March 1989 Issue 37

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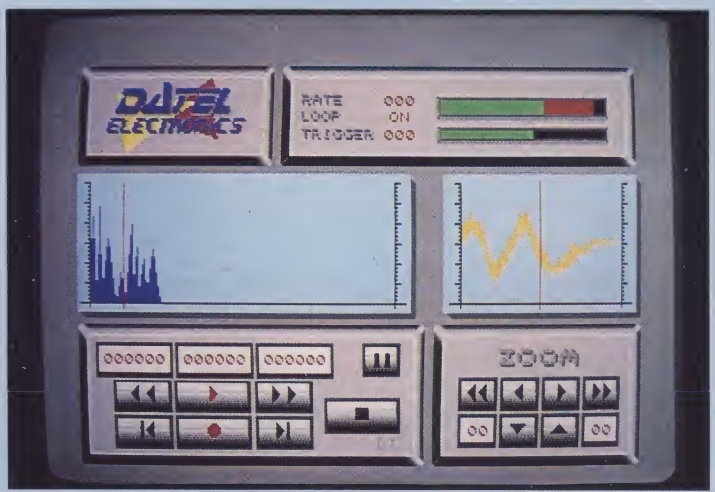
Thames Television - Making the ST into a TV star!

- **Kempston DAATAscan** - *A low-cost 200dpi hand-held scanner: a good all-round package*
- **Midi and Music** - *MidiStudio, Midigrid, and a report from the Frankfurt Music Fair*
- **Plus** - *LDW Power, Superbase Pro v3, Borodino, pc-ditto Modula-2, Adimens Database*

DATEL ELECTRONICS



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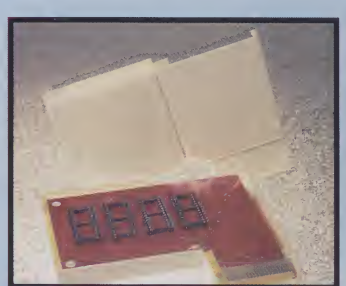

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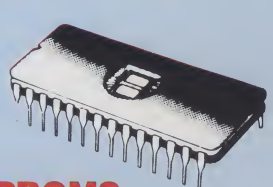

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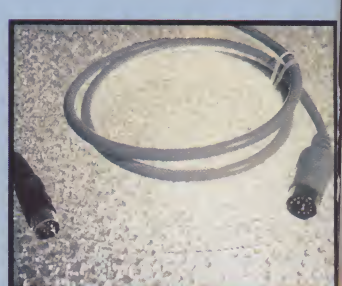

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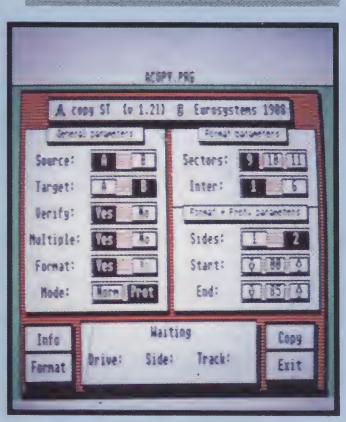

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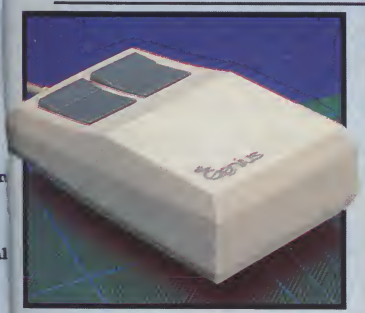

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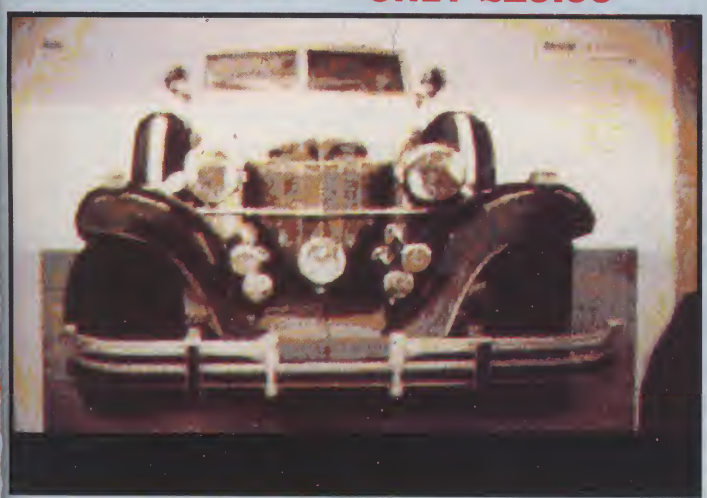

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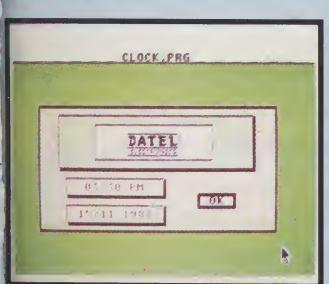

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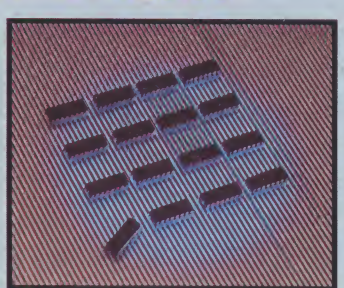

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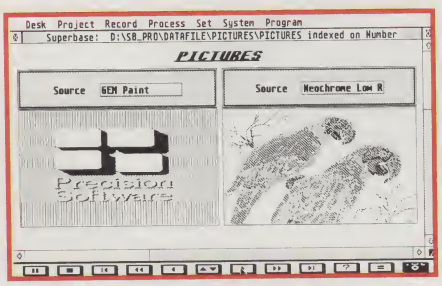
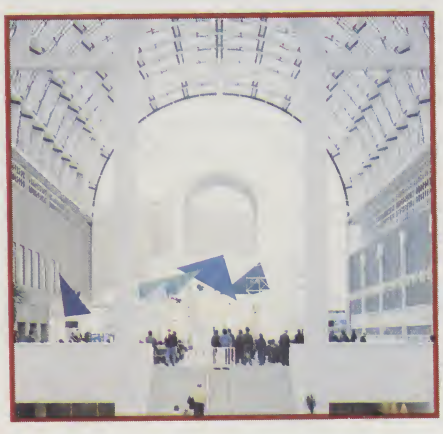
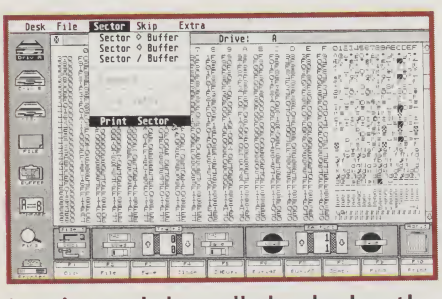
Thames TV using ST's for broadcast work??? It's true! - page 11



Superbase Professional v3. Does this new Precision database fit Graham like a glove? - page 53



Frankfurt music show - A report from one of Europe's most important music/midi shows - page 40



Just in, and they all checked out! 60Mb hard disk, Sprite Factory, mouse, educational software and disk utilities - page 19

04 News Low-cost hard disk upgrade from Third Coast; SCSI/DMA interface and Supra HD utilities available from Frontier; GenLocks and PAL encoders; vector clipart from Electric; MegaST1 from Atari; Spectre 128 preview; and a report from the 1989 BETT show.

11 Thames TV Get an ST, some excellent image-making software, a tight deadline, and you have a recipe for success. Graham Wayne finds out how Thames Television came to use STs for producing one of their new logo sequences.

19 Just in, checked out Atari's new Megafile 60 hard disk; the Genius mouse from Datel; CRL's Sprite Factory; educational software from Softstuff; and a comprehensive disk editor.

25 pc-ditto Avant Garde's impressive PC emulation software still has quite a following. We find out what it's all about and what you can do with this £79 PC; but is it just a novelty?

28 Adimens Database A preview of this sophisticated new relational database management package.

33 ST World I/O As the letters flood in, we present another choice selection from the pens, printers and modems of the enthusiastic ST World readers.

38 Music and Midi This month's Midi column takes a first look at Ladbrooke Computing's promising new Midistudio package. Plus, another glance at the unique and remarkable Midigrid.

40 Frankfurt Music Messe Graham Wayne reports from the 1989 Frankfurt music fair on some exciting new products in the ST Midi world. C-Lab, Sonus and Steinberg are among the front-runners in this fast-moving area.

45 Advanced Graphics Part two in our series of articles all about programming advanced graphics in machine code. This month, Jeff Lawson turns his attention to clipped sprites and horizontal scrolling.

53 Superbase Professional V3 Precision Software have recently upgraded their powerful and sophisticated database management system. Graham Wayne tackles the improvements head-on, and considers how the average user might go about making use of such a comprehensive system.

Note: Sorry we couldn't bring you the final instalment of World of DTP, but due to the impending release of Calamus and Pagestream, we decided to wait until next month, in order to put these two newcomers into a fairer perspective.

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This month's cover:

This month, Ian's front cover digital illustration relates to our main feature - Thames TV's ST Video Cookbook. Graham Wayne tells the tale of how Thames Television's new station ident and title sequences came to be created with the help of the ST.

HAVE YOUR SAY IN THE FUTURE OF OUR WORLD - TURN TO PAGE 103!

58 Borodino Wargaming hits the big screen with an element of graphic adventure. The first title in Atari's exciting new Battlescapes series allows you to take part in an accurate re-enactment of the classic battle of Borodino.

60 Hardware Fact File One of the best all-round 24-pin printers in NEC's P6 Plus. It's not cheap, but it might have a specification that you just can't resist.

65 Modula-2 What is this language all about? Where does it come from? Modula-2 is enjoying an increasing interest amongst the ST programming community. Don Milne explains the ins and outs of the language.

70 LDW Power Atari hits the spreadsheet market with this fast and powerful package which offers Lotus-123 compatibility and GEM output of graphics.

77 Bookshelf If you are struggling with the C programming language, then perhaps you need a book on the subject. David Gristwood considers four possible candidates.

78 Kempston DAATAscan Kempston Data Ltd. have put together an affordable scanning package based on a 104mm-wide, hand-held scanner, and some image enhancement software including Atari's HyperPaint which can be used to edit high-resolution .IMG files.

85 Programmers Clinic Open wide, breathe in. Dr. Lodge presides over another session at the clinic, where readers' programming problems are solved and explored.

91 Clinic Special, The other button Malcolm McMahon describes one of GEM's better bugs, and explains how to get round it with a short machine code patch.

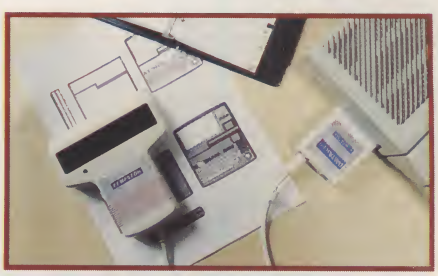
97 ST World on Line More news and views from down the wire. What does BIX offer over CIX? Will the Micronet Telesoftware Gateway make an impact? Also, more about PSS and a selection of Bulletin Board services for the ST owner.

100 Public Domain Another dip into the world of Public Domain software reveals some useful desk accessories and the latest version of the Double Click disk formatter.

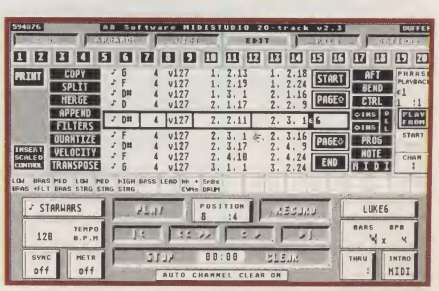
103 Reader Survey Tell us about yourself and how you use your ST, so that we can make ST World even better.

The time: 6am September 7th 1812. The place: seventy miles west of Moscow, the small town of Borodino - page 58

This month's Hardware Fact File features the respected NEC P6 Plus 24-pin printer - page 60

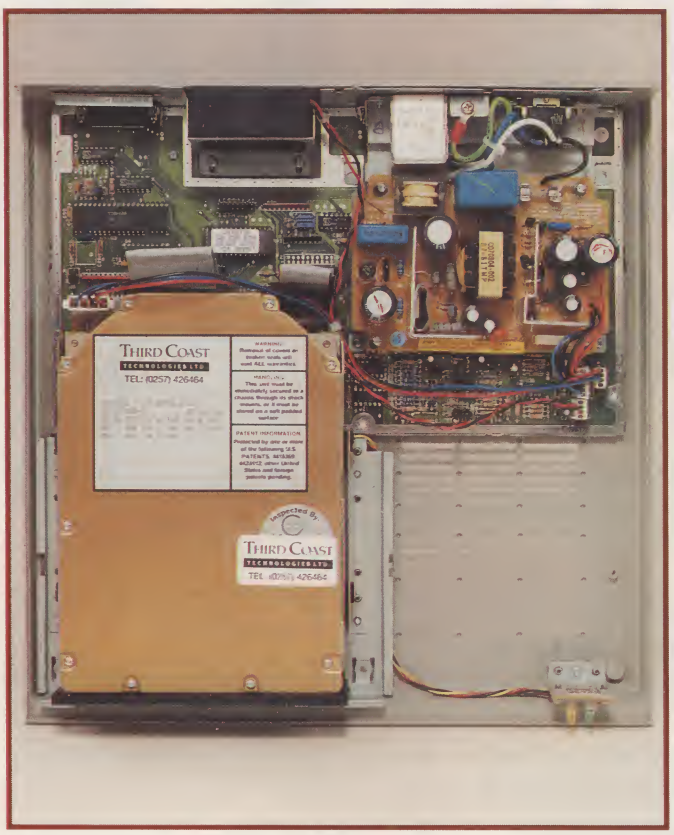


Kempston's DAATAscan: hand held, in black and white- page 78



Midistudio and midigrid - page 38

20Mb to 60Mb upgrade service



If you can't afford to buy a Megafile 60 outright, then Third Coast Technologies can help you to upgrade your 20Mb to a 60Mb for £299 or 45Mb for £249

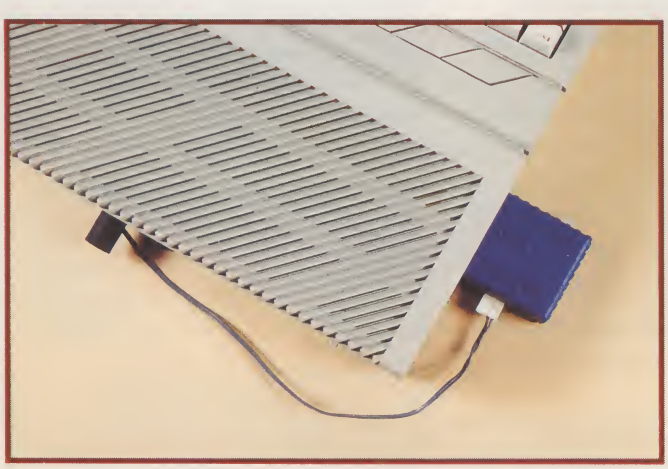
Third Coast describe their hard-disk drive upgrade, taking your 20 Mb up to 60Mb as, 'quite painless'. Your original hard disk is returned to have the new drive unit fitted and adjustments made to its controller. Third Coast offer a data transfer service which is included in the overall upgrade price. Fitted, the upgrade offers a complete set of software utilities which allows up to twelve partitions to be defined. The 20 to 60Mb upgrade offers a 60 percent capacity increase and a 40 percent performance gain. Third Coast retain the old drive as a trade in, which enables them to offer such a competitive price. The upgrade is guaranteed for one year, and there is six months phone support on offer. In addition to the Megafile 20, Third Coast can upgrade the SH204, SH205, the Triangle range, Cumana range and Supradrive 20 for only £299.00.

Third Coast Technologies, 0257 426464

Romantic Robot Multiface

Remember add-ons and interfaces protruding from every orifice on your old eight-bit computer? Now Romantic Robot, the 'amorous droids', have released their so-called multi-purpose back-up interface, Multiface, which has been enhanced from its original specification. This device can be used to save screens or programs to floppy or hard disk. In their own words the product is idiot-proof and comprises an interface which fits snugly into the cartridge port and a lead with a male/female adaptor that fits into the monitor port. Although the accompanying software is not GEM-based, it has an easy-to-use keyboard menu from which you can access the various facilities.

Also included is a Disk Organizer which allows fast, buffered copying and can use all available memory. A Multi-Toolkit, which works in Hex, ASCII and Decimal, provides an editing facility which you can use to inspect and alter any memory location, or the 68000 registers. Additionally, it can save, load, print and fill any part of RAM. Multiface freezes an image or snapshot of the RAM at the press of 'the magic button' on the side of the cartridge. Therefore, if you can freeze a program, protected or unprotected, it saves the entire block of memory. But the real bonus with Multiface is that you reload the game / program and resume at a later date. Multiface costs £49.95.



The multiface cartridge is available in a range of colours.

Romantic Robot, 14 Deancroft Avenue, London NW9 8EN. Tel: 01-200 8870

A D-RAM nuisance

Electronics firms in America are deeply concerned about the Japanese monopoly of the D-RAM chip market, and are now planning to fight back. Manufacturers from all over the States are forming a consortium in order to increase production of the vital chip. The shortage of the D-RAM chip is directly responsible for the rise in computer prices, although Atari were determined to absorb the cost for as long as possible. The fact that US computer manufacturers have elected to share the cost of setting up the cooperative and manufacture the chips, is an indication that this cartel means business.

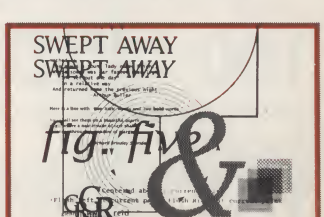
In closing ranks, the consortium hopes to be less vulnerable to the unpredictability of the D-RAM chip market.

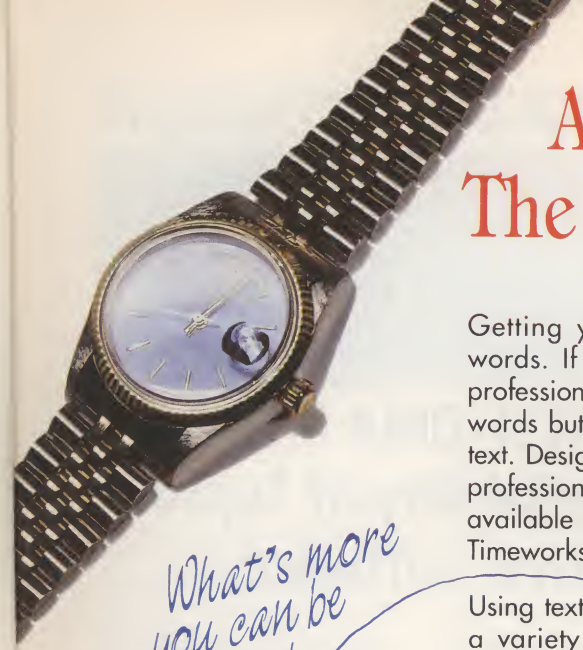
The problem began when cheaply produced Japanese chips were 'dumped' on the market, forcing US companies to withdraw from manufacturing. This was superseded by a severe shortage of the chip, which had the effect of putting hardware manufacturers under considerable stress and holding up the launch of new machines. Rumours of this cartel have been circulating through electronics conventions for quite a while, but insiders say everyone concerned is now willing to take action.

UltraScript out soon

Imagen's PostScript emulator for the SLM804 laser printer, UltraScript, will be available by March from Atari UK. At the time of going to press, a price had not been set, but it has been confirmed that the product will be supplied with 15 typefaces. Another 70 will become available at a later date.

Atari UK, Atari House, Railway Terrace, Slough, Berkshire. 0753 33344





Are You Getting The Message Across?

Getting your message across takes more than words. If it's worth writing, it's worth presenting professionally. A picture may be worth a thousand words but only if it is correctly integrated with your text. Designs with impact, previously the preserve of professional typesetters and graphic artists, are now available in your office – under your control – with Timeworks Publisher.

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Signa scanners in the picture

Signa's impressive new hand scanner, reported last month, will be available by early March. The device is slightly more compact than the DAATAscan (reviewed in this issue), and has the ability to scan at 100, 200, 300 or 400 dpi, with 32 grey levels over a 104mm scan width. The package includes Scansoft 2.6, and has been confirmed at a price of £395 + VAT. The Colibri is also available with a cut-down version of Augur, the OCR package, for an extra £184 + VAT. The unit will also be available for rental.

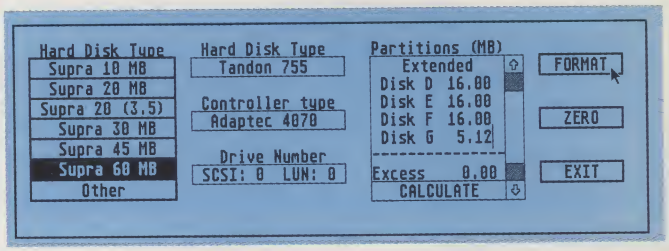
The Hawk 432 scanner, ideal for advanced OCR work, is available for £1450 + VAT, and will be supplied complete with ST and IBM interfaces, Scansoft 2.6 and suitable PC scanning software.

(above) The Colibri hand held scanner

Signa Publishing Systems,
Trevenen House,
Cricket Hill Lane,
Yately, Camberley, Surrey.
GU17 7BA
Tel (0252) 875031.

The Hawk 432 flat-bed scanner

The Supra Formatter / Partitioner allows up to 12 partitions to be defined.



Supra SCSI/DMA interface and availability of Supra hard driver software

Supra's SCSI/DMA interface, which is used in the popular Supra Drives is now available from Frontier Software as a separate item. The interface bridges the gap between the ST's DMA port and a range of industry-standard SCSI hard disk mechanisms. The interface has a full DMA pass-through which allows connection of other DMA devices, and has a built-in battery backed-up clock. An auto-booting utility enables the system to boot directly from the hard disk without the aid of a floppy, while the formatter and partitioner allows you to divide the drive into as many as twelve partitions.

Frontier have also announced that the Supra hard disk utilities will be available officially for £49.95. The SCSI/DMA interface retails for £100.00, and STache (the cacheing utility) for £19.95.

Frontier Software,
PO Box 113,
Harrogate,
N. Yorkshire HG2 0BE.
0423 67140/530577

K-Graph 3 amendment

In reply to the K-Graph 3 review which appeared in the December issue of ST World, Kuma Software have stated that the Metafile and .IMG file saving routines have been amended and work perfectly. They would also like to clarify that GDOS is not required if .IMG or other files are to be transferred into other programs such as, Timeworks DTP or 1st Word Plus.

Kuma Computers,
12 Horseshoe Park,
Pangbourne,
Berskhire RG8 7JW.
Tel (07357) 4335.

Capital Computers' Genlock Board for the ST

Capital Computers in Edinburgh, are about to step up production of their affordable Genlock for the Atari ST. This hardware add-on allows ST video output to be mixed with a secondary video source, for special effects, presentations or video titling. Capital have designed two models: a standard version and a professional version which utilises Texas chip technology and has an anti-aliasing capability as standard. Both devices offer chroma keying; the ability to merge the secondary video source wherever a certain colour appears in the ST's monitor output. They can also overscan, thus eliminating the border region.

The standard Genlock is fitted as an internal enhancement to any 520, 1040 or Mega ST, for the remarkable sum of £230 all inclusive. Video titling software is also available for the system. The professional model has not been in full production yet, but could be launched at a price of around £500-£800. There is also a possibility of a Panasonic effects generator becoming available as a £100 enhancement to the system.

So far, demand has far outstripped supply; however, by early to mid-March the £230 GenLock unit should be more freely available.

Capital Computers,
12 Home Street, Tollcross,
Edingburgh EH3 9LY.
031 228 4410.

Preview - Spectre 128 Macintosh Emulator

Macintosh emulation is a strong and viable option for ST owners. With the 64K ROM Aladin emulator performing so well, how does Spectre 128 from the USA measure up? Stephen Soghoian talks about his experience with a direct American import of the product.

For all of us ST owners who have yearned to be able to run the 'big' Macintosh applications software, Spectre 128, a derivative of Data Pacific's Magic Sac, could be the answer. As with Aladin, this product is made possible partly due to the fact that both the ST and the Macintosh share the same Motorola 68000 processor, and have little else in the way of sophisticated custom chippery. Spectre allows us to use most of our existing ST equipment without having to buy new printers, disk drives, modems etc.. I currently run Spectre on a 1040STFM, with a NEC P2200 24-pin printer, mono monitor and an external double-sided 3.5" floppy drive.

Spectre does work with a colour monitor but not very well, owing to the fact that the ST's vertical resolution is only 200 pixels as opposed to 400 in the high resolution mono mode. Running in mono, Spectre gives a 30% larger screen area than a standard Mac with a 9 inch internal screen. It is also interesting to note a detectable speed increase over a real Mac, which is easily seen in the form of faster window handling. In theory, Spectre will work on a 520STFM, although it is not really practical to run a majority of Mac software with less that 1MB of RAM and a double-sided disk drive. With a 1Mb ST, Spectre leaves you with about 800K of RAM for Mac Emulation, which is just enough to run most Macintosh programs.

The Spectre 128 hardware comes in the form of a cartridge containing a small PCB with two empty ROM sockets, a few capacitors and one TTL chip. With the US spec. product, the buyer has to obtain and fit real Mac ROMS, which may be 64K or preferably 128K, this unit plugs into the cartridge port of the ST. The software is supplied on two floppies. One contains the software element of the Spectre emulator, while the other contains a 'transverter' utility which permits the conversion of ST to Mac/Spectre 400K SSDD 3.5 inch format and vice versa. With the present version of Spectre, it is not possible to directly read a Mac format disk in the ST's drive. This is because the Mac uses a GCR variable speed disk drive, incompatible with the ST's MFM format; Spectre uses its own 800K D/S (HFS) or 400K S/S (MFS) format floppies.

Spectre 128 offers hard disk support, although the ST's Midi ports and sound chip are not currently supported, and printer drivers are not supplied when the product is purchased from a US source.

Setting up

To get started, you will require a copy of the Macintosh System and Finder on a Spectre format disk. Genuine Mac System disks can be purchased from an Apple dealer for about £30. The problem is actually getting the system files onto a Spectre format floppy; porting files from Mac to Spectre can be done reliably via an RS232 cable, using suitable comms software at either end. The best tip to remember here, is to use an error-checking protocol such as XModem and to set the comms package on the Mac to 'MacBinary' mode. The ST disk can then be converted to Spectre format by using the 'transverter' utility, which builds a 400K SSDD disk which, with System and Finder resident, should be bootable.

I currently run Spectre with 128K ROMS, System 4.2 and Finder 6.0; this has so far proved to be a stable combination. The Spectre manual states that the emulator can run a number of Mac System releases. Programs tested so far, include:

HyperCard
Microsoft Word 3.01
Ready, Set, Go 4.5 (DTP)
Superpaint 1.1
MacDraw II
Fullpaint
Aldus Freehand 1.0
MacLink Comms
Stuffit 1.51 Shareware

Spectre 128 is capable of running some of the bigger software packages, such as

HyperCard, due to the fact that it supports 128K Macintosh operating system ROMs. It has, therefore, become very popular throughout the relatively modest US market. When Spectre reaches the UK through normal channels, ST World will, of course, carry out a full evaluation of the product.

Battle against the Hackers!

The message at the Corporate Computer Security '89 conference at the London Novotel, 14th-16th of February, is that hackers are not acned and bespectacled computer whizz-kids. Hacking is perpetrated by professionals on a grand scale, and according to the chairman of the conference, Professor Henry Becker, formerly M.D. of Racal Guardata: 'Data has always been vulnerable, but the increasing awareness of the ease with which it can be obtained, manipulated and fraudulently used, is reaching epidemic proportions.' The conference is an indication that a large and zealous army is about to declare war on amateur and professional hackers alike.

HiSoft goes international

HiSoft have named the publishers who will represent their ST software in both Germany and the United States. Michtron Inc, who are based in Pontiac, Michigan, have been appointed sole distributors of HiSoft products in the States. Whilst Markt and Technik, of Munich, are marketing the German translated software in Europe. David Link, HiSoft's MD, commented: *'We are very pleased to have appointed such quality companies to represent our software products outside the UK. It is important for our customers to be able to obtain advice and support within their native countries and we are constantly looking to appoint top distributors in other countries.'*

New Panasonic 9-pin printer

Panasonic are adding to its competitively-priced dot matrix printer range, with the £269.00 KX-P1180. Aimed at rigorous office work, this robust 9-pin printer can handle a variety of paper applications, including labels, A4 sheets and envelopes, and up to 4-element multipart stationery. Additionally, it can cope with A4 landscape and A3 paper. The NLQ mode operates at 38 cps while the draft speed is 192 cps. The printer is packaged with two draft and three NLQ fonts.

ST software sales rising

Computer Trade Weekly's 'share of software sales by machine' poll, showed the ST accounted for 11.1 percent of total software sales, (30.01.89). In the same poll, Amiga software sales amounted to 7 percent. But despite the predicted debacle of the eight-bit market, Commodore and Spectrum software sales still account for the lion share of the market, 28 and 30 percent, respectively.

BETT Show '89

Graham Wayne reports from the 1989 BETT show.

London's Barbican Centre was recently the venue for the British Education Training and Technology Show (BETT). Attended by Under Secretary for State at the Department of Education and Science, John Butcher MP, the show hosted a wide range of exhibitors demonstrating computer and related technology. Virtually every stand brimmed with personal computers, the most prolific being the IBM clones and Archimedes. So strong was Acorn's presence at the show, I fully expected to find an Archie running a demo in the Gents.

Atari did not officially exhibit at the show, but funded a more modest stand to one side, staffed in the main by third-party developers taking the opportunity provided by Atari to demonstrate their software, although Bob Gleadow did attend on the morning of the second day. The educational policy of Atari has been revised and formalised recently, according to d'Este du Plessis, the charming lady in charge of actioning Atari's education policy. Offering substantial discounts in this sector, the company's ATW machine is now approved by the Department of Education and Science and Atari are gearing up to promote their products more consistently, although d'este was at pains to point out that Atari did not, at present, have the resources to tackle the market head-on.

The British Education Training and Technology Show at the Barbican Centre.

Already active in other areas, Atari are setting up 6 trial 'reference sites' at which machines will be installed in schools so that teachers can take a look at a system operating in an authentic environment. They are also funding education projects in Shropshire, three music workshops in London and are compiling a regular broadsheet containing information on hard and software which Atari will seek out and make available at very low prices. *"We are aware of the lack in all spheres of educational software"*, d'este told me.

On the stand itself, HAT Software were displaying their range of products aimed largely, though not exclusively, at the education market: First Paint, First Type and Sprinter. Andy Hunt and his wife Caroline were showing the innovative Midigrid system to often fascinated, sometimes bemused, visitors. Part of the stand was also given over to Shropshire Education Authority, who were demonstrating their extensive use of STs.

Atari STs,PCs and ATWs on Show

Although the Atari presence was modest, the ST, PC and ATW machines drew interest from many sources. Whether this interest is sustained will be determined in part by the continuing enthusiasm demonstrated by the developers of Atari-related products and the success of the progressive approach to the education market Atari are following. Since the penetration of the education market is an established method of cultivating a loyal user-base, it makes sense for Atari to make this sector a target for development and to this end they espouse some interesting ideas. But only time, and effort, will tell.

Silica Systems formed

Newly-formed Silica Systems were showing a range of education-orientated packages that drew much praise and some surprise from their audience, many of whom laboured under the illusion that the ST was merely a games machine. On the stand, Richard Beer of Personal Robots Ltd. was showing various robots controlled entirely by the mouse and an attractive visual interface for the ST. Evenlode's David Crombie was demonstrating Steinberg's Pro 24 while Silica staff were running demos of the Spectrum 512 colour paint package, for which a 3D animation system is soon to be available, and Pagestream, the impressive-looking DTP package running on a large screen display that made me drool. But the most surprising exhibitor on the Silica stand was Thames TV, showing the ST graphics (produced using Cyber Studio) which will actually be transmitted in the forthcoming series of trailers (see feature in this issue).

The education department of SDL, established for just over a year, is now incorporated into Silica Systems, set up to handle all aspects of their retail business. Run by Peter Brailsford, Silica offer a responsive service to institutional users by demonstrating the ST and its best software as well as offering advice on effective educational IT solutions. I asked Peter why Silica Systems thought this show was worth attending.

"The main reason we are here is to promote public awareness of the ST as a serious machine; to promote teacher awareness of the ST as a very cost-effective computer considering how powerful it really is. It might take time, but time is nothing in the education area - they might take a year to come to a decision (about buying equipment)."

Gribnif's NeoDesk II

You can't forget the company's name, but the phone number... As reported last month, NeoDesk II has no UK distributor, but can be ordered direct by phoning 0101 413 584 7887. We apologise for incorrectly quoting the international dialling code as 010.

Nine Tiles Superlink network now open to ST users

Nine Tiles announce that ST interfaces for their network facility, Superlink, are now available. They are also releasing, Swiftlink, which has a new lightweight protocol and enables Novell and NETBIOS networks to achieve a rapid file transfer rate of about 15 seconds per megabyte. Swiftlink, which is compatible with other Nine Tiles products, represents a significant advance in cost-effective network performance. For the Which Computer? Show, Nine Tiles have bundled together an introductory Swiftlink pack, including three interfaces, six wall boxes Simple-Net software and Novell Drivers, toolset and cables for £649.00 plus VAT. Additional interfaces are £199.00 each.

Nine Tiles, Beach House, 25 Greenside, Waterbeach, Cambridge LB5 9HW. 0223 862125/440099

New Mega ST unveiled at Which Computer? Show

Atari is unveiling a low-end Mega ST at the Which Computer? Show, at Birmingham's NEC on the 21st February. This launch is in line with earlier revelations, that after focusing on the entertainment market during the Christmas period, they are switching the onus to the business sector. It is intended that the Mega 1, priced at £599.00 (+ VAT), will bridge the price gap between the 1040 ST at £499.00, and the existing Mega 2, which retails at £934.99. The Mega 1 is being marketed within the hotly competitive business range and is directed primarily at the word-processing market. This addition to the ST range is described as 'an up-graded 1040 package', which is clothed in the more aesthetic and ergonomic Mega computer casing. A mono monitor is also included in the price, and Atari are currently working on an accompanying package which should include various word-processing programs. However, specific details of how much they are bundling with the machine and what programs will be included have not been disclosed.

Concurrently, Atari have revealed plans to alter the 'gamey' image of the 520ST package. The existing 520ST 'Super Pack' is due to be withdrawn from the market in March and a new 'added value bundle' will replace it. A spokesman described the package as: 'Maintaining the same degree of entertainment value, but with an increase in serious software.' The new package will retail for £399.00. Atari stated confidently that the ST is not in need of a boost, and that this 're-shuffle' of the range will make it easier for the user to buy a complete package to suit their specific requirements.

Inoculation Against the Computer Virus

Thanks to some timely advice, the Friday 13th virus day was less devastating than predicted. But we are all vulnerable to contamination, as the virus can enter the system in several ways: carried in name brand or shareware programs; left behind by a disgruntled former employee; or even via a gateway to an external information service. The best form of immunity for multi-user systems is prevention and detection, periodically running anti-viral software and checking all floppies which have been used to offload data. Other precautions include: making back-ups and storing them off site; copying system software and data regularly; and checking for signs of tampering or change and quickly removing any contaminated data. Finally, vaccine programs have been criticized for creating a false sense of security and experts say that they are not the answer to all problems.

Fortunately, ST disks are not as prone to virus contraction as Amigas and Macintoshes. To be safe, always boot from a 'clean' disk and use a virus killer / detector if you are in any doubt.

