, in using it with my own unexpanded STM.

In common with the majority of Metacomco's products, this one revolves around a Gem-based programming environment called Menu+. This enables you to readily access the many different parts of the package straight from the on-screen menus, without having to learn tedious sets of commands.

The main disadvantage with this system, is that every component has to be loaded into memory before it can be used. I found for small programs, this means far too much time is spent waiting for the appropriate sections to load in from the disc.

This problem is compounded by the extreme size of some of the segments, particularly the assembler, which at 89k is more than three times the size of the equivalent HiSoft Devpac routine.

Although users of high level languages like C or Pascal may well find such overheads perfectly acceptable, I wouldn't normally expect all this rigmarole when

using assembly language.

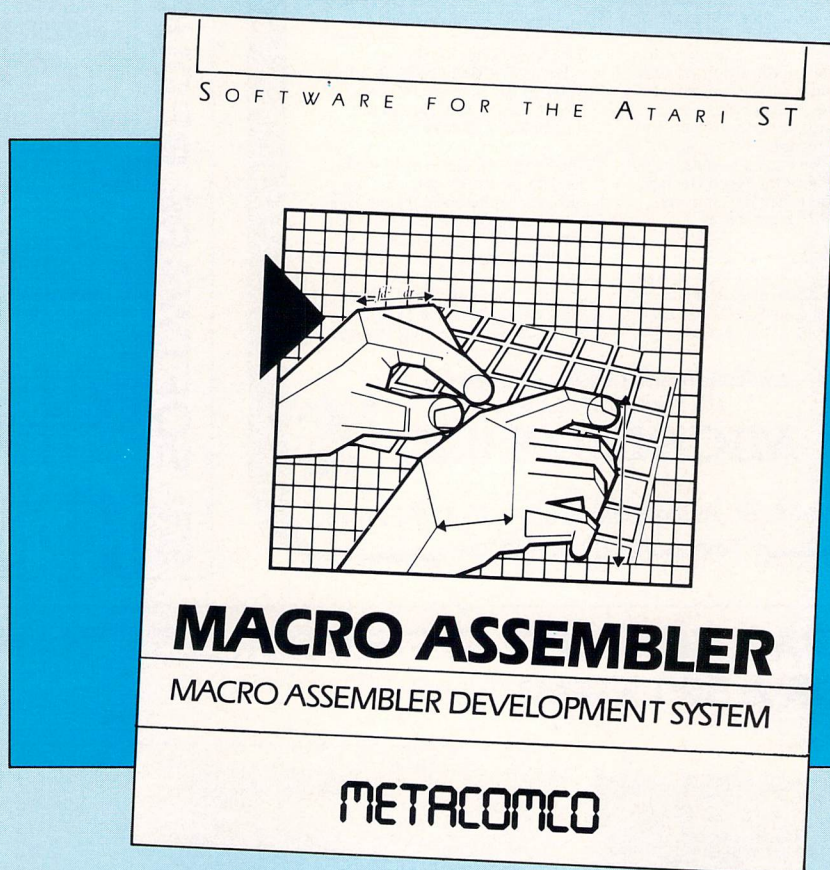
Most of Metacomco's competitors speed things up a great deal by incorporating an editor which is instantly available to the programmer at any time. In my opinion this package would have been improved beyond recognition if Metacomco had built a similar sort of ability into Menu+.

Having said that, this new version of Menu+ does represent a significant improvement on the old, with several options having been expanded and a couple of new facilities added. It's still nowhere near as good as a fully integrated system, but it does simplify the development cycle considerably.

The editor Metacomco provides is an updated copy of its existing keyboard-driven program. It works reasonably well, its large number of useful faculties being accessed using either a Control key combination or from a command line activated by pressing Escape.

The range of features is very impressive, which is unfortunately more than I can say for their speed. In particular, both the screen scrolling and the block move operations proved almost painfully slow.

Developing software



```
DEBUG+ for the Atari ST Version 1.04
(C) Copyright 1986 Metacomco plc.
Loading module 'E:\DISC1\EXAMPLES\BUG.BIN'
Program loaded at 04BF80
```

Section Start Length

```
text 04C880 00008C
data 04C18C 000000
bss 04C18C 000000
> L
04C880 MOVE.L $4(A7),A0
04C884 LEA.L $80(A0),A0
04C888 CLR.W D0
04C88A MOVE.B (A0)+,D0
04C88C CLR.B $0(A0,D0.W)
04C890 TST.B (A0)
04C892 BEQ.S $4C8A2
04C894 CMPI.B #$20,(A0)
> █
```

Using Debug+ to disassemble a program

To my mind this seriously reduced the overall effectiveness of the program.

Alongside all this, a small and rather superficial Gem interface has been installed. This allows you to use the mouse in conjunction with a limited set of menus to execute some of the extended keyboard functions directly from the screen.

Despite this, I continually kept having to refer to the extended commands to perform even simple activities like a search. This was very poorly implemented from the menu, with the search string being cleared every time it was called.

With a bit more optimisation and a little more care, this editor would have been excellent, but in its present form I couldn't really recommend it and you might be better off considering a replacement, say Tempus.

After creating a program, it's necessary to translate it into machine code using the assembler. Metacomco achieves this in two steps. First the source text is assembled into a special binary format. Then it's converted into executable code

Turn to Page 91 ►

Super Conductor

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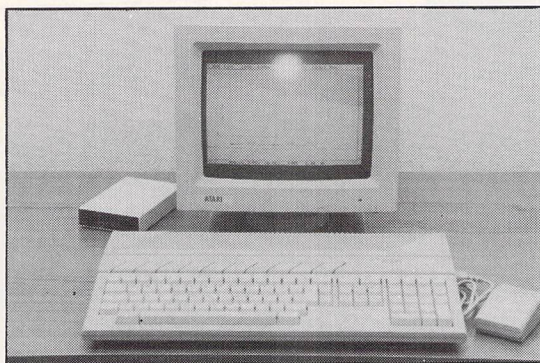
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using a separate linker program. The advantage of this method is it enables you to create libraries of your most useful subroutines in binary form and then combine them with any other program you like without having tediously to re-assemble them.

The system comes into its own when writing Gem programs, as you can effortlessly access any of the Vdi or Aes functions from the Gem library – GEMLIB.BIN – with just a couple of lines of code.

The disadvantage of this technique is that for small routines the procedure can be rather slow. This is because you effectively need to call two programs from the disc rather than one.

Given this proviso, the assembler worked very well in practice, and assembled even large programs reasonably quickly.