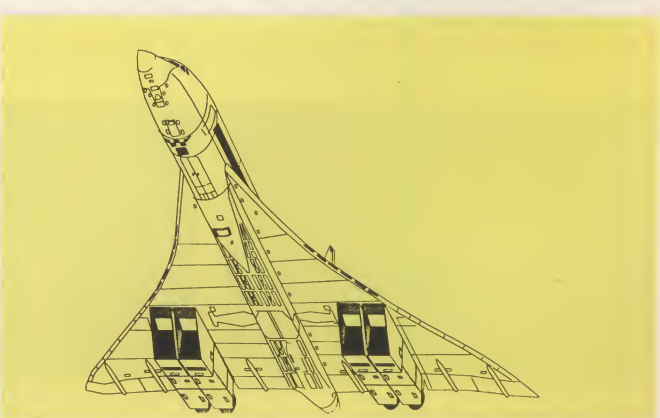
DrawArt and ScanArt

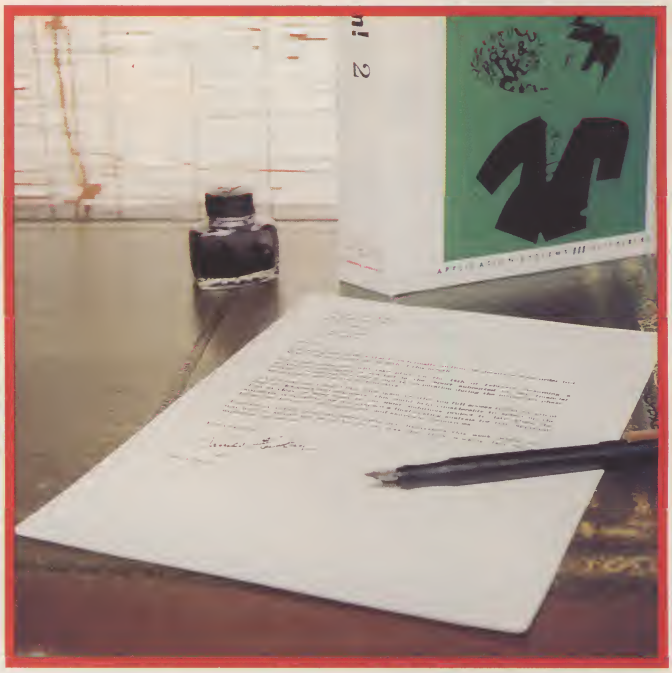
Electric Distribution have released two very useful graphics enhancers, by Migraph, which provide a range of useful bitmapped and line-drawn graphics which can be included in your own art and DTP work. DrawArt is a collection of 150 pictures specifically chosen and categorised for a number of uses. These drawings cover various themes including: the office; transport; sport and music. DrawArt benefits from being object-orientated, thus giving fine detail, regardless of how the image is enlarged, or on which resolution of output device it is printed. It is also possible to select and alter sections of the illustration for specific uses. DrawArt images can be used with any package which handles .GEM files, including Timeworks Desktop Publisher and EasyDraw.

ScanArt contains a selection of over 100 scanned pictures which are supplied in .IMG format. These illustrations also cover a variety of subjects including: humour; animals and the holiday theme. All of the images in the ScanArt package are high-resolution and produce an excellent quality of reproduction on all types of printers. DrawArt retails for £69.95 and ScanArt for £49.95.

Electric Distribution, Meadow Lane, St Ives, Huntingdon, Cambridgeshire PE17 4LG 0480 496789

DrawArt; vector-drawn clipart gives optimum results with any resolution of output device.





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Trevenen House, Cricket Hill Lane, Yateley, Camberley, Surrey, GU17 7BA. 0252 874406/875031 Fax (0252) 871086

THAMES TV'S ST VIDEO COOKBOOK

For the amazing confection I am about to reveal, you will need the following: a massive broadcast TV company with an audience of millions; a top graphic designer; an impossible deadline; a huge budget and a few jobs on the line; a multi-million pound computer system; a host of TV stars; the London skyline; Miss World; the most sophisticated film and video special-effects equipment in the world; a bit of carpet and a VHS camera. And to bind all these wonderful ingredients together, we must add the final and most important item of all to the list - the Atari ST.

Mick Mannveille, whose direct but gentle eloquence could sell a great many STs if he ever needed another career, which he might have considered if the ST hadn't saved the winter campaign production from over-running.

I don't think you would predict an adventurous side to the nature of Mick Mannveille - not on first meeting him. A slight figure, he speaks quietly but with an insistent authority; he believes what he says and knows his mind. While he talks, his hands make small, delicately evocative movements which are consistent with the habits of his trade. Mick works at the sharp end of the business, as a senior graphics designer for Thames Television. His work is screened day after day; if summed he probably gets more air time than Sports, which is saying something. It's the high-speed, high-technology gloss, a matrix of identity and continuity the creation of which forms Mick's daily grist, the logos and previews and announcements, seamlessly knitted together by a stream of graphics, animations and computer images that constitutes both the marketing style and corporate presentation of Thames TV to its viewers and advertisers.

Perhaps, like me, you don't pay much attention to the spinning logos forever dashing across the screen between Minder and Gorbachev, yet they play a vital role in maintaining the perceived quality of the station, because they are always sandwiched between the most expensive TV on the air: advertising and programme title sequences. So if the station's promotional campaign is simply mediocre, it will appear very dull indeed when contrasted by torched fields past which zooms a dashing red car driven by a carefree yup, or the astonishing computer-generated fly-by over central London that introduces News at Ten - which is exactly what I want my flight simulator program to look like.

ST World ran an article on Mick back in issue 26. At that time he was using an ST to experiment with graphic ideas before putting them into practice on very expensive computer graphic systems like Alias and that dynamic duo of digital conjuring, Quantel's Paintbox and Harry. However, I hadn't seen the original piece so I was curious to find out a little about his craft.

"Television graphic design has changed dramatically over the last five or six years. What I would have been doing then was using maybe film animation, or shooting some live action on film or possibly shooting models on film or doing illustrations and using film-based techniques. Now, video techniques are the name of the game. Quite often it's a combination of film and video techniques. Apart from those things, there's a whole range of video effects: there's 3 D computer modelling, there's 2D like Quantel Paintbox and Harry, there are 1001 different devices that allow you to do different

things. At the end of the day, you pool together a whole range of different techniques and disciplines to make your finished product. In some ways the job is more difficult because there's almost nothing you can't do; anything you can think of can be achieved, so there's no excuses except time and budget. Those are the two main constraints, budget being the most difficult."

The mention of budgets gave rise to an enquiry on my part as to what role the ST could assume in an environment where the most common tools are expensive leading-edge technological products.

"It gave us an opportunity to try things out, particularly in the 3D modelling sense. The only other way of doing it was by going to a company like Electric Image, and ultimately we would be using their equipment anyway. If you spent a long time there, playing with the choreography and the lighting etc., then you would be into a very high cost. But if I can build the models, or very simple versions of them, using the ST, then I can decide whether or not it looks good, and it would save a lot of the boring stuff, waiting for things to render and then trying something else. So a lot of the decisions were made before I even got to the facilities company."

At the outset, the range of software available to Mick and assistant Colin Martin was very limited, consisting of Neochrome, Degas and an early version of Andromeda's Film Director. However, a little bird, vaguely disguised as Peter Brailsford of Silica Systems (towards whom Mick expresses a debt of gratitude for his continuing assistance and support) whispered in Mick's ear that he should investigate some new products from Antic Software, written in part by Tom Hudson, father of the de-facto art package standard-setter, Degas.

"I can't quite remember how that started, but it was phone calls to Electric distribution and saying the magic words "Thames TV" and "I want to try and do some animation", so they agreed to send me some software, CAD 3D and Cyberpaint, on the condition that I gave an interview to Martin Walsh (who was writing for the magazine at the time). So we did an article about the crown I designed for Miss World."

A Suitable Sauce

It is as well that Mick provided a solution to the dilemma with which he found himself confronted, since he himself was partially responsible for its creation. Allowing his imagination to exceed the indulgence of his masters, Mick and assistant Colin Martin had put together a set of designs for the new campaign assigned to them.

"The first ideas we came up with were a bit weird and wild, but I had this hope that, because we had a relatively new guy in promotions, we could convince him these adventurous new things we were doing would be good for the station's image." But after months of research, preparing storyboards and demonstration graphic images using the ST and other conventional media, this ploy fell at the last fence. The station mandarins didn't approve. It was back to square one, with barely enough time left to finish the rejected campaign, let alone start a new one from scratch. To add insult to injury, Mick and Colin were unceremoniously evicted from their office while it was rebuilt, so they had nowhere to work. This is the point at which, for some people, desperation will prevail. Of course, Mick had an Atari ace up his sleeve, although he may not have realised it at the time.

I should think a bit of brain-wracking went on in the ensuing days, while a new approach to the campaign was formulated. Eventually, Mick decided on a collage technique because, as he puts it *" Collage is very trendy at the moment. We didn't have much time and collage is great: instead of being one ace idea, it's 5000 mediocre ones all shown very quickly, one after another. So long as they are, at the least, mediocre, you can get away with it."* Having made that decision, the next step was to create some test-collages using conventional materials. These were quickly approved and, with time slipping steadily away, Mick went on to the next stage, which was trying the ideas out using Cyberpaint on the ST. By this time he had collected many different images that were variously drawn or digitised into the computer.

Colin Martin, Mick's assistant.

OK, I admit it. The pictures of familiar London architectural sights wasn't produced on the ST at all, but laid into the ST-generated background from a caption camera, a well-lit box with a CCD video camera mounted above it into which photos or artwork can be placed.

The collage was largely assembled using the extensive facilities of Cyberpaint, which is essentially a digital picture effects unit (for distorting, flips, rotates, window moves - all the kind of thing you see in pop videos but software based on an ST), a rotoscoping tool (for hand retouching individual frames of a film or animation) and a paint box, with a plethora of other incidental

A flying carpet. No getting away from the resolution of the Thames logo (left) created in Alias. But the idea of digitising his carpet and overlaying the logo, which will only be seen very briefly (right) appeals as much for its simplicity as cost-effectiveness.

functions too esoteric to mention. Mick speaks of it in glowing terms. *"The only direct comparison that I can make with Cyberpaint is Quantel's Harry ..... I actually now prefer to work with Cyberpaint because it is just so incredibly flexible.....It's a great way of creating still frames as well as animation....It's just wonderfully flexible...There's so much you can do with it....It's a much friendlier, easy-to-use package"*. I think he likes it.

Down on the studio floor (where Mick and Colin only go for photographic sessions). We had to keep out eye open for technicians, who would commit murder if we touched their cameras, and who could blame them?

In to Cyberpaint went pictures of the well-known Thames personalities. The familiar London skyline, so beloved of Prince Charles, was drawn and redrawn in different styles. Colin spent much of his time preparing other pictures using paint packages including ZZ Rough, a radical and exciting new kind of graphic software for the ST, as yet unavailable in this country. But Mick also wanted to have the Thames stone slab on the ST, to use in the collage. The original logo was created in Alias, a mainframe system with five zeros in its price tag and 600 megabytes of storage. But rather than digitise it, a rather novel technique was employed to create a similar effect. Mick took a VHS camera, pointed it at a bit of carpet to generate some texture, digitised the carpet into the ST and laid the logo and name over the top. I do so admire people who need so little in the way of resources, in order to be resourceful.

When he was finally happy with the resulting collages, Mick arranged the all-important meeting with the men at the top, the Thames executives who would decide on the merit of his work and, if the worst came to the worst, where he might not be working next week.

"We took the computer along to a meeting with the producer and our head of department, because he too, by now, had become interested in what was going on, partly because we were working at home, and in the back of his mind was the impression that we weren't doing anything! We got it all set up. Everyone was there. We hit the 'Go' button and everyone was amazed. The guy in charge of the whole department, both presentations and promotions, came in to have a look at what was going on as well, and he was amazed. I was apologising for the resolution, and saying 'Of course, we're going to do this properly', but he was saying 'I really like the look of that', and I thought that I really liked it as well, but had been afraid to say so because I didn't think that anybody else would. For ages, people had been knocking me for playing around with this 'games machine', you see".

I interrupted the story at this point to ask a question which revolved around the suspicion that Mick already had the idea to originate the material on the ST, instead of laboriously transferring the work to a more expensive computer. Mick denied this: the main criteria for developing the design on the ST, at this stage, was because he and Colin had no facilities available and were working out of Mick's front room; the ST was the only suitable tool they had at their disposal. But was the Head of Production aware of the low-cost technology being used on this illustrious project? Mick was of the opinion his boss wouldn't know one computer from another. His reaction had been much more direct. *"He*

saw it, and liked it. It was as simple as that."

So the decision to complete the campaign using the ST graphics was taken, more by default in light of the quality not being subject to questions from above. But Mick was now committed by the specific nature of the animated storyboard he had demonstrated his ideas on.

"If I had come back with something different, they were going to say 'You showed me this doing that, and it came from over there, and it was in these colours etc.,' so in the back of my mind, I was worried about that. Design-wise, everybody agreed that this was the way to go, but the head of promotions was still saying to me, 'Have you decided how you are going to achieve it yet?' and I had to say,'Well, no, I'm still not sure', and by now we had even less time to finish the job'.

"Then my assistant, Colin Martin, who has done an awful lot of very good work on this, came up with a technique which was a way of collaging images together very quickly. The only problem was that it was very unpredictable. There is a function in Cyberpaint which allows you to XOR images together. You can actually predict it if you take notice of the look-up tables, but it's very complicated, so to me it was just unpredictable. But it was fast. You got an awful lot of images, very quickly all collaged together, some of them were great, some of them were rubbish. We saved the good ones and soon we had disks full, and we thought 'What are we going to do with all these?' So we loaded them all into a sequence and played it. By that time, we had had meetings with the composer, Ray Russell, who had seen a VHS of our rough animation, and we had talked about the style of music we wanted, and he had produced a rough mix of the music which he gave us on cassette. So we looked at the images, and played the music, and the reaction was 'Eureka!!'. When you add the two together, it's like magic. We were then convinced that this had to be the way to do it.

"From there on in, it was developing that technique, of using the Matt system, X-Orring and overlaying images together, and trying to get some elements of animation into it at some time. We developed a vocabulary of types of images and ways of putting them together. We had to come up with several sequences in a very short space of time and had already booked an edit suite because we knew when our deadline was, so we were committed to having all our stuff, no matter how it was produced, by that deadline. So then, the only other obstacle was getting all the material onto one-inch videotape, but because we had already been using the Atari at Thames beforehand, the problem had already been solved, it was just a question of getting the pictures as good as possible. We have an area called CAR, which stands for Central Apparatus Room, and the engineers in there are very helpful. We plugged the Atari in, did various technical things with it, and tweaked it about until we got some really ace pictures out of it. We then booked a session to do the transfer, which we did the night before the edit, having just about completed the very last sequence. And that's how it all came about."

A few days after the interview, I attended the final editing session where the many component parts are assembled onto the tape that will be played by the station. In the celluloid ghetto of London's Soho are to be found a conglomeration of the most expensive and well-equipped post-production facility houses in the world. Thames had booked time at the prestigious Moving Picture Company, an astonishing, multi-level warren of different sized rooms, each of which contains hundreds of thousands of pounds-worth of state-of-the-art film and video equipment. Within minutes, it is quite possible and reasonably frequent to find several million pounds of computer and video technology hooked up into the quiet little room in which you are working.

It is here, or somewhere similar, that Mick would have come to create his masterpiece if he hadn't had the ST. The staggering costs of using these most expensive of tools has been reduced to a fraction of the norm for graphic artists like Mick Mannveille and Colin Martin. Their open-mindedness and imagination are significant factors in the story, but the leading light of this drama is still, to my mind, the Atari ST; the so-called home computer, generating images transmitted across the nation. And when the curtain finally goes down on the final phase of the 1989 Thames winter campaign (which started transmission in mid-February) I have no doubt that the ST will play a significant role in the campaign that succeeds it. And by way of an early footnote, I understand that Channel Four have purchased six STs and genlocks to go with them. I think we can reasonably expect to see more of the ST.
On TV.

The heart of the Moving Picture Company facilities, an editing suite. This equipment is modest compared to elsewhere in the building, although most facilities can be linked to each other to maximise on the frantically expensive gear they have to keep pace with to maintain a commercial edge. MPC are one of the best in the business.

...and elsewhere in the building (next door to the edit suite, actually) are the heavy guns, the 1 inch 'C' format video recorders, the digital picture storage discs (800 mb winchesters mostly) and the computers required to produce the most sophisticated special effects currently available.

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• Megafile 60 • Genius mouse • Things to do with numbers • Disktool • Sprite Factory •

JUST IN - CHECKED OUT

This month, we have a good selection of hardware, some educational software, and a disk utility.

Megafile 60 Hard Disk Drive

Atari's new Megafile 60 hard disk drive offers excellent value for money in the mass-storage market. Just £599.99 for 60 Mb of storage, which works out at around £9.99 per megabyte.

The exterior looks just like any other 'Mega' box, the back panel containing DMA in and out sockets. It's a pity that Atari are still offering a rather mediocre set of hard disk utilities and, in particular, that it is only possible to have a maximum of four partitions, with none above 16Mb. There is absolutely no reason why the number of partitions cannot be extended. Still, it all works just fine, and the autobooting software is reliable. Software includes a formatter, a partitioner, a booter, and utilities to park the heads safely, and a patch to overcome the 40-folder limitation of the pre v1.4 operating system.

The Megafile 60 actually offers 64.6 Mb of formatted storage capacity, across three disk platters and six surfaces, using RLL data format. The data transfer speed is quoted as 7.5 megabits per second. It is a very fast drive, and will be made significantly faster when used with the new TOS 1.4 due, in part, to the FAT searching code which has been dramatically improved. WordPerfect loaded in 7 seconds (5 under TOS 1.4) and Publishing Partner in 10 seconds (6.5 from TOS 1.4). My disk snooper program informs me there is an Adaptec 4070 controller inside the Megafile, which is connected to a MiniScribe 3675 drive unit.

The Megafile 60 is not a quiet device by any means. As it powers up, it makes quite a significant scrunching sound, and noise levels are amplified by the cooling fan at the back. The unit works perfectly in conjunction with an Atari laser printer, and it is possible to add further drives by changing the DIP switches inside. The manual supplied is detailed and offers five pages of help and advice for dealing with possible errors during setup and operation. In conclusion, the quick Megafile 60 is a welcome addition to the ST range.

If you've seen one megafile, you've seen them all... The 60 can be externally distinguished only by virtue of the badge, it's price and the sound it makes upon starting up!

Product:	**Megafile 60 hard disk drive**
Price:	**£599.99**
Supplier:	**Atari Corp. (UK) Ltd**
Phone:	**0753 33344**

Genius mouse

Is your mouse tired, or are you tired of your mouse? Datel Electronics are currently marketing an alternative mouse which can be thought of as a direct plug-in replacement, or even an upgrade.

The Genius mouse is approximately the same size as the standard Atari item, but differs somewhat in proportions. It is higher at the palm end and has its buttons situated on a receding face. The cable is more flexible and twice as long as the

The Genius mouse - a good alternative to the standard Atari alternative.

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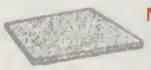

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On balance, the pen is mightier than the mouse

Of course, the mouse is an innovation which has made computers less intimidating and far easier to use, but life doesn't end at window and icon manipulation. When artistry, control, style and precision are required, the pen brushes our rodent friends to one side.

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To further increase the appeal of the 1st. CRP tablet we have even introduced two standard formats which correspond to international standard paper sizes - namely Din A3 and A4.

It is ideal for drafting and CAD (especially with the optional puck), artistry, cartooning and even in areas where the mouse has traditionally dominated, such as, desktop publishing. With its optional overlays, menus are taken from the screen to the tablet and activated by the pen.

Another 1st. for CRP - pen-pushing is back in fashion.

Signa Publishing Systems Ltd

Trevenen House, Cricket Hill Lane, Yateley, Camberley, Surrey, GU17 7BA. 0252 874406/875031 Fax (0252) 871086

standard mouse, but has a poorly designed plug into which the cable disappears without any fatigue-protecting sleeve. Care must therefore be taken when plugging and unplugging the Genius mouse into the ST's badly located mouse socket. Button action is good; light and precise, less hit-and-miss than some Atari mice which use the casing as a button bumpstop.

Although the Genius is lighter than the Atari mouse, it is no less robust. In fact, once you start to use the device, an improved level of manoeuvrability becomes apparent, helped by the fact that it has a higher 'gearing' than the Atari item, thus reducing necessary mouse travel by about 40% (although this can also be achieved by using a mouse speed-up utility available in the Public Domain). The standard Atari mouse operates at approx. 130dpi, compared to 200dpi (screen pixels moved per inch) for the Genius.

Product: Genius Mouse
Price: £24.99
Supplier: Datel Electronics
Phone: 0782 744707

Things to do with numbers

The ST is gradually making inroads into the education field in schools. It has certainly taken its time, but there are now positive signs, with several local authorities displaying interest.

'Things to do with numbers' is the latest release from Robin Kimberley's Soft Stuff company. The 'Things to do with...' series is aimed at primary school age children; and if my own children's reactions are any guide, should prove very popular.

'Things to do with numbers' runs in low resolution only. The program offers a choice of three different games/exercises. 'Time Teller' requires the child to convert times displayed on an analogue clock face to digital format using the 24-hour clock system. 'Book Search' is an exercise in logic where the user has to find a target 'bug' hidden behind one of a hundred books using an x/y coordinate entry for each guess. A thermometer tells whether the guess is cold, warm or hot. This confused me, but my 8 year-old seemed to have little trouble!

'All Aboard' - one of three new exercises.

The third offering is called 'All Aboard'. The task is to build up a train full of people using only groups of a certain size. Success is rewarded by a series of satisfying 'hoots'.

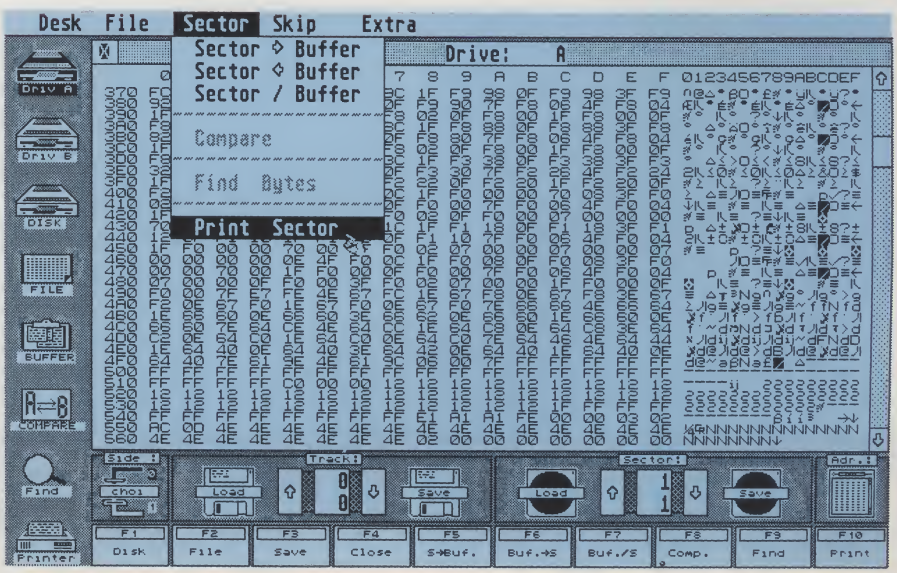
All of the programs in the Soft Stuff series make good use of the mouse; indeed, the child is not required to use the keyboard at all. Robin Kimberley, himself a primary school headmaster, points out that very young children do not learn upper case letters and so will not recognise many of the legends on the keys. They also find the mouse easy and instinctive to use.

Product: Things to do with numbers.
Price: £19 inc VAT.
Author: Robin Kimberley.
Supplier: Soft Stuff.
Phone: 0455 617426.

DiskTool

Disk and memory editors many and various exist for the ST. Datel's offering is a fast, mono-only disk editor which boasts numerous modes and advanced features to aid the hacke.. sorry, user wishing to recover lost data. Curiously, the product is called ST Super Toolkit II in Datel's advert, and Atari DiskTool ST in the terse, amusingly translated, 15-page manual.

All of the action takes place inside a large fixed window, in which HEX and ASCII bytes are displayed. The program basically offers three different modes of operation: the disk edit mode; the file edit mode; and what is referred to as the 'profi' mode. I suspect that 'profi' refers to the original name of this Dutch-derived product, Profi-monitor. The program boasts fast screen handling, and uses its own machine code routines to achieve a respectable turn of speed.



The 'profi' mode gives good low-level access over the ST's disk controller.

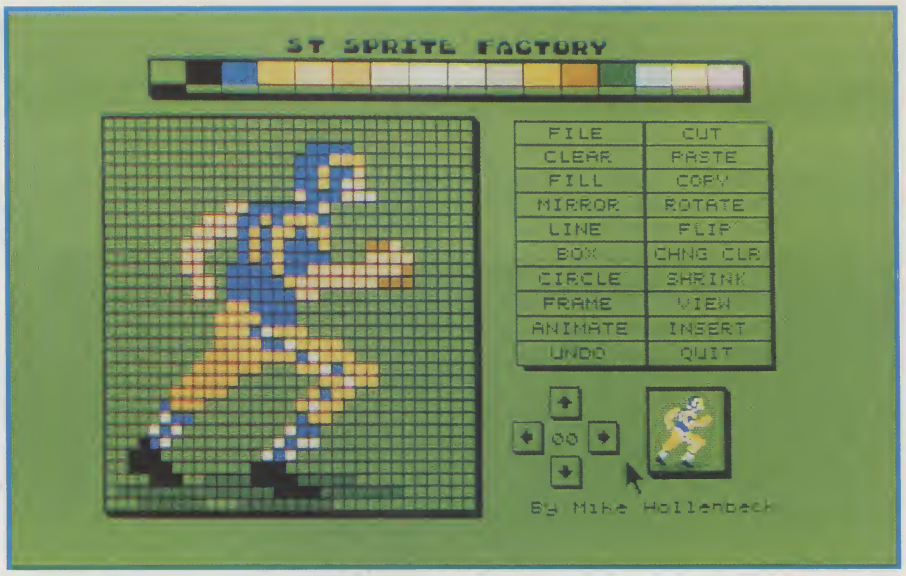
Unfortunately, DiskTool is copy-protected, a fact which will disappoint hard disk users. It also locks out desk accessories.

The file mode allows specific files to be examined and edited as a continuous block which is read from disk. DiskTool displays the track and sector of the currently displayed section of 512 bytes. As with all three modes, it is possible to enter hex or ASCII bytes to directly modify any given sector.

The disk mode allows any track or sector across the whole disk to be accessed. It is possible to scroll through the disk at sector or track level, and there are 'jump' options to give rapid access to the boot sector, directory and FAT tables. DiskTool allows unusual sector sizes to be created; 128, 256 and 1024 sized sectors may be created and edited. It is also possible to view and edit address fields and hence checksum values, which is one way of creating a copy-protection scheme. The program has many other interesting features including a byte / text string search and replace facility.

DiskTool II has an army of features which allows you to perform all sorts of disk surgery, whether this be recovery of data, or creation of special formats. In the right hands it is a truly powerful utility; good value, but for a shade under £15 you can't expect a good manual, which is just as well, because you don't get one.

Product:	**Disk Tool II**
Price:	**£14.95**
Supplier:	**Datel Electronics**
Phone:	**0782 744707**



ST Sprite Factory's main edit screen.
Lots of tools to play with, but limited sprite sizing.

The Sprite Factory,

The ST Sprite Factory comes from America and presentation wise, it is very good. It comes on two single sided disks, held in an A5 four-ring binder, together with a helpful and professionally printed fifty-page manual.

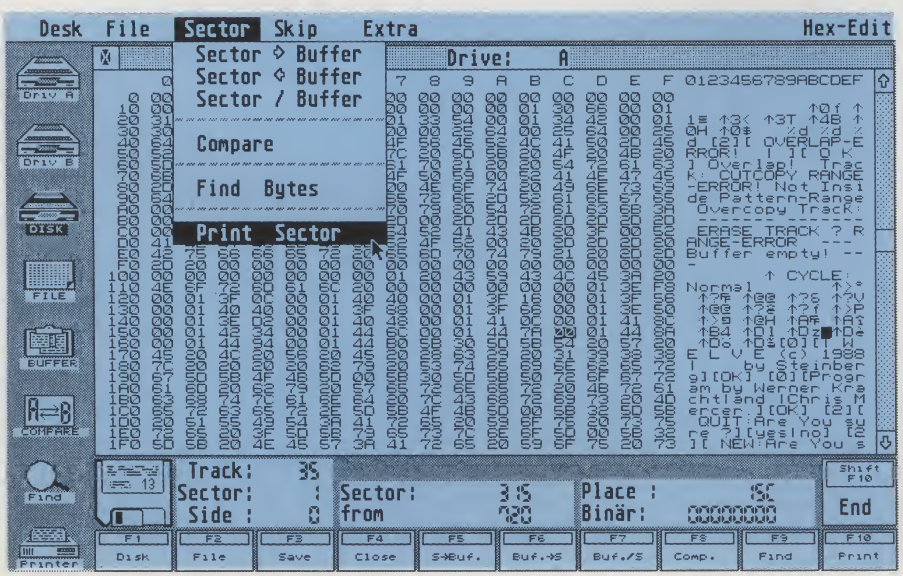
The editing features are comparable with Animatic Sprite Master with some additional distortion options. One outstanding feature is the ability to create a mask file of the sprites you create. This is a great time saver, if you have a need for such masking.

So far, so good. Unfortunately the great disadvantage of this package, is that sprites are restricted to a rigid 32x32 size. This may well be an overwhelming failing for many people. It does, however, bring the advantage of simplifying storage and later manipulation by the programmer. The storage of the sprite data is interesting, as it is straight Degas file format. The program simply divides up the Degas picture file into discrete 32x32 boxes in a uniform grid pattern.

The manual contains clear, concise information on screen layout, raster operations, page flipping, VDI parameter blocks and other delights is given. Also provided is a short tutorial on animation and sprite collision detection. Excellent stuff. Sadly, though, it is aimed at the OSS Pascal programmer, with a little help for C or GFA Basic programmers. UK-based Basic's such as Fast or HiSoft Basic don't even get a mention.

On the first disk there are some ARC'ed files containing a GFA Basic demo, a fine scrolling demo and a joystick manipulation program. More useful is a utility to generate backgrounds out of sprites. The second disk contains a separate program to do pretty much what the others had separate programs doing. That is, picture file converting and creating source code for C, Assembler and Basic programmers.

Product:	**The ST Sprite Factory.**
Author:	**Mike Hollenbeck.**
Version:	**1.1.**
Price:	**£49.95.**
Publisher:	**Future Software Systems, (CRL are UK distributors).**



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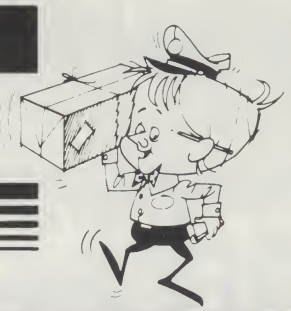

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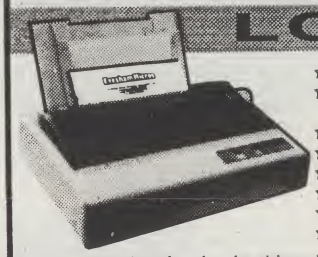

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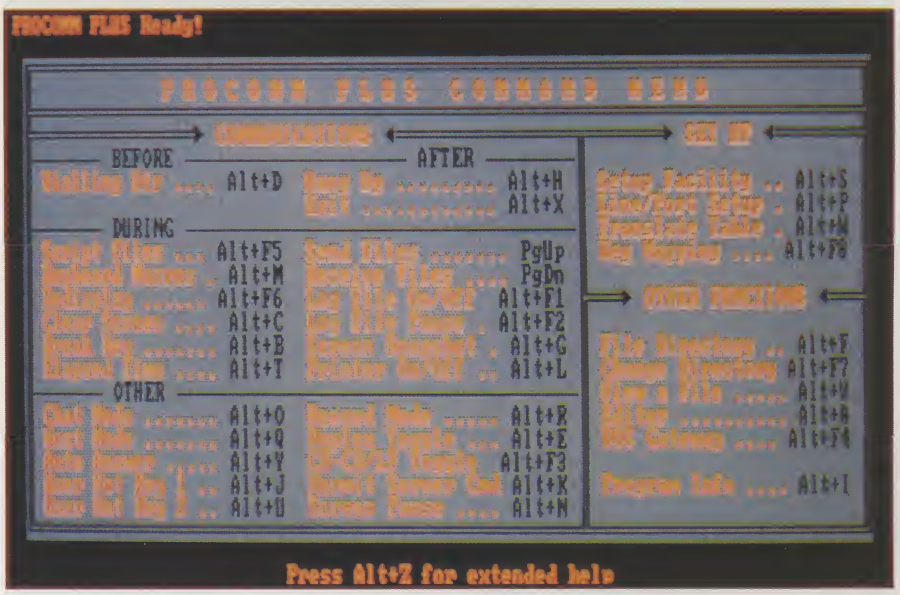
PC-DITTO

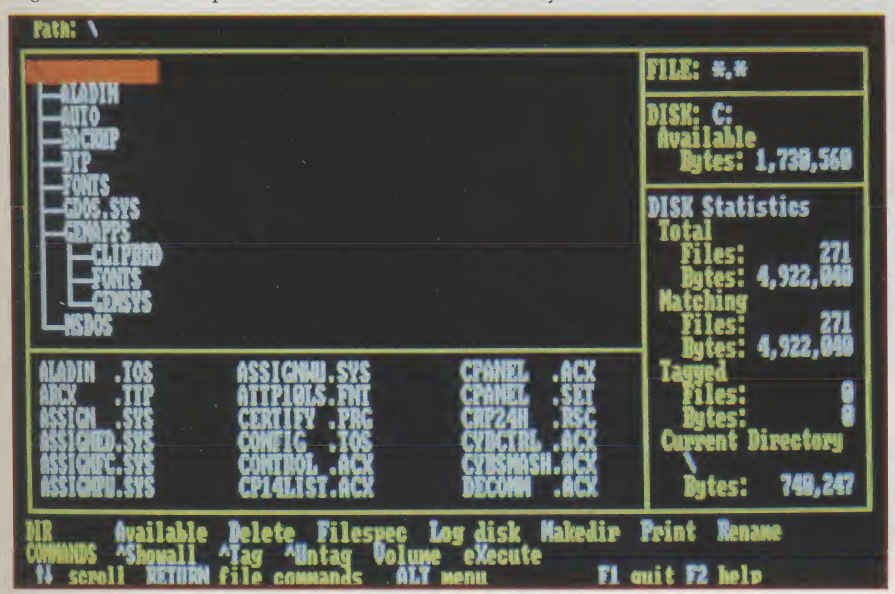
Can the ST hold its own in a world dominated by Big Blue? If you need PC compatibility, should you consider pc-ditto, or is it just a novelty? John Nuttall finds out.

Emulation is described in my dictionary as an attempt to equal or surpass something, by imitation. It also had an archaic usage meaning 'jealous rivalry'. Perhaps the latter definition is more to the point when applied to computer emulation - that process of making one computer behave like another, so that it can operate on the same data and run the same programs as the imitated system. It is likely to be quite a complicated affair, as one CPU tries to cope with instructions designed for another. Then there is the problem of disk formats, memory management, and peripherals such as keyboards and monitors, printers and mice. Finally, there is nearly always a trade-off between compatibility and speed of execution

The ST is well-blessed with emulators. Some emulate by software, others by hardware and software in tandem. Currently, it is possible to emulate a CP/M machine, an Apple Macintosh, a MS-DOS Personal Computer, and there's even a rumour about an Amiga emulator and one that runs software written in BBC Basic. Why should the public be interested in an emulator? The reasons are many and varied. It may be that we already own or have access to another computer. We may need to run programs or manipulate data from a system we no longer own. Likewise, there might be software we prefer or need to run, without going to the expense of purchasing another computer. In rare cases, the emulator might offer a better price/performance ratio than the original machine. Be aware though, that the host machine will need sufficient memory to cope with the emulating software and the programs and data you intend to use.



Procomm Plus, running perfectly under pc-ditto.



X-Tree, a standard DOS utility for examining the contents of a disk.

The standard

Like it or not, the IBM and its clones still dominate the business world. When it was introduced in August 1981, the IBM Personal Computer was a rather staid machine. It contained an 8088 processor, 16-bit internally, but communicating with the outside world in 8 bits. It was thought that the maximum memory size of 640K was more than sufficient for everyone. And it contained no more than a few kilobytes of ROM BIOS because it boots its operating system (MS-DOS or PC-DOS) from disk. A recent article put it this way:- "The PC machine is blessed or cursed with the MS-DOS operating system where commands have to be typed at the keyboard to perform even the most basic functions. While such commands instil a tremendous discipline in the user, they could hardly be described as state of the art".

Over the years, the humble PC has been welded and bolted to keep pace with a developing market. MS-DOS has gone through numerous releases, (4.0 is the latest), disk drives vary from 5.25" single or double-sided (160K) to high capacity (1.2Mb) 3.5" units, and the processor itself might be a 80286 or 80386 with increased clock frequencies. Even the screen standard presents a number of options from monochrome Hercules to the Colour Graphics Adaptor (CGA) or the Enhanced Graphics Adaptor (EGA). When all is said and done, there is very little that is "standard" about the machine.

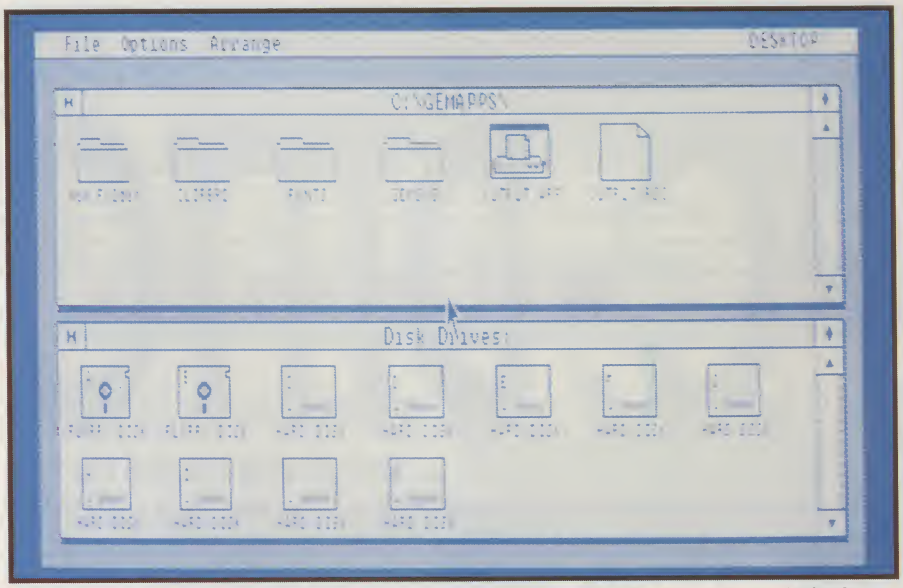
Nevertheless, as can be gleaned from the pages of ST World, folk are very interested in running PC software on their ST computers, either because they can get hold of mature PC programs at a reasonable price, or because they use PCs at work and want to continue their work when they arrive home. I have been using a PC emulator for the last twelve months for two reasons. In the first place, there are some programs that I wish had appeared on the ST: something of the calibre of Smart or other integrated software. Secondly, there are simply hundreds of public domain programs that can be had for very little, that are worthy to be ranked among the best. A recent trip around my local Dixons store, provided me with large

boxed versions of Perfect Writer II and Perfect Filer II at £5.95 each - sold off because they were pulling out of the business sector. A copy of any PC periodical will furnish you with addresses for PD or discontinued software. A word of warning is in order: some of the software being sold off cheaply is very much "first generation" - sometimes buggy, sometimes awkward to use, and sometimes with little or no user support.

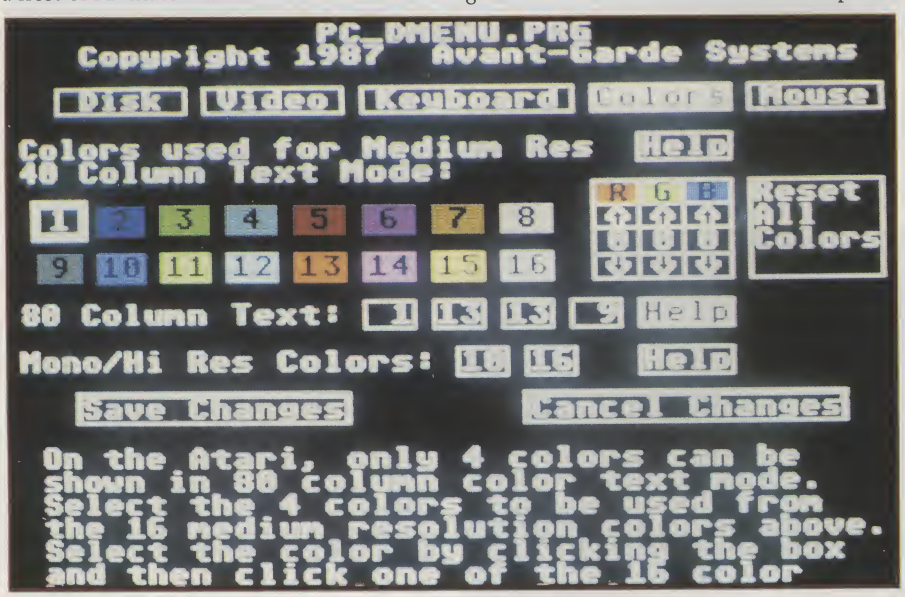
pc-ditto

A very cost-effective route to PC emulation comes in the form of pc-ditto from Avant-Garde Systems in America. Its form of emulation is via software alone, so there are no costly hardware items to fix to your already overcrowded cartridge port. The package contains a 3.5" disk, a manual, and a keyboard template. The last item is required because the ST keyboard lacks such features as 'page up' or 'page down', along with scroll and number lock. These functions are therefore assigned to the HELP and UNDO keys and the top keys on the numeric pad.

The software will run on a 520 or a 1040 ST. Due to limitations inherent in MS-DOS, there is no significant advantage in using a Mega ST; you will always be limited to a maximum workspace of 703K. Likewise, a monochrome or colour monitor can be deployed. The user will need to obtain PC or MS-DOS as this is not supplied with the package, and if you don't already have it, it could cost you an extra £50. If you want to make the most of the capacity of your 3.5" disks, or use your standard Atari hard disk, then ask for MS-DOS 3.2 or 3.3. The list of software compatible with pc-ditto is quite impressive, and I had no trouble running WordPerfect 4.2, Smart, Ability Plus, Procomm Plus, the Perfect series, Sage Accounts, Sidekick, and a host of PD material.



GEM 3 for the PC; the Desktop is far less sophisticated than the ST's, and is excruciatingly slow under pc-ditto.



The pc-ditto configuration program allows many of the ST's facilities to be used by the emulator.

Installation is quick and easy; there is a menu program which has to be run from the desktop to set the system configuration correctly. An external drive of the 3.5" or 5.25" variety may be connected; a hard disk (if connected) can be used to read or write MS-DOS programs and data, and may also hold the system files, making it possible to boot from partition C. This was an added bonus for me, as it considerably shortened loading time, and it was also possible to mix ST and IBM files on the same partition. Pushing my luck further, I discovered I could even have the MS-DOS booter and the normal Atari hard disk booter in the same root directory. Of course, you will need to re-format the partition with the usual FORMAT C:/S to copy over the system programs. Curiously, these are visible files whereas they are hidden on a true MS-DOS machine. Additional files are provided to get MS-DOS to cope with multi-partitioned hard disks. The partition size should be larger than 4.2Mb but less than 32Mb.

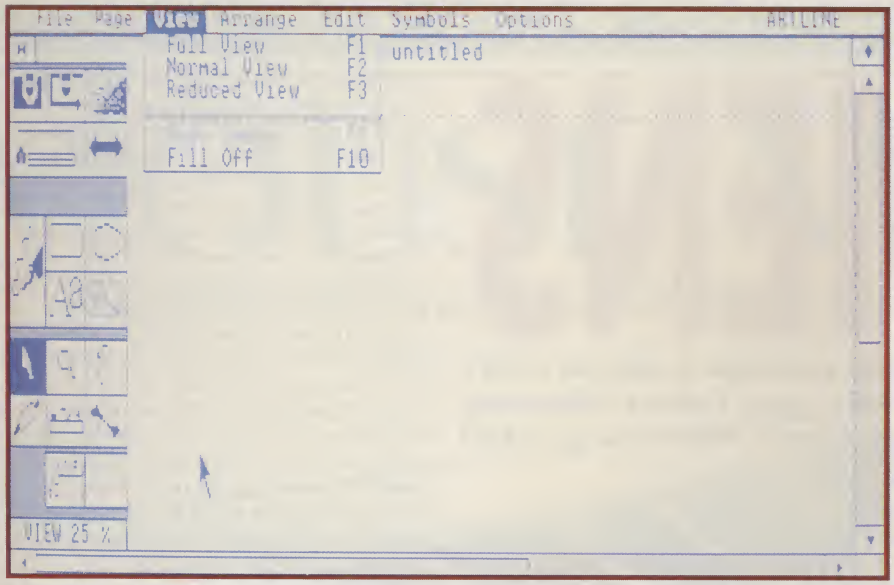
A further menu option describes the mouse options. Many, but not all PC programs can make use of a mouse. This piece of software will handle a serial mouse (i.e. compatible with the Microsoft mouse), or a generic mouse mode, where it emulates keystrokes. The driver for this and the hard disk should be added to the batch file on the MS-DOS boot disk. Further fine tuning, before actually running MS-DOS, requires the user to specify the type of monitor used (colour display on an Atari monochrome monitor is done by shading), and the colour palette of your taste, and the keyboard country of origin. Do make certain that you purchase the latest release of the software, which is 3.64, as there are still early versions around which are grey imports and do not support European machines properly.

In order to launch MS-DOS, simply double click on PC_DITTO.PRG and you will be prompted for the MS-DOS system disk which usually resides in drive A. After a while, the tedious A> prompt appears and you are ready to load up your software or perform command line operations. If you are unfamiliar with these, you will need to obtain some guide or prompt card - they are not the most intuitive of commands and are very fussy about spaces and punctuation.

We began this article by defining emulation as an attempt to equal or surpass something, by imitation. How well does pc-ditto cope? First reactions were very favourable. It is robust, reliable, and a bargain. It supports the parallel and serial ports fully, and will even take the time and date from either an ST with a clock card installed, or a Mega ST. However, the software solution to emulation is slow, rating 0.3 Norton speed, meaning it is about a third of the speed of a standard PC. In reality, the loss of speed is not always noticed. It depends in great measure on what software you are running. Perfect Writer II was very slow at refreshing the screen, and it was very frustrating to use. WordPerfect fared a lot better, as did Smart. Communications software worked perfectly, and I know one PC dealer who has bought an ST with pc-ditto, which sits there all day running his bulletin board software. You can't ask for a higher recommendation.

Run time

Any emulator is going to require the user to get hold of software in the format native to the system it imitates, and pc-ditto is no exception to this. A number of



Artline from Digital Research running under pc-ditto on an ST. This sophisticated art / drawing package is claimed to be an Illustrator (Macintosh) rival. Sadly it is unusably slow under ditto.

prospective purchasers still ask me if the ST is IBM-compatible, and the answer is "yes, about 80 per cent." In fact the 3.5" double-sided disk format is about 98% compatible. Users will find however, that while they can read either 3.5" or 5.25" IBM format disks, there are problems writing to them. Although the IBM and ST disks use the same track and sector sizes, there is a crucial difference. Both formats use a boot sector, but the MS-DOS system keeps vital information embedded on it, while the ST is one word different. If the ST then writes anything to that sector, MS-DOS can't quite work out what is happening.

There are a host of programs available for formatting disks under GEM to be IBM or clone compatible, some of them public domain. The trouble is that they do not work very well and there are reliability problems. The new TOS 1.4 for the ST has greater fidelity in formatting, reading and writing DOS disks. If you want to read and write to the same disk using pre 1.4 TOS it is far more reliable to format them on a true PC. I have never encountered a single problem when formatting 3.5" disks on my Amstrad PPC. Something of a similar problem will be encountered on a 5.25" disk drive, but problems are accentuated by the fact that the drive must be 40 and not 80 track. In either case, the user is then best advised to issue an MS-DOS copy command to port over the files under pc-ditto to the newly formatted disk. Fortunately, the configuration program within pc-ditto allows us to connect an external drive to the ST, and this can be either a 5.25" or 3.5" type, although you must specify which is connected. Thus copy-protected 5.25" disks need to start from the second drive. For hard disk users, I noticed that the manual states that there might be problems installing some varieties of DOS on the hard disk and Avant-Garde Systems are working to increase compatibility. I certainly encountered no difficulties with MS-DOS 3.3.

What can you do to get hold of PC software and make it run reliably on the ST under emulation? The simplest option would be to get hold of a 3.5" version of the software and copy it either as outlined above or onto a hard disk. Since a number of newer PCs have now adopted the smaller disk size, most software publishers offer the 3.5" size. Another option would be the purchase of a 5.25" disk unit. My original Cumana CS400 drive was modified with pull up resistors and a 40/80 switcher, by Cumana themselves for next to nothing. There are also a few companies offering drives suitable for use with the ST, including the distributor of pc-ditto on this side of the Atlantic, Power Computing, who are offering a software and hardware package at £159.00. If all that sounds impossible or too much expense, then a disk format conversion service is available from companies such as Grey Matter. It will even work in reverse, so that GEM files could be copied to PC format disks. If you own a modem, then you can download material which could be worth having. However, watch the cost of the phone bill - it might end up more expensive than actually going out and purchasing something.

If you know somebody with a PC, then you can always transfer material from one machine to another via a null-modem cable. It is fast and reliable and you can tackle any problems as and when they occur. Bear in mind the copyright that exists on commercial software including DOS, and the restrictions that apply even to shareware material.

In the final analysis, pc-ditto keeps its promise. It doesn't quite equal or even surpass an unadorned PC, but it does scotch the myth that an ST cannot be IBM compatible, just.

Product: PC-ditto
Version : 3.64
Price: £79.95
Author: Avant-Garde Systems
Supplier: Power Computing
Phone: 0234 273000

There is another alternative for Atari users wishing to run PC applications. This is the PC5 from Atari's range of low-cost high-performace PC clones - see a full review in a future issue of ST World.

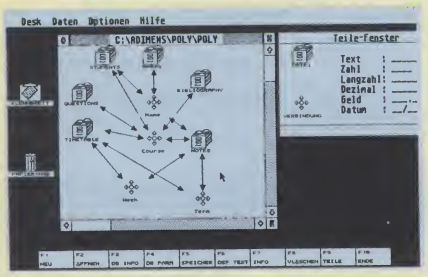
ADIMENS

The Adimens relational database package is due to arrive here in the UK by spring of this year. Gunter Minnerup gives an indication of what to expect from one of Atari UK's new power-products.

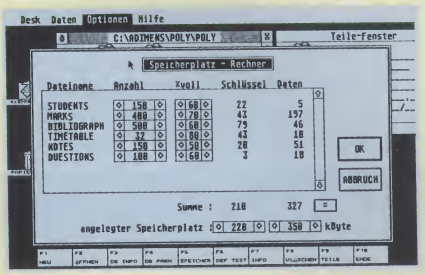
Atari's move into the serious software market, recently begun with the release of HyperPaint, is set to bring the company into competition with some established names. In the DTP arena, for instance, Atari's Calamus will take on the combined might of Fleet Street Publisher, Pagestream and Timeworks. Due to be released around spring of this year is the database package called Adimens. Is it good enough to rival market leaders, Superbase Personal and Superbase Professional?

Like Calamus, Adimens is an import from West Germany where it has been in widespread professional use not only on the ST but MS-DOS, VAX and UNIX systems too. Adimens ST makes full use of GEM (see screenshots below, which have been taken from the German version) and comes in several individual modules: INIT.PRG to define database structures; DRC.PRG to create the necessary GEM resource files; EXEC.PRG for working with and maintaining data files; and REORG.TTP to modify existing databases. In addition, there are ADITALK, a programming language and environment to write stand-alone applications which is somewhat reminiscent of dBase, and ADIMENS-PROG to support the incorporation of C, Pascal and GFA Basic routines in Adimens programs. In Germany, Adimens has become the centre of a considerable cottage industry with a range of specialist books and off-the-shelf applications - it will be interesting to see the exact shape of Atari UK's offering and the impact it has here on Superbase's supremacy.

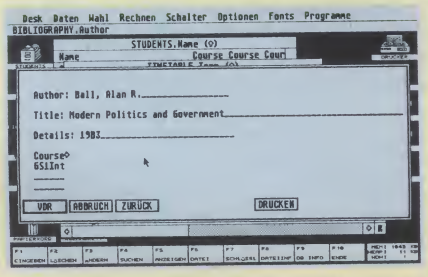
Note: This brief preview is based upon the current German release of Adimens; the full UK version is still undergoing final testing by Atari. Prices and availability will be announced shortly.



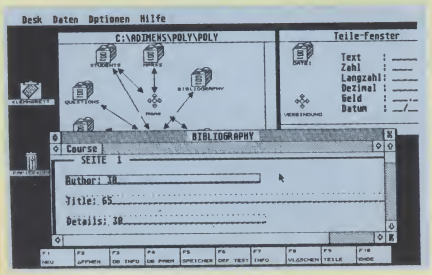
Creating a database structure could not be simpler: INIT.PRG presents the user with a parts window (right) from which the icons to represent the various data files to make up a complete database are dragged into the main window opposite. Adimens is a relational database, and relations between fields of different files are established by dragging the cross-shaped icon over the respective file icons. Note the graphic representation of such relations by the arrows (in one or both directions).



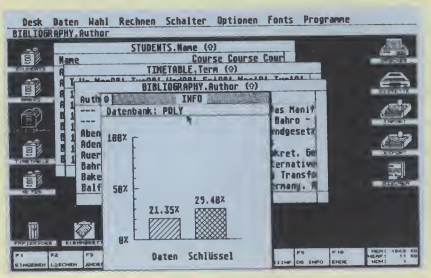
Adimens needs to reserve disk space for the data and index files, but compresses these to optimise disk utilisation. Still in INIT.PRG, this screenshot shows the large dialog box requiring the user to indicate the expected maximum record numbers and anticipated average field space usage. All these values can be modified later if, as is usually the case, existing data files are outgrown in practical use.



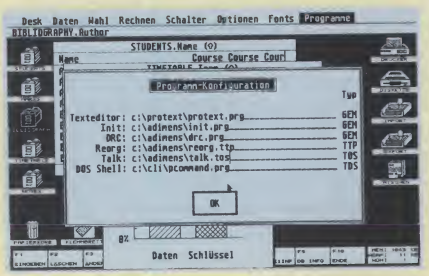
Records can be displayed either as lists or as page forms. Note the Forward, Stop, Backward and Print buttons on the form, and that there is no Fast Forward, video-style, as in Superbase. For elementary functions such as entering, erasing, editing and searching for records, alternatives to the dropdown menus are provided by the function keys and the row of First Word Plus lookalike buttons at the bottom of the screen.



Similarly, fields are created by clicking on a file icon and dragging one of the field types from the parts window into the file definition window (bottom). Fields can be arranged arbitrarily on the page mask and multiple fields, as for multi-line text fields, are possible.



Once DRC.PRG has created the resource files, EXEC.PRG can be entered to enter, sort, delete and otherwise manipulate data. Note the chunky icons - on the right, from top to bottom: the printer, disk, import, export and mailmerge icons. All these functions can be activated by dragging a file or the clipboard icon (next to trashcan) over these, usually after defining a filter to select a subset of the relevant data file. The window in the foreground reports on the percentage of data and index file space used up so far.



Access to a wordprocessor (for mailmerge and report forms), the INIT, DRC, REORG modules, the TALK programming environment and a command line interpreter from within Adimens are possible through the Programs menu. Paths can be defined in this dialog box and saved to a configuration file. Although this facility is only really useful for two-disk or hard disk setups, Adimens will happily work on unexpanded, single-drive 520STs.

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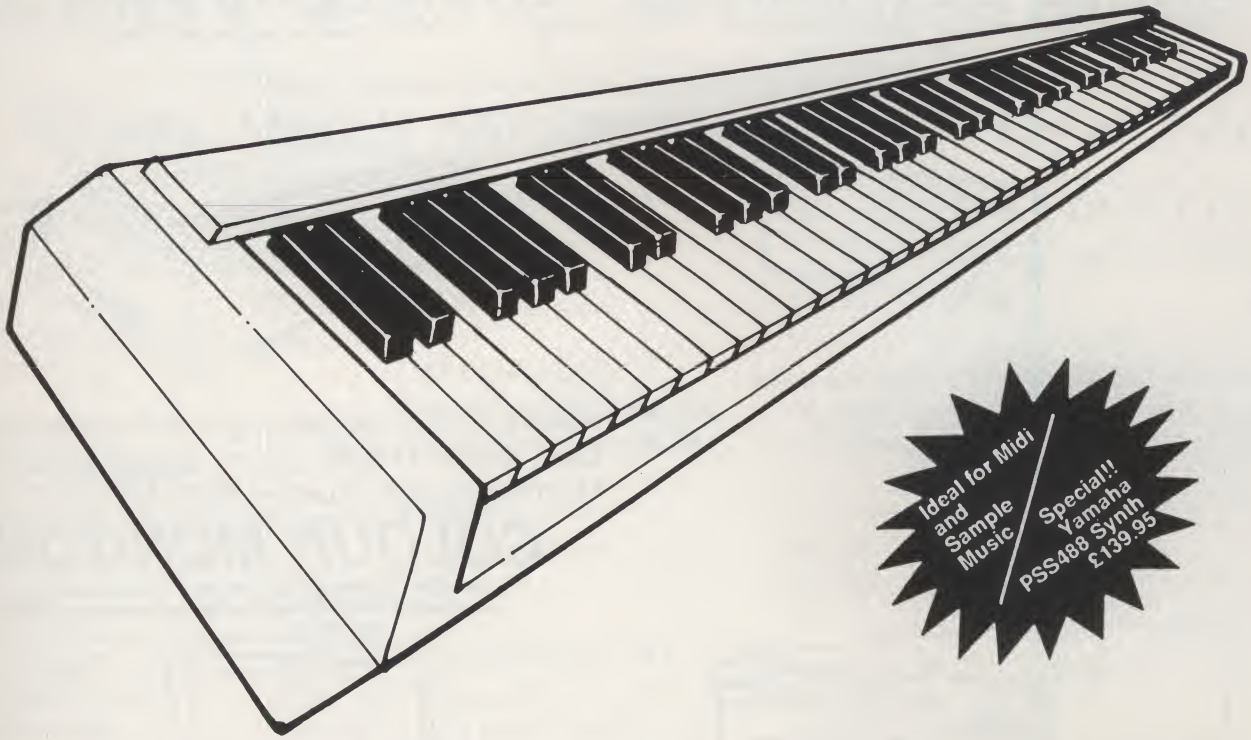

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- data size: 8/12 bits
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  - input: AD 7575 JN ADC Sample & Hold
  - Output: AD 7528 JN Multiplying DAC
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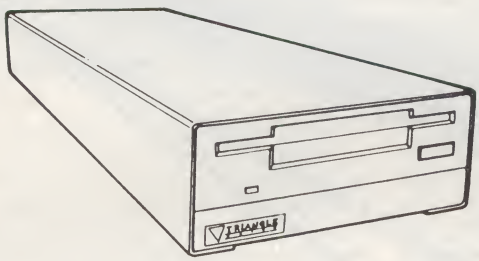

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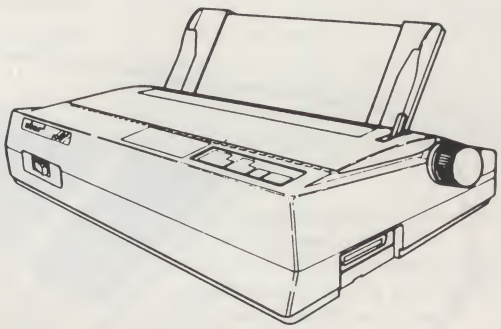

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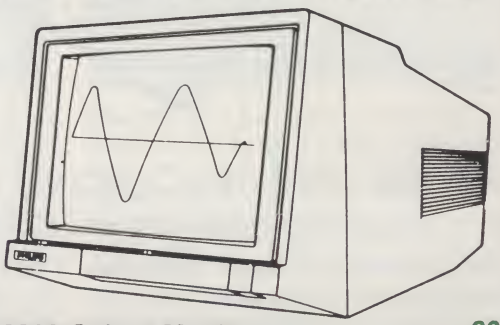

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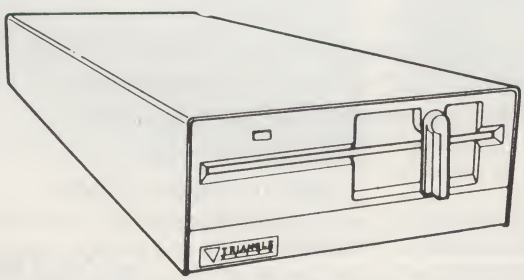

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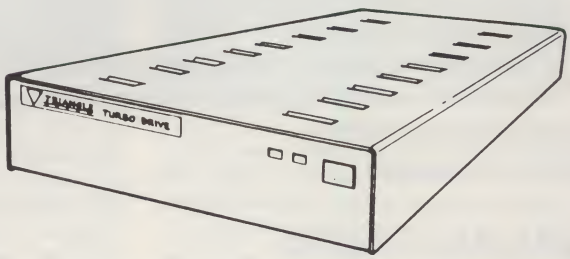

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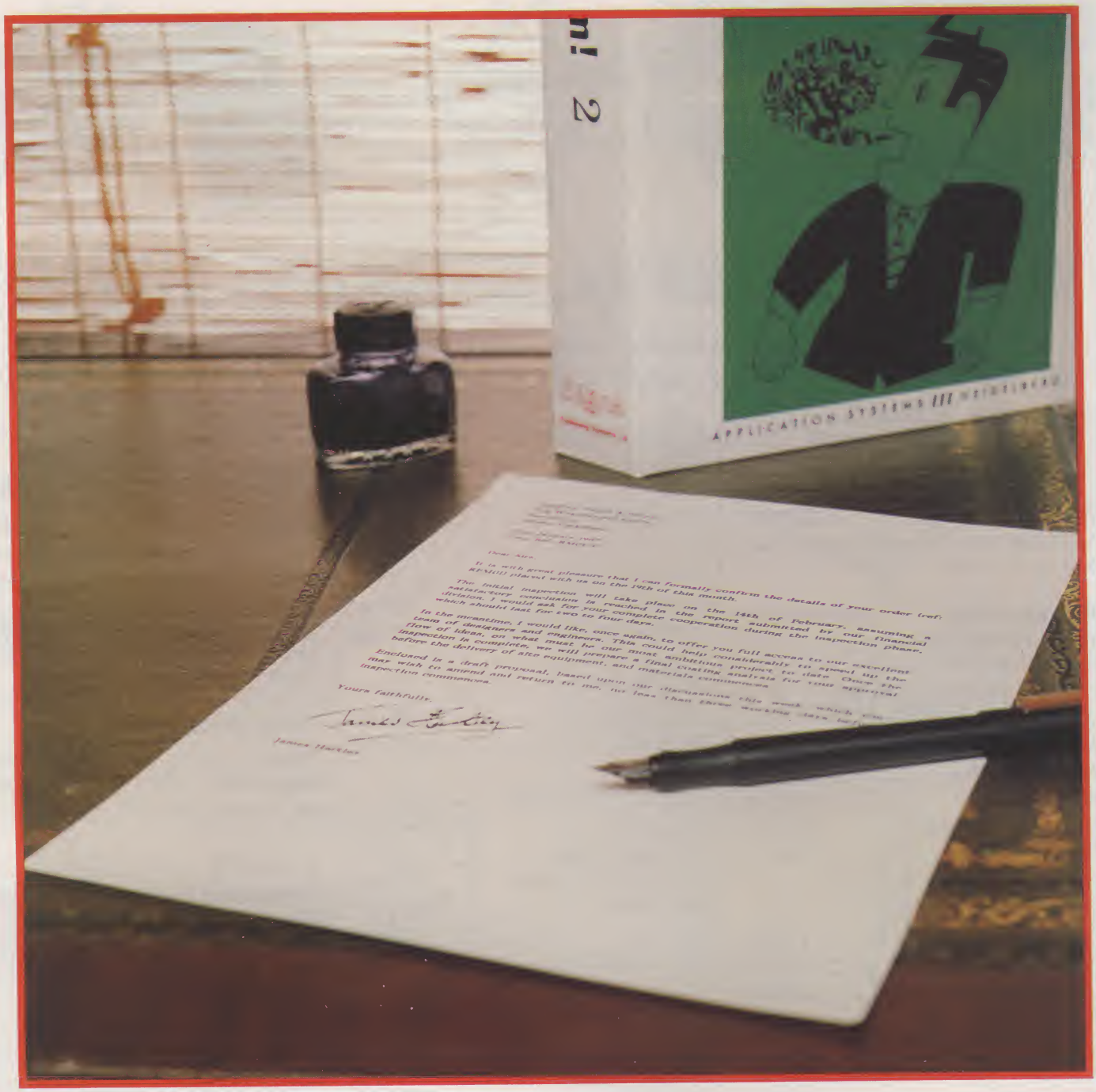

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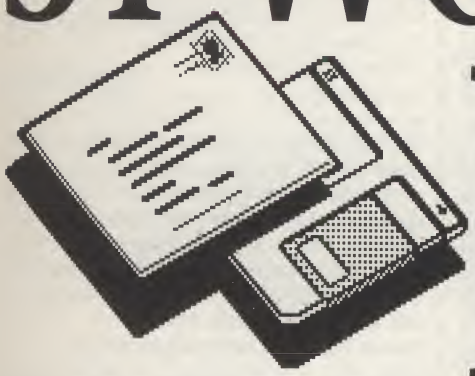
ST WORLD I/O



After being nearly starved of enough usable letters to fill a page last month (all off enjoying the Christmas spirit, I presume!), we now have rather a high quotient of pertinent and dynamic letters to portray this month, which is going to force me to keep my opening waffle to a minimum again. What was that head rolling past? Oh yes, I must remember not to mention the Copy Protection article which appeared in ST World, and somewhere else...

The subject of keyboard hassles is obviously something that many feel strongly about. There was a feeling of irony as I typed in Mrs Diana Ross's letter, championing touch-typing, while I struggled to bash the keys in my own distorted fashion. GDOS raised its head again - although I'm sure that 1st Word Plus does nothing at all with GDOS; I think the misunderstanding arose when Mark R Hilton, in I/O STW35 tried modifying the ASSIGN.SYS file using FWP, then ST Writer. You need a real text editor to do this with - Tempus, or MicroEMACS, for example. ST Writer will not save out as pure ASCII, so that wouldn't work for ASSIGN.SYS mashing.

A letter from a local solicitor caused much anxiety - until we realised that it was simply another I/O contribution soliciting some advice (no, please don't send him a bill after furnishing a reply to his questions!). Another slice of history turned up: someone out there actually uses a Microwriter! I have been seen lately with a Psion Organiser II, which I consider either hideous, useless or invaluable, depending on whether I'm entering data or retrieving it.

ST World I/O is edited by Ian Tindale. Write to: ST World I/O, 10 Theatre Lane, Chichester, West Sussex, PO19 1SR. Fax: 0243 789809.

GDOS fonts

Started by Ian Tindale, STW30, p36
+Found fonts in Flt Str, Charles Quekett, STW32, p24
+Being left behind?, Barry Parkinson, STW32, p24
+PostScript solutions, Richard Seel, STW32, p24
+The lost fonts, Mark R Hilton, STW35, p23

Mostly a matter of memory

In answer to Mark Hilton's question about GDOS and backpack: I think it must be mostly a matter of memory; I am using Microsoft Write with Backpack, with few problems on a 1040ST. However, I was unable to install GDOS onto Degas Elite and my one attempt to get GDOS to work with 1st Word Plus was a waste of time. In neither case was BACKPACK.ACC installed. I was also unable to find a use for Metafile. I fiddled around with the resulting .GEM file and couldn't get any program to take it up even after trying different suffixes.

It is quite likely that I didn't do everything quite correctly, as I have only recently discovered GDOS. All I can say about it is that in Microsoft Write it is a pleasure to use, even with a fairly elderly 9-pin DMP. I may very well abandon 1st Word Plus in its favour, for ordinary word-processing.

How can I get VIP to produce the same excellent graphics output as Swiftcalc? Part of the printout gets laterally displaced and now and then includes a rogue '3' at the end of the line, and then a duplicate row of dots. This occasionally happens with Write, too. I never get this problem with the Graph module in Swiftcalc or with Degas, so I doubt if the printer is faulty (Canon PW-1080A). [Sounds like a printer driver problem - how compatible is a Canon PW-1080A with, presumably, the Epson FX-80 that these programs (via FX-80.SYS) think they're driving? - Sysop].

Dr. John A Roth, Earley, Reading.

Decent ST applications?

Started by Barry Rose, STW31, p26
+Marketing considerations, Lee Cooke, STW33, p23
+Singing dog syndrome, A M Burnett, STW36, p27

Try before you buy?

If software houses paid rather more attention to their product, law-abiding citizens would be less prone to casual copying and swapping of titles. For a good example, look no further than 1st Word Plus. After a long wait, I bought, at full retail price, FWP when it was finally released. It is shot through with examples of slipshod and lazy programming. For instance, graphics to be imported must be in the same folder as the document they belong with. Fair enough: but go to Read Picture and the file selector defaults to drive A, even if you read your document from drive B. This applies with the new version, with the default set to drive B.

The same applies to Delete File, always drive A. And don't expect the graphics to actually appear where you position them! Or that the printer driver will drive the printer properly; more money for a dedicated driver there. The flashing cursor I absolutely hate - why can't I switch it off? Furthermore, it took three letters to Softline before I could get FirstMail to function properly, because rather than admit in the manual a rather obvious shortcoming, and explain it in a twenty-word sentence, the problem is glossed over.

So I have now spent over £100 on an average, sluggish piece of software. Had I known anyone with an Atari ST when I first bought FWP (I now know 5 other people with various STs), and had been offered a copy, I would have had a chance to decide to save my £100 and maybe put it towards Signum, which I now cannot justify. I buy software to use. I have not the slightest interest in the process of the computer. I'm sorry if this is heresy, but I don't want to have to program anything at all, or work around any shortcomings. As someone who has been exposed to PC type machines at work, I recognise the user-friendliness of the Atari ST - why spoil it with inadequate software?

Magazines such as yours cannot escape some share of the responsibility. For instance, I have read excellent reviews of Signum, which can position text with extreme accuracy, but, does it suffer from the same shortcomings as FWP? Can it position graphics with the same accuracy? Is its file handling less irritating? How many times have I read "this is only a beta version - the manufacturers will fix this bug / glitch / other problem before release"? Why are you testing beta versions? It is not your job to drum up interest in new software - let the manufacturers advertise. I think the nub of the problem is this: people do not want to fork out upwards of £40 for serious software only to find it full of annoying foibles. If they can borrow a copy to try out, they probably will. And if you have a copy already, why pay all that money for a manual, and possibly the privilege of paying half as much again for a new version, if it ever arrives, with some of the original faults removed?

Colin R Harrison, Catford, London.

Fussy disk drives

Started by T Q Tran, STW32, p26
+Fussy disks, Iain Laskey, STW34, p24
+Highly dense disks, A M Burnett, STW36, p27
+2Mb Floppies, Paul Rossiter, STW36, p27
+Kick to flip the bits, Iain Laskey, STW36, p27

Best of three

Some drives have big problems handling HD disks. I have a new 1040STFM with Mega ROMs, and since the cheapest disks I can get are Verbatim HD (sic!!! isn't it?) by now all my disks are HD. I use them in Atari, PC-Ditto and MagicSac modes, with

no problems at all. However, a few of my friends also purchased these disks on my recommendation, and I ended up having to buy the disks back from them, as their drives couldn't handle them, Neither can all the early Macs, and quite a few Amigas (in fact, of the three machines, Atari's rate of success is the highest). All that doesn't quite explain why, but at least your problem isn't unique, nor is there anything wrong with your machine or drive.
Swavek Jabrzemski, Clovelly, NSW, Australia.

DIY hard disk

Started by Alex Pidd, STW32, p26
+Expert advice, Andrew D Barclay, STW34, p26
+Expert reassurance, Bob Bell, STW35, p26

Driving a hard bargain

Since you published my letter offering advice on DIY hard disks, I have been contacted by over 40 people for help; everyone who wrote enclosed a stamp, which at least shows ST World readers are polite! Recently the situation has changed, and I offer this letter as an update.

Unless you want to make up a hard disk as a hobby project, in which case the money saved may be secondary, the recent price reductions on commercial 20Mb drives mean that the main savings now come from using secondhand drives, adding on drives to existing kits, or making up fast big drives. If you are content with the smaller and slower drives - as the majority of users are - then a genuine Supra / Atari hard disk will be the best bet.

A number of those who wrote either had various bits surplus or wanted bits, having had the odd technical disaster. If you are a private owner and have spare controller cards, drives, power supplies, cases, etc. or are in need of these, I will try and act as an information exchange or HD marriage bureau, if you write and let me know your requirements. Lastly, two quick tips: if your kit works, but not properly, giving read errors or lots of bad sectors, remake all connections and reformat with fewer cylinders and heads - this will satisfy you that the electronics are OK. Never install an autoboot unless you know how to get into the drive from floppy - if you put a bad .ACC file on drive C your disk will loop round, endlessly resetting - even FlairPaint reviewers can fall into this trap!
Andrew D Barclay, 34a Bridle Road, Stourbridge, West Midlands DY8 4QE.