Full conditional assembly is supported, as is the ability to generate files in both Tos and GST linker formats. Some commands like DATA and BSS would however, only work correctly with the Tos system.

The linker supplied with this package is the one from GST, which has become the standard for ST system software. As a consequence, this assembler should be compatible with the majority of high level languages produced by other manufacturers.

Probably the most important single aspect of any development package is the debugging environment it supports. Metacomco supplies an excellent utility called Debug+ which neatly combines the functions of a machine code monitor with those of the linker.

It allows you quickly to debug any

assembled programs without having to link them first. Furthermore, Debug+ is also capable of dealing with either GST or Tos files, which may well be important for some potential users.

It is usually invoked from Menu+, and automatically loads and links your newly assembled program. You can now test your routine using one of the many debugging options provided. All instructions are entered in a plain English format, with none of the complicated mnemonics so often associated with this sort of program.

Dedicated machine code hackers can however, speed things up considerably by assigning their own control key combinations to any command using a special Map facility.

In addition there's also a useful macro capability enabling you to create your own customised Debug+ commands, which can be loaded every time the package is run. Program control features include STEP (single step) GOTO (go until) and BREAK (breakpoint).

... should provide everything you need for serious development work

Full disassembly of any section of memory is available using the DISASM instruction which spontaneously takes into account any labels saved along with your code.

To avoid the usual problems with graphical routines, all program output is sent directly to a separate screen, and can be displayed at any time. In terms of sheer power, I rate this program very highly indeed, even when compared to something like Devpac's Mon-ST, and yet

at the same time it's refreshingly easy to use.

As usual, Metacomco has bundled Kuma's K-Resource with the system. This enables you to incorporate complicated Gem dialogues involving icons and menus into your assembly language programs.

One minor snag with this process is K-Resource specifically caters for high level languages like C, and Pascal. You therefore have to convert any appropriate header files into the correct format for the assembler before they can be used.

There's also an interesting program called Make for advanced programmers. This allows you to specify the relationships between a set of program files in such a way so that if one of them is changed, the appropriate action is taken to update any others which depend on it. This facility should prove very useful during the development of large assembly language programs.

The documentation supplied with the package is good on the whole. Plenty of worked examples are included, making it very easy to familiarise yourself quickly with the numerous features of the system.

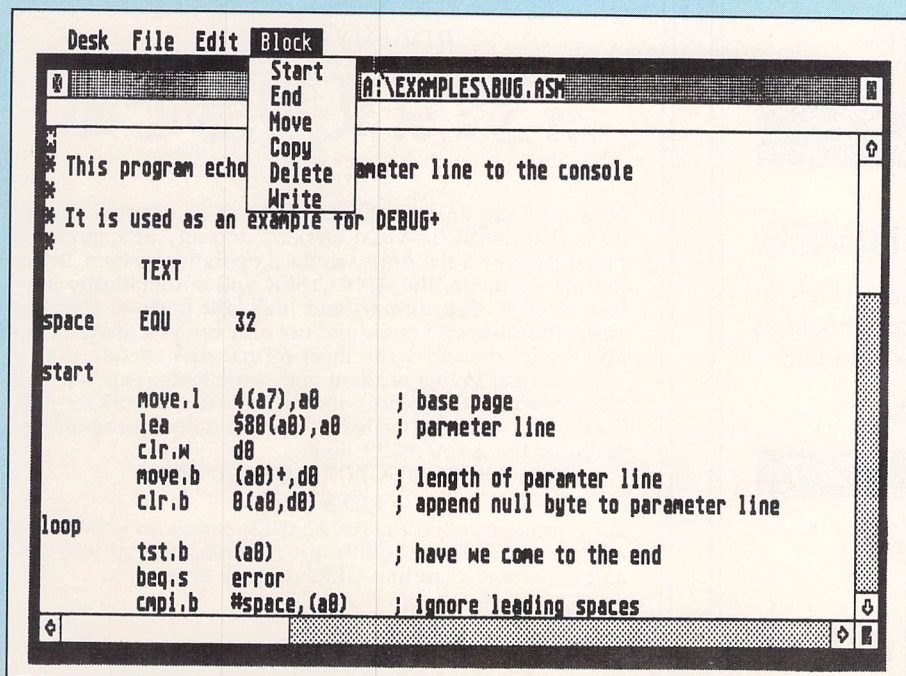
The Gem documentation, although largely C based, is clear and comprehensive, and illustrates some of the more important Gem functions with some simple Gem specific programming examples.

My only real gripe was the lack of information about the operating system, Tos. Most other assemblers of this type provide a large set of Tos macro routines in an include file, and this will be sorely missed by many assembly language programmers.

I found this a rather strange package, apparently hacked into existence from one or another of Metacomco's existing high level languages. The net effect is to make it rather cumbersome to use, especially on systems without either copious amounts of memory or a hard disc.

It's certainly not lacking in power, and if you've a bit of previous experience, should provide everything you need for serious development work. However, it might put a beginner off assembly language programming for life.

On the other hand, the support for Gem is so extensive that it may well prove ideal for Gem programmers wishing to write routines such as desktop accessories. Furthermore, if you have yet to acquire a resource construction set, it's worth noting that K-Resource alone could easily cost you more than £40, and at only £10 or so more, this package has to represent excellent value for money.



Using the editor to enter a program

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Customise your keyboard

Sam Cherian offers you three handy utilities to expand the key definitions

THIS is a suite of three utility programs written in GFA Basic. The first, Keys, will let you put any of the ST's 255 characters on any key in either of the normal, shifted or caps lock positions.

You may change as many keys as you like and the redefined keyboard can then be saved as a file for later use. You can create any number of different keyboard layouts and save them to disc. You also have the option of keeping the last one made for current use.

The second and third programs, KeyGem and KeyTos, load a previously defined keyboard into memory, reset the keyboard pointers, and exit. To get the standard layout again just reset the ST.

KeyGem and KeyTos are two versions of the same program. KeyGem will work only in a Gem environment since it uses Alert and file selector boxes and can be run from the desktop.

The other version, KeyTos, is designed to be a stand-alone program running from an AUTO folder on the boot disc. This means the Basic code will have to be compiled using the GFA Basic Compiler.

The AUTO folder is a neat arrangement: The operating system will run any

programs in this folder, in the order in which they were saved, as soon as initialisation is complete. The only snag is the programs cannot use any Gem facilities since Gem is still not operational at this stage. So KeyTos can't use Alerts or file selector boxes like KeyGem.