An eye on the keyboard

Started by Colin Robson, STW34, p27
+Listen 'ear, Ian Tindale, STW35, p28
+Oil teach mice elf!, Martin Jelfs, STW36, p28
+Typing solution, David Roberts, STW36, p28
+The turtle taught us, Ian Tindale, STW36, p28

Microwriting in serial

I am also interested in alternative keyboards. In particular, I would like to be able to use my Microwriter as the alternative keyboard. 'Microwriter' is that curious little machine which was supposed to revolutionise writing / typing, which you 'type' into with one hand, describing letters with a combination of button presses, each located under a different finger. I can do basic word processing, i.e. insertions, deletions, word-wrap and paragraph formatting, but it's big advantage is that it is very easy to 'type' quickly and accurately (as well as being a handy wee gadget that you can carry around and use anywhere). It is normally plugged directly into a serial printer after the letter, such as this, is 'typed' and the hard copy is required.

However, for use with the ST, it is the fast and easy (to someone who can't touch-type conventionally) keyboarding of text which the Microwriter could potentially offer, that interests me. In short, does anyone know how the serial output of the Microwriter could be fed into the ST as an alternative to the serial output from the ST's built-in keyboard, whilst preferably keeping the Atari keyboard on-line for use of the function keys, etc.?

The ST and Microwriter can, of course, with suitable communications software in the ST, talk to each other through the modem port, but I am really hoping for a more direct link so that any program accepting text, such as word processing, databases and CAD, can be run on the ST with the text being input from the alternative (Microwriter) keyboard.
Brian Snell, Dundee.

Touching upon typing

May I may use your column to offer a piece of advice to readers, especially those new to computing, or planning to buy some of the increasingly available educational software for their children?

Do take the time to learn touch-typing before you learn bad habits using two-finger, eyes-down methods. It is quite an easy skill to learn from scratch, but painfully difficult to adapt to once you have learned bad fingering. At the risk of sounding incurably sexist, girls in particular are going to have a bad time at secretarial college if they have deeply-ingrained clumsy habits. The increased speed, accuracy and concentration are really worth the time and effort for anyone who is going to use the keyboard extensively.

The great advantage of having an Atari ST in this respect is that there are programs around which will teach you from the screen; it is not my intention in writing this letter to push any of these, but I can provide details to anyone having difficulty in finding one. But I would also like to know if anyone is aware of an advanced typing tutor, as those I have encountered are fairly simple and do not help beyond the stage of short sentences.
Diana Ross, Selly Park, Birmingham.

Layout your keyboard

The simple answer to typing with the capslock on is not to use the capslock at all, but to use the shift key instead! The only other 'legal' solution is to use interrupts to test the type of key being pressed, and output a noise accordingly. This would mean turning off all the BIOS keyboard routines and writing your own - a horrendous suggestion!

As for the other question of reconfiguring the keyboard layout to make the number keys equal to their shifted counterparts. This is fairly easy to do - first make a backup of your word processor (if possible, thankyou Frank Doddy). Next, using a disk sector editor, search for a set of keys, for example 'qwerty'. You will probably have now found the keyboard layout tables (three tables detailing which key represents which ASCII character, for normal, shifted and caps keys). Simply change the appropriate characters into what you want them to be, et Voila! - your custom keyboard layout. For further information, see 'ST Internals' under XBIOS 16, XBIOS 24 and the table on page 84.
Simon Marsh, Ladybridge, Bolton.

From the New World

Ian Tindale, in ST World I/O, mentions the Dvorak keyboard layout in the piece on page 28. This keyboard layout has nothing to do with the composer of the same name, but was, I think, developed by the American Navy, who found it speeded up the average typist by about 30%, if, that was, the typist was not already familiar with the qwerty layout. My old Apple II had a software file which reconfigured the keyboard to Dvorak; the trouble was that unless you shifted all the key caps, it was quite a job to instruct the computer to change back again!
W F M Deans, Thurso, Caithness.

Czech this out!

Oh, so Anton Dvorak (1841-1904) didn't really create a new keyboard layout inbetween composing loads of Slavonic dances and a pretty neat piece of music in his New World symphony! Well I'll be! Actually, this Dvorak keyboard which I am cognisant of is more than a layout - it's a new shape. I recall, dimly, a TV programme I saw many years ago, depicting a fellow who started out in business and rapidly and morbidly sank from trace, as nobody rushed to buy his new invention.

He'd designed a keyboard unit where the keys were laid out in two bowl-like recesses, each one facing the direction of origin of each hand, instead of the silly situation today's qwerty keyboards present - a few dead-straight rows of buttons, which your hands attack from virtually 45 degrees and in a tight curve of movement. Apparently, this not only used a more sensible layout (I'm informed that the present layout materialised to prevent typists from jamming the slow mechanics of the turn-of-the-century typewriters), but used a more ergonomic design, resulting in less back stress and more of the good things in life.

This is what I thought a Dvorak keyboard was, not just a mere re-arrangement of keys. I also vaguely recall seeing a PD program on a bulletin board (probably BBS09III - 0705 736025) which purported to rearrange an ST's keys to conform to Dvorak's Symphony No. 9 in E Major.
Can you honestly imagine everyone still using keyboards to confer with computers

in the year 2001? The comment regarding voice synthesis and recognition wasn't entirely flippant - we have cheap transputer machines (ATW); we have speakers and microphones; we don't quite have cheap, fast, effective formant analysis and sequence substitution - but it can be done!
Ian Tindale, ST World.

Trackerballs

I notice that the subject of Trackerball vs Mouse gets another airing in the January ST World. I was particularly interested in the comments about the necessary 'handedness' of a trackerball on the lap-top machine. Now I have had to use both types for the last year. I use an Atari ST with its standard mouse, and an Apricot Xen-i 386 with its standard mouse; trouble is, the Apricot mouse is a trackerball. The only way I could get the hang of both controllers was to carry on using the mouse with my right hand (I'm right handed), but to use the newer trackerball with my left. Otherwise I wound up pushing the Apricot trackerball thingy bodily round the desk and turning the air blue.

I also set the Apricot mouse driver up so the buttons were reversed (left for right) which seems to feel consistent. Now I'm perfectly at home with either type (although I have to say that the better alternative would have been to replace the Apricot mouse rather than learn both, but that would have cost money - distant sound of accountant falling over), but only if I get a choice of which hand to use with which!
David Morton. extracted from CIX. atari.st/main msg#2656

Simon Poole's KEYEDIT.PRG

The answer to Mr Robson's problem of redefining the upper row of the keyboard is simple. There is a program called KEYEDIT.PRG, which allows you to design your own keyboard. Many of my friends, who have got English or German ROMs in their Atari STs, use this program to get the Danish characters æ, ø, å, Æ, Ø, and Å on the proper keys. When run, the program generates a program called KEYS.TOS, which you put in your AUTO folder. The program is written by Simon Poole, and is distributed in Denmark by the PD libraries. The other problem could be solved by avoiding the CapsLock key altogether and using the Shift key instead.
Jens Kristoffer Nielsen, Silkeborg, Denmark.

Star LC-10 fonts

Started by Tony Goodhew, STW34, p27
+Hassle-free colour drivers?, D W McLeod, STW35, p28

78 characters minus one

Further development work on the use of the Star LC-10 with downloaded NLQ fonts has led to the discovery of the following feature. The LC-10 can hold 78 NLQ downloaded characters, paragraph 3 on page 94 of the manual. If you attempt to redefine the full 78 characters with a single command sequence, such as in decimal 27, 38, 0, 48, 125, 78* (47 character bytes), to define the characters from '0' through to '}', mistake is made in the initial character and the standard NLQ character is used on printing. As further redefinitions of 78 characters at a time are made, the faulty character moves on by one position at each definition, letting the original '1' then the '2' etc. show through.

The problem does not appear if the full 78 characters are redefined in groups of less than 78 characters, or if 77 is used as the maximum group size. My LC-10 has ROM NXIP1.2. Perhaps someone with a later version or a colour upgrade could let me know if the feature exists on these machines?
Tony Goodhew, Birstall, Leicester.

NL-10 font editor

I have written a simple font editor in GFA Basic for altering Star NL-10, NLQ fonts. Anybody is welcome to it, as long as they send me a disk and SAE. I, too, would be interested in good font software for these printers.
Simon Marsh, 11 Kilmaine Drive, Ladybridge, Bolton BL3 4RU.

ST's and video monitors

Started by Iain Laskey, STW34, p27
+Analogue and TTL, Ian Tindale, STW34, p27
+TTL multisync, Paul Rossiter, STW36. p28

Amstrad upgrade

If there are any ST owners who, like me, have upgraded from an Amstrad system, but kept the monitor, then they probably have had the same saga of the monitor connections. Several firms produce leads, but the two I tried didn't work, so I made my own. In the end, it was surprisingly easy, and all I had to do was place three 220 Ohm resistors in series with the red, green and blue lines, and join the horizontal and vertical sync lines together [Hmmm... you're potentially risking the longevity of your glue chip that way. Better to make sure one sync line, when it's high, isn't also being dragged down by the other line when that other line is low, hence people's performances with resistors and diodes to twin the sync together. - Sysop].

The only problem I faced was getting the sound, and this was solved unexpectedly when I went into my local Tandy shop and found a high gain amplifier on sale. This was connected to the sound output from the ST on the monitor plug (pin 1) and all works well. For the power to the amplifier, I used the 12V socket on the front of the Amstrad monitor, although the amplifier is normally powered by a 9V battery, it also works well [you're at it again - solid state electronics is long-lasting and reliable, it's usual mode of failure is through thermal imbalance or overheating. Running two sync lines into each other, or driving an amp designed for 9V by forcing 12V up it will work, but for how long? - Sysop]. The stock number for the amplifier is 27771008, and it costs £9.99.
Cpl S Richardson, ESA, RAF Marham, Kings Lynn.

Modula who?

Started by Albert W Nicholson, STW35, p29

MIDI network made easy

I am writing to you in appreciation of a company who gave me support throughout the development of my A level computer science project. The project was to create a network, using MIDI to connect a number of STs together. The language I decided to use was Modula-2, but I had neither any previous experience in this language, nor any knowledge of MIDI.

The Modula-2 package our school owned was by M2S of Bristol. At the beginning, and at a number of other times, they supplied technical information over the phone, or in the form of listings, where necessary. The people were willing to listen, and the listings always arrived promptly in the post.

I would like to thank M2S for their help, without which I would not have overcome some of the problems. I am now studying a degree in computer science, at Brighton Polytechnic, and one of the languages we are using is Modula-2. I can, therefore, thoroughly recommend Modula-2 as an excellent language with which to write a major (or minor) piece of software.
James O'Shea, Hove, Sussex.

New Discussions

Solicitor's Software

I am a solicitor with a firm in the South of England, who is contemplating purchasing a number of STs for our various offices. I already own an ST personally, and believe that it is a suitable machine for a variety of applications within a solicitor's office.

My major stumbling block to be able to proceed with this project is that I do not know whether there is an accounts package produced by any of the software houses which are approved by The Law Society for solicitors' client's accounts and office accounts. There are a number of stringent rules which have to be abided by, and packages have to be approved by The Law Society before they may be used by a solicitor. I would be obliged if any of your readers could inform me whether or not they are aware of any such software for the ST, if so, could they supply the names and addresses for me?
Michael Dalton, Hayling Island, Hants.

Beginners start here - 1

I am toying with the idea of buying a computer to use as a word processor, and as a first step in the process, I have bought a number of computer magazines in order to find out what facilities the machines afford, what their expected life may be, and most importantly, what their users

think of them. I have been familiar with computers since the days when a mini-computer was regarded as a machine having less than 16Kb of memory, when everything was in machine code, and a punched-tape reader was regarded as a high-speed input device. I am, therefore, no computer ninny. Nor am I a musical ninny. All the same, I found the article 'An introduction to basic sequencing' (page 38, STW35) neither introductory, nor basic. Perhaps I should try to find some earlier articles on computerised music, or was the balance between jargon and information in the article just a bit too far to one side?
W F M Deans, Thurso, Caithness.

Beginners start here - 2

Every month I glean the pages for as much information as possible, both write-ups and adverts. For me, as a newcomer to the Atari 520STFM, I find it confusing; the Atari booklets supplied with the computer do not seem to be very informative as to programming, or even examples. Could you recommend a suitable publication for a newcomer, and also a suitable language?

I notice in certain write-ups things like 'C', Fast Basic, HiSoft Basic. What does it really all mean? I have tried writing small programs for my hobby - I am a Radio Amateur - but I find I have to load Atari Basic, then load the program and then run. Is there an easier way? Any advice or suggestions would be appreciated.
Jim Skillen GI4TSK, Comber Newtownards, Co. Down.

Beginners start here - 3

Several of the questions posed in I/O have been of a rather basic nature. I can recommend a text by Andreas Ramos, Århus, Denmark. The text is named 'Your second manual to the ST'. It is available on disk, and I suspect that A50 from ST UK is in fact that very text - the size (250K) is about right. Apart from its value as a manual, it is also quite funny. It is written in English, and contains a lot of references to cats (see also Andreas's contributions to I/O in STW32; he always talks about cats!).
Jens Kristoffer Nielsen, Silkeborg, Denmark.

Beginners start there - 4

As Jens mentions, above, 'Your second manual to the ST' by Andreas Ramos, is something most newcomers will benefit from. We recently received a copy - an A4-sized book, from Glover publishing, costing £3.95, + 50p p&p to Denmark. Incidentally, mention is made of ST World ourselves, but the subscription address is wrong - we have moved our subs operation back in-house, to the Chichester address.

As a radio ham, you'll be interested to know of a PD library hold a number of programs for the Radio Amateur, among everything else they do. Ask for a list, from **The South West Software Library, POBox 562, Wimborne, Dorset, BH21 2YD.**

I hope that, like Jens, many of our readers will write in to help Jim Skillen, and others in a similar situation, with the predicament he and others face, using the wealth of experience of our readership. It will be most useful to receive such help and tales of early experiences.
Ian Tindale, ST World I/O.

WordUp purchase justified

Referring to the review of WordUp in issue 29: I also have WordUp, yet right-hand justification not only is there, but works very well indeed. Nor have I noticed the lack of metric measurements. If anything, I seem to have both metric and imperial pre-sets, and a chance to introduce my own custom-made measurements in any units I choose. In fact, this program looks and feels very much like Mac word processors, especially in its block highlighting and fonts functions (I have Magic Sac, and used to use it a lot, until I bought WordUp).

On a slightly different note, right after buying WordUp, I rang Neocept in the US to let them know that I was sending in my registration card, along with the disk for the update I knew was out by then. To my enormous surprise they told me not to do that as it would confuse their accounting system, but to just send my registration card, wait for the notification of an update, and only then send in my disks!!! Well, I'm still waiting, Neocept... (mind you, I love both WordUp and Fontz!).
Swavek Jabrzemski, Clovelly, NSW, Australia.

Right justification rightly justified

Aha! Swavek, you've spotted something which grates against my early exposure to typesetting - the computer industry's confusing way of referring to what in graphics terms would be called ranged-left or ranged-right or justified (or in typesetting terms: quad-left, quad-right and justified) as left justification, right justification and justification. Although you can choose a paper size in both metric and inches, you cannot set the ruler to metric, nor any of the other areas where measurements are required. If you want to place a graphic to a size of 64*40mm, you can't - you have to guess (or use inches, I suppose).

You seem to have to go through a tedious process to get things registered from over there in Australia. We should count ourselves lucky we have local distributors to take care of things like that. You mention the following at the head of your fax to us: "believe it or not, there's only one computer shop / mail order house that I know of which imports ST World, usually once every three months from the US, as it's apparently cheaper than bringing it in from England!!!" Well, you might like to try a couple of the more technical bookshops in Melbourne who may actually stock it. I can't remember their names (more than a decade since I lived there) and a friend of mine now living in NSW informed me last year that he saw it reasonably regularly in Melbourne, but never in Sydney, so maybe there's hope! Contact us for the possibility of an Oceana Subscription rate.
Ian Tindale, ST World.

Floppy-driven to destruction

May I be the first to start a thread on what the software houses don't mention - like "A five-year apprenticeship in the art of floppy-juggling is essential to the smooth running of this program" or, "Don't forget to cancel all appointments for the next hour if you plan to print something". For those who are baffled, using a 1040STFM with an Epson GQ-3500 laser printer and Timeworks DTP to print 1 sheet, the procedure is as follows:

1 Insert Startup disk
2 Reboot ST (with Epson powered down)
3 Insert Fonts disk
4 Insert Startup disk
5 Select Open File
6 Insert Data disk
7 Select file to print
8 Insert Startup disk
9 Switch on Epson
10 Select Print
11 Insert Fonts disk
12 Insert Startup disk
13 Wait about 10 mins
14 Insert Fonts disk
15 Insert Startup disk
16 If second copy required goto 10

The most efficient way to print multiple copies using this setup would be to send all the data to the Epson once, and select multi-copy on the printer. The printer driver would not allow this, and a software bug (admitted by Electric Distribution) corrupts second and further copies. For anyone else using this setup, I have modified the printer driver to allow multiple copies. I'll be happy to assist anyone I can.
Andrew Corbett, Gosport, Hants.

Hard-driven to destruction

I have recently purchased a 30Mb SupraDrive to upgrade my 1040STF, but I was surprised to read the following in the SupraDrive manual: " ...don't ever try to copy a file to itself. A bug in the TOS operating system may trash the entire hard disk contents if you accidentally try... This can occur with floppies, but it isn't as critical then because you are not dealing with the potentially large amount of data on the hard disk. This problem normally happens when copying a group of files at one time."

Three questions:

1 Is the problem real?
2 Why have I never seen it discussed before, it seems a very basic flaw in TOS.
3 I take it that pull down 'save and resume' (and other) operations are designed to get around the bug. What worries me is that I use long 1st Word Plus files with up to 60 picture files per document, with the pictures being pulled in using the FWP Snapshot utility. The problem is that Snapshot does not display a dialogue box if there is a clash of file names (there are other filing problems with Snapshot as well). Does this mean that if I update a picture .IMG file and in simply overwriting the old one, I may "trash the entire hard disk". Eeeeeeek!
Martin R Leach, Battersea, London SW11.

PRIZES! PRIZES!PRIZES!

That's it for this month. Subscription prizes are going out to: W F M Deans, Colin R Harrison, and James O'Shea.
See you again next month. - Ian.

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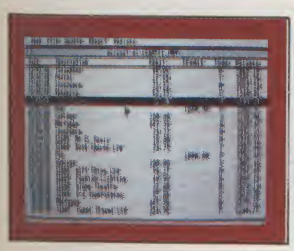
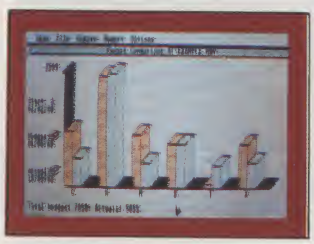


MAIN ACCOUNT SCREEN



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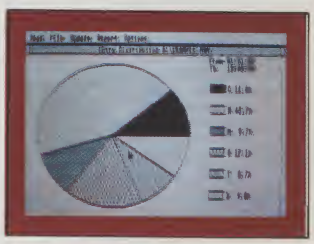

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In this month's MIDI column, Graham Wayne, talks about some of the latest developments and new products in the ST MIDI arena. There will be some tips on offer too.

THE WORLD OF MUSIC & MIDI

I once met a chap who told me an interesting tale which I would like to relate to you. Apparently, he had gone west on business, visiting California's Silicon Valley where he met, among others, some software engineers from Xerox who were very excited about a new interface they had designed. When shown the prototype system, my acquaintance was politely unimpressed. "It's very pretty", he said, perhaps patronisingly, "but who would want to use it, and why?"

MidiGrid

The user-interface he was seeing was the first WIMP window system, and his reaction was similar to mine when first confronted with Midigrid, certainly an innovative product but giving rise, through a certain cynicism, to the same shrug of indifference. The 'so what' syndrome, I suppose. But all this was to change when I met Andy Hunt and wife Caroline at the recent BETT education show, where the progenitors of Midigrid were demonstrating their brain child to teachers.

To recap on the program (detailed by Chris Mullen in issue 35 of ST World), Midigrid is a kind of sequencer/ computer keyboard/ performance tool/ cooking utensil. Oops, sorry about that; the trouble is that applications for Midigrid, like the radical window system in my story, are not immediately evident. So far, initial reaction to Midigrid has focussed on one specific type of use to which the program is certainly, but not exclusively, suited; easy access control of performance using the mouse to generate music. Obviously attractive to impaired-movement students, the media have unfortunately concentrated on this aspect of Midigrid to the exclusion of all else, much to Andy and Caroline's distress. But again, I think it's largely due to not having much else to say about the program due to lack of understanding and imagination. Yet, a little forethought reveals remarkable potential for this software and I would like to offer some of the ideas generated in my discussion with Andy and Caroline.

One idea that came to me quite early in our conversation had to do with the awkward business of setting up key-groups for an Akai S900 sampler, although any sampler could be controlled in a similar fashion. Using Midigrid, samples assigned to a box, which could be one sample or a combination of sounds, can then be played, remapped to a keyboard or sequenced. If you own an S900 you will know how much time is used setting up key assignments. Another useful idea came out of my own work with video soundtracks. One often requires several events to occur simultaneously to a particular point in the picture. Midigrid will facilitate setting up boxes containing notes, controller events, triggers to external effects units (program change, gate control etc) and several boxes could hold different types of event ready to be triggered by a click of the mouse in the required box.

And there's more. In performance situations, each box in the Midigrid can be programmed to trigger sequences, or other events, by the click of one mouse button. Since virtually any combination of events can be set up, the implications for performers could be profound. Similarly, the ST could be interfaced to other types of trigger device; pads, light sensors or the like (á la Jean Michel Jarre) could command boxes within Midigrid to set off chords, sequences or other special effects. But perhaps the most interesting aspect of our discussion came from Andy, who told me about a lighting engineer who is designing a midi interface between the ST and the lighting controller, with the intention of preprogramming lighting cues and effects which will be triggered during performance using Midigrid.

Ex-Cambridge graduates, Andy and Caroline Hunt, who devised the unique Midigrid software.

These ideas are only a starting point for the application of Midigrid. In the coming months I hope to bring you new ideas and uses for the program which Andy and Caroline will be feeding me from time to time. And if you discover new and interesting ways of using the program, drop me a line and I'll pass on your ideas. It would be a great shame to see Midigrid suffer in the commercial market through lack of exploitation. In a world where originality is often suppressed, it is refreshing to find brave souls who will challenge the established ways. I only hope we can meet it as courageously.

Midi Studio

Since my only lead on new product this month came in the form of a tip-off that Ladbroke's new sequencer, Midistudio, was worth checking out, I had to resort to the undignified business of verbally twisting Brian Davies' appendages in order to get an early copy. But, good as his word, the disk arrived next day with a text file of the manual. Brian was at pains to point out that this was a pre-release version.

He needn't have worried: not only does Midistudio seem well-behaved, it also gives every impression of being a standard-setting product in this price range. Midistudio is a pound short of £100 but will give Steinberg's Pro 24 a good run for its money. Midistudio has 20 tracks, but the track count is not the issue here; it's a question of design quality. Midistudio is designed to allow musicians to overcome the kind of intractabilities that midi throws up every now and again. For example - take program change numbers. Devices sport a range of different arrangements, varying from one manufacturer to another. Banks numbered 1 to 128 or 0 to 127, A and B, or even base 8 counting from 11 to 88 like the D50, are all catered for in Midistudio. No more having to keep look-up tables on pieces of paper, converting the sequencer program change numbers to those of the destination device.

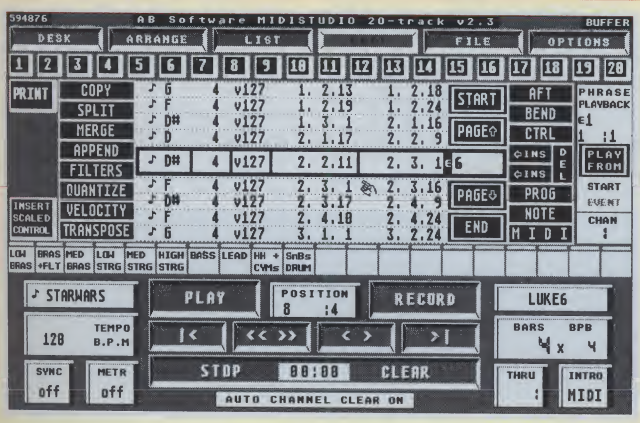
Research

Another area (one of many, really) that demonstrates consideration and good research on the part of John Blackledge and AB Software, creators of Midistudio, are the extensive sync options accounting for sending and receiving clocks, sync start and song pointers, in all kinds of combinations, several of which are designed to speed up rehearsals. Creating songs from sequences is simple, performed visually by the expedient of dragging named blocks around the screen. Whole tracks can also be moved, comprising chained and copied sequences.

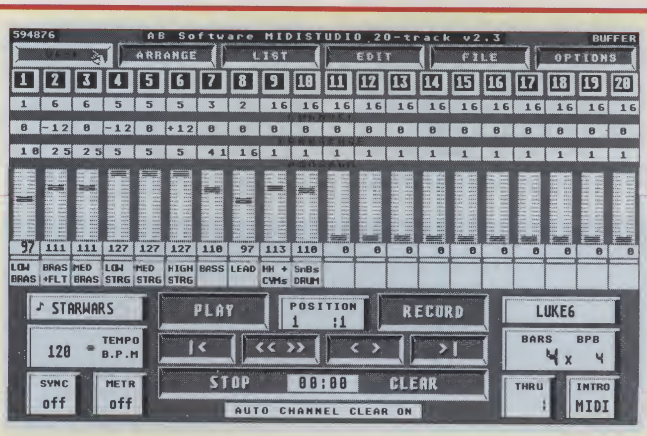
If there was an area of the design subject to possible criticism, it might be the low resolution of the clock, which is limited to 24 pulses per quarter-note. In the manual, which is pretty chatty to say the least, Blackledge claims to have followed advice from musicians who told him a higher resolution was unnecessary. Personally, I think he was talking to the wrong players, but it must be said that the manual also invites comment and feedback from owners and includes a list of possible update revisions for comment. Fair enough.

There are some facilities it would be unreasonable to expect of software in this price range, but most of the exclusions are well conceived and not much missed by their absence. There is no piano-roll-type display of track contents; all event editing is numerical. There is no score-writing or display but this is a task best left to software specifically designed to encompass standard notation transcription and the printing thereof, not a simple task by all accounts. But there was one area in which I was disappointed: Midistudio does not support the midi standard file format. The author is critical of the standardisation so far, but does state his intention to release a follow-up utilities disk containing, amongst other things, a file-conversion program, to and from standard files.

By far and away the biggest surprise about this package was an offer contained in the manual. The author will consider customising individual versions of the program as a (chargeable) service to users, according to their specification (if within the realms of possibility). I cannot count the number of times I would have liked some modifications to my software, all to no avail, of course. Not only is this an enterprising service, but one that, if adopted by software developers in other areas, could really broaden the possibilities for software engineering and use. I hope it works out in practice. Midistudio certainly has.



Midistudio combines mouse and keyboard input fairly extensively, so remote, mouse-only operation is not really feasible. However, the abandonment of Gem windows speeds operation considerably, and Midistudio is fast and effective to use. Most important, numerical data can be edited incrementally with the mouse buttons but real-time mixing changes must be made with keys.



Midistudio also contains a mixer screen, in which faders are assigned to the volume controller (#7) for each track. Channels, transposition and program changes are also set here, and the whole display animates as the track plays, which sounds gimmicky, although I suspect it may turn out to be useful.

FRANKFURT MESSE

MUSIC&MIDI SPECIAL REPORT

It took our reporter a while to recover from the disappointment of seeing relatively few computers at Frankfurt's 1989 Music Messe, overwhelmed as they were by the awesome range of musical equipment and accoutrements. But, while pushing his way through more stereotypical Heavy Metal guitarists than there are stars in the sky, Graham Wayne did catch a glimpse of some STs, demonstrating a few items of interesting new software...

It is pertinent to recall that the music industry was quick off the mark when developing applications for the ST. Three years on from those early, and buggy programs and the Midi market is almost unrecognisable both for its diversity and depth. Consequently, the software trends shown at this year's Music Messe, held in the vastness of the Frankfurt exhibition centre, further confirmed my feeling that we are about to see some spectacular new applications of all kinds in the coming year, based on a most significant development shared amongst several exhibitors - new operating systems for the ST. Steinberg, Hybrid Arts and new British company, Digital Muse, have announced software based on proprietary operating systems, following the Dr. T Supergem story reported in last month's ST World. This is a path that, I predict, many developers across the broad spectrum of application software will take as programmers seek access to the raw power of the 68000 chip without the overhead of TOS and GEM.

Another observable trend in the Midi computing field is that, like automotive design of the last few years, there is a drawing together of facilities and interfacing whereby one sequencer begins to look rather like another, offering one or other variant on the familiar themes of scrolling piano rolls, notated sequence displays, user-definable windows and graphic displays of virtually any kind of data. Only the editors still display some idiosyncratic design but, in general, it is becoming harder for the prospective buyer to choose between one manufacturer and another, since most of the new applications offer vast ranges of facilities.

Hardware

There was plenty of hardware on show, from patch bays to specialist midi-controllers for guitarists. Schaller were showing a Midi conversion system for saxes and clarinets (and also for autoharps, which is a thought-provoking idea for inputting Midi data) although the most interesting device I saw was a Midi microphone developed by the French company Digigram SA. Called the Midimic, this unit converts any audio sound into note and pitch information which can be transmitted as Midi data, so it is now possible to sing straight into your ST. Let's hope it's reasonably intelligent; some of its applications certainly won't be.

(above) Steinberg's 'comprehensive' range on display

Hybrid Arts occupied a stand at the show, on which their new operating system, Chaos, was running Genedit, an editor designer program that they claim will support virtually any synth that supports system exclusive data. Hybrid have also released what they call the 'final, official' version of their range of four sequencers, which means that they consider it finished and further upgrades are unlikely. New to the show, however, was the Edith sequencer, a version of their existing 60-track sequencer that supports Midi time-code in software. And for those whose credit cards can withstand a major assault, the ADAP disk-based sampling /recording system was on show, driven by the ST. Hybrid Europe (as opposed to Hybrid US) were demonstrating a remote ST interface called Hybridmode which is designed to sit on a keyboard or mixing desk and will transmit most of the frequently used key and mouse inputs for Hybrid, C-Lab and Steinberg Pro 24 sequencers.

Superscore

US company, Sonus, were demonstrating the latest version of Superscore, the powerful transcription and sequencing software. Superscore V1.3 now offers several new features, the most interesting of which is the elimination of unwanted rest symbols when converting sequences into notation, which can often be irritating and time-consuming to remove by hand after the event. Masterscore V2.0 was also on show, with the event editor now incorporated into the sequencing program instead of running as a separate program. To give you some idea of the power on offer, Masterscore offers 1/768 note resolution, 768 tracks (24 sequences of 32 tracks each) dual Midi outputs, SMPTE hit points and a partridge in a pear tree. Also present at the show were German company, Soft Arts, demonstrating their extensive range of ST products, including the new M1 editor, which incorporates a 32-track sequencer that will run simultaneously with the 8-track sequencer in the M1 itself.

While most of the innovations in Midi software were concentrated at the expert-user end of the market, the smaller and cheaper products from most developers were graced by a trickle-down effect, as last year's code gets incorporated into more modestly-priced, but increasingly substantial offerings. Prices are rising for state-of-the-art software, up to £500 or more for some products which is comparable to existing Macintosh application costs,

but value for money is readily available although the choices are more narrowly defined and depend on taste or specialisation rather than a feature count. However, it will be interesting to see the response from the other US companies whose presence was missed at the show, namely, Passport and Dr. T, both of whom have new products forthcoming. As I say, there's going to be some hair-raising software for the ST this year. All I need is some hair.

Steinberg

Steinberg were showing one of the most comprehensive ranges of ST-based products at the show. Pro 24, Masterscore, the Synth and Soundworks series of editors, including the new M1 utility were on display, along with Pro 12 and the DMP 7 editor for Yamaha's digital mixer. But pride of place went to Cubit, the new sequencer that supersedes Pro 24 and runs under the M.ROS operating system written by Steinberg. The most significant aspect of these new developments is that M.ROS is a true multi-tasking O/S, where programs in memory will continue to execute while the user addresses another, unlike switching devices that put programs on 'hold', as it were. M.ROS also handles synchronisation between programs to ensure priority for time-domain operations such as sequencing. In addition, it forms a comms channel between several STs, any of which can control all the others, and offers a clock resolution of one SMPTE subframe (0.5 of a millisecond at 25 fps) or 384 ppq.

Cubit, on the other hand, is the next generation of sequencing software from Steinberg. The most interesting developments are apparent in the user-interface, which has grown conspicuously towards Macintosh styles of presentation, and towards Passport's interface in particular. Note in the screen shot the curious use of the Chicago font, standard to all Mac software. I don't think my ST will be fooled. Anyway, Cubit boasts an awesome 1024 tracks over sixteen pages, all of which may be run independently. (Sixteen meg ST, anyone?) Many features are refinements on existing features found in sequencing software, but the overall style and concept sets the tone for Steinberg as they approach the 1990's.

Final items of note on the stand: the Avalon sample processing software, a comprehensive editing and resynthesis package of tremendous power and will run with an optional D/A board for the ST providing 12 bit resolution monitoring of samples played by the computer, and the Mimix mixing desk fader automation system, which allows up to 64 faders to be controlled from the ST.

C-Lab

The most impressive display of STs was mounted by C-Lab, who were showing the well-established Creator and the Notator, which combines all the Creator functions with notation display of sequences available as an editing option as well as printing. This followed another trend in the sequencer market, that of notational display as an option for input and editing. It seems the 300-year development cycle of music notation is hard to better when representing music graphically.

C-Lab were also demonstrating Unitor, which offers two extra midi-ins and outs,

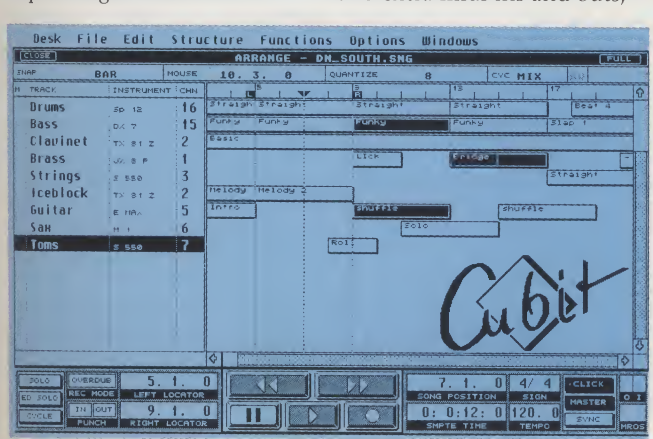
(above) C-Lab showing Creator and Notator

(below) Digital Muse with Virtuoso

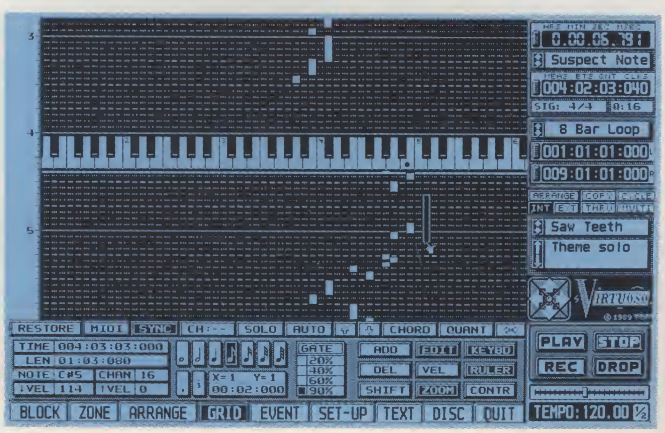
and something that doesn't end with 'or', the Export Midi expansion interface that offers 96 Midi channels to the power-hungry (and presumably rich, if you have enough gear to put on the end of 96 channels) musician.

Digital Muse

It was nice to see a new British company at the show, in the form of The Digital Muse, a London-based development house showing Virtuoso, their brand new sequencer software. Written entirely in machine code for optimum speed, they are one of the companies who feel that the GEM interface offers too many limitations for serious Midi products. Claiming to be a multi-tasking program, it appears that Virtuoso will run and allow editing simultaneously, as well as performing disk operations as a background task. The note resolution is very high - 480 ppq is quoted - and Digital Muse promises development of the product range in several areas, forming a strong suite of ST software to challenge the dominant forces in the Midi computing world. Virtuoso is expected to be available within a few weeks of the show.