If you put KeyTos into the AUTO folder it will load a keyboard of your choice at boot-up. If you want the standard layout just hit Return without entering anything.

The theory behind the utilities is fairly

straightforward. When you press a key on the ST's keyboard it does not directly generate the character corresponding to the key. The keyboard processor sends a message to the 68000 telling it which physical key was pressed.

This message contains a unique scan code which the operating system uses to work out the Ascii value. There are three, 128-byte keyboard translation tables holding the Ascii values for each key – one for each key position (normal, shifted and caps lock).

The scan code is used to index into the correct table to get the Ascii value of the key pressed. This then generates the character. The beauty of this arrangement will become clear when you understand how we can use it to produce the new keyboard tables.

The addresses of these tables are held in a vector table – a name for three consecutive addresses – which can be accessed using the ST's XBIOS function 16. The same routine is also used to relocate the tables.

In rom-based systems, as most STs are now, the keyboard tables are held in rom and cannot be changed, so the program starts by copying the rom tables (128 x 3 = 384 bytes) into a safe area of memory.

The area I have chosen is just above the screen memory. As you are perhaps aware, the video ram or screen memory of the ST must begin on a 256-byte boundary. This means the starting address must be exactly divisible by 256. It must also occupy 32000 consecutive bytes.

At the end of the screen therefore, there are 768 bytes which are unused and wasted by the system. It is perfectly safe to use this area, since the ST will do nothing there unless you ask it to.

The keyboard vectors are accessed by passing three ones to XBIOS 16 – one for each table – as parameters. It returns the vector table address in the variable Kt.

If you Lpeek the address (four bytes for an address), address+4 and address+8 you will get the locations of the three tables. The screen address is found using XBIOS 3. Then 32000, and 128 just to be safe, is added to produce the location of the new normal table and 128 bytes further on, the new shifted and caps lock tables. The command Bmove copies the rom tables into the designated areas.

Another system routine Gemdos(1) is

```

10 Rem Keys
20 Rem By S. Cherian
30 Rem (c) Atari ST User
40 Gosub Setup
50 Gosub Chkeys
60 Gosub Options
70 Procedure Setup
80 K=Xbios(24)
90 Kt=Xbios(16,-1,-1,-1)
100 Norm=Lpeek(Kt)
110 Shift=Norm+128
120 Caps=Norm+256
130 Normn=Xbios(3)+32128
140 Shiftn=Xbios(3)+32256
150 Capsn=Xbios(3)+32384
160 Bmove Norm,Normn,128
170 Bmove Shift,Shiftn,128
180 Bmove Caps,Capsn,128
190 Return
200 Procedure Chkeys
210 Print "Press key to be changed"
220 Key=Gemdos(1)
230 Kscan=Int(Key/65536)
240 Input "Enter new Ascii value of
key ",Asc
250 Input "Position:N=Normal S=Shift
C=Caplock ",AS
260 If AS="n" Or AS="N"
270 Poke Normn+Kscan,Asc
280 Endif
290 If AS="s" Or AS="S"
300 Poke Shiftn+Kscan,Asc
310 Endif
320 If AS="c" Or AS="C"
330 Poke Capsn+Kscan,Asc
340 Endif
350 Return
360 Procedure Options
370 BS="Change more keys?"
380 Alert 2,BS,1,"YES/NO",B
390 If B=1
400 Gosub Chkeys
410 Gosub Options
420 Else
430 BS="Save keyboard?"
440 Alert 2,BS,1,"YES/NO",B
450 If B=1
460 Fileselect "\*,*",",",Kb$
470 Open "0",#1,Kb$
480 Bput #1,Normn,384
490 Close #1
500 Gosub Mokbd
510 Else
520 Gosub Mokbd
530 Endif
540 BS="Keep keyboard?"
550 Alert 2,BS,1,"YES/NO",B
560 If B=1
570 K=Xbios(16,L:Normn,L:Shiftn,L:Ca
psn)
580 End
590 Else
600 BS="Exit?"
610 Alert 1,BS,1,"okay",B
620 End
630 Endif
640 Endif
650 Return
660 Procedure Mokbd
670 BS="More keyboards?"
680 Alert 2,BS,1,"YES/NO",B
690 If B=1
700 Gosub Setup
710 Gosub Chkeys
720 Gosub Options
730 Else
740 Goto Ret
750 Endif
760 Ret:
770 Return

```


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used to get the scan code of a key. Gemdos(1) waits for a key press and returns a 32 bit value. The lower byte of the upper word contains the scan code and the lower byte of the lower word contains the Ascii value. The keyscan is extracted from this by division by 65536.

After the new Ascii value and the table

to change are input, the keyscan is used as an offset into the table and the Ascii value is placed in the correct location.

When all the changes have been made the area of memory holding the tables is saved as a file. If you decide to keep the last table, the keyboard pointers are reset using the XBIOS function 16 again. This time however, the addresses of the new tables are passed to it.

```

10 Rem KeyTos
20 Rem By S. Cherian
30 Rem (c) Atari ST User
40 On Error Goto Fnf
50 Print "Press Return for old keyboa
rd"
60 Print "Any other key for new keybo
ard"
70 Normn=Xbios(3)+32128
80 Shiftn=Xbios(3)+32256
90 Capsn=Xbios(3)+32384
100 Repeat
110 AS=Inkey$
120 Until AS<>""
130 If AS=Chr$(13)
140 End
150 Else
160 Gosub InkB
170 Endif
180 Procedure InkB
190 Input "Select Drive:A=1 B=2 ",D
200 Chdrive D
210 Input "Keyboard Filename ",Kb$
220 Open "I",#1,Kb$
230 Bget #1,Normn,384
240 Close #1
250 K=Xbios(16,L:Normn,L:Shiftn,L:Caps
n)
260 End
270 Return
280 Procedure Fnf
290 If Err=-33
300 Print "File not present on disc"
310 Gosub InkB
320 Endif
330 Return

```


Program II

```

10 Rem KeyGem
20 Rem By S. Cherian
30 Rem (c) Atari ST User
40 Print "Press Return for old keyboa
rd"
50 Print "Any other key for new keybo
ard"
60 Normn=Xbios(3)+32128
70 Shiftn=Xbios(3)+32256
80 Capsn=Xbios(3)+32384
90 Repeat
100 AS=Inkey$
110 Until AS<>""
120 If AS=Chr$(13)
130 End
140 Else
150 BS="Select Drive"
160 Alert 1,BS,0,"AIB",D
170 Chdrive D
180 Fileselect "\*.*",#1,Kb$
190 Open "I",#1,Kb$
200 Bget #1,Normn,384
210 Close #1
220 K=Xbios(16,L:Normn,L:Shiftn,L:Caps
n)
230 End
240 Endif

```

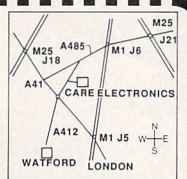
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SCRAP BOOK

THIS month's Scrapbook consists of just one program – a utility written by **Liisa Forstii** who lives way up in the frozen Arctic Circle in Finland.