Steinberg's Cubit



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PROGRAMMING ADVANCED ST GRAPHICS

• HORIZONTAL SCROLLING • CLIPPED SPRITES • SPRITE BOUNDARY CHECKING

In part two of our new programming series, Jeff Lawson explains how to master horizontal scrolling and sprites.

Last month I dealt with simple sprites and vertical scrolling and described routines for elementary functions, such as, palette setting, screen buffering, loading and saving files. This month I shall cover horizontal scrolling and sprites that are clipped to the screen. A demo program shows how the new routines may be used. The program code presented will run in the low resolution screen mode. Conversion to monochrome is straightforward and was discussed last issue.

Horizontal scrolling

A wide image must be formed in order to scroll horizontally. 'Wide_Image' in Listing 2.1 shows how such an image can be created from a series of Degas screens:

```
"SCREEN_A.PI1",
"SCREEN_B.PI1", etc.
```

The routine 'Scroll_fr_H' given in Listing 2.2 produces a screen image by reading the wide image from the starting pixel held in D0 writing D7 rows starting at the screen row held in D1. This routine is flexible in that it provides for fast scrolling by allowing successive frames to be separated by several pixels. Two or three horizontal strips scrolling at different rates would give the parallax effect that has found favour in some ST games. 'Scroll_fr_H' has the drawback of being clumsy since the original wide image may need shifting up to fifteen places during one frame. Notice, too, that there is a lot of jitter because the scroll frame is produced fast when 0 shifts are required and slow when a shift of 15 places is required. (An appropriate delay loop linked to the TOS 400Hz timer would slow down but smooth out such scrolling.) A quicker implementation would manipulate the data available from the previous frame (provided it had not been overwritten: sigh, '...problems, problems'). 'Scroll_Left' given in Listing 2.3 gives a dedicated piece of code for scrolling a wide image left by one pixel. 'Scroll_Left' cannot scroll by more than one pixel at a time, of course, and screen buffering introduces an additional problem in that successive frames lie on different logical screens. Clearly, some thought must go into a workable implementation of 'Scroll_Left'. Interestingly, for the monochrome version of 'Scroll_Left' the inner-loop need only consist of one instruction: 'ADDX.L -(A0),-(A2)' with 19 iterations. (A2 is identical to A0 here.) This is possible because there is only one bit plane.

Clipped Sprites

Sprites are often required to slide smoothly on and off the top, bottom or sides of the screen. The simple sprite routine described last issue is incapable of doing this: I shall now describe a new routine that will. The routine, called 'Sprite', is given in Listing 2.4. I have partitioned the 'Sprite' listing into several sections for easy reference. A sprite's coordinates are taken to lie at its centre. In order to write a sprite onto the screen, the top-left coordinates are formed by subtracting half the sprite width from the centre x coord for the left-most pixel (SECTION B) and half the height from the centre y coord for the top-most pixel (SECTION E). The screen format specific code which was exemplified last issue is most prominent in SECTIONs D and G which adjust the screen ptr held in A4 for addressing the screen at the top-left of the sprite. Note that SECTION D is unnecessary if the sprite lies past the left of the screen. Similarly for SECTION G, should the sprite lie partially above the screen. If the sprite lies entirely off screen then this is detected while clipping in SECTIONs C, F, H and I and a branch to 'off_screen' terminates the proceedings.

Left clipping

Left clipping is handled in SECTION C. The pointer to the bit image data (held in A3) must be adjusted to account for the clipped region of the sprite. It is tempting to suppose that the number of chunks by which the bit image ptr is to be moved is equal to the number of pixels out of sight divided by 16. However, a careful analysis shows that a more subtle calculation is required. Suppose the number of hidden pixels, held in D0, lies between 1 and 15, then a 'LSR #4,D0' would result in 0 when we really want 1. Hence, 'LSR #4,D0' must be followed by 'ADDQ #1,D0'. However, in the case of 16 hidden pixels 'LSR #4,D0'/'ADDQ #1,D0' gives 2 when 1 is required. An initial 'SUBQ #1,D0' ensures that the correct number of chunks is produced. The number of chunks by which A3 is to be incremented is multiplied by 10 for the number of bytes (one mask word and four bit plane words per chunk). A further point must be considered. Suppose that there are 7 hidden pixels:

```
'SUBQ #1,D0'
'LSR #4,D0'
'ADDQ #1,D0'
```

gives 1, A3 is moved along by 1 chunk and 16-7=9 pixels are lost. To avoid this loss, bit 7 of the 'sprite_vars' flags is set to remember that data from the chunk preceding that pointed to by A3 be read. The shift count (found in SECTION I) is 9 in this case so the correct number of pixels will be 'shifted in'. Note that for cases when the hidden pixels are an exact multiple of 16 the shift count is 0 so no preceding pixels are used.

Top clipping

Top clipping is dealt with in SECTION F. This is a simple matter of moving the sprite pointer (A3) down by the number of hidden pixel rows and reducing the row counter (D7) appropriately.

Bottom clipping(!)

Merely a matter of reducing the row counter by the number of hidden pixel rows.

Right clipping

The number of chunks to be handled will be reduced if part of the sprite lies off to the right of the screen. The reduced chunk count is found by dividing the number of visible pixels by 16 then adding 1 if the number of visible pixels is not an exact multiple of 16. Bit 6 of the 'sprite_vars' flags is cleared to indicate that a shift out on the rhs should not be written.

The 'pre_load' part of SECTION J is quicker than retaining the data by a ROR.L into the MSWords of the registers. (Not so for the MC68020 which has a barrel shifter executing a multiple shift in the same time as a single shift). 'Sprite' will be used in an example program later.

Special effects

The 'Sprite' routine may be modified to incorporate an additional mask for several special effects. Sprites could be displayed or removed by sweeping from top-left to bottom-right, say. They can ripple onto or off the screen by a careful mask definition. To illustrate the masking technique Listing 2.5 shows how 'Sprite' may be extended to use a series of stipple masks which give the effect of a sprite fading on and off the screen.

Sprite collision detection

When sprites are moving around a screen they most commonly overlay a background image (which may be scrolling!). Detection of a collision between a sprite and a 'boundary' on the background image is often required in games. Collision between sprites is also important for games. For applications it may be necessary to detect when an

PROGRAM 2.1 - Load Degas to give wide image

```
* Routine to load a given number of Degas screens producing a
* wide image.
* D0-D7/A0-A2/A4 smashed.
Wide_Image     MOVEQ     #no_of_scrns-1,D6
               MOVEQ     #0,D5          counter for loaded screens
wd_img_lp1     LEA       Screens2_name(PC),A0
               LEA       Screen_header(PC),A4
               MOVE.L    #32034,D7
               BSR       Load_File
* Fix new screen onto the existing wide image:
               LEA       Wide_image,A0
               MOVE      D5,D0
               MULU      #32000,D0
               ADDA.L    D0,A0          ptr to end of current wd img
               LEA       32000(A0),A1   ptr to end of next wd img
               LEA       32034(A4),A2   ptr to end of loaded scrn
               MOVE      #200-1,D4      row counter
wd_img_lp2     MOVEQ     #160/4-1,D2    longwords per row
wd_img_lp3     MOVE.L    -(A2),-(A1)    transfer a 'new screen' row
               DBRA      D2,wd_img_lp3
               MOVE      D5,D3
               BRA.S     next_img4
wd_img_lp4     MOVEQ     #160/4-1,D2
wd_img_lp5     MOVE.L    -(A0),-(A1)    transfer 'old wd img' row
               DBRA      D2,wd_img_lp5
next_img4      DBRA      D3,wd_img_lp4
               DBRA      D4,wd_img_lp2
               ADDQ      #1,D5          another screen processed
               LEA       Screens2_index(PC),A0
               ADDQ.B    #1,(A0)        next file name index
               DBRA      D6,wd_img_lp1
               LEA       Screen_palette(PC),A0
               BRA       Set_Palette    (return)
Screens2_name  DC.B      "SCREEN_"
Screens2_index DC.B      "A.PI1",0
               EVEN
*
* These lines must lie at the end of the program calling
* 'Wide_Image':
Screen_header  EQU       *
Screen_palette EQU       *+2
Screen_image   EQU       *+34
Wide_image     EQU       *+32034
```

PROGRAM 2.2 - Horizontal Scroll

```
* Routine to produce a horizontal scroll frame of D7 rows.
* Entered with wide image pixel column in D0, with screen pixel
* row in D1, A0 pointing to the screen base and A1 pointing to
* the base addr of wide image.
* D0/D1/D6/D7/A0/A1 smashed.
img_width1     EQU       no_of_scrns*160  byte width of wide image
Scroll_fr_H    MULU      #160,D1          screen row offset
               ADDA      D1,A0
               MOVE      D0,D1
               LSR       #1,D1
               AND       #$FFF8,D1
               ADDA      D1,A1        ptr to correct starting word
               AND       #$F,D0       count for left (sic) shift
               BRA.S     next_H_row
Scrl_fr_lp3    MOVEQ     #80/4-1,D6   80 words per row
Scrl_fr_lp4    MOVE.L    8(A1),D1     MSW
               MOVE      (A1)+,D1     LSW
               ROL.L     D0,D1        data from MSW shifts into LSW
               MOVE      D1,(A0)+
* repetition improves the blit/control-counting ratio:
               MOVE.L    8(A1),D1
               MOVE      (A1)+,D1
               ROL.L     D0,D1
               MOVE      D1,(A0)+
*
               MOVE.L    8(A1),D1
               MOVE      (A1)+,D1
               ROL.L     D0,D1
               MOVE      D1,(A0)+
*
               MOVE.L    8(A1),D1
               MOVE      (A1)+,D1
               ROL.L     D0,D1
               MOVE      D1,(A0)+
*
               DBRA      D6,Scrl_fr_lp4
               LEA       img_width1-160(A1),A1   next row on wd img
next_H_row     DBRA      D7,Scrl_fr_lp3
               RTS
```

PROGRAM 2.3 - Scroll left one pixel

```
* Scroll D7 rows left by one pixel, starting at row D0. New
* pixel position on wide image is in D1.
* D0/D1/D5-D7/A0/A1 smashed.
img_width2     EQU       320        set to byte width of wide image
Scroll_Left    ADDQ      #1,D0      row will be read right to left
               MULU      #160,D0
               ADDA      D0,A0
* point to last word on scrn starting row:
               LEA       160-2(A0),A0
* form right-most visible pixel from wide image:
               ADD       #319,D1
* point to the byte containing the plane 4 bit of the
* right-most pixel visible from wide image:
               MOVE      D1,D0
               LSR       #1,D1
               AND       #$FFF8,D1
               LEA       7(A1,D1),A1  assume 2nd byte of plane 4 wd
               AND       #$F,D0
               NEG       D0
               ADD       #15,D0
               CMP       #8,D0        really second byte of word?
               BCS.S     second_byte  yes
               SUBQ.L    #1,A1        first byte of a word
               SUBQ      #8,D0        ensure bit posn within byte
second_byte    BRA.S     next_lft_rw
* Handle each bit plane separately within a row:
left_lp1       MOVEQ     #4-1,D6      four planes
* the right-most bit on a row must be read from the wide image
* (the remainder already lie on the screen):
left_lp2       MOVE      (A0),D1
               ADD       D1,D1        X flag used below
               BTST      D0,(A1)
               BEQ.S     clr_scrl_bt
               OR        #1,D1        (doesn't affect X flag)
clr_scrl_bt    MOVE      D1,(A0)      write right-most plane word
               MOVEQ     #19-1,D5     handle remainder of plane words
left_lp3       SUBQ.L    #8,A0        next plane word to the left
               MOVE      (A0),D1
               ADDX      D1,D1        (X is used and affected here)
               MOVE      D1,(A0)
               DBRA      D5,left_lp3
               LEA       19*8-2(A0),A0  next (previous) scrn plane
               SUBQ.L    #2,A1          next wide image plane
               DBRA      D6,left_lp2
```

icon (sprite) is dragged out of a window or onto a window. In deciding how to write collision detection code it is best first to recognize any motion constraints that operate on the sprite. For instance, if a background image shows a side view of a scene upon which a sprite is constrained to move horizontally (along the 'ground') then collision detection on its left or right-hand sides may be all that is necessary. However, if objects (other sprites) are being dropped from above the horizontally moving sprite then collision with the top of the sprite must also be accounted for. A further point: what constitutes a collision? Do sprites merely have to touch or must they overlap? Sprites may overlap by more than just one pixel if they are travelling at greater than one pixel per frame. The algorithm must recognize these features.

Naturally, it is best to run the collision detection code before the corresponding frame is written, since this will allow overlapping sprites to be repositioned (bounce) if necessary. Alternatively, a collision condition could trigger a series of explosion sprites partially covering the overlapping sprites. 'Bounds' in Listing 2.6 shows how a sprite may be checked against left and right bounds. 'Collision' in listing 2.7 checks for a collision between two sprites. The extent of a sprite in 'Collision' is taken to be a rectangle but, in fact, most sprites have irregular outlines. Hence, two sprite bit images may not overlap even though their rectangular extents do (sprite kerning?!). For fast-moving graphics this probably won't cause a problem but, it could be important for slow-moving sprites. A more accurate collision detection algorithm would consider the sprite masks after the rectangular extents method had indicated a collision. A judicious reduction in rectangular sprite extents, based on knowledge of possible motion constraints, would produce an acceptable compromise in all but the most exacting situations.

The program in Listing 2.8 illustrates how sprites may be combined over a horizontally-scrolling background. Collision detection routines are used to keep the sprites within a horizontal strip and to cause an explosion if they collide.

Try adapting the sprite-cutting program given last issue in Listing 1.7 so that it can handle sprites of different sizes on the same Degas screen and produces a file in the format expected by 'Sprite' in Listing 2.5. You will then have the basis of a useful sprite system.

About the author

Jeff Lawson is an accomplished video games programmer specialising in games with state-of-the-art graphics. Previous work includes two flight simulation-type games for the ST. Most notably, he is currently working on a sophisticated 3D game with StarglideriI-like graphics, due for release later this year. Jeff has also written FlairPaint, which was under development for one and a half years.

```
                LEA     160+8(A0),A0    next screen row
                LEA     img_width2+8(A1),A1    next wide image row
next_lft_rw     DBRA    D7,left_lp1
                RTS
```

PROGRAM 2.4 - Draw a Sprite

```
* Routine to draw a sprite.
* Entered with sprite_vars valid and A5 pointing to the screen
* base.
* D0-D7/A0-A4 smashed.
*
* Sprite data files are expected to take this format:
* sprites      DS.L     ptr to sprite data-*      } for each sprite
*
* sprt data    DS.W     1      words per plane per row (chunks)
*              DS.W     1      row offset (total bytes per sprite
row)
*              DS.W     1      pixel width
*              DS.W     1      pixel height
*              DS.B     ?      bit image data
*                  (mask plus four planes interleaved)
* SECTION A:
Sprite         MOVEA.L A5,A4              screen base address
               LEA     sprite_vars(PC),A0
               MOVEM   (A0)+,D0-D2        sprite ndx & x,y coords
* A0 points to the 'sprite_var' flags from now on.
               LEA     sprites(PC),A3
               LSL     #2,D0      index -> offset
               LEA     0(A3,D0),A3
               ADDA.L  (A3),A3    point to sprite data
* get starting position etc:
               MOVE    (A3)+,D6   words per plane per row
               MOVE    (A3)+,D3   row offset when reading data
               MOVE    (A3)+,D4   pixel width
               MOVE    (A3)+,D7   pixel height
* SECTION B:
* form screen x coord for left of sprite:
               MOVE    D4,D0
               LSR     #1,D0      width/2
               SUB     D0,D1      lhs x coord, aka starting x
* SECTION C:
* check for left clipping:
               MOVE    D1,D0
               BPL.S   left_all_on
               NEG     D0         this many pixels out of sight
               CMP     D4,D0
               BGE     off_screen entirely off left of screen
               BSET    #7,(A0)    indicate previous word shift in
               SUBQ    #1,D0      adjust for multiple of 16 case
               LSR     #4,D0      this many words per plane lost
               ADDQ    #1,D0
               SUB     D0,D6        fewer chunks to process
* words per plane -> bytes per sprite data row:
* effectively D0*10:
               ADD     D0,D0        *2
               ADDA    D0,A3
               LSL     #2,D0        *4
               ADDA    D0,A3
               BRA.S   left_clippd
* SECTOIN D:
* generate offset from left of screen:
left_all_on    BCLR    #7,(A0)          no left clip
               LSR     #1,D0            4 planes
               AND     #$FFF8,D0
               ADDA    D0,A4            full offset
* SECTION E:
* form screen y coord for top of sprite:
left_clippd    MOVE    D7,D5            pixel height of sprite
               MOVE    D5,D0
               LSR     #1,D0            height/2
               SUB     D0,D2            top sprite y coord
* SECTION F:
* check for top clipping:
               BPL.S   top_all_on
               NEG     D2       this many rows out of sight
               SUB     D2,D7    reduce row count
               BMI     off_screen entirely off top of screen
               MOVE    D3,D0    bytes per row
               MULU    D2,D0
               ADDA    D0,A3    point to correct row within data
               MOVEQ   #0,D2    new screen y
               BRA.S   top_clipped
* SECTION G:
* generate screen offset from top of screen:
top_all_on     MOVE    D2,D0
               MULU    #160,D0
               ADDA    D0,A4          row offset on screen
* SECTION H:
* check for bottom clipping (ouch):
               ADD     D2,D5          1 past last sprite row
top_clipped    SUB     #200,D5        (sic - inclusive pixel)
               BLE.S   bottom_ok
               SUB     D5,D7          fewer rows of sprite to draw
               BMI     off_screen     entirely off bottom of screen
* SECTION I:
* check for right clipping:
bottom_ok      BSET    #6,(A0)        assume no right clip
               MOVE    D1,D5
               AND     #$F,D5         places to shift right
               ADD     D1,D4          1 past last sprite column
               CMP     #320,D4        additional shift possible?
               BLE.S   right_ok       yes
               BCLR    #6,(A0)        no
               MOVE    #320,D6
               SUB     D1,D6
               BLE     off_screen  entirely off right of screen
               MOVE    D6,D4
               LSR     #4,D6
               AND     #$F,D4
               BEQ.S   right_ok
               ADDQ    #1,D6
*
right_ok       MOVE    D3,2(A0)       bytes per sprite row
* A0 points to sprite_vars flags
* A3 points to bit image data rectified for clipping
* A4 points to screen
* D5.W no. of right shifts to be performed on each row of data
* D6.W no. of words per plane per row to actually be displayed
* D7.W no. of rows to be displayed
* SECTION J:
* For the remainder of the routine D0 is used to hold the screen
* clearing mask and D1-D4 are used to hold bit image data for
* planes 1 to 4.
               MOVE    D7,-(A7)       keep row counter on stack
               BRA     next_row
sprite_lp1     MOVE    D6,D7          chunks
               MOVEA.L A3,A1          data ptr
               MOVEA.L A4,A2          screen ptr
               BTST    #7,(A0)        use preceding data?
               BNE.S   pre_load       yes
* ensure 'blank' data is shifted in for initial write:
               MOVEQ   #-1,D0         null mask
               MOVEQ   #0,D1          blank bit image
               MOVEQ   #0,D2          ditto
               MOVEQ   #0,D3          ditto
               MOVEQ   #0,D4          ditto
               BRA.S   next_word
sprite_lp2     MOVE    (A1)+,D0       mask
               MOVE    (A1)+,D1       plane 1 bit image
               MOVE    (A1)+,D2       plane 2 bit image
               MOVE    (A1)+,D3       plane 3 bit image
               MOVE    (A1)+,D4       plane 4 bit image
* shift sprite data to correct screen position:
               LSR.L   D5,D0
               LSR.L   D5,D1
               LSR.L   D5,D2
               LSR.L   D5,D3
               LSR.L   D5,D4
* write the sprite data to the screen:
               AND     D0,(A2)
               OR      D1,(A2)+
               AND     D0,(A2)
               OR      D2,(A2)+
               AND     D0,(A2)
               OR      D3,(A2)+
               AND     D0,(A2)
               OR      D4,(A2)+
* ensure valid sprite data will be shifted in on next iteration:
* (only interested in MSWord: 'MOVE.L' takes less program memory
*  than 'MOVE.W'/'SWAP' though they execute in the same time)
pre_load       MOVE.L  -10(A1),D0      mask
               MOVE.L  -8(A1),D1       plane 1 bit image
               MOVE.L  -6(A1),D2       plane 2 bit image
               MOVE.L  -4(A1),D3       plane 3 bit image
               MOVE.L  -2(A1),D4       plane 4 bit image
next_word      DBRA    D7,sprite_lp2
               BTST    #6,(A0)         rhs writable?
               BEQ.S   row_done        no
* ensure trailing data is blank:
               MOVE        #-1,D0      (a MOVEQ would smash MSW)
               CLR         D1          ditto
               CLR         D2
               CLR         D3
               CLR         D4
*
               LSR.L   D5,D0
               LSR.L   D5,D1
               LSR.L   D5,D2
               LSR.L   D5,D3
               LSR.L   D5,D4
*
               AND     D0,(A2)
               OR      D1,(A2)+
               AND     D0,(A2)
               OR      D2,(A2)+
               AND     D0,(A2)
               OR      D3,(A2)+
               AND     D0,(A2)
               OR      D4,(A2)+
*
row_done       LEA     160(A4),A4   next screen row
               ADDA    2(A0),A3     next data row
next_row       SUBQ    #1,(A7)
               BPL     sprite_lp1
               ADDQ.L  #2,A7        remove row counter
off_screen     RTS
*
* Example sprite data.
* This data must be left justified within words.
* Ideally the data would be prepared by another program (similar
* that in Listing 1.7 given last issue). The data could then be
* loaded or linked with the main program.
*
sprites        DC.L    sprite0-*
               DC.L    sprite1-*
               DC.L    sprite2-*
*
```

```
* Small blob:
sprite0         DC.W    1       chunks per row
                DC.W    10      total bytes per row (row offset)
                DC.W    9       pixel width
                DC.W    10      pixel height
* bit iamge data:       mask  pln 1 pln 2 pln 3 pln 4
                DC.W    $DDFF,$0000,$2200,$0000,$0000
                DC.W    $C9FF,$0000,$3600,$0000,$0000
                DC.W    $007F,$0000,$FF80,$0000,$0000
                DC.W    $087F,$0000,$E380,$1400,$0000
                DC.W    $DDFF,$0000,$2200,$0000,$0000
                DC.W    $C9FF,$0000,$2200,$1400,$0000
                DC.W    $007F,$0000,$FF80,$0000,$0000
                DC.W    $007F,$0000,$FF80,$0000,$0000
                DC.W    $D5FF,$0000,$2A00,$0000,$0000
                DC.W    $D5FF,$0000,$2A00,$0000,$0000
*
*
* Big blob:
sprite1         DC.W    3       chunks per row
                DC.W    30      total bytes per row (row offset)
                DC.W    48      pixel width
                DC.W    14      pixel height
* bit iamge data:       mask  pln 1 pln 2 pln 3 pln 4
* row 1:
                DC.W    $FFFE,$0001,$0000,$0000,$0000     chunk 1
                DC.W    $0000,$FFFF,$0000,$0000,$0000     chunk 2
                DC.W    $7FFF,$8000,$0000,$0000,$0000     chunk 3
* row 2:
                DC.W    $FFFC,$0003,$0000,$0000,$0000
                DC.W    $0000,$FFFF,$0000,$0000,$0000
                DC.W    $3FFF,$C000,$0000,$0000,$0000
* etc
                DC.W    $FFF0,$000F,$0000,$0000,$0000
                DC.W    $0000,$FFFF,$0000,$0000,$0000
                DC.W    $0FFF,$F000,$0000,$0000,$0000
*
                DC.W    $FF80,$007F,$0000,$0000,$0000
                DC.W    $0000,$FFFF,$0000,$3C3C,$0000
                DC.W    $01FF,$FE00,$0000,$0000,$0000
*
                DC.W    $F800,$07FF,$0000,$0000,$0000
                DC.W    $0000,$FFFF,$0000,$07E0,$0000
                DC.W    $001F,$FFE0,$0000,$0000,$0000
*
                DC.W    $0000,$FFFF,$E000,$0000,$0000
                DC.W    $0000,$FFFF,$0000,$0000,$0000
                DC.W    $0000,$FFFF,$0007,$0000,$0000
*
                DC.W    $0000,$FFFF,$FF80,$0000,$0000
                DC.W    $0000,$FFFF,$0000,$0000,$0000
                DC.W    $0000,$FFFF,$01FF,$0000,$0000
*
                DC.W    $8000,$7FFF,$07FC,$0000,$0000
                DC.W    $0000,$FFFF,$0000,$0000,$0000
                DC.W    $0001,$FFFE,$3FE0,$0000,$0000
*
                DC.W    $8000,$7FFF,$001F,$0000,$0000
                DC.W    $0000,$FFFF,$E007,$0000,$0000
                DC.W    $0000,$FFFE,$F800,$0000,$0000
*
                DC.W    $C000,$3FFF,$0000,$0000,$0000
                DC.W    $0000,$FFFF,$7FFE,$0000,$0000
                DC.W    $0003,$FFFC,$0000,$0000,$0000
*
                DC.W    $E000,$1FFF,$0000,$0000,$0000
                DC.W    $0000,$FFFF,$0000,$0000,$0000
                DC.W    $0007,$FFF8,$0000,$0000,$0000
*
                DC.W    $F800,$07FF,$0000,$0000,$0000
                DC.W    $0000,$FFFF,$0000,$0000,$0000
                DC.W    $001F,$FFE0,$0000,$0000,$0000
*
                DC.W    $FF00,$00FF,$0000,$0000,$0000
                DC.W    $0000,$FFFF,$0000,$0000,$0000
                DC.W    $00FF,$FF00,$0000,$0000,$0000
*
                DC.W    $FFF0,$000F,$0000,$0000,$0000
                DC.W    $0000,$FFFF,$0000,$0000,$0000
                DC.W    $0FFF,$F000,$0000,$0000,$0000
*
*
* Explosion blob:
sprite2         DC.W    1       chunks per row
                DC.W    10      total bytes per row (row offset)
                DC.W    15      pixel width
                DC.W    14      pixel height
* bit iamge data:       mask  pln 1 pln 2 pln 3 pln 4
                DC.W    $FEDF,$0000,$0100,$0020,$0000
                DC.W    $F297,$0000,$0D08,$0060,$0000
                DC.W    $9D27,$0000,$6218,$0040,$0080
                DC.W    $E60F,$0000,$1870,$0000,$0180
                DC.W    $9203,$0000,$0C20,$601C,$01C0
                DC.W    $E00F,$0000,$0000,$1800,$07F0
                DC.W    $0019,$0000,$E060,$0006,$1F80
                DC.W    $EC4F,$0000,$10B0,$0000,$0300
                DC.W    $DAA7,$0000,$2440,$0018,$0100
                DC.W    $F2DF,$0000,$0C20,$0000,$0100
                DC.W    $A6ED,$0000,$1910,$4002,$0000
                DC.W    $EE77,$0000,$1180,$0008,$0000
                DC.W    $FB53,$0000,$0080,$042C,$0000
                DC.W    $DBDF,$0000,$0000,$2420,$0000
sprite_vars     DS.W    1       object index
                DS.W    2       sprite centre x,y coords on screen
                DS.B    1       flags
```

```
*  bit 6 set if data which shifts out on the right can actually
*           fit on the screen
*  bit 7 set if part of the image is off screen to the left so
*          the first right shift of a row must move data in from
*          the previous word rather than move in zeros.
              DS.B   1      packing (re-align on word boundary)
              DS.W   1      bytes per row of sprite data
```

PROGRAM 2.5 - Extensions to Sprite routine

```
* Extensions to 'Sprite' which allow for fading.
* Extended sprite variables:
sprite_vars     DS.W    1       object index
                DS.W    2       position (x,y) on screen
                DS.B    1       flags
*  bit 5 set for fade
*  bit 6 set if data which shifts out on the right can actually
*       fit on the screen
*  bit 7 set if part of the image is off screen to the left so
*       the first right shift of a row must move data in from
*       the previous word rather than move in zeros.
              DS.B  1     packing (re-align on word boundary)
              DS.W  1     bytes per row of sprite data
              DS.W  1     no. of chunks per row to be displayed
              DS.W  1     fade type offset
              DS.W  1     fade row offset
              DS.W  1     screen clearing fade mask
*
* Extended SECTION J:
* Storing the variable held in D6 frees-up the register for use
* as a fade mask.
              MOVE  D7,-(A7)
              BTST  #5,(A0)       fading requested?
              BEQ   next_row      no
              MOVE  D6,4(A0)      chunks per row displayed
              BRA   next_rowF
* Remainder of original SECTION J goes here:
sprite_lp1    etc.
              ...
off_screen    RTS
*
* Additional fade-specific stuff:
*
fade_masks      DC.W    %0111111101111111
                DC.W    %1111011111110111
                DC.W    %1101111111011111
                DC.W    %1111110111111101
*
                DC.W    %1110111011101110
                DC.W    %1011101110111011
                DC.W    %1101110111011101
                DC.W    %0111011101110111
*
                DC.W    %1010101010101010
                DC.W    %0101010101010101
                DC.W    %1010101010101010
                DC.W    %0101010101010101
*
                DC.W    %1000100010001000
                DC.W    %0010001000100010
                DC.W    %0100010001000100
                DC.W    %0001000100010001
*
                DC.W    %1000000010000000
                DC.W    %0000100000001000
                DC.W    %0010000000100000
                DC.W    %0000001000000010
*
sprite_lp1F     SUBQ    #2,8(A0)        next fade row offset
                BPL.S   valid_fade
                MOVE    #(4-1)*2,8(A0)  4 word-rows per mask
valid_fade      MOVE    6(A0),D6        fade type offset
                ADD     8(A0),D6        plus fade row offset
                MOVE    fade_masks(PC,D6),D6
                MOVE    D6,10(A0)       screen clearing mask
                NOT     D6              sprite clearing mask
*
                MOVE    4(A0),D7        chunks
                MOVEA.L A3,A1         data ptr
                MOVEA.L A4,A2         screen ptr
                BTST    #7,(A0)         use preceding data?
                BNE.S   pre_loadF     yes
                MOVEQ   #-1,D0
                MOVEQ   #0,D1
                MOVEQ   #0,D2
                MOVEQ   #0,D3
                MOVEQ   #0,D4
                BRA.S   next_wordF
sprite_lp2F     MOVE    (A1)+,D0
                MOVE    (A1)+,D1
                MOVE    (A1)+,D2
                MOVE    (A1)+,D3
                MOVE    (A1)+,D4
                LSR.L   D5,D0
                LSR.L   D5,D1
                LSR.L   D5,D2
                LSR.L   D5,D3
                LSR.L   D5,D4
```

```
* add the fade element to the sprite element for the screen
* clearing mask:
                OR      10(A0),D0
* mask the sprite bit image data for fade effect:
                AND     D6,D1
                AND     D6,D2
                AND     D6,D3
                AND     D6,D4
* write the data to the screen:
                AND     D0,(A2)
                OR      D1,(A2)+
                AND     D0,(A2)
                OR      D2,(A2)+
                AND     D0,(A2)
                OR      D3,(A2)+
                AND     D0,(A2)
                OR      D4,(A2)+
pre_loadF       MOVE.L  -10(A1),D0
                MOVE.L  -8(A1),D1
                MOVE.L  -6(A1),D2
                MOVE.L  -4(A1),D3
                MOVE.L  -2(A1),D4
next_wordF      DBRA    D7,sprite_lp2F
                BTST    #6,(A0)                 rhs writable?
                BEQ.S   row_doneF               no
                MOVE    #-1,D0
                CLR     D1
                CLR     D2
                CLR     D3
                CLR     D4
                LSR.L   D5,D0
                LSR.L   D5,D1
                LSR.L   D5,D2
                LSR.L   D5,D3
                LSR.L   D5,D4
*
                OR      10(A0),D0
                AND     D6,D1
                AND     D6,D2
                AND     D6,D3
                AND     D6,D4
*
                AND     D0,(A2)
                OR      D1,(A2)+
                AND     D0,(A2)
                OR      D2,(A2)+
                AND     D0,(A2)
                OR      D3,(A2)+
                AND     D0,(A2)
                OR      D4,(A2)+
*
row_doneF       LEA     160(A4),A4      next screen row
                ADDA    2(A0),A3        next data row
next_rowF       SUBQ    #1,(A7)
                BPL     sprite_lp1F
                ADDQ.L  #2,A7
                RTS
```

PROGRAM 2.6 - Sprite boundary check

```
* Routine which checks the sprite, whose index and coords are
* held in 'sprite-vars', against a left boundary in D1.W and a
* right boundary in D2.W
* Routine returns Z set for touch condition, N set for overlap
* and both Z and N clear for no collision.
* D0/D3/A0/A1 smashed.
* Point to the correct sprite data:
Bounds          LEA     sprites(PC),A0
                LEA     sprite_vars(PC),A1
                MOVE    (A1)+,D0        sprite index
                LSL     #2,D0           index -> offset
                ADDA    D0,A0
                ADDA.L  (A0)+,A0        point to sprite width (s1y)
* centre x coord - width/2 = left-most pixel column of sprite:
                MOVE    (A0),D0         width
                MOVE    D0,D3
                LSR     #1,D3           width/2
                NEG     D3
                ADD     (A1),D3
                SUBQ    #1,D3           allow for 'touching' test
                CMP     D1,D3           Z set for touch,
                BLE.S   collision1      N set for overlap
                ADD     D3,D0           right most pixel column
                ADDQ    #1,D0           allow for 'touching' test
                CMP     D0,D2           Z set: touch; N set: overlap
collision1      RTS
```

PROGRAM 2.7 - Check for Sprite collision

```
* Routine to check for a sprite collision. This code expects
* the sprite variables to be extended to include sprite index
* centre coords of a second sprite at an offset of 18 from
* 'sprite_vars'.
* Routine returns Z set if sprite touch, N set if sprites
* overlap and both Z and N clear for no collision.
* D0-D4/A0-A3 smashed.
Collision       LEA     sprites(PC),A1
                LEA     sprite_vars(PC),A2
                LEA     18(A2),A3
                MOVE    (A2)+,D0            1st sprite index
                LSL     #2,D0
                LEA     0(A1,D0),A0
                ADDA.L  (A0)+,A0            !
                MOVE    (A3)+,D0            2nd sprite index
                LSL     #2,D0
                ADDA    D0,A1
                ADDA.L  (A1)+,A1
* A0 points to width/height of first sprite
* A1 points to width/height of second sprite
* A2 points to centre coords of first sprite
* A3 points to centre coords of second sprite
* Check left/right extents:
                BSR.S   chk_extents
                BGE.S   collision2  no overlap
* comments in parentheses refer to the second pass:
chk_extents     MOVE    (A2)+,D0    first x (y) coord
                MOVE    (A0)+,D1    first width (height)
                MOVE    D1,D4
                LSR     #1,D4       width/2 (height/2)
                SUB     D4,D0       left (top) most pixel column
                ADD     D0,D1       right- (btm-) most pixel col
* similarly for second sprite:
                MOVE    (A3)+,D2
                MOVE    (A1)+,D3
                MOVE    D3,D4
                LSR     #1,D4
                SUB     D4,D2
                ADD     D2,D3
                CMP     D3,D0       left/right (top/bottom) compare
* Z set for touch, Z and N clear for no overlap
                BGE.S   collision2
                CMP     D1,D2  left/right (top/bottom) compare
collision2      RTS             N set: possible (definite) collision
```