Verify is a disc utility which checks that a disc's contents are in good condition and that there aren't any bad sectors or corruption. When run it will prompt you to insert the disc to test and then press a key. Having done this, it will read every sector on the disc.

Any sectors which can't be read – because they have been physically damaged or corrupted in some way – will be reported. If there are more than nine bad sectors the routine will abort, displaying an appropriate error message.

Verify is written in 68000 assembly language using HiSoft's Devpac assembler. This is fairly standard, and you shouldn't experience any problems converting it to another assembler.

The only thing that may need changing is the macro definition at the start of the listing. Enter the listing and assemble it to disc with the filename VERIFY.TOS. To run it double-click on it from the desktop.

It would be prudent to try it out first on a disc which does not contain any valuable data or programs, just in case you make a typing slip while entering the listing.

To test that it works, run it and half way through verifying a disc, pop the disc out of the drive for a second or two.

Tos will make several attempts to read

the disc before finally failing. This will be detected by the routine and an error message should be displayed on screen. Push the disc back in before nine errors

have occurred and it should carry on and verify the rest of the disc. If all is well you now have a valuable utility for verifying the contents of your discs.

SCRAPBOOK is a special feature consisting of short, simple programs sent in by our readers. It's a place where we can publish all of the interesting little routines that don't end up in our regular features but are too good for us not to share with other readers.

If you have a short program which you think other readers would find useful, send it to:

*Scrapbook, Atari ST User, Europa House,
Adlington Park, Adlington,
Macclesfield, Cheshire SK10 4NP.*

```

*****
*      Verify a disc      *
*      By Liisa Forstii   *
*      (c) Atari St User  *
*****

pstring MACRO
LEA \1(PC),A0
BSR string
ENDM

*****
*      Start of program   *
*****
MOVE #1,-(A7)      Switch cursor off
MOVE #0,-(A7)
MOVE #21,-(A7)
TRAP #14           XBIOS 21 CURSCON
ADDQ.L #6,A7       Tidy stack
MOVE #25,-(A7)     Drive A or B?
TRAP #1            BDOS 19 C.GETDRV
ADDQ.L #2,-(A7)    Tidy stack

MOVE D0,D6         D6=drive
pstring disc       Print message
start
BSR waitkey
pstring sides
LEA buffer(PC),A6  A6->buffer
MOVE #0,D7
MOVE #1,D5
BSR read
MOVE #0,D0
MOVE.B $1A(A6),D4  Number of sides
MOVE D4,-2(A6)
BSR digit
pstring crlf
loop
MOVE.L #0,D7       D7=track
loop1
MOVE.L #1,D5       D5=sector
loop2
pstring track
MOVE.L D7,D4       Print track number
DIVS #10,D4

BSR pnumber
pstring sector
MOVE D5,D4         Print sector number
BSR digit
BSR read           Read sector
BEQ ok
pstring bad        Bad message
ADDQ #1,-4(A6)     Inc bad sectors
CMPI #9,-4(A6)     9 bad sectors?
BNE ok
pstring abort
BRA exit
ok
ADDQ #1,D5         Next sector
CMPI #10,D5        Done all sectors?
BNE loop2
BSR keyp          Key pressed?
BNE exit          End if key hit
ADDQ #1,D7         Next track
CMPI #80,D7        Done all tracks?

```

Turn to Page 96 ►

◀ From Page 95

```

BNE loop1
SUB #1,-2(A6)           Other side?
BNE loop
exit
pstring key
BSR waitkey
MOVE #0,-(A7)           BDOS 0 P_TERM_OLD
TRAP #1                 Return to Desktop

```

```

*****
* See if key has been pressed
*****

```

```

keyp
MOVE #11,-(A7)
TRAP #1                 BDOS 11 C_CONIS
ADDQ.L #2,A7           Tidy stack
TST D0                 0=no
RTS

```

```

*****
* Read the keyboard
*****

```

```

readkey
MOVE #8,-(A7)
TRAP #1                 BDOS 8 C_NECIN
ADDQ.L #2,A7           Tidy stack
RTS

```

```

*****
* Print a number
*****

```

```

pnumber
BSR digit
SWAP D4

```

```

digit
ADD #0,D4               Print number in D4
MOVE D4,-(A7)
MOVE #2,-(A7)
TRAP #1
ADDQ.L #4,A7
RTS

```

```

*****
* Read a sector
*****

```

```

read
MOVE #1,-(A7)           Read 1 sector
MOVE #0,-(A7)           Side 0
MOVE D7,-(A7)           Track D7
MOVE D5,-(A7)           Sector D5
MOVE D6,-(A7)           Drive D6
MOVE.L #0,-(A7)         Not used!
MOVE.L A6,-(A7)         Buffer
MOVE #8,-(A7)           Verify sector
TRAP #14                XBIOS 8 _FLOPRD
ADD.L #20,A7            Tidy stack
TST D0
RTS

```

```

*****
* Print a string
*****

```

```

string
MOVE.L A0,-(A7)         Print a string
MOVE #9,-(A7)
TRAP #1
ADD.L #6,A7
RTS

```

```

*****
* Wait for a key press
*****

```

```

waitkey
BSR keyp                 Flush buffer 1st
BEQ here
BSR readkey
BRA waitkey
here
BSR readkey             Now read key
RTS

```

```

disc DC.B "*****"

```

```

DC.B 13,10
DC.B "* Insert disc to verify *"
DC.B 13,10
DC.B "* and press RETURN *"
DC.B 13,10
DC.B "*****"
DC.B 13,10,0

```

```

track DC.B 13,"Track:",0
sector DC.B " Sector:",0
bad DC.B "...read error",10,0
key DC.B 13,10,13,10
DC.B "Press a key...",0

```

```

sides DC.B 13,10,"Sides=",0
crlf DC.B 13,10,0
abort DC.B 13,10,"Aborted due to "
DC.B "multiple errors",0
EVEN

```

```

DC.W 0                 number of bad sectors
DC.W 0                 number of sides

```

```

buffer DS.B 1024

```

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THE TYPE FOR THIS ADVERTISEMENT WAS PREPARED ON AN ATARI 1040 ST USING PUBLISHING PARTNER AND OUTPUT ON A LINOTRONIC TYPESETTER.