PROGRAM 2.8 - Scrolling and Sprites Demo

```
* This is an example program which illustrates the routines
* involved in horizontal scrolling, clipped sprites and
* collision detection.
no_of_scrns     EQU     3       set this to the no. of screens reqd
                BSR     Wide_Image      create wide image
* set up logical/physical screens:
                BSR     Get_Screens
                LEA     Variables(PC),A6
                BSR     Init_sprt
main_loop       MOVEA.L -8(A6),A0       logical screen ptr
                MOVEA.L -12(A6),A1      wide image ptr
                MOVE    (A6),D0         horiz scroll index
                MOVE    6(A6),D1        vert scroll position
                MOVEQ   #80,D7          no. of rows to scroll
                BSR     Scroll_fr_H
                BSR     Updt_Sprts
                BSR     Write_Sprts
                BSR     Updt_H_Scrl
                BSR     Toggle_Screens
                BRA.S   main_loop
*
*
* Move sprites and check for collision with scroll region:
Updt_Sprts      BTST    #0,25(A6)       explosion?
                BNE.S   explosion       yes
                LEA     8(A6),A0
                MOVEQ   #5,D3           sprite height/2
                BSR     Move_Sprite     small sprite
                MOVEQ   #7,D3           sprite height/2
                BSR     Move_Sprite     big sprite
* Check for collision between sprites:
* (This shows how tacky having more than one set of variables
* can be. Ideally 'sprite_vars' should be held within
* 'Variables' pointed to by A6 but at least 'Sprite' is easily
* transported from one program to another.)
                LEA     sprite_vars(PC),A0
                LEA     18(A0),A1
                CLR     (A0)+           small sprite index
                MOVE.L  12(A6),(A0)     small sprite coords
                MOVE    #1,(A1)+        big sprite index
                MOVE.L  20(A6),(A1)     big sprite coords
                BSR     Collision
                BGT.S   sprites_ok
* (BGE.S used if sprites are allowed to touch but not overlap)
* Initiate explosion:
                MOVE    #10,26(A6)      no. of explosion frames
                BSET    #0,25(A6)       remember explsn in progress
                CLR.L   8(A6)           stop sprites
                CLR.L   16(A6)          moving
* determine explosion site:
                MOVE    12(A6),D0       small sprite x coord
                ADD     20(A6),D0       big sprite x coord
                ASR     #1,D0           mean
                MOVE    D0,28(A6)       explosion sprite x coord
                MOVE    14(A6),D0       small sprite y coord
                ADD     22(A6),D0       big sprite y coord
                ASR     #1,D0           mean
                MOVE    D0,30(A6)       explosion sprite y coord
sprites_ok      RTS
* Process explosion:
explosion       LEA     sprite_vars(PC),A0
                SUBQ    #1,26(A6)       next explosion frame
                BEQ.S   end_explo
                CMP     #5,26(A6)       start fade?
                BGT.S   explo_done      no
                BNE.S   update_fade     no
                BSET    #5,6(A0)        fade flag
                MOVE    #4*8,12(A0)     initial fade type offset
```

```
explo_done    RTS
update_fade   SUBQ   #8,12(A0)
              RTS
end_explo     BCLR   #0,25(A6)        stop explosion
              BCLR   #5,6(A0)         stop fading
* Re-initialize sprite data but retain y coords:
              MOVE   14(A6),-(A7)
              MOVE   22(A6),-(A7)
              BSR.S  Init_sprt
              MOVE   (A7)+,22(A6)     big sprite y coord
              MOVE   (A7)+,14(A6)     small sprite y coord
              RTS
*
* Initialize new sprite data:
Init_sprt     LEA    8(A6),A0
              LEA    sprite_dat(PC),A1
              MOVEQ  #16/4-1,D0          16 bytes
i_sprt_lp     MOVE.L (A1)+,(A0)+
              DBRA   D0,i_sprt_lp
              RTS
sprite_dat    DC.W   2,2          small sprite delta x,y
              DC.W   -10,95       small sprite x,y coords
              DC.W   -2,2         big sprite delta x,y
              DC.W   468,93       big sprite x,y coords
*
* Sub-routine to move sprite pointed to by A0 and check for
* scroll region collision. Entered with sprite height/2
* held in D3.
* D0-D2 smashed, A0 updated to point just past sprite data.
Move_Sprite   MOVEM  (A0)+,D0/D1  delta x,y
              ADD    D0,(A0)      update x coord
              MOVE   (A0)+,D0     new x coord
              ADD    D1,(A0)      update y coord
              MOVE   (A0)+,D1     new y coord
* check for top collision:
              MOVE   6(A6),D2     vertical scroll position
              ADD    D3,D2        account for sprite height
              CMP    D2,D1
              BGT.S  top_ok
              MOVE   D2,-2(A0)    sprite remains over image
              MOVE   #2,-6(A0)    new delta y
* check for bottom collision:
top_ok        ADD    #80-1,D2
              SUB    D3,D2        account for sprite height
              SUB    D3,D2
              CMP    D2,D1
              BLT.S  bott_ok
              MOVE   D2,-2(A0)
              MOVE   #-2,-6(A0)
* check for left collision:
bott_ok       CMP    #-50,D0
              BGT.S  left_ok
              MOVE   #369,-4(A0)  wrap sprite x coord
* check for right collision:
left_ok       CMP    #369,D0
              BLT.S  rght_ok
              MOVE   #-50,-4(A0)
rght_ok       RTS
*
*
* Routine to write all active sprites to screen.
Write_Sprts   MOVEA.L -8(A6),A5       logical screen ptr
* draw small sprite:
              LEA    sprite_vars(PC),A0
              CLR    (A0)+          sprite index
              MOVE.L 12(A6),(A0)    sprite coords
              BSR    Sprite
* draw big sprite:
              LEA    sprite_vars(PC),A0
              MOVE   #1,(A0)+        sprite index
              MOVE.L 20(A6),(A0)     sprite coords
              BSR    Sprite
* draw explosion sprite if necessary:
              BTST   #0,25(A6)
              BEQ.S  sprts_drawn
              LEA    sprite_vars(PC),A0
              MOVE   #2,(A0)+        sprite index
              MOVE.L 28(A6),(A0)     sprite coords
              BRA    Sprite          (sic)
sprts_drawn   RTS
*
*
* Routine to update the rate at which scrolling occurs and
* to actually move the scroll index to its new position.
* Look for keyboard input:
Updt_H_Scrl   MOVE.L #$10002,-(A7)
              TRAP   #13
              ADDQ.L #4,A7
              TST    D0
              BEQ    input_done
              MOVE.L #$20002,-(A7)
              TRAP   #13
              ADDQ.L #4,A7
              SWAP   D0             look at scan code
              CMP.B  #$4B,D0        {left arrow}?
              BNE.S  no_left        no
              TST    4(A6)
              BEQ.S  input_done
              SUBQ   #1,4(A6)
              BRA.S  input_done
no_left       CMP.B  #$4D,D0        {right arrow}?
              BNE.S  no_right       no
              CMP    #20,4(A6)      arbitrary maximum
              BEQ.S  input_done
              ADDQ   #1,4(A6)
              BRA.S  input_done
no_right      CMP.B  #$48,D0        {up arrow}?
              BNE.S  no_up          no
              TST    6(A6)
              BEQ.S  input_done
              SUBQ   #1,6(A6)
* update sprite positions:
              SUBQ   #1,14(A6)
              SUBQ   #1,22(A6)
              SUBQ   #1,30(A6)
* delete redundant line:
              MOVE   6(A6),D0
              ADD    #80,D0
              BRA.S  delete_row
              BRA.S  input_done
no_up         CMP.B  #$50,D0                {down arrow}?
              BNE.S  input_done             no
              CMP    #199-79,6(A6)
              BEQ.S  input_done
              MOVE   6(A6),D0
              ADDQ   #1,6(A6)
* update sprite positions:
              ADDQ   #1,14(A6)
              ADDQ   #1,22(A6)
              ADDQ   #1,30(A6)
delete_row    MULU   #160,D0
              MOVEA.L -8(A6),A0             logical screen
              ADDA   D0,A0
              MOVEA.L -4(A6),A1             physical screen
              ADDA   D0,A1
              MOVEQ  #0,D0
              MOVEQ  #160/4-1,D1
del_row_lp    MOVE.L D0,(A0)+
              MOVE.L D0,(A1)+
              DBRA   D1,del_row_lp
* update scroll index:
input_done    MOVE   4(A6),D0
              TST    2(A6)
              BMI.S  left_motion
              ADD    D0,(A6)
              CMP    #no_of_scrns*320-320,(A6)
              BLT.S  update_done
              MOVE   #no_of_scrns*320-320,(A6)
invert_dir    NEG    2(A6)
update_done   RTS
left_motion   SUB    D0,(A6)
              BGT.S  update_done
              CLR    (A6)
              BRA.S  invert_dir
*
* Include the following routines here:
*  Wide_Image     from Lst 2.1 - don't include last 6 lines
*  Set_Palette    from Lst 1.4
*  Get_Screens    from Lst 1.5 - don't include last 5 lines
*  Toggle_Screens from Lst 1.6
*  Load_File      from Lst 1.7
*  Scroll_fr_H    from Lst 2.2
*  Sprite         from Lst 2.4 & 2.5 - less 'sprite_vars' part
*  Collision      from Lst 2.7
*
*                                                          offset
                DC.L   Wide_image                         -12
logical_screen  DS.L   1                                  -8
physical_screen DS.L   1                                  -4
Variables       DC.W   0     horizontal scroll index      0
                DC.W   1     scroll direction             2
                DC.W   1     scroll increment             4
                DC.W   60     vertical scroll posn        6
                DS.W   2     small sprite delta x,y       8
                DS.W   2     small sprite x,y coords      12
                DS.W   2     big sprite delta x,y         16
                DS.W   2     big sprite x,y coords        20
                DC.W   0     flags                        24
*  bit 0 set for explosion
                DS.W   1     explosion frame counter      26
                DS.W   2     explosion x,y coords         28
*
sprite_vars     DS.W   1     object index
                DS.W   2     position (x,y) on screen
                DS.B   1     flags
*  bit 5 set for fade
*  bit 6 set if data which shifts out on the right can actually
*         fit on the screen
*  bit 7 set if part of the image is off screen to the left so
*         the first right shift of a row must move data in from
*         the previous word rather than move in zeros.
                DS.B  1      packing (re-align on word boundary)
                DS.W  1      bytes per row of sprite data
                DS.W  1      no. of chunks per row to be displayed
                DS.W  1      fade type offset
                DS.W  1      fade row offset
                DS.W  1      screen clearing fade mask
                DS.W  1      index for possible collision sprite
                DS.W  2      x,y coords for collision sprite
*
Screen_header   EQU   *
Screen_palette  EQU   *+2
Screen_image    EQU   *+34
Wide_image      EQU   *+32034
screen_space    EQU   *+32034+32000*no_of_scrn
```

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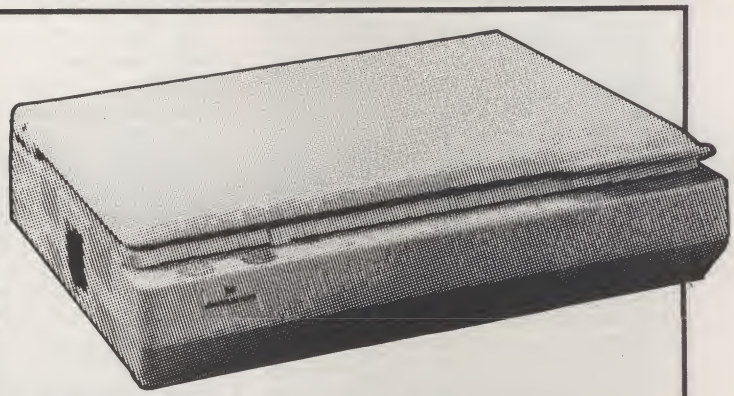

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SUPERBASE PROFESSIONAL v3

As well as reporting the revisions to the sophisticated database Superbase Professional, Graham Wayne compares the latest offering from Precision software to its down-market relative, Personal 2, and ruminates on the various ways to use and choose a database.

For any business or professional person using an ST and requiring a top-flight database to run on it, Superbase Professional has, since its release in April '88, been a leading contender. Now, eight months on, Precision Software have released an upgrade, version 3.01. But before we consider the revisions to the program, perhaps it would be helpful to review the features of Superbase Pro that provoked ST World (in Issue 27) to nominate it 'a landmark in modern microcomputer software'. This is high praise indeed, but deservedly so; Superbase Pro really is an astonishingly powerful relational database.

In appearance and use it is largely identical to its little brother, Superbase Personal 2, which was reviewed in the last issue. Indeed, many of the features are shared by both programs and in describing the common elements, plus the extra facilities to be found in Professional, one can determine the relationship between the cost and possibilities on offer, which may be matched to the business application and available budget by one or other of the programs, but without compromising on the essential power of the database - the ability to handle, sort and report on collections of data very quickly, in numerous and flexible ways. Both Superbase products achieve this by providing an efficient, largely mouse-driven design environment, an extensive range of field types, a text editor and the ability to incorporate external files in a database. Both have comprehensive report generators and allow the user to perform many types of calculation, comparison, validation and so on. Most importantly, Superbase is a relational database which means that information can be passed from file to file, record to record, and reports can incorporate or store derived data from anywhere in the database via a unique relational link, like a name or a number, by which the information is located. The Superbase system also supports other file types, notably the IBM format dBase 2 and 3 files, although Pro 3 supports a wider variety.

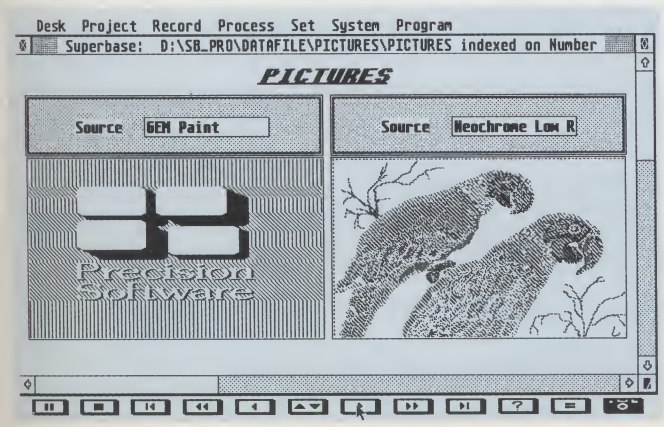
The Professional touch

But where Professional really extends the possibilities of data management over its more modest companion, Personal 2, is in two major areas. The first is built in to the main programming shell - another programming shell! You see, the outer shell is GEM driven, pointing and clicking and using menus to get results such as designing a form or a report, selecting files or records to update. The only time the keyboard is used is to enter data of some kind, although the Superbase products contain many keyboard shortcuts and Pro also had programmable function keys. But within the program menu in Superbase Pro are a host of new features based round the basic-like programming language called DML (Database Management Language) that is built into the main program. Entered by typing into a special program editor, through use and concatenation of simple commands, all the functions of the database can be entirely automated. One of the main purposes for such automation is the insulation of the user from the mechanics of the database, for example, when relatively unskilled staff are required to enter data routinely, but without having to instruct the program what to do with the data once in the system. That part of the data management can be running in the background as a separate program, invisible to the end-user.

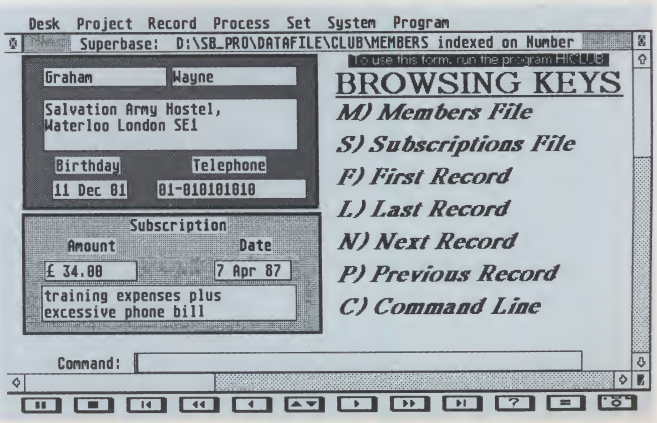
The boys in the back room

Background programming, or procedures, are also invaluable for complex data retrieval and manipulation performed on a regular basis, checking for valid input, calling other records and files for calculations and issuing the final report. Indeed, the program can automate the database to such an extent, with commands for virtually all the database functions, options and even user-defined menus, that it is largely unnecessary to run it from within the programming shell. Precision have recently completed a run-time module that they will license to users, allowing user-automated programs to be run as stand-alone systems. This is as close as you can get to a bespoke system without employing someone to write it from scratch.

The second major facility that Pro offers over its little brother is another program that comes on a separate disk. Called the forms editor, it is primarily a design program with which the look of the screen, and printed reports, can be created by the user. GDOS fonts are supported and artwork from graphics packages can be incor-



Another form, this time to display external files. Superbase cleverly dithers pictures at different resolutions so you can still tell what they are.



The forms editor lets you design user-friendly entry and display screens, as well as the format of printed output. The key options are programmed in DML.

porated in the form designs. More than this, the revised forms editor (V3.01) also provides the tools to design and program transactional forms which will input, display, calculate, store and report using data from several different files simultaneously, as well as providing more versatile options for report formatting and adroit types of analysis. So, all in all, the full range of features contained by Superbase Professional should facilitate the most demanding of users. Conversely, Personal 2 provides all the data-handling power, but without the form design program, a selection of fonts and the DML programming language, a statement I must qualify by adding that Personal 2 still offers a wide range of basic-like commands that may be used in creating reports, searching for data , mail-shots and so on. The choice of which program, therefore, is entirely dependent on the intended application and the degree of sophistication required, not the difference in quality between low and high priced products.

Afterthoughts

Other than the above-mentioned points, it is difficult to fault Superbase Pro 3, given the short period of familiarisation. There are few features of any comprehensive database on the market and on any personal computer, that Pro 3 lacks. The directory change could certainly be improved; I personally prefer to design the records and the way they look in one program, which saves some time. The object manipulation and editing of attributes in the forms editor (the style and appearance fields, boxes, lines and text) is slowed down by the use of menu selection instead of dragging active points on the object outline, a standard GEM technique after all. But these are minor issues; they do not stop the job from getting done, albeit with a little inelegance. However, I fully expect to see another revision or two in the lifetime of this product, so who knows what the future may bring?

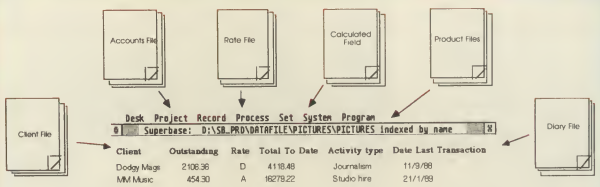
Product: Superbase Pro V3.0
Price: £249.95 inc VAT
Upgrade: £29.95 (Pro2 owners)
Publisher: Precision Software.
Phone: 01 330 7166

Ringing the Changes

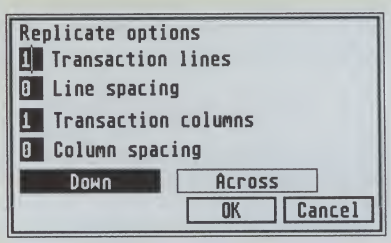
Superbase Professional 3 has several enhancements to the previous version, as well as some improvements to existing functions. The most significant addition is probably the implementation of full transaction handling, where linked data from different records and files are displayed in sets of repeated fields within a transaction form. Existing owners will be aware that menu options already existed for transactional form design but the source code didn't quite make it into the program. This feature has now been completed. The import and export of files have been improved and a reasonable XModem communications module added which can also be controlled by internal DML (Database Management Language) programming commands. Mail-merge now accepts variables embedded in the text document as well as fields; blank lines, such as addresses with irregular numbers of field entries, are now closed up.

A number of additional DML keywords calling new sub-routines have been added and the forms editor exhibits several changes, including the directory and drive selection, which works properly now. However, these options can only be accessed via their own menu entry so you still can't change directory or drive from the load or save file selector, for example, making disk navigation unnecessarily torturous. This is an unfortunate omission that could have been remedied.

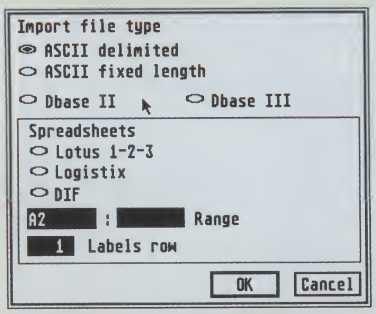
Another lost opportunity is in the program editor, which was strongly criticised in the original ST World review. The editor now allows indentation of program lines so that nested structures can be clearly identified, but there are still no block functions, return does not create a new line and there continues to be a lack of consistency between the text editor, which has all the necessary functions, and the program editor, which is diminished by their absence.



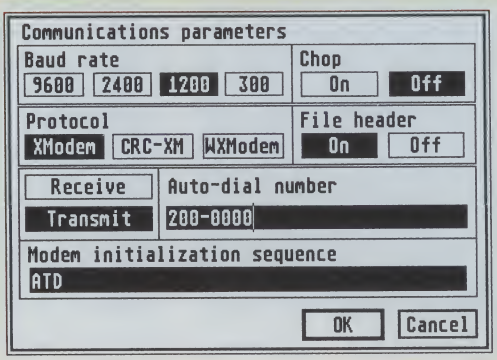
The Transactional forms in Pro 3 are one of its most powerful reporting features. What makes it powerful is that data can be called from any files in the database. Transaction handling can also be programmed from the Data Management Language. In the example, I have created a bad debt report taking information from different files. The common field, or link, is the client code.



Transaction layout dialogue, after nominating the fields used and the links between files.



A wider range of file-types are supported for import and export.



A capable comms module has been added to Pro 3. Comms can also be put under program control for automated batch up or download.

Programming: Beyound the pale for mere mortals?

Whenever one reads about databases, the topic of programming always seems to crop up. It is hardly surprising, therefore, that many people might be discouraged from buying a database, no matter how useful it could be, at least in part because they don't feel confident about so daunting a task as learning to program a computer. But why, having purchased a program, should one have to program it as well? The answer may be discerned by an oblique glance in the direction of the rag trade.

Buying clothes can be a frustrating affair. If, like me, your body doesn't seem to conform to any of the standard sizes (I'm very tall, as it happens) you may resort to the more costly expedient of bespoke tailoring, two words that may also be heard in the discussion of database development. For, like ill-fitting clothes, most businesses discover that off-the-peg databases have several baggy bits, or the sleeves are too short (am I going too far with this analogy?) At this point, there is no option but to configure a database to the exact requirements of the user - bespoke systems, tailored to the business.

There are experts at writing databases to serve specific business requirements. Called systems analysts, they command the sort of salaries you and I can only dream of - I've been quoted anywhere between £200 to £400 a day for such expertise. Needless to say, this is not an insignificant factor when considering whether to do the job yourself. Traditionally, databases have been custom-built in Basic, C and other languages, a phenomenally time-consuming endeavour. But, following the advent of more powerful personal computers, a new kind of development tool has become available - the shell system. In reality a very high-level language, the shell is a programming environment containing built-in commands and procedures that are very specific to, in this instance, database development and special routines built into the shell perform complex tasks in the background, unseen by the user but at his command for the sake of typing or mousing a certain keyword or command.

The Superbase products are shell systems. If you purchase one of them, you haven't actually bought a database, but the means to create one (if you dispense with any demonstration files which, unfortunately, never seem to suit the task one has in mind). Where the quality and power of the system becomes evident is in how easy the programming shell makes it for the user to accomplish complex and sophisticated forms of data management, without spending ludicrous amounts of time achieving it. But just how complex is programming a database?

The answer depends on the kind of application the user is designing for. The initial steps of building files, each containing records (an individual item in the file relating to say, a customer, a job or an item of stock), in turn consisting of fields for various kinds of data, are straightforward. But when you wish to manipulate that data, perform calculations, analyses or cross-reference it, some background programming must be written. The Superbase systems contain many programming commands, rather like a Basic language, which help the user achieve the desired manipulation. Of course, it would be rather foolish to just dive in and learn all the programming commands, reserved words and their functions; that's the wrong end of the funnel. In practice, after a file and its records have been designed, one inevitably starts off wanting to do a simple thing, like put the current date into a new form, or subtract an item from a list when another type of transaction such as a sale takes place, or add some figures from several different files for an analysis. Slowly then, as the user becomes more demanding of the system, the program code grows almost imperceptibly until pages of abstract symbols are as familiar as, well, other pages of abstract symbols.

Joking aside, the path is slow to travel but the rewards both to the business and personally are substantial. Patience and humility are the essential qualities. Programming is very unforgiving; if the code won't work, its usually your fault although most shell environments stop you from making the more obvious mistakes. So don't be dismayed. Taken one step at a time, you can gradually build a database that fits your requirements perfectly. As I often say during discussions of this kind, if you can understand double-entry book-keeping, sales ledger, a spreadsheet or a cash-flow projection, then you can program a database. Especially with a little help from a shell program like Superbase.

Superbase program: ADDSRCH

```
REM Addsrch - locate words in Address file
a% = 0:a$ = "":REQUEST "LOCATE Word ","",4,a%,a$,12
IF NOT (a%) THEN
x$ = "SELECT WHERE Notes CONTAINS ~*" + a$ + "*~":EXECUTE x$
SELECT FIRST :FORM SHOW
END IF
```

Programming can get very involved, yet the starting point is always simple. This little program, which prompts the user to type in a word that will be searched for in the file. If you have used a basic language, then some of the commands may be familiar, but Pro 3 has many high-level commands like Request, which brings up a dialogue box, and Form Show, which calls up any external files containing the specified word.

...then get Fancy

Superbase: D:\SB_PRO\DATAFILE\Please open a file

COL / ROW	1	2	3	4	5	Row Sum	Average
1	1	3	5	7	9	25	5
2	2	4	6	8	10	30	6
3	5	10	15	20	25	75	15
4	10	20	30	40	50	150	30
5	20	40	60	80	100	300	60
6	30	60	90	120	150	450	90
7	40	80	120	160	200	600	120
8	50	100	150	200	250	750	150
9	100	200	300	400	500	1500	300
10	500	1000	1500	2000	2500	7500	1500
TOT	758	1517	2276	3035	3794	11380	228

Superbase program: ARRYTEST

```
FOR r% = 1 TO 10
? BF STR$ (r%,2);"  |"; BF OFF ;
FOR c% = 1 TO 5
? STR$ (x%(r%,c%),4);" ";
NEXT c%
? BF "  |  "; STR$ (b%(r%),4);"   | "; STR$ (a%(r%),4);"     |"
NEXT r%
? REPLICATE ("-",59); NEWLINE ; BF "TOT |";
FOR c% = 1 TO 5:? STR$ (c%(c%),4);" ";:NEXT c%:? "  |" STR$ (tt%,6);" |"
STR$ (tt% / 50,4);"|"
? REPLICATE ("=",59)

DATA 1,3,5,7,9
DATA 2,4,6,8,10
DATA 5,10,15,20,25
DATA 10,20,30,40,50
DATA 20,40,60,80,100
DATA 30,60,90,120,150
DATA 40,80,120,160,200
```

Program
Command ^A
Run
New
Edit
Open
Close
Save
Print
Remove

Once you become familiar with the way the programming language works, more ambitious programs can be implemented, stage by stage until the full design (which always changes) is achieved. In this, more complex example, the table to the left is being generated by the program opposite. Only part of the program is visible but much of it is repetitive - another aspect of programming that may give a false impression of the apparent complexity. Using the language in conjunction with the forms editor offers the possibility of fully customised databases. Menus, dialogues and prompts can be programmed as well as the standard relational operators, conditional and loop structures and sub-routines.

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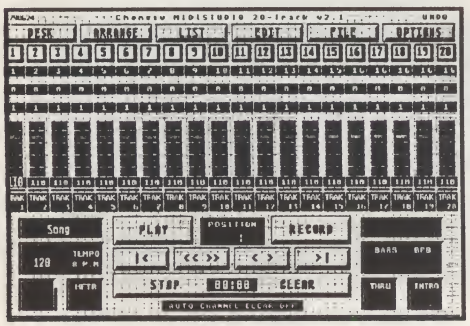
NEW SOFTWARE

IMAGE SCANNER ONLY £89.99

SCREEN SHOT

Midistudio £99.99



Midistudio is a 20 track Midi Music Studio. This Midi software package is a realistically priced introduction to Midi music processing and includes the following features.
20 tracks each assignable one of 16 midi channels, each track can be transposed up or down 2 octaves, the main screen features full tape deck controls with individual volume sliders for each track, note editing facilities including editing of pitch, octave, duration and velocity, plus full midi controller editing(pitch bend, mod wheel. etc.).
Full control over phrases is offered through Quantizing, transposing, and phrase arrangement software pages. The arrangement facilities allow moving and copying phrases on any of the 20 tracks.
The package is easy to use and is a strong competitor with Pro 24.

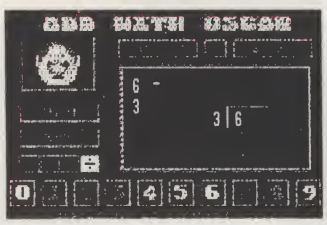
" Out performs Pro-24 v2.1 in almost every way "

Atari ST User Jan 89

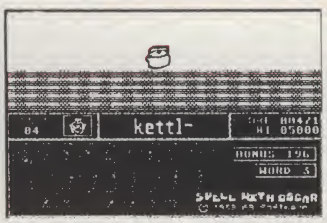
EDUCATIONAL SOFTWARE

Add With Oscar £12.99

Add with Oscar is a fully mouse controlled educational game with full colour screens and sound for teaching addition, subtraction, multiplication and division to children. This program has selectable difficulty levels and a Hi-Score table.



Spell With Oscar £12.99



Spell with Oscar is a game which teaches spelling, keyboard skills and motor coordination. Pictures of objects move smoothly accross the screen and the pupil should spell the name of the object while Oscar checks for mistakes. Spell also incorporates selectable dificulty levels and a Hi-score table. **Extra data disks £5.99**

TRILOGY £12.99

Quick List Plus is a utility that compiles a directory of your disks. Sort on disk or name, reads any drive, including hard drive. Printer output for hard copy of databases.

Mastermat is a formatter that optimises disk space, allows non standard sector and track formats/ fast read format.

Picstrip is a utility that captures all or part of a picture file for use in Basic programs, supports GFA, FAST, HISOFT and ST Basics and is Degas, Neochrome and AB Animator compatible.

AB Animator £14.95

AB Animator is a utility for creating and animating sprites. It supports GFA, HISOFT and FAST basics and is compatible with degas and neochrome picture files.Use the full icon control to animate up to 20 big frames of 56 pixels wide by 33 pixels high.

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Others	Ring

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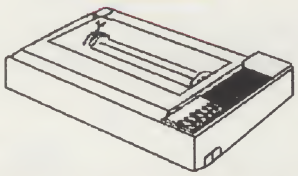

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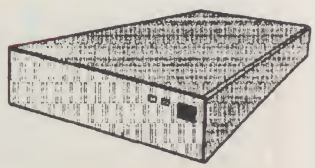

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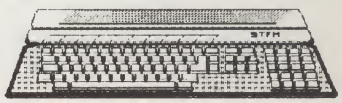

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BORODINO

Wargames may not be your cup of tea, but now they have been given a new lease of life with Atari's new Battlescapes range. The result is an accurate and challenging re-enactment of classic conflicts from the depths of history. Simon Tunstall recounts his experience of Borodino.

Seventy miles west of Moscow sits the small town of Borodino. It is here at 6 a.m. on the morning of September 7th, 1812, that the largest battle of Napoleon's campaign in Russia commenced. Napoleon had originally invaded Russia with an army of 675,000 men, supported by 1300 cannon, and had been attempting to bring the Russians, under Kutusov, to bay with at least a three-to-one advantage to himself. However, the wily Kutusov had given ground and forced Napoleon to fight a series of small disjointed and indecisive battles, whilst at the same time stretching the French supply lines to breaking point. When the two generals finally faced each other at Borodino, they met on more or less even terms with approximately 130,000 French troops facing 120,000 determined Russians. Thus began the battle, that as the author of this program points out: 'provided much of the war in Tolstoi's "War and Peace", not to mention the cannons in Tchaikovsky's "1812 Overture"'.

This is the scenario being presented to us by a new computer wargame from a new author, Dr. Petcr Turcan, and the first in a new series of computer wargames called "Atari Battlescapes" from Atari Corp.(UK).

Instead of the usual format of most wargames, where the players have an 'eye in the sky' view of everything that occurs on the battlefield, and where they have god-like powers enabling them to be everyone from company commander up to Army commander and move every single unit with chess-like precision, "Borodino" attempts to bring a new aspect to wargaming and place the players in the situation as faced by Napoleon or Kutusov on an eighteenth-century battlefield.

Players are restricted to what they can see by their own personal range of vision and they can only physically control their own movements around the battlefield.

View east from Redan Redoubt - Napoleon's starting position.

Communications with the player's subordinate units are conducted via despatch riders, who will carry orders, battle reports and messages between the various units.

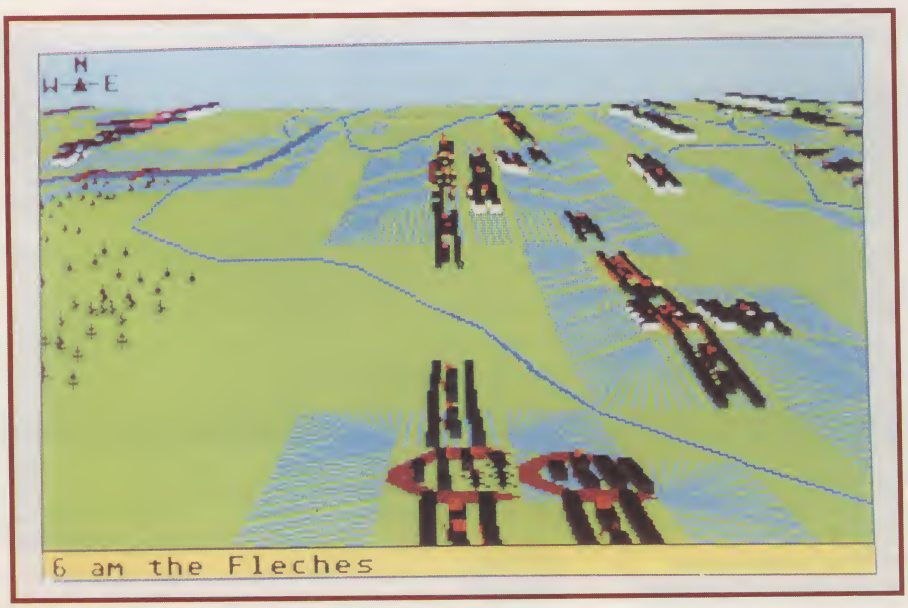
To produce a viable simulation and an interesting and challenging game along these lines may have seemed a little far-fetched not too long ago, but Dr. Peter Turcan, along with the power of the Atari ST, appears to have actually succeeded.

Upon booting up Borodino for the first time, you realise that you may be looking at something special, when the opening shot of the game is a colour 3D view of part of the battlefield looking east across Borodino village, and visible off to the right, up on a low hill, is (what I later learned) the large earthworks called the 'Great Redoubt'. However, having been misled by pretty graphics on many games before, I reserved judgement for a while longer, and whilst the remaining data was loaded, I read with interest a brief text description of the setting of the battle, as it appeared in a text 'window' at the bottom of this display.

There is an option to see the cannons firing, although this turned out to be a little disappointing, especially as the game has no sound to draw your attention to any gunfire.

Here the graphics were very impressive as I was presented with a view looking east from Napoleon's starting position at the "Redan" earthworks, surrounded by the Imperial Guard infantry regiments of Curial's division, neatly lined up in battalion column formation. In front of this position are the infantry regiments, cavalry brigades and artillery batteries of Davout's Corps. In the distance can be seen the Russian positions in the earthworks at "The Fleches" and the village of Utitsa off to the right, with the "Great Redoubt" off to the left.

The units are represented in coloured 3D blocks of regiments (infantry), brigades (cavalry) and batteries (artillery), with the bands of colours indicating their types e.g. units with dark purple bands with black on top (hats) are French Imperial Guard infantry. Units with dark purple tops, red



View north from the Redoubt along the French lines.

bands below and white bands at the bottom are Russian Cossack cavalry. Artillery are conspicuous by their guns, in addition to their tunic colouring. Leading each unit are the commanders on horses with differing flag colours and shapes indicating whether they are Corps and Divisional generals or Regimental colonels.

A round cursor, representing a 'telescope', can be moved around the view and by "clicking" the mouse button when it is placed over a unit or landmark, it will cause information on what you are looking at to appear in the text 'window'.

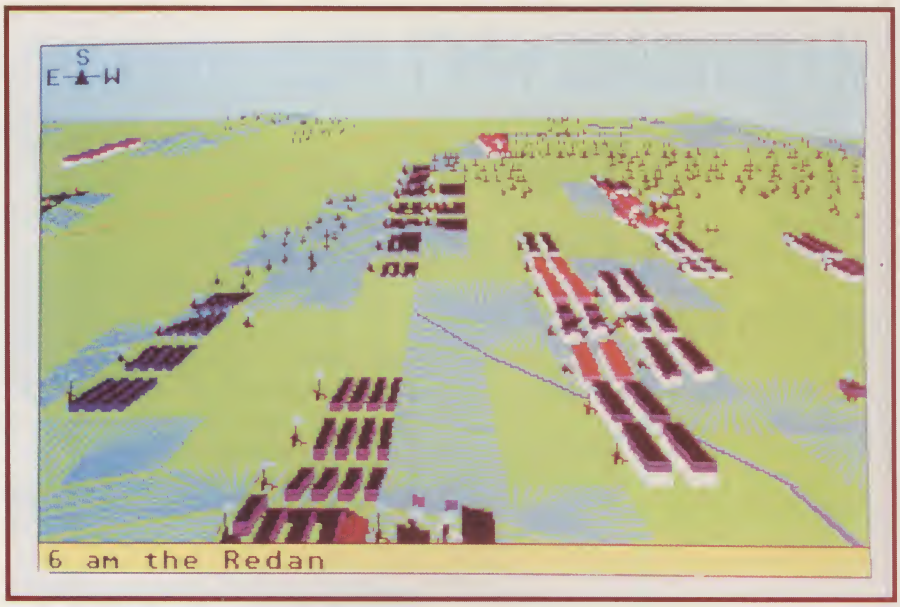
Information on landmarks will display it's name, any units within or on it, and it's range from your viewing position. To change the direction of your viewing position, it is a simple matter of typing in "LOOK N(orth), W(est), etc.", and you will see the view change to that perspective.

If as I did, the option to view from other than your commander's position is selected, then typing in "LOOK (direction) FROM (a landmark or subordinate commander's name)" will magically teleport you to the new position. Using this option, I had a wander around the battlefield moving from unit to unit after identifying the next unit with the 'telescope'. Although the manual states that the view on the screen only goes out to a horizon of 1.5 to 2 miles, and that the battle area is 6 miles north/south and 5 miles west/east, it is only when you see for yourself all of the units of both sides stretching out into the distance, that you can appreciate the size of the thing! Having been suitably impressed by the 3D colour grandeur of all these troops awaiting my word before unleashing their attack, I then got down to the business of playing the game.

The battle itself lasts the whole day from 6am to 7pm, when a final tally and assessement of the result is given. The game is played in turns, with each turn representing 15 minutes. A maximum of eight orders per turn are allowed to each side, and these take the form of text commands (as if 'writing' out orders) and are taken by computer-controlled despatch riders to the corps commanders who will then attempt to carry out your orders. These despatches need not neccessarily be orders, but can be requests for information on a unit's position or battle reports. The parser for the text commands are logical and well structured, and are explained well in the manual, with plenty of examples to help you out.

I started to experiment with some orders, but soon discovered that things did not happen very quickly back in the Napoleonic era! The game has allowed for the fact that despatch riders did not fly through the ether and arrive instantly at their destination and that they are subsceptible to getting killed and not delivering their message if riding too near to enemy troops!

Vital information and orders are invariably 'game hours' old, especially for units several miles away from your position, and the battle may have moved on quite considerably by the time they receive your orders or battle reports finally get through to you! Although frustrating at first, this was what finally got me hooked on the game system. The feeling that you were actually there and that you had to rely on your subordinates or spend your time charging up and down the line risking life and limb as you urge on your troops to



View south from the Redoubt along the French lines.

View west from Kutusov's starting position (he starts some way behind the lines).

greater efforts.

The computer controls your own forces very well and carries out your orders with a certain amount of logical sense. The program's combat, movement and computer controlled tactics have been based upon detailed Napoleonic miniatures rules, although which set rules were used has not been specified.

You will see units rout, units get smaller as they take significant casualties, infantry units form square when threatened by enemy cavalry, you will get requests from Corps commanders for extra troops to support attacks or receive reports of tactical withdrawals or local counter-attacks. The computer opponent can be a handful if given the opportunity and appears to make sensible decisions on when to hold, counter or withdraw.

The time taken for the computer to resolve movement and combat, and to redraw the view with everything at their new postions, can be a little slow at times, but this is acceptable when considering the amount of data being processed. I have not played the two-player version of the game, but have heard from other sources that it plays well if you are prepared to give it the time.

The game comes on two disks, plus a comprehensive 62-page manual with includes instructions, background information and the Order of Battle for both sides. In addition, you get a Write On - Rub Off pen for use with laminated side of the enclosed double-sided colour map, one side of which gives the historical main moves of the battle, the other side a map of the battlefield upon which to plot your own moves. (Why only one map and pen was supplied for a game that has a two-player option is a mystery).

Conclusion

Borodino is an excellent visual and gaming experience and the more you play it, the more you appreciate the detail and depth that has gone into it. Being able to play either side and to set up your own starting orders, will give it enough variety for it to be taken out of the disk box or brought off shelf and replayed many times. A must for the serious and not so serious wargamer alike.

Product:	**Borodino**
Price:	**£29.99**
Supplier:	**Atari Corp. UK**
Developed by:	**Dr. Peter Turcan.**
Phone:	**0753 33344**

HARDWARE FACT FILE:

NEC P6 Plus 24 -pin dot matrix printer

Rated by many as one of the best 24-pin printers an ST can exploit, the NEC P6 has an excellent reputation for quality and accuracy. The latest incarnation of this model is the P6 Plus - we look at NEC's latest hit, here in this month's hardware fact file.

The NEC P6 and its wider carriage sister, the P7, have always known a special relationship with the Atari ST. Signum2, for example, the document processor from Signa Publishing, is almost perfectly at home on a P6 - most of the available fonts are designed for this output device.

Due to the three main aspects of this printer: accuracy; resolution and robustness, the NEC P6/P7 Plus are the perfect dot-matrix printers for business and office use, where they will perform time and again, and withstand most day-to-day punishment.

The manual provided is a rather thick, very reference-like, spiral-bound affair. It becomes apparent that there are no dipswitches on this printer - all settings are software selectable, or front-panel programmable. The front panel is a high-quality membrane switch assembly.

The P6 Plus offers several built-in fonts and typefaces: Courier in 10, 12, 15, 17 and 20 pitch (not point); Prestige Elite in 12, 15 and 20; ITC Souvenir in 12 and 17; Bold proportional spacing; Times PS; Helvette PS; Draft Gothic in 10, 12, high speed, 15, 17 and 20; plus font cards.

Both single-sheet and sprocket-feed paper can be used as standard, with the option of fitting a single-bin automatic sheet-feeder attachment. Centronics input is supported as standard - RS-232c costs extra, but is easily fitted. The NEC P6 Plus can be primarily thought of as running under Epson LQ-800 emulation, however, it offers extra modes and twice the vertical dot resolution.

Only three sides of the NEC P6 Plus are used: power switch on the right rear (unreachable), Centronics and IEC mains sockets on either end of the rear, and control panel plus font-card slot on the front.

Summary

The NEC P6 plus is one of the most intelligent consumer-level dot-matrix printers around today. It has a brutally effective 'look and feel' about it. The 360*360dpi graphics should not be taken to mean that the P6 Plus is capable of higher quality than a laser printer. This is simply not the case - laser printers are faster, more accurate and more consistent than any dot matrix.

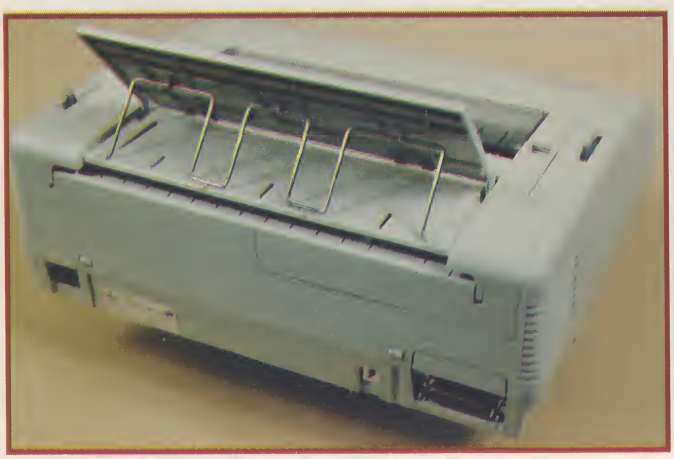
Check list

Input: .....Centronics (RS-232c optional).
Colour option: .....yes
Hex dump mode: .....yes, with hex and ASCII
Emulation: .....Epson LQ-800
Text pitch:.....10, 12, 15, 17, 20, ps
Column width at 10cpi:....80
Paper width:.....127mm-254mm wide
Price:.....£649.00 (rrp)
Ribbon:.....Endless loop (DR12), 4-colour fabri:
..... (DR12), Multistrike (LQ12)
Paper handling:.....tractor feed
.....plain paper cut sheet
.....optional single-bin auto sheet feeder
Special codes:.....Triple-width characters
.....Double-width characters
.....Double-height characters
.....360*360dpi graphics
Speeds: .....draft 10: 220cps
.....high speed 12: 265cps
.....letter quality 10: 75cps
.....proportional: 94cps ave.
Vert spacing command: ...FS 3 (n) where n/360-inch line spacing.

bit image modes

code	mode	dpi	pins
0	single density	60	8
1	double density	120	8
2	hi-speed double	120	8
3	quad density	240	8
4	CRT screen	80	8
6	other CRT screens	90	8
32	single density	60	24
33	double density	120	24
38	other CRT screens	90	24
39	triple density	180	24
40	high density	360	24

Max bit-image mode: 360*360dpi



NEC P6 Plus in Courier 10 mode
Underscore on & off *italics on*
ITC Souvenir, in 10 pitch
Helvette, proportional spacing *and italics*
Times, proportional spacing *and italics*
New Prestige Elite, 12 pitch

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Panasonic 1592	£439
Panasonic 1124	£320
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NEC P7+	£POA
NEC P2200	£319
Jukl 6100	£319
Citizen 12DD	£149

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Future Designs	POA
Human Forms	POA
Stereotek	POA
Cyber Control	POA
Cuber Paint	POA
Genesis	POA
GIST	POA
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Star Struck	POA
START	POA
1st Mail	POA
1st Word Plus (English)	POA
1st Word Plus (French)	POA
1st Word Plus (USA)	POA
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GSTC	POA
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Supercharged Easy Draw 2	POA
Easy Tools	POA
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Other languages also available	POA
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Trimbase ST	POA
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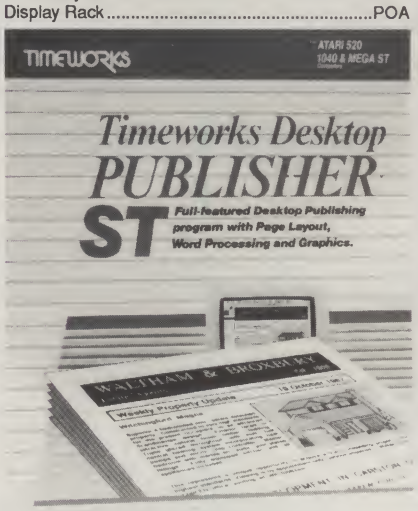
Art Library 2	POA
Display Rack	POA



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SINGLE SIDED APPLICATION DISKS

• A5 - Archiver II file/disk compacter version 1.0 excellent, Autodate and many more.
• A6 - Autogem - auto boots any GEM program on booting the ST, Xformat2 - Extended disk formatter, Shorttermcomms, VC spreadsheet -non GEM spread sheet, Directory lister, System font changer - uses Degas format fonts, Appointment reminder, Print Master to Degas converter, and others.
• A13 - Publishing Partner disk 1. Public domain fonts for non PostScript printers. Hudson, Columbia, Devoll, Thames, Spokane and Saturn. There are colour and monochrome screen drivers and printer drivers. Font editor - create your own fonts, very complex. Also on this disk is a printer driver for the HP Laserjet Plus printer. All the fonts on this disk work with the HP Laserjet Plus printer.
• A24 - Astrolab German astronomy program. Monochrome only, version 0.7 latest version - much improved!.
• A29 - Skymap mono only star system - 1500 stars are included excellent astronomy program, . Contern - version 4.2 comms pckg - on line help, function key editor GEM based.Very good directory printer lister.
• A30 - DEC edt clone for the ST (editor), Disk engineer version 3.01, allows you to do anything to any disk is GEM based can give you a complete report on any disks, format, copy, listings and FAT info. Includes source code. 8-bit to Degas converter, MAC picture tranfer program.
• A31- 40 1st Word printer drivers - all Epsons, Panasonic, Atari and Atari Laser, NEC Pinwriter, Star, Olympia, Toshiba etc.
• A35 - Compunet fully working supplied by Compunet themselves, version 3.01 documentation on how to get started. Plus ProEd. Excellent text editor that is non GEM - very good. Home accounts - Payscheduel, Accounts (ST Basic program and manual), Loancalc (ST Basic program).
• A36 and A37 - Clip Art 1 and 2, dozens of monochrome pictures and clip art suitable for any package that uses Degas or Tiny format pictures.
• A38 - Publishing Partner disk 2. Six new fonts for non-PostScript printers - colour and monochrome screen fonts and docs to tell you how to access the foreign characters of the ST. There is also a much needed update to the Helvetica font. The 6 new fonts are Caligrify, Elegance, Courier, Roman Bookface, Westside and Avant Garde.
• A40 - Harddisk 1. Disk full of hard disk programs - including Turtle version 2.8.
• A41 - Monochrome emulator version 3. This program makes your ST think that it is running in monochrome mode when it's using your TV or colour monitor. Works on 520's, 1040's, new and old TOS, and tested with dozens of programs - includes the source code in 'C'. CMFonts converts Macintosh fonts to ST GDOS format. The programmer claims to have tested the results with Calligrapher includes Source 'C' code - sounds good. Topchart, Setdate. Apricot textfile converter and source code. INPUT a small program to enter small text files to disk or printer. Deformattor - this program deformats your disks! A Virus killer and disk immuniser.
• A44 - STar Net Bulletin Board System a very good BBS system. Clocks, countit, Micro EMACs to EDST file converter, Seek Speed - diskseek speed changer can help with IBM drives,
Virus killer version 2.
• A50 - Beginner disk 250k text file for people who are new to the ST or are having problems with aspects of the machine i.e. RAM disks, spoolers, Desktop Accessories etc.
• A51 - 12 communication packages and utilities etc. all ARChived to fit onto a single disk. Disk contains ARChiver II and help doc.
• A52 - Hard disks disk 2. Eight hard disk utilities.
• A63 - Fontkit 3.31 by Jeremy Hughes - Epson, ST screen and Degas font editor - excellent, needs A64 as well.
• A64 - Fontkit 3.31 by Jeremy Hughes - Fonts and utils for A63 - excellent, needs A63 as well.
• A65 - Clip Art 3 - 1930's trademarks in tiny fmt. Can be used with most DTP and WP packages.
• A66 - Unix disk 1 - Supplied by C. Korycinski from Perth. Full of Unix Utilities all with docs.
• A67 - Unix disk 2 - Supplied by C. Korycinski from Perth. Full of Unix Utilities all with docs.
• A71 - Be a guest on Compunet, Maths made easy by A Craig very good, PCP Accelerator - speeds up lines to USA, Convert Printmaster to Degas.
• A72 - Personal Finance by Eric Chapman very good, Superboot V2.00 excellent choose which Accessories you want, have a loading screen, choose AUTO folder programs, choose a DESKTOP.INF file, set time and date + more, Sector Editor by K J Walters V1.0, CAS puts arrow in top left hand of screen. Ripper.
• A74 - Movie database 2000 films available on video in text form can be used in any word processor or text editor and can easily be pulled into a database.
• A75 - Nicholas Ekins-Daukes collection of programs: Shares Program (keeps track of your shares). High scores for the game player to store all your highest scores. Weather 1 program store weather data. Weather 2 variation of Weather 1. Beat Box and Beat Bind drumm sequencer and beat box file merger. Edbank the electric money box. Graph plot for plotting line charts. Specport to port ZX Spectrum graphics to the ST via the RS232 interface. Specsave to save transmitted RS232 files to disks. Printer server allows a computer connected to your ST via the RS232 port to use the ST printer.

DESKTOP ACCESSORY DISKS

• DA1 - Calendar, Crab, Index printers, Intasect RAM disk excellent, RAMdisks, Lupe, Reversi, Sideclick, Spooler, Texas instruments calculator, Tiny tool editor, Analogue clock, Breakout.
• DA2 - 5 Calculators, Calendar, Font loader, Digital watch, Puzzles, Screen protector, RAMdisks, Snapshot screen saver, Directory printer, Maze game, RAM free plus, Init disk, System (configs printer modem, colours, has note pad and much more in 28k!), Mites, IBM block terminal, Note pad, Goodies, Remember, Mites, control panel latest version - time and date work properly, VT52 RS232 config, plus others.
• DA3 - W/P tools,Diskman - disk utility, Minidos - disk utility, X - utilities, M and T - ramdisk and spooler, New Word (word processor) this is truly very good and very useful has many features and manual, coder, uploader use with Fastcom to combat its inability to upload
messages written off-line to anywhere other than page 7 in Prestel, Alarm clocks - very good, Schnapp saves screen to buffer and then will dump when you want, MAD 2 different .acc s that muck up the screen ramdomly. One scrolls the programmers name throught the mouse pointer!, Pro painter dumps to disk a marked block of screen.
• DA4 - Calc 7 scientific calculator and 'C' code, Caps Off/On - displays at top off screen nice and boldly whether Caps Lock key is on or off, Squirtit, Read Only Control Panel, Startup - excellent, Private eye - really brilliant tells you all about the insides of your machine - O.S.
version top of memory etc. Rat Trap - brilliant program written by Alan Thomas which is based on the idea of Mousetrap but it's much much better several different modes of running, Reverse screen. RAMBuffer nice clock and RAMdisk program, Address book - excellent, Code Table, Disk info, Melt, MMcopy, Puzzle, RAC2, RAMFree,Reversi, Speedmouse - set speed of mouse - excellent.
• DA5 - Assistant, Clip, Combined - 10 Accessory in One, DCS, Epson FX5 utility, HPLike2 - Hewlett Packard calc, MiniDOS,Mob2Key, NakaJima printer Config. RAMbuffer, ROCP, Reverse Screen, Startup - excellent.

GRAPHICS DISKS

• GR1 - NEOchrome version 1, Palette, DR doodle, Palette setter, Doodle to Degas converter, Effects (slideshow that does effects on any NEO pics with a 'PIC' extender, Windpics(loads all the NEO '.PIC' pictures in disk a into a seperate window allowing you to have all On screen at once), 3-D designer (draw images and make them movel, Sprite designer, Shrendraw - drawing program and pascal source code, another bigger Sprite editorl and Degas fonts.
• GR2 - Grafcon, Degas to RLE converter, Dump-to-gem dump Degas files to Gemini printer, Megablit a very good drawing package with all the features,Picture converter including Art director to NEO/Degas, PI3 to NEO,Little Painter German paint program mono only, Degas converter and printer full GEM.
• GR3 - MASTER Painter - excellent graphics program works in ALL resolutions in NEO Degas and Doodle formats. Has multiple screens 6 on 1/2 Mb, upto 24 if you have enough RAM, animate between these multiple screens, all the usual tools plus rotate to any angle, skivle- horizontal and vertical, zoom, twist, built in converter, very well laid out and designed- full
GEM but this does not slow it down in the way maybe Degas Elite is. This is a truly brillinat program. Also Paintlux a monochrome painting program in GEM and German.
• GR11 - 11 picture converters and utilities - PICswitch 0.7, NEO to mono etc.
• GR13 - Studio and VanGoGo - two excellent colour only art programs. VanGoGo includes an sprite editor - German but easy to pick up.
• GR14 - Public Painter Mono only absolutely fabulous!

LANGUAGE AND MUSIC DISKS

• L5 - 'C' Compiler including Text Editor, not for the absolute beginner and certainly not a tutorial, this disk contains all that you need to compile C source code, it is very very good, so before you spend £100 plus on a commercial C compiler C if you like C with this excellent PD compiler.
• L6 - Toy Prolog - German full documention, demos and source codes.
• L7 - Xlisp version 1.7 includes manuals.
• L9 - ST ICON version 6.3, based on SNOBOL4. Complete manual.
• L10 - Little Smalltalk. Incudes Smalltalk language, full manual, exampleprogs. and editor. See Jan and Feb 1988 issues of Personal Computer Worldfor tutorial etc.
• L11 - Forthmacs and micro Emacs editor plus forth programs. and manuals.
• M4 - Midi sequencer excellent play and record etc. very good.
• M7 - MidiDrum and MidiPlay - 2 great midi progs - mididrum is a drum machine, and midiplay a sequencor fully programmable - mono and midi only.
• M2 - Casio CZ series data librarian, Casio CZ voice manager, Orch-play includes files generated using the commercially availiable Orchestrator includes midi and ST sound chip support, Miditogi allows you to play the STs' internal sythesizer via your midi synth, ST synthesizer! Casio CZ-101 preset transporter.
• M5 - CZpatch, DXpatch. YAMAHA DX100 voice editing program, colour only.

MISCELLANEOUS DISKS

• W1 - 1st Word with manual, tutorial and 18 printer drivers.
• W2 - STwriter with manual, tutorial etc. 2 versions 1.75 and GEM/text based 'Elite' version of STWriter. the same program that can be switched into GEM mode and back to original non GEM version, usual full manual and quick reference etc. with new features. very good word processor.
• W7 - SIGPIC v2.00 great program from Germany that converts a mono screen image into a one page SIGNUM document, this can then inserted anywhere into the doc, Inhalt - generates a table of contents or an index of a document written with Word Plus, Snap Help, Typing Tutor - full graphics - this is in German but it's easy to pick up.
• W8 - 1st Print, Hard copy, LQ 800 accessory, NEC CODEP6 - NEC accessory, NEC EMU - emulator prog for NEC's the have FX mode, and others.
• W9 - Newsletter Maker - Allows you to make a GEM Disk magazine - very good.
• D51 - ST Tour! An excellent demo for all you New STers. The tour worksin Monochrome and in Colour, and shows how to use all the features of the ST, including desktop accessories, menus, windows etc. This is very,very good.
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INTRODUCING MODULA-2

Modula-2 is a highly competent programming language which exists as a good alternative to Pascal, C and even Basic on the ST. Don Milne introduces the language and describes some of its finer points.

In my experience there are basically two types of programmer - hobbyists and serious programmers. Hobbyists typically use interpreted BASIC, program mostly for fun, or as an adjunct to their normal job, for example an engineer using a computer to take the grind out of some heavy-duty maths. This person is concerned with quick results, not with long-term considerations, such as portability or ease of maintenance. For this type of programmer BASIC will continue to be a good choice for some time to come.

The working programmer has different requirements. The program developed for one environment may need to be moved to another, so the chosen language must be easily portable. This rules out BASIC for serious consideration. The program may also need to be maintained by someone else when he or she moves on, so a language which makes this easy is a necessity. Performance may also be important, and that means that the language must be compiled rather than interpreted, and, moreover, the compiler should generate reasonably good code. Happily this is not the problem it used to be - compilers are getting faster and better as small computers expand their capabilities.

Currently the language which reigns supreme in the professional arena is C (especially on the ST). However, a latecomer on the horizon may seriously

Where did Modula-2 come from?

The creator of Modula-2 is the famous (infamous?) Nicklaus Wirth. In the sixties he was involved in the design of Algol, followed this with a variant of Algol called Algol-w and then, in the early seventies, designed the language for which he is best known - Pascal.

Pascal was designed to teach good programming (Wirth is a Professor of Mathematics in Zurich) which led Pascal to become an immediate hit with the educational community. Its shortcomings as a programming language became very obvious when it made its debut on small computers. The first problem was that the early microcomputer Pascals were pseudo-compiled (the compilers produced an intermediate code called p-code which was then interpreted), which meant that programs seemed very slow when compared to those produced by the C compilers which later began to appear, which generated machine code directly. This earned Pascal an entirely undeserved reputation for slowness, and C the equally undeserved reputation for speed. Even today these myths surface whenever the two languages are discussed.

Standard Pascal did, however, have genuine problems in the design department. File I/O was primitive; string handling was absurd; access to the underlying hardware damn near impossible, and (one of the most damaging limitations of all) there was no facility for modular programming - by which I mean breaking a large programming project down into tasks for which "modules" are developed and compiled separately, and pieced together later (linked). As has been pointed out before, here was the standard bearer of "Structured Programming" which could be used to develop structured programs, but not structured systems. The BSI, whose ISO Pascal standard many hoped would correct some of these deficiencies, instead chose to cast them in concrete.

All successful Pascal compilers have to some extent ignored the language standard and, instead, correct the deficiencies by means of special extensions. While many professional programmers do use extended Pascals, the situation is unsatisfactory. The rule of inter-machine portability is broken, leaving the programmer dependent on the commercial fortunes of a single compiler vendor, and also with a problem when moving to new environments not supported by that vendor.

This apparently leaves C with an overriding advantage. The language is perceived as efficient; you can split large projects into separately compiled modules; there are facilities for low level work; the standard file and string handling libraries are adequate for most duties, and, most important, a major portion of the language and its library are standard across a wide range of environments.

C does, however, have its own drawbacks. C compilers do little type checking - a feature to its proponents, a source of bugs to the rest of us - but most of all, the syntax of the language itself can be both difficult to remember and more difficult to read. I'm quite sure that many a C convert thinks wistfully back to their Pascal days, "surely, someone could design a language with the power of C but with a style more like Pascal?". Whether they know it or not, these programmers are describing Modula - 2.

Modula-2 has two direct ancestors: Pascal is, of course, one, and the other is Modula, an experimental language designed in the seventies to investigate approaches to concurrent programming. Modula-2 was developed in parallel with Wirth's Lilith computer system with the idea that all Lilith software (low or high level) would be written in the new language. The point to notice is that, unlike Pascal, which was developed as a teaching aid, M2 was designed expressly for "real world" programming from the start. M2 has a cleaner syntax than Pascal, and adds several new features which include, excellent support for modular programming, low level programming, concurrency, new data types, and so on.

unsettle the C applecart, and that latecomer is the programming language, Modula-2.

Modules

Fundamental to understanding the language Modula-2 is understanding the concept of the module. Some of the benefits of modules are:

```
Separate compilation.
More logical "bundling" of related routines,
constant declarations, data types and variables.
Information "hiding".
```

It is not necessary for every module to have all of these attributes. For example, Modula-2 offers a special form of module called a "local module" which is not separately compiled - this construct exists in the language purely on the strength of benefits offered by the other attributes.

Separate compilation can speed up the development of very large programs because it removes the need to compile the entire program simply because of a change in a single module. Instead, that module only is recompiled and the program is then re-linked.

Bundling of related routines makes large programs easy to handle in the mind of the programmer, because major program sub-functions are broken into tasks each dealt with by their own module - this is simply attacking the large project using the divide and conquer principle. Each of the routines and variables in a given module would be related to that single major task. As an added benefit, a sufficiently useful module can be stored in a "library" for re-use in later programs, provided that you are careful to remove any program dependencies.

Hiding

Information hiding may seem a strange term. Basic programmers I meet, often assume that I am talking about selfishly hiding clever program source code from interested readers! Not so. Information hiding simply means removing from the "sight" of a program information about a module not required to use the module. This ensures that the program makes no assumptions about how a module is implemented.

In Modula-2, all details about a module remain hidden unless it is declared in a special "definition module". Figure 1 is an example of a Modula-2 definition for a simple graphics module - this is all the information the compiler would have when processing a client module. The module may be designed to use one of the ST graphics modes, or all of them, or perhaps the mode used will be changed later in the development stage. None of this concerns the client program. If the data structure used to represent the display appeared in the definition, then this level of flexibility would not be possible. I should emphasise that all Modula-2 external modules are required to have a definition part, and only the objects in the definition part are available to the client program.

```
DEFINITION MODULE Graphics;

  PROCEDURE SetPixel(x,y,colour:CARDINAL);
  PROCEDURE ClearPixel(x,y:CARDINAL);
  PROCEDURE ReadPixel(x,y:CARDINAL; VAR
                          colour:CARDINAL);
  PROCEDURE Line(x1,y1,x2,y2,colour:CARDINAL);
END Graphics.
```

FIGURE 1. EXAMPLE MODULA-2 DEFINITION FOR A SIMPLE GRAPHICS MODULE.

Comparison

So how do Modula-2 modules compare with similar features provided in other languages? Dealing with BASIC first - there are probably BASICs around which provide some equivalent of a module, however I know of none.

Standard Pascal has only one feature which can be thought of as a primitive module - the include file. Include files allow a program to be broken up into packages of related procedures and declarations, and that is about it. There is no separate compilation, and certainly no information hiding. Some extended Pascals support a type of module called a "Unit" which is very close indeed to the Modula-2 concept, but the problem of portability with extended Pascals has already been discussed.

C comes very close to providing true modules. C has what are referred to as "compilation units" which are separately compiled, and which provide the necessary mechanism for bundling related functions. Even so, the C compilation unit has several weak areas. The C language has no equivalent of the M2 definition module, so good C programmers achieve something like the same effect through the use of the so called "header file". Header files are purely an invention of the C programmer - they are not in any way supported, checked, enforced or recognised by the language itself.

This means, for example, there is no check by the C compiler that the contents of a header file are consistent with the matching implementation module or with other client modules (all M2 compilers must perform a version check and will refuse to link modules compiled using older definitions). If a C programmer wants to call a function in an external module, he must know (for example) that the function he wants to call takes a 'long' as an argument and not the 'int' that he expects - the compiler will not complain, so the programmer finds out when the program crashes! Modula-2 compilers check the definition and can therefore ensure that the arguments to a procedure match the procedure declaration.

There is also the possibility of name clashes, ie objects in different modules having the same name - the programmer finds this out at link time. In Modula-2 the fact that an object is available in the definition (exported) is not enough. In order to make use of the object, the client module must specifically

```
MODULE Test;

FROM Graphics IMPORT SetPixel;   (* explicit import *)
IMPORT Plotter,Graphics;         (* qualified import *)
BEGIN
    SetPixel(1,2,3);             (* calls SetPixel in module Graphics *)
    Graphics.Line(1,1,10,10,3); (* calls Line in module Graphics *)
    Plotter.Line(1,2,30,40);     (* calls Line in module Plotter *)
END Test.
```

FIGURE 2. EXAMPLE SHOWING HOW OBJECTS ARE "IMPORTED" FROM ANOTHER MODULE.

ask for (import) that object. This means that it is always clear to the M2 compiler which object is required. If there is a name clash, then M2 also allows the option of a "qualified import" which allows the programmer to prefix the name of an object with the name of the module to which it belongs. Figure 2 shows examples of various types of import from our example graphics module and an imaginary Plotter module.

Syntax

Pascal and C are similar in one respect: they both use "brackets" around chunks of code to form so called "compound statements". Pascal brackets compound statements with "begin" and "end", while C uses curly braces.

Modula-2 departs from the C and Pascal tradition by dropping the opening bracket. Instead, all program statements which begin with a keyword also end with a keyword (as in the IF statement, this is nearly always "END" - the only exception is "REPEAT" which terminates with "UNTIL"). Figure 3 shows an IF statement in C, Pascal and Modula-2, which demonstrates the point.

Like C, Modula-2 is case sensitive. This means that M2 does not treat words as being the same if they have a different mixture of upper and lower case letters. For example, "IF" is a recognised keyword in the language, but "If" or "if" would not be recognised, and so on. This also highlights another feature of the language: all Modula-2 keywords have to be in UPPER CASE, an aspect which many programmers do not like at first, but one which you soon get used to.

FIGURE 3. AN EQUIVALENT STATEMENT IN PASCAL, C AND MODULA-2.

```
(Pascal)
if a<>b then
begin
      a := a+b;
      Write(a)
end;
```

```
(C)
if (a != b)
   {
   a += b;
      printf("%i",a);
   }
```

```
(M2)
IF a#b THEN
      INC(a,b);
      WriteCard(a);
END;
```

Handling Data

Figure 4 shows the basic data types which Modula-2 supports. These are largely similar to those of Pascal, except that M2 provides an additional CARDINAL type (unsigned integer). A typical sixteen-bit CARDINAL type can handle numbers from 0 to 65536 whereas INTEGERs of the same size range from -32768 to 32767. Modula-2 also provides the extra numeric types LONGREAL and LONGINT which provide greater range or precision at the expense of extra memory usage.

Figure 5 shows the data types in Modula-2 which are genuinely new from a Pascal viewpoint and which are of greater interest. BITSET is a specialised form of the old Pascal "set". Traditional program variables have a single value associated with them. Sets, on the other hand, may have several associated values and the language provides operations which add or remove values from a set, test whether a particular value is a member of a set, and so forth. Even if you have never used Pascal, these concepts should be familiar to anyone who has done secondary school maths. Sets are normally represented in a computer using an array of bits, each bit being associated with a particular value in the domain of the set, and each bit being asserted if the value is a member of the set and zero if not.

A Pascal programmer did not have to be an Einstein to see that set operations provided a handy way of doing bit manipulation, and this is formalised in Modula-2 through the BITSET type. A BITSET has a fixed number of elements defined by the wordlength of the host processor - on micros this is usually sixteen bits. BITSETs can be manipulated using the normal set operators inherited from Pascal and also using the M2 standard procedures INCL and EXCL which respectively set and reset individual bits. BITSETs are enormously useful - the following example shows how they can be used to represent a bit mapped graphics display, eg the high-resolution display on the ST:

"FullScreen" is a two-dimensional array of BITSETs which represent the display and "Screen" is a pointer to a memory area organised in such a way. To set a pixel on the screen, an appropriate routine could be:

The ST monochrome display is 640 pixels wide, or 40 words. Dividing the pixel x-coordinate by 16 gives the number of the word to change, and the MODulus gives the number of the bit within that word which must be set. Clearing a pixel is possible by simply replacing INCL with EXCL.

Variables of type PROC are called "Procedure variables" and contain the address of a Modula-2 procedure, allowing the procedure to be called indirectly, as in figure 6. Procedure variables can also form elements of arrays or records or be passed as arguments to other procedures. This technique is extremely useful for writing general-purpose routines, such as a generic sort - the algorithm is the same for all data, so you need only supply routines for comparison and exchange as arguments to

```
TYPE FullScreen = ARRAY [0..399],[0..39]
                        OF ScreenLine;
VAR Screen : POINTER TO FullScreen;
```

```
PROCEDURE SetPixel(x,y:CARDINAL);
BEGIN
     INCL(Screen^[y,x DIV 16], x MOD 16);
END SetPixel;
```

```
TYPE IOPROC = PROCEDURE(CHAR);
```

Type	Meaning	Typical Size
INTEGER	Signed integer	16 bits.
LONGINT	Signed integer	32 bits.
CARDINAL	Unsigned integer	16 bits.
BOOLEAN	Logical type	8 bits.
REAL	Floating point	32 bits.
LONGREAL	Floating point	64 bits.
CHAR	single character	8 bits.

FIGURE 4. BASIC DATA TYPES IN MODULA-2.

FIGURE 5. NEW DATA TYPES.

```
Type      Meaning

BITSET    Bit mask
PROC      Procedure type

WORD    Assignmt compat with any word sized var.
ADDRESS  Assignmt compat with any pointer.
PROCESS  Identifies a concurrent process.
```

the sort function. In actual fact, PROC denotes a particular type of procedure - one that takes no arguments. Although this is often exactly what you need, you can handle other cases by declaring your own procedure types, for example:

Defines a procedure type compatible with any procedure taking a single character as an argument.

A variable of type "WORD" is assignment-compatible with any variable which has a size of one word (all microcomputer implementations of Modula-2 also include a BYTE type which has similar properties). WORD variables are at their most useful when used in a procedure declaration, as that allows any word-sized argument to be passed to the procedure.

An ADDRESS variable is assignment-compatible with any pointer type. You can perform arithmetic on address types allowing Modula-2 programs to steep themselves in the pointer tricks so beloved of C programmers.

A PROCESS variable identifies a concurrent process. The language provides primitives to initialise a process variable, transfer control between concurrent processes, or to attach a process to a hardware interrupt.

Types

One of the features of both Pascal and Modula-2 is strong typing - the feature which hackers love to hate. Modula-2 does, however, provide ways of defeating type checking in situations where the programmer feels it necessary.

We have already seen one method: the special BYTE or WORD variables which are effectively untyped, and so are compatible with all other variables of one byte or one word in size.

An area where type checking was a special problem in Pascal was in writing general-purpose array handling routines. Suppose you wanted to write a function SUM which totalled the elements of an array. In Pascal, unless you wanted to get tricky, you would have to write a different version for arrays of different sizes. In Modula-2, you can use what is known as an open array, in which the size of the array is not known but can be tested at runtime using the built-in function HIGH() as in figure 7.