THE A-Magic Turbo Dizer is a powerful, budget-priced video digitiser originally developed by a Swiss software/hardware company and now imported by Software Express.

Basically, a video digitiser is a combination of hardware and software which together is capable of taking a signal from a video source and converting it into a picture which can be displayed on the ST's monitor screen.

The Turbo Dizer package consists of a largish black cartridge that plugs into the ST's cartridge port on the left-hand side of the micro, plus two discs of software.

The cartridge has a BNC socket at the opposite end to the cartridge edge connector, into which you plug a video source such as a video camera, video recorder or television with video output.

After switching on the ST and video and booting up the Turbo Dizer software you are presented with the menu shown below. From here, you can set various parameters such as the colour, format and grey levels. Plus you can access the help screen illustrated on the next page.

The Turbo Dizer will work with any ST - 520 or 1040 - and in monochrome or colour. It won't produce a true colour picture in low resolution, it uses the 16 colours to produce 16 shades of one single colour - red, blue or green - selected from the menu. The grey option is for monochrome monitors only.

The Format option specifies the format the file is to take when a digitised picture is saved to disc. This can be in Degas, NeoChrome, Art Director or bitmap form. This last option is simply a saved screen. In monochrome mode the only options available are Degas and bitmap as NeoChrome and Art Director won't run in high resolution.

After setting the options you can start digitising. I used a video recorder for this test. The Turbo Dizer isn't spectacularly fast and can digitise pictures at just over one frame per second. When the spacebar is pressed it reads the video signal and draws the image on the monitor or TV screen.

I found it best to keep tapping the

Abracadabra ...ST video!



Roland Waddilove finds the A-Magic video digitiser competent and inexpensive

spacebar regularly. The Turbo Dizer then slowly flicks through the frames. When you find a suitable picture pressing Return brings up the menu and you can save the image on-screen.

Once saved, the digitised images have many uses. You can load them into any of the currently available art packages and touch them up, cut out blocks, add them to your own pictures, insert them into newsletters and club sheets using DTP

packages and so on. The scope is limitless.

The accompanying manual is small and contains little information. However, you don't need to know a great deal to use this package anyway, so it can't be criticised too much on this score.

A little more information would not

Turn to Page 101 ►

Color:	Format:	Graylevels:
Red	DEGAS	2
Blue	NEON	4
Green	ARTDIR	8
Gray	BITMAP	16
<div style="display: flex; justify-content: space-between;"> Save as.. Info </div> <div style="display: flex; justify-content: space-between;"> Quit Help </div>		
START		
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The main menu



A monochrome picture digitised from a video recorder source

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Once these images are in the ST they can then be saved to disk as a single image or a set Sequence in one of two popular paint package formats [Degas (PI1) & Neochrome (Neo)].

SAM can also load the previously saved images and then replay them at any pre-desired replay rate and using any one of the six pre-set colour palettes available.

Once a frame has been saved to disk, it is then possible to use these pictures in any Degas or Neochrome compatible program. For example:- Art, animation, programming languages and of course Desk Top Publishing packages.

In conjunction with SAM we use Degas Elite, Cyber Studio, Signum 2 and Timeworks DTP.



Sample of a photograph Digitised on SAM, converted on Degas and printed out using Signum 2 on a NEC Pinwriter 2200.

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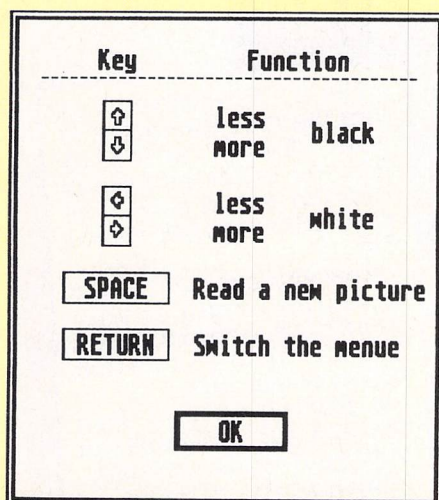
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DEBBIE DESIRE'S PROBLEM PAGE Personal, emotional or sexual problems answered.



The help screen



A sample digitised picture supplied with the package

◀ From Page 99

have gone amiss though, as some programs on the disc were not explained. For instance, there's an accessory called TV which did nothing useful at all on my ST. Perhaps I was doing something wrong?

The sample pictures supplied on the disc are excellent and I must admit, I couldn't quite produce the same sort of quality image with my video recorder.

The results were still good however, and better in low resolution colour than in monochrome.

This is a competent, but not outstanding, basic video digitising package. It's not too expensive, and is well within the reach of most ST owners.

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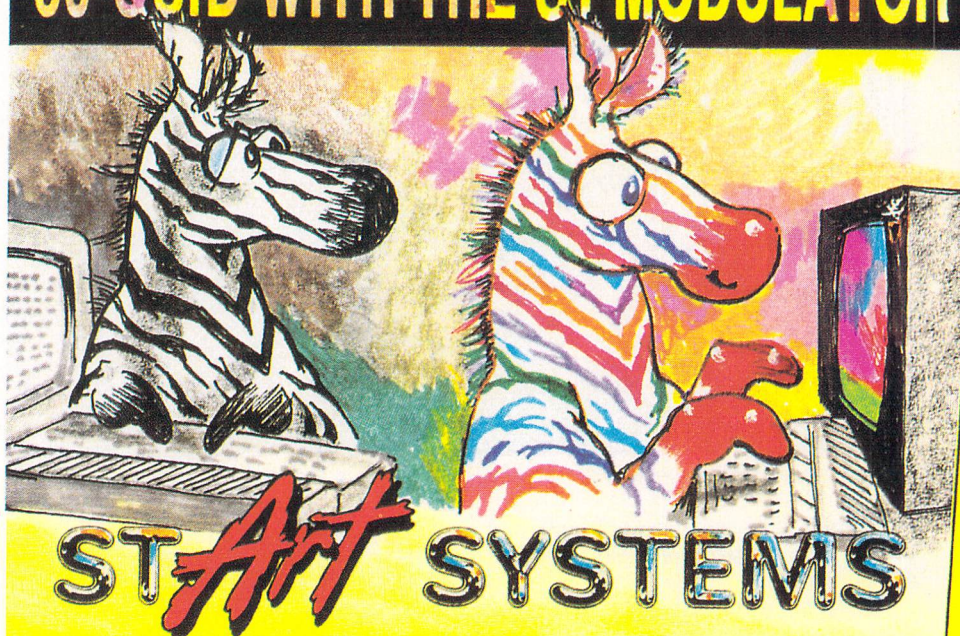
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IN essence a hard disc drive is a form of extremely fast, permanent storage media. Silicon Systems' Big Disc is such a unit and the 40Mb version reviewed here is capable of storing the equivalent of more than 50 double sided floppy discs.

There are several hard discs available and of these the Big Disc is one of the cheapest and probably the ugliest – although don't let that put you off. What it lacks in aesthetic appeal is made up for admirably in strength of construction, taking my bulky Sony monitor without so much as a creak. In comparison, Atari's SH205 model doesn't feel anywhere near as robust.

Nestling inside the case is a large cooling fan humming away quietly. In a typical working environment its noise is hardly perceivable.

One interesting feature of Big Disc's design is the routing of the drive to computer cable. This sprouts from a cable stay at the front right of the box, leaving about 50 cm of cable draped untidily across the desk. This is a deliberate attempt to allow the cable a free run. How well it works in practice depends on the layout of your work area.

Big Disc's most powerful asset, as can be seen from the accompanying benchmarks, is its speed. I had hoped to include comparative timings with Atari's SH205 unit, but unfortunately, the one destined for the test followed Murphy's law, developed a serious fault and refused to work.

In fact these tests don't really do justice to how fast the system feels. Saving a document under 1st Word's Save and Resume feature is a real breeze, taking just a couple of seconds for the complete operation.

The internal drive seems sluggish in comparison, and programmers developing software using an assembler or a C or Pascal compiler will find the improvement when using Big Disc quite staggering. You're likely to be left wondering how you've managed all this time without one.

Where it really comes into its own is in the office – where data and records could cover hundreds or even thousands of clients. Even with the larger memory Mega STs, it's quite likely that software will, at some stage, have to search records from the disc. Speed and storage available are important here – imagine

Fast access – no problem

Mark Smiddy reviews a new hard disc drive and finds it fast, reliable and extremely efficient

having 50 or so discs full of clients' records.

Support for the unit comes in the form of a large user-friendly manual, complete with some amusing one-liners, and a single disc of utilities.

A formatter is included, as is a park facility (used before transporting the unit) and the software to set up partitions – once formatted the disc is divided into sections known as logical drives or partitions. Each acts just like a very fast floppy, with much greater storage.

The best news is that Big Disc – unlike the Atari drives – doesn't have to be booted from special software. That is, you don't have to put a hard drive boot disc in drive A before re-booting Tos. However, a formatted disc must be in drive A or the system will probably crash – a feature of Gem, I'm told.

In terms of cost per byte, the Big Disc hard drive weighs in at 0.002 pence. Compare this to floppy discs which work out at 0.0005 pence per byte – one quarter of the cost, assuming the bulk purchase of ten cheap double-sided discs

and the cost of an external 1Mb drive.

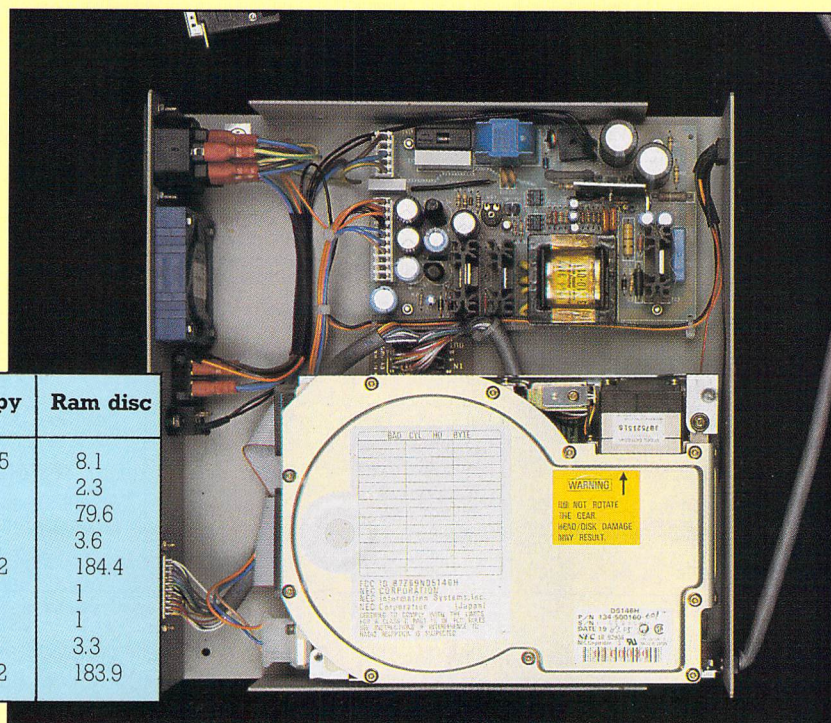
It's also like putting all your eggs in one basket – what happens if it goes wrong? Losing 40Mb of data and programs is at very least heartbreaking – at worst it's disastrous. Backups are essential and this is can be very expensive.

Looking on the bright side, it's very unlikely most people would want to back up an entire 40Mb disc. In practice half a dozen double-sided floppies should more than suffice.

A hard disc – treated with care – is extremely reliable. From its day of manufacture the discs are marked with a bad sector map. Tos will skip around these bad sectors and it could take many years before a new one appears. These faults can often be repaired – marked as bad and ignored – without losing too much data.

Hard drives may be expensive, but they're worth it if you need speed and massive online storage. Just in case you run out of room, Big Disc – like all good hard drives – can be chained to another. Of the third party hard drives available this one is well worth a closer look.

*Product: Big Disc hard disc drive
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Benchmark	Big Disc	Floppy	Ram disc
Open/close file 1000 times	100.3	199.5	8.1
Print 1000 numbers	2.6	7	2.3
Print 1000 strings	19.2	302	79.6
Input 1000 numbers	3.9	5	3.6
Input 1000 strings	227.5	311.2	184.4
BPUT 1000 bytes	1.2	4.6	1
BGET 1000 bytes	1.2	1.3	1
Input 1000 numbers backwards	3.6	4.8	3.3
Input 1000 strings backwards	227	310.2	183.9

Disc benchmark timings in seconds

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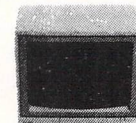
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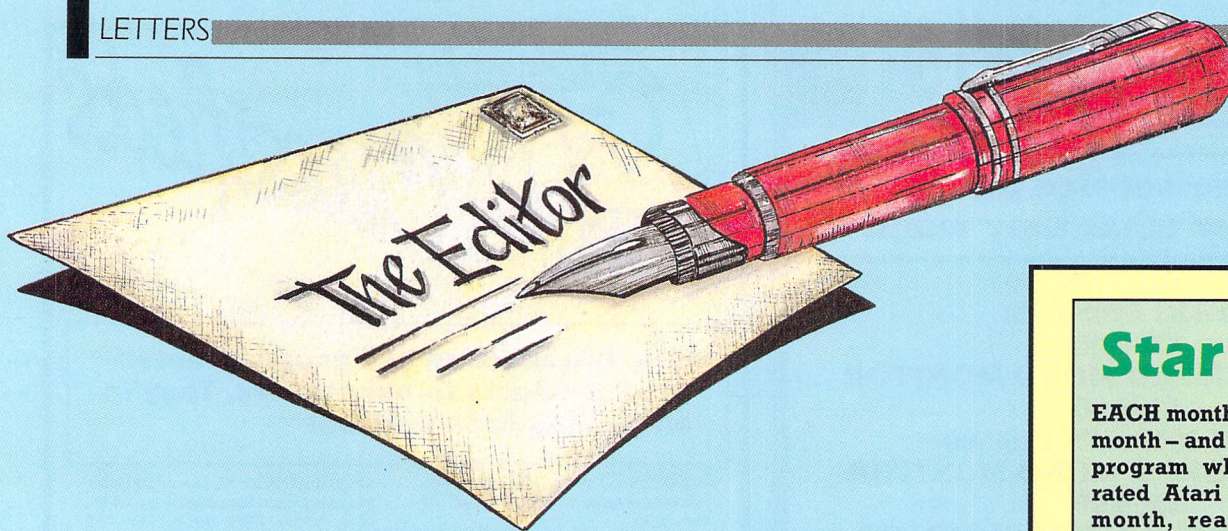
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Internal drive upgrade

I OWN a 520STFM and a colour monitor. In an effort make the best use of the storage media available, I bought a Triangle 1Mb disc drive. As the system stands, I can't boot from drive B without special software. Is it possible to remove the standard internal drive and replace it with the the Triangle – and if so, how? – **E. Reinaud, Havant, Hampshire.**

● In theory it is possible to replace the internal drive with a third party drive, but in practice this is not as simple as it seems. For a start both drives have to be removed from their casings. This involves opening the ST and removing quite a lot of the innards.

Second, the external drive will have to be reconfigured as a drive A. This usually involves setting a couple of DIP (dual in-line package) switches near the multi-way connector at the back of the PCB. You'll have to find out which switches to set – they vary from design to design – otherwise damage can occur.

Finally, the drives which use a standard Shugart connector, can usually be swapped without modification. Unfortunately, you may now find the eject button will not fit through the moulded slot in the ST's case. If this is so, a hole has to be cut to accommodate it.

All of this manipulation will invalidate your guarantee, so the best option is to contact the several advertisers offering this sort of upgrade as an after-sales service

Switching monitors

RECENTLY I bought an Atari monochrome monitor and have encountered a problem, as switching from high resolution monochrome to low resolution and vice versa, involves disconnecting the monitor.

The upshot of this is that the monitor socket is starting to wear, resulting in the

plug becoming loose. Is there an attachment I can buy to allow me to switch between monitor and TV without disconnecting the leads?

Thanks for a very professional and informative magazine Atari ST User is well worth the money. Keep up the good work. – **M. Bond, Warrington, Cheshire.**

● Several monitor switchers are available, some offer outlets for connection to a hi-fi system and composite video monitors.

Several regular advertisers in Atari ST User offer these devices. Priced around £35.

Desperately seeking keyboard

I AM desperately trying to interface my 520STFM to a Midi keyboard. I believe one is available for the Commodore 64, which is said to be Midi-compatible.

Will I be able to use this with my ST, and if so what additional software and hardware will I require? – **K. Thompson, Lancaster University, Lancaster.**

● When it comes to Midi (Musical Instrument Digital Interfacing) the ST is probably the best micro for the job at the present time – its design includes a Midi interface as standard.

You will find a review of the excellent Steinberg Midi software on page 22 of this issue. As for the hardware, almost every electronic keyboard and synthesiser produced these days has a Midi port.

Blitting the screen

I AM experimenting with high resolution animation using Fast Basic's BLIT command to move frames from a buffer area on to the screen. However, I am experiencing problems getting the right coordinates for the frames.

The buffer area contains a Degas screen loaded from disc, and it is here I suspect, my problem lies. What I am attempting to do is to load the Degas pic-

Star Game for

EACH month we'll select a letter of the month – and the sender will receive the program which our reviewers have rated Atari ST User Star game. This month, reader Joanne Lindon will receive Captain Blood, which is

Secrets of the Scarlet Bard

HERE are some hints for The Bard's Tale. Although this is by no means a complete solution, it should help you form an almost invincible party. A good one should contain a paladin, a monk, a hunter, bard, sorcerer and wizard – in that order.

The archmage is incredibly powerful, but will take a lot of getting. The monk and the paladin get multiple hits on enemies as their experience grows, but can only hit one foe at a time. Monks fight better without weapons. The bard, found in the preformed party Ateam, has a fire horn. Use it against multiple enemies, like the 396 berserkers in the castle. It has a limited number of charges, though.

The two most important places in the game are Roscoe's energy emporium and the review board. Unmarked on the map or from the outside, their locations are as follows: Roscoe's – travel South along Grey Knife, cross the junction and turn left. Move one step forward, turn left and enter the house. Review board – travel three moves South along Trumpet starting from its junction with Blacksmith. Turn left and enter the stone building.

Next come the dungeons. There are 16

ture into the buffer screen as it would appear on the monitor

This is similar to the operation of Blit-demo on the Fast Basic demonstration disc which uses the following lines of code:

```
RESERVE S%,32768
S%=(S%+256) AND $FFFF00
BLOAD FILE$,S%-32
```

Could you explain what the third line is achieving, as I believe this to be the crux of the problem? – **John Bainbridge, Faversham, Kent.**

● The statement BLOAD loads a disc file to a specified address in memory – in this case S%-32, where S% is the memory address of a 256 byte boundary, that is

a Star Letter

reviewed of page 38.

Letters on every subject of interest to Atari ST users are welcome. Send them to: The Editor, Atari ST User, Europa House, Adlington Park, Adlington, Macclesfield SK10 4NP.

in all – supposedly mapped on a 22 square grid, although my maps show them to be somewhat larger. The first dungeon – the cellars – is beneath the tavern of the Scarlet Bard, located beyond the statue of the Samuri on Rakhir. Buy some wine to enter the dungeon.

The second and third dungeons – the sewers – are under the cellars. There are two ways in to these. The simplest is to cast the level three conjurer spell, lesser revelation, and find the hidden door.

From the entry point, explore the far end of the left-hand corridor. Level six players should survive the sewers without too much trouble. Explore every square and make a map. There are a lot of hints scribbled on the walls, but watch out for darkness.

By the time your characters reach level 12 or 13, you may attempt an assault on the castle. A good wizard and sorcerer will be essential here. Don't enter the castle without a special character defending the party – demons are a good bet since they will usually destroy the grey dragon defending the entrance.

Finally make sure you have the seventh level conjurer spell – Apport Arcane – and know how to use it. You're on your own now, but don't rely on magic and avoid dragons. – **Joanne London, Frome, Somerset.**

Alternative assemblers

IN the February 1988 issue of Atari ST User, Alan Fothergill states his Alternative keys program can be assembled with HiSoft, Devpac and most other assemblers.

However, it has occurred to me that trouble might be experienced using the K-Seka, Metacomco or Digital Research assemblers. This is due to their use of the block storage segment (BSS) for uninitialised data.

The HiSoft system puts BSS information in the text area of the file, except for the RSBSS and DSBSS directives.

The problem arises in the first three lines of the program where memory required to hold the program is calculated. Because no BSS space has been allowed for, the assembled file will not fit into the space allocated for it by the Gemdos routine, Setblock.

Executable files running under Gemdos have format starting as follows: Base page – 100 bytes, text area – the program itself, initialised data area – directives like DC.L, and finally, the uninitialised data area – directives such as DS.L.

Alan Fothergill's size calculation goes from the size of the base page up to 24 (A5), therefore the base address of the BSS is assumed to be zero. In truth, it will be more than 1000 bytes if assembled with other assemblers.

The solution is to add up the sizes of the text, initialised and uninitialised data areas to get a total size before passing the total to the stack. – **S. Thorington, Eastwood, Essex.**

The singing database

I OWN a fairly extensive record and tape collection, currently listed in a loose leaf book, sorted alphabetically under the separate headings of artist, composer and title.

Continually having to update this, after buying new albums has become a tedious task, necessitating the re-typing of whole pages and often complete sections.

I have been advised that my 520STFM, using a database would be much better at this, so can you clarify the following? Would a database: Store information at 40 lines per page? Move the bottom line on to the next page and so on, right to the end of the alphabetic section when inserting a new entry – similar to word processing? Print a copy of any page I

require? Print a copy of any section I require – a particular artist, composer and so on? – **R. Spencley, Peterborough.**

● There is a wealth of databases available for the Atari ST range, although most Gem-based programs should be able to cope easily with your needs. One popular package certainly worth a look is Kuma's K-Data. This was reviewed alongside Antic's Base Two in the December 1987 issue of Atari ST User.

Resourceful images

AS a long time reader of your great magazine, I hope you or your readers can help me.

I am using DR's Resource Constructor, but am having trouble with loading icon and image definitions. I have written a program to let the user draw the design and save it, but the constructor always bombs out if I try to re-load this.

Perhaps I need to save some additional data with the image? Any ideas would be gratefully received. – **David Derrik, Cheddar, Somerset.**

● If any of our readers can help with this problem, we would like to hear from you.

Puzzling bombs

I AM sorry to say after typing in your sliding block puzzle in the February 1988 issue of Atari ST User I cannot get it to work. As soon as I reach the Select Picture Format screen, bombs appear and the machine crashes.

I was looking forward to playing the game, but instead spent an entire night checking it thoroughly and it still won't work. Please can you help? – **P. Gowers, Burnley, Lancashire.**

● The listing is correct and is reproduced exactly from a working program. However, since you have an early version of Fast Basic, system errors can cause an irretrievable crash. Later versions include a bomb catcher to help stop this – the error messages produced are often less than helpful though.

System errors are most often caused by mistakes in machine code, so the routines select-file and assemble must be correct. Also, the amount of workspace required for the program needs to exceed 127k, to allow the picture to be unscrambled – up to 5000 moves can be undone, enough for most people.

any address ending in \$00. This is because 256 bytes is the smallest change in the value of PHYBASE the ST's video processor will recognise.

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```
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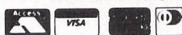
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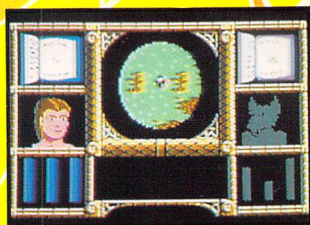
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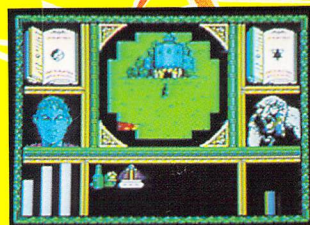
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A game that takes fantasy role playing
one step further.

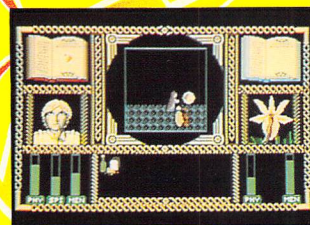
Witness the superb graphics that set Wizard Warz apart from other strategy games and view through a circular screen that diminishes as your health weakens and makes your goal harder to achieve. See the effect of your spells as they hurtle across the screen. Wizard Warz is a combination of fast moving action and depth of game play that produces its true fantasy role playing with real strategical challenge.



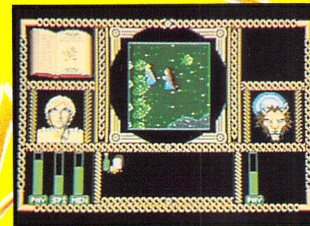
Screen shot from CBM version.



Screen shot from Spectrum version.



Screen shot from Atari ST version.



Screen shot from Atari ST version.

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