Notice that an open array declaration declares that the argument is an array, and also declares the type of every array element, but not the number of elements. The element type could also be BYTE or WORD which allows any variable, structured or unstructured, to be passed to that routine.

M2 also has 'type transfer' which is similar in principle to type coercion in C. An expression such as CARDINAL(x) tells the compiler to treat x as a CARDINAL, regardless of its actual type. The language definition states that no actual conversion is performed - the compiler simply takes the programmer's word for it that the object x is a CARDINAL, or can sensibly be treated as one.

```
MODULE Test;

 VAR p:PROC;

 PROCEDURE MyProc();
 BEGIN
      WriteString('In MyProc'); WriteLn;
 END MyProc;

 BEGIN
    MyProc();          (*this calls MyProc directly *)
    p := MyProc        (* assign the addr of MyProc to var p*)
    p();               (* call MyProc indirectly *)
 END Test.
```

FIGURE 6. EXAMPLE SHOWING THE USE OF PROCEDURE VARIABLES.

```
PROCEDURE Sum(VAR x:ARRAY OF CARDINAL):CARDINAL;

VAR i,total:CARDINAL;

BEGIN
   total := 0;
   FOR i:=0 TO HIGH(x) DO INC(total,x[i]) END;
   RETURN total;
END Sum;
```

FIGURE 7. FUNCTION TO SUM THE ELEMENTS OF AN ARRAY OF ANY SIZE.

Conclusion

Modula-2 is a powerful programming language which deserves your attention and which is worth the time it takes to learn. It should attract programmers who want efficient programs but who would prefer a more readable syntax than is provided by C.

Several compilers are available for the ST. In an forthcoming article I shall be looking them over and reporting on the results.

Don Milne is a computer consultant and Modula-2 expert. He can be contacted via CIX (Compulink Information eXchange) where he moderates the 'modula.2' conference using the id. 'mpack'. CIX is on 01 399 5252 (data).

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LDW POWER

Following Microsoft Write, LDW Power is the second of the new range of business products to be marketed by Atari UK. The package promises much: GEM-based spreadsheet, Lotus compatibility, fast, GDOS graphics and the ability to run on any configuration of ST hardware: Roland Tongue discovers how much it delivers.

LDW Power is supplied on two single-sided disks and a 232-page manual in a ring binder, all contained in a stout outer slide-in case. The disks are unprotected and the program will run in either high or medium resolution on any ST system from 520ST with one single-sided disk drive upwards.

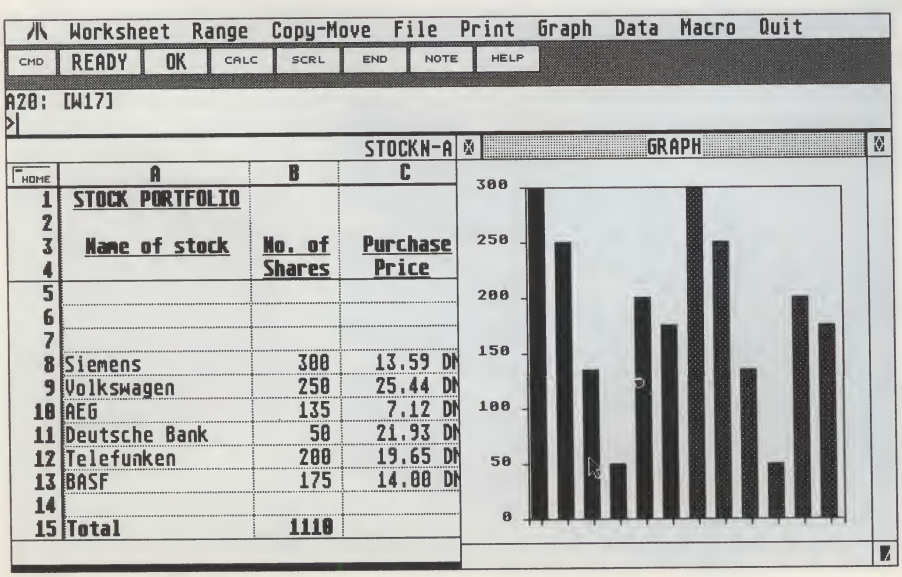
The manual is well written and comprehensive but, unfortunately, lacks any tutorial sections, which (if well written) can be a great help to the first-time user.

Full-featured

LDW Power has a very impressive specification, offering all the features that the user would expect to find in a top-end-of-the-market spreadsheet. The maximum sheet size is 256 columns by 8192 rows, though, obviously, memory restrictions will limit the user to only a small proportion of this available area. Up to four GEM windows containing separate sheets may be open at the same time, and blocks of data may be easily moved or copied between the various sheets.

The program is fully GEM-based, is intuitive and quick to use. I do have one quarrel with the GEM implementation. One of GEM's strong points is that the user interface is always as consistent as possible and one of the most consistent features is the menu bar. The standard GEM menu bar has the File menu as the second item from the left. Where does LDW Power have its file menu? Why, in the middle, of course! Even when the user finds the menu, the terminology within the drop-down is novel: for instance, 'Retrieve' replaces the more usual 'Load' or 'Open'. After you have finished work on the spreadsheet and wish to leave the program you simply click on 'Quit'. Where is it? At the bottom of the File menu? No, of course not, it's at the right-hand side of the menu bar. This may seem a pedantic complaint, but it really does get in the way of speed and train of thought if one has to keep hunting for such simple things.

(There is no excuse for such a non-standard implementation of the GEM menu bar as LDW Power has. The time for ST applications software to become more consistent and carefully thought out, is long overdue - Ed.)



The LDW workscreen allows multiple spreadsheet and graph windows

Lotus 1-2-3 compatible

The Lotus commands, functions and file structures have become a much used standard on the IBM PC, and many books have been written detailing the uses and structures of macros. Macros are a system of programming commands used within a spreadsheet to make the sheet perform regularly used processes. Macros range from the very simple - perform a calculation and, depending on the answer, post the result to some other location on the sheet - to the very sophisticated - perhaps setting up a comprehensive management accounting system, posting results to other spreadsheets and automatically printing out several different graphs.

LDW Power can read and write Lotus .WKS files and supports all the standard Lotus 1-2-3 commands and functions. Lotus macros will run without any conversions.

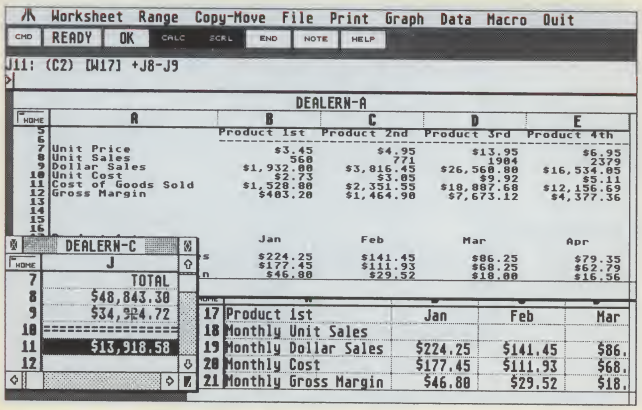
LDW Power has a very clever command selection interface. Lotus and VIP users will be used to selecting functions using standard 'slash' commands - for instance /l tells the program that the user wishes to load a file. ST users are used to pointing with the mouse and clicking to select functions. LDW Power allows the user to use both methods; the program accepts either method of function selection at any time and in any combination.

Database functions

For a spreadsheet, LDW Power offers good database functions. All the usual functions are offered and are backed up by good string handling and 'Data Parse' commands.

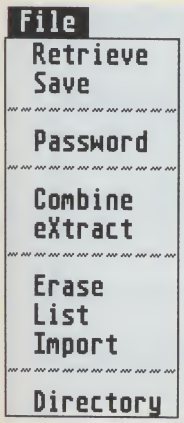
Using Data Parse, it is possible to import ASCII files into the worksheet and to split them into pre-defined chunks each of which is entered into a different spreadsheet cell. This is

LDW Power - a closer look



A maximum of four GEM windows may be open at any one time, displaying different spreadsheets or graphs. Below the Menu bar is the Indicator line which informs the user of what is going on at any one time and is also used to select groups of commands. Below the Indicators is the Status line which details the contents of the cell which contains the cursor. In this case, the selected cell is J11, the selected currency display format is C2 ($ with commas separating thousands), the column width is set to 11 characters and the cell contains the formula J8+J9.

One of the sheets has been set to condensed mode; this allows the user to show up to 28 rows of data in one window. In the condensed window the grid has been hidden - another of the comprehensive formatting options.



The infamous File menu. As well as the unusually named Retrieve option, Erase is also slightly ideosyncratic. Delete is a more common term for the command which causes a file to be removed from a disk.

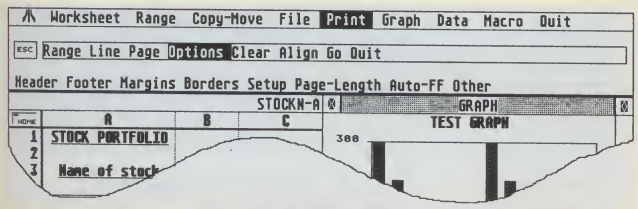
LDW files may be password protected, a feature useful in commercial environments where security of sensitive financial data can assume great importance.

The Combine command allows data from other LDW or Lotus spreadsheets to be overlaid on to the current worksheet. This data may either overwrite, be added to or subtracted from the current data.

Macros are one of the most powerful features of good spreadsheets. LDW Power has a macro record mode which aids the user in the accurate creation of what can be very long and complex series of commands.

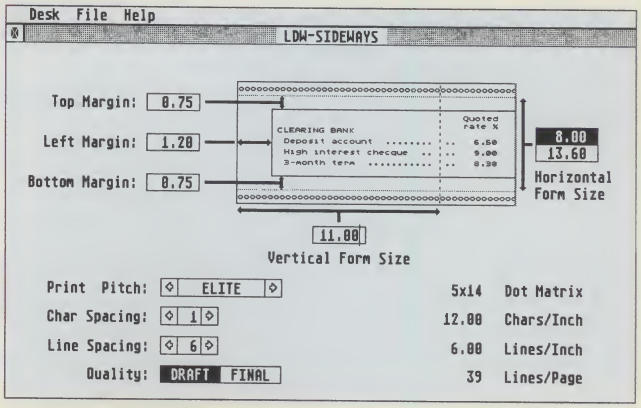
When in the record mode the user enters the commands as if using the spreadsheet manually. As the commands are entered, the spreadsheet executes the command. When the desired series of operations is complete, the user clicks on the End button and the macro is stored ready for future use.

To help with debugging macros, a Step feature causes the macro to be executed one step at a time, enabling the user to take as long as required to spot the error.



This illustration of the Printing output selection options illustrates LDW Power's twin selection methods. Pointing and clicking on Print on the GEM menu line changes the indicator line to show the first level of options; clicking on one of these options, in this case 'Options', brings up the next level of choices - and so on.

For users of Lotus-style commands this same result could have been produced by entering /P[ret] O. This series of keystrokes could form part of a macro to print the spreadsheet.

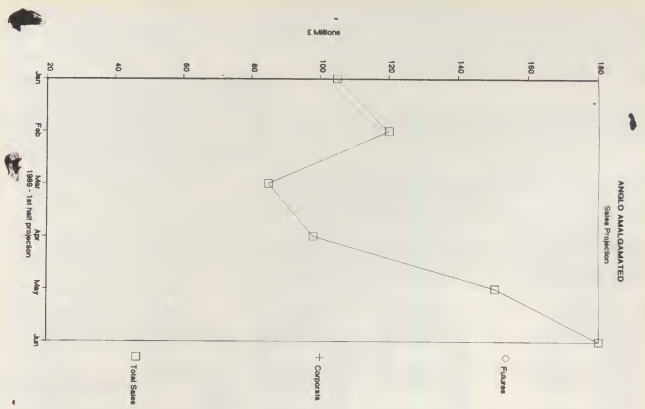


LDW Power offers a good range of print format control options, giving control over headings, type style and page layout.

A sideways printing utility is supplied with LDW Power. To use this option, the portion of the spreadsheet to be printed is first saved as an ASCII file.

After leaving the main program, the utility is run as a separate application. Because all that is being printed is a standard ASCII file, this program may be used with any ASCII data file - for instance, from a word processor.

You may select where on the page the data is to be printed and you have a choice of three character sizes as well as variable line spacing. Because spreadsheets often span several screen-widths this ability to produce good quality wide printouts is a valuable aid to presentation.



LDW Power offers a choice of line, bar, stacked bar, x-y and pie-chart graphs. A maximum of six data sets may be included on any one graph (except pie-charts).

The standard of graph presentation is adequate; there is plenty of control over scaling, titling and annotation, though there is no user control over fill patterns. Several graphs may be defined within one spreadsheet, though only one may be displayed at any one time. High quality output to graphic printers or to disk as METAfiles should allow the inclusion of graphs within other documents.

impressive enough, but it is also possible to specify whether numbers contained within the ASCII string are to be entered into the sheet as labels or as values. This function allows data produced by other applications to be imported and manipulated in sophisticated ways. One omission on the data import options is the ability to import Data Interchange Format (.DIF) files. DIF is a commonly used data transfer standard.

Output

LDW Power uses GDOS to output metafiles (.GEM) and to produce high quality graphics printouts of graphs. This is a useful option, allowing graphs to be imported into other graphics or DTP programs for further use.

I had some trouble with this function, with the program frequently reporting error messages and occasionally bombing out completely. I tried this option on both standard and expanded 520STs, and on a Mega 4: in each case I experienced difficulties. Even those .GEM files which were produced caused problems; I could not import them into either EasyDraw or Timeworks DTP, although they would print using the standard Outprint program supplied with EasyDraw. I feel that this feature requires further attention from the authors.

Conclusion

LDW Power performs well, and is a welcome addition to the range of spreadsheets available for the ST. Lotus compatibility is its strong point as is the ability to run on the most basic ST - though the user will soon run out of memory if working with complicated sheets.

The graphing functions are adequate, though not nearly as well presented as those produced by Logistix, one of the rival packages. The ability to output metafiles will be a valuable one - when it works reliably.

LDW Power is well worth scrutiny for anyone looking for a sophisticated spreadsheet package. It will be particularly attractive to users already familiar with Lotus 1-2-3.

Product:	**LDW Power**
Version:	**1.03**
Price:	**£129.99 inc VAT**
Publishers:	**LDW Design Works**
Distributers:	**Atari UK**
Telephone:	**0753 33344**

LDW Power - Functions

Mathematical functions:

@ABS - absolute value;
@EXP - power of constant e;
@INT - integer part;
@LN - natural logarithm;
@LOG - logarithm (base 10);
@SQRT - square root.

Trigonometric functions:

@PI - constant;
@SIN - sine;
@COS - cosine;
@TAN - tangent;
@ASIN - arc sine;
@ACOS - arc cosine;
@ATAN - arc tangent;
@ATAN2 - four-quadrant arc tangent.

Special mathematical functions:

@RAND - random number;
@ROUND - rounds a number to a given precision;
@MOD - returns the remainder.

Statistical functions:

@SUM - sum of values;
@MAX - maximum value;
@MIN - minimum value;
@COUNT - number of nonblank cells;
@AVG - average;
@VAR - population variance;
@STD - standard deviation.

Financial functions:

@NPV - net present value;
@IRR - internal rate of return;
@PV - present value;
@FV - future value;
@PMT - mortgage payment;
@RATE - compound growth rate;
@TERM - periods to compound a final sum;
@CTERM - periods to invest to a final sum;
@SLN - straight-line depreciation;
@DDB - double declining balance depreciation;
@SYD - sum-of-the-years'-digits depreciation.

Data management functions:

@CHOOSE - chooses a value from a list;
@HLOOKUP - horizontal lookup;
@VLOOKUP - vertical lookup;
@INDEX - chooses a value from a table.

Logical functions:

@IF - tests a condition;
@N - always returns a number;
@S - always returns a string.

Error-trapping functions:

@NA - marks not available values;
@ERR - signals an error;
@ISNA - tests if a value is available;
@ISERR - test if an error has occured;
@ISNUMBER - tests if a cell contains a number;
@ISSTRING - tests if a cell contains a string;
@TRUE - returns 1;
@FALSE - returns 0.

Special functions:

@CELL - determines the nature of a cell;
@CELLPOINTER - determines the nature of the current cell;
@ROWS - calculates the number of rows in a range;
@COLS - determines the number of columns in a range;
@@ - references a cell indirectly;
@EXTERNAL - fetches a value from another worksheet file.

String functions:

@FIND - locates a string within another string;
@MID - extracts a substring;
@LEFT - extracts a substring;
@RIGHT - extracts a substring;
@REPLACE - replaces a string with another string;
@LENGTH - calculates the length of a string;
@EXACT - compares two strings;
@LOWER - converts letters to lowercase
@UPPER - converts letters to uppercase;
@PROPER - capitalizes the first letter in each word;
@REPEAT - repeats a string;
@TRIM - removes unwanted spaces;
@STRING - converts a number to a corresponding string;
@VALUE - calculates the value of a number in string form;
@CHAR - produces the character equivalent of a number;
@CODE - returns a character code;
@CLEAN - removes nonprintable characters.

Date and time functions:

@DATE - returns the integer equivalent of a date;
@DATEVALUE - converts a date stored in a string to an integer;
@DAY - extracts the day from a date in integer form;
@MONTH - extracts the month from a date in integer form;
@YEAR - extracts the year from a date in integer form;
@TODAY - returns the current date in integer form;
@NOW - returns the current date and time in integer form
@TIME - returns the time as a fraction;
@TIMEVALUE - returns the time stored in a string;
@SECOND - extracts seconds from a fraction;
@MINUTE - extracts minutes from a fraction;
@HOUR - extracts hours from a fraction.

Database functions:

@DSUM - sum of cells matching criteria;
@DMIN - minimum value matching criteria;
@DMAX - maximum value matching criteria;
@DCOUNT - number of cells matching criteria;
@DAVG - arithmetic mean of cells matching criteria;
@DVAR - population variance of cells matching criteria;
@DSTD - standard deviation of cells matching criteria.

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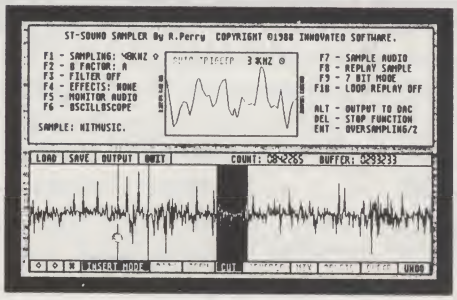

SAMPLE TIMES 520ST

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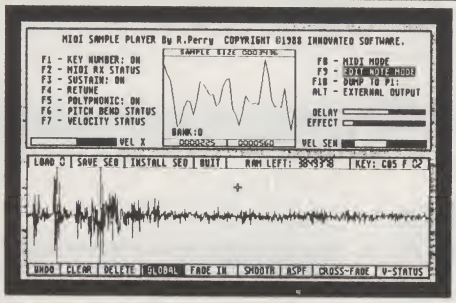

Actual screen shot.

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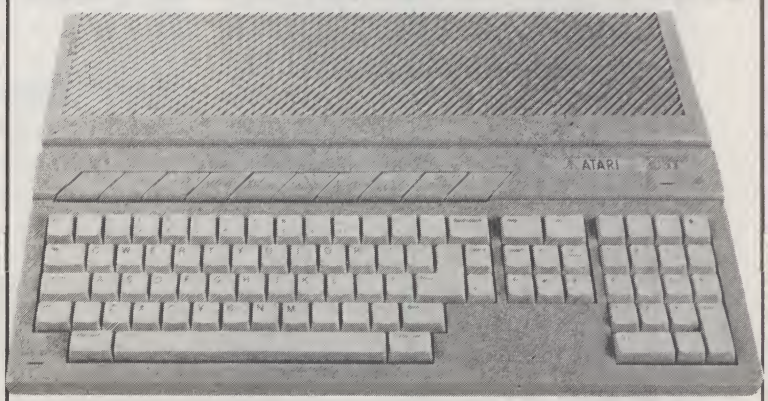

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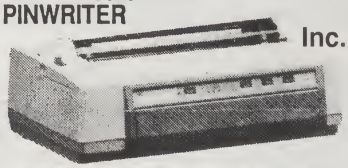

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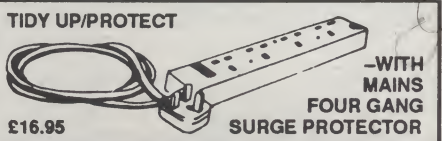

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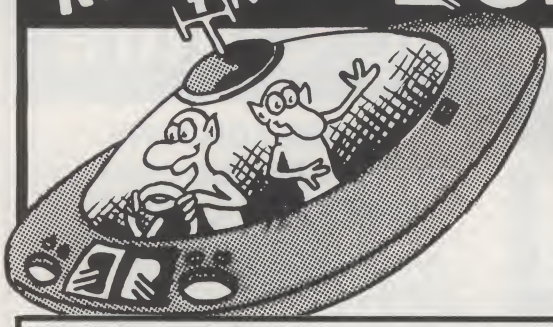

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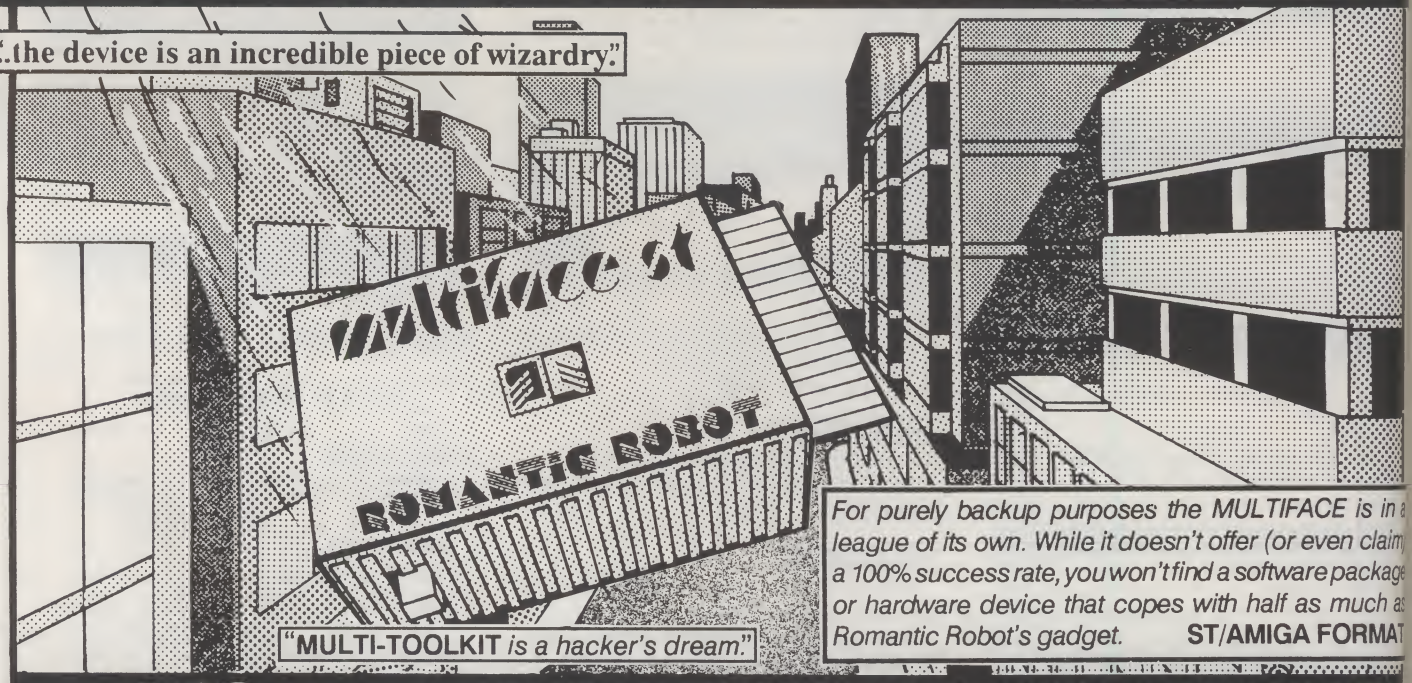

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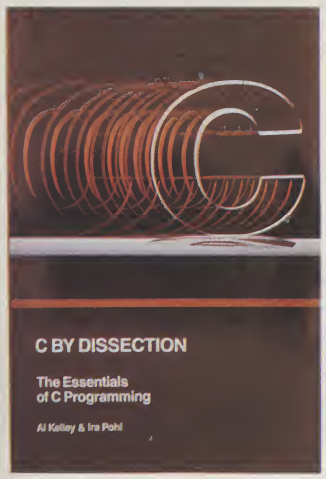
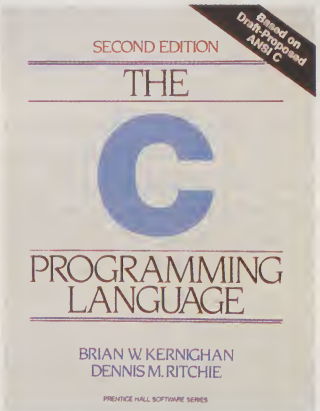


'C by Dissection'

Al Kelley and Ira Pohl
Benjamin/Cummings Publishing £18.95
ISBN 0-8053-6861-2

This book takes its title from the technique adopted by Messrs. Kelley and Pohl in which sample programs and functions in the text are carefully 'dissected', and their inner workings explored. This takes the form of a line-by-line breakdown of the C code, with brief comments on the function of the individual statements and what actions will occur under different conditions. This format is used throughout the text, and on the whole the technique works quite well, providing a useful insight into the way the language operates. Although the book assumes no programming experience on the part of the reader, the emphasis in the book's early stages on the C language, rather than on the elements of programming, means that this book is perhaps better suited for those with some knowledge of programming. The writing is both clear and readable, and avoids the common pitfalls of being patronising or verbose. As well as the usual source code examples and exercises, the text includes discussions on topics such as programming style and operating system considerations. Although a very thorough and competent text, it somehow still lacks that certain sparkle.

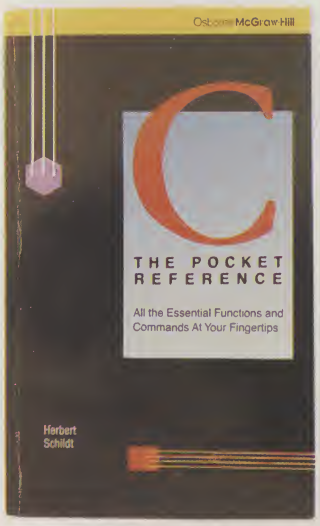


'The C Programming Language' (2nd Edition)

Kernighan and Ritchie
Prentice Hall £24.95
ISBN 0-13-110362-8

For a decade now, 'The C Programming Language', usually referred to as simply 'K&R' by devotees of the language, has remained the definitive guide to the C language. This success has been due in part to the co-authorship by Dennis Ritchie, who was responsible for the design of the language itself. With the forthcoming standardisation of the language by the ANSI (American National Standards Institution) committee, Messrs. Kernighan and Ritchie have updated their text in line with the new draft ANSI C.

The book assumes some familiarity with the basic concepts of programming. The authors are excellent teachers and lucid writers, and cover the different aspects of the language and the inner workings of the sample programs, with great clarity and succinctness. In this second edition of the book, extra care has been taken to fully explain some of the language's more complicated features, such as pointers. The book also serves well as a language reference guide, containing an excellent concise summary of the language and the standard library. Ten years on, this still remains the best tutorial and reference guide to the C language.



C: The Pocket Reference

Herbert Schildt
Osborne/McGraw-Hill £4.95
ISBN 0-07-881321-2

"Computer users' memory loss", explain the publishers, "is a common ailment that plagues even the most competent C programmer". This pocket-sized book is, in their own words, "a remedy that's guaranteed for immediate results".

Although some space is devoted to a brief outline of various aspects of the C language, such as data types, the bulk of the text covers the functions in the standard C library. It is here that the book is at its weakest, for it was written before the final draft ANSI standard appeared, and thus the book attempts to cover a number of popular compilers. For example, Mr Schildt mentions the four ANSI dynamic allocation functions and then goes on to cover several other functions which may or may not be supported by different compilers. There is also much reference too specific to the 80x86 range of processors found in the IBM PC. Moreover, there are virtually no programming examples in the the text. It is difficult to see who will benefit from this book, as any decent reference manual supplied with the compiler should be a better source of accurate information.

Artificial Intelligence Using C

Herbert Schildt
Osborne/McGraw-Hill £19.95
ISBN 0-07-881255-0

This text has been written to show how many Artificial Intelligence tasks, such as natural language processing, pattern recognition, machine learning and logic problems, can be tackled using C programs. Mr Schildt adopts a similar approach for each of the topics in the book. He starts by providing some background information about the subject, outlining the task that the program is to perform, and then creates a simple program. From this starting point the program is improved as it is analysed, and if a better algorithm is found or the program fails to perform its task, the design is thrown away and a new program created. The code samples and programs are reasonably clear, though they are not particularly well commented, nor is the supporting text very informative at times. Unfortunately, the programs have been written for the IBM PC, and some of them will require changes to work on the Atari ST.

This book only scratches the surface of the topics it examines, providing a working background for further investigation, or alternatively, the code segments in the book could possible be incorporated into larger programs. The book's only real weakness is Mr. Schildt's rather uninspired style of prose.

SURE SCAN DO, WITH KEMPSTON'S

DAATASCAN

If you find the choice of scanners for the ST rather limited, or the price too high to consider, then the DAATAscan from Kempston could be a wise choice. If you want affordable and quality scanned graphics, join John Nuttall on a guided tour of DAATAscan.

I suppose in a couple of years, scanners will be a part of every domestic computer scene. They will get cheaper, more sophisticated (with the addition of inexpensive OCR options), and will be as commonplace as a 'phone. After all, if you are going down the DTP track, you will often need graphics, but you will not always find pre-prepared "clip art" or self-drawn images the most appropriate. For many, the first tentative steps will be made possible using the DAATAscan from Kempston Data Ltd, because it offers a scanner with excellent capabilities, coupled with more than adequate software and a bonus package in the form of Atari's HyperPaint (reviewed in issue 35 of ST World). Also included is a small conversion utility which will change an .IMG file into other formats.

The scanner is interfaced to the ST via a small box which plugs into the cartridge port of the ST. Two sockets are provided: one for the external power supply, and the other for the data lead from the scanner itself. The salient facts concerning the product are as follows: it has a scan width of 105mm and a scanning speed of 2 cm/sec. It supports .IMG format, as well as all three Degas modes, Neochrome, something called MSP and TIFF. Tagged Image File Format (TIFF) is a comprehensive image file format which is supported across a range of leading industry microcomputers including the Macintosh and PC. This is the first application we have seen on the ST which supports TIFF from the outset. While this is certainly a major step forward for the ST, it will not benefit many ST owners at present.

Working with DAATAscan

As far as I can see, the problems with hand-held scanners are twofold. In the first place, you cannot scan anything as large as an A4 page. It might be possible, at some future date, to splice two scans together, and some manufacturers have attempted to offer software solutions for the limited scan width with varying degrees of success. The second difficulty relates to both the speed of scanning and keeping the line straight. Scan too fast or too slow and the image will end up distorted. Wobble slightly, and you might end up with the graphics appearing as if they had been through a distorting mirror. The present DAATAscan software release does not offer any splice at the moment, but it seems to be high on the development priority list.

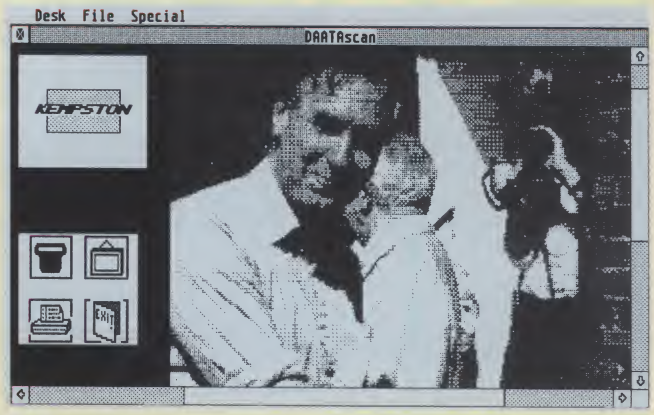
The skills required to scan at the right speed and in a straight line, are soon developed, and the DAATAscan handles itself with credit. I particularly liked the ability to view what I was scanning through the window at the top of the scanner. This makes the whole process less likely to be a chance affair. My first impression of the results obtained to date, is that the software and hardware combination are excellent, and capable of good results if you don't mind taking time over the scan. The main attractions and some distinguishing features of the package, are that it works in .IMG format at 200 dpi; it has support for the other major image or paint formats; it works in all three ST screen resolutions, and the user can save a part of the scan to disk. The dither routines are somewhat arbitrary in their pixel groupings, so you will need to experiment to see which serves you best.

Once the software has been loaded, you can begin scanning straight away. Some measure of thought has

DAATAscan offers a working resolution of 200 dots per inch, and is capable of registering 16 grey levels. On the right-hand side of the handle is a small contrast adjustment dial, while on the left-hand side you will find a start button to begin scanning, and a four-position switch marked 'B & W' and 'dither'. The first position is most suitable for scanning simple line art, while the dither positions offer three types of pixel grouping including bayer and spiral. These settings are the most suitable for scanning colour material.

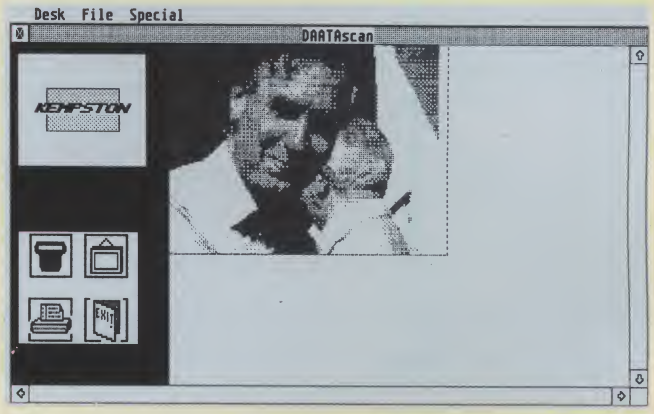
DaataScan in Action

The software itself is very easy to drive. This shot shows simple black and white line art scanned at 200 dpi. Underneath the Kempston logo are the four main functions which are also available from the pull-down menu. They include: scan; print; disk operations; and quit. To start, you must also press the 'scan' button on the scanner's hand grip.



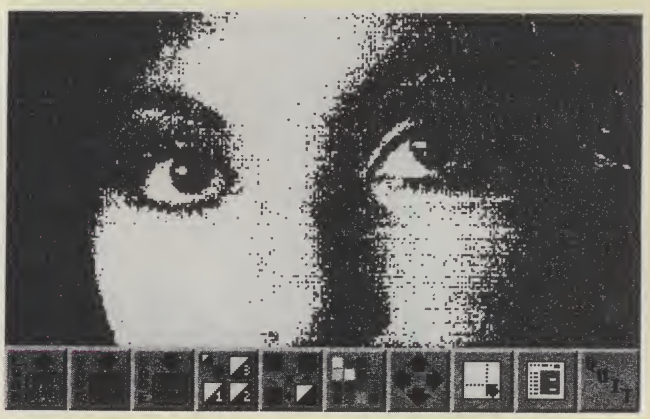
How well does the scanner handle a colour photograph? Quite well, given the sixteen grey levels. This photo was scanned using setting one of the dither routines. Careful adjustment of the contrast control would add some further detail to those areas which have become blocked out.

A fairly high grade black and white photograph has been scanned in using the B & W setting on the edge of the scanner handle. It looks very "soot and whitewash" since no additional grey-scaling has been introduced. Note that the picture is larger than the working area, and the GEM sliders will allow the rest of the image to be viewed.



In some cases, not every detail needs to be retained from the original. Here, we have banded the face of the individual, and saved the block to disk. The saved block has then been loaded back into the work screen. The normal 'SAVE' routines will identify a cut block automatically.

The same photograph, but this time we have opted for position two on the dither setting. It is beginning to look like a newspaper reproduction. Although the grey-scaling has been improved and the whole thing looks more subtle, there is a trade-off in edge sharpness which is inevitable.



Although the scanner software will support most graphics formats, the conversion routines are duplicated and enhanced in the image modifier program supplied in addition to HyperPaint. This permits you to change the size and the brightness of an image, to change the palette and the colour distribution of the pixels. All the functions are available from the selection box at the bottom of the screen.

gone into this product, as you can begin the scan either from a function key or from the menu, or by clicking on the top 'scanner' icon in the panel on the left of the screen. Indeed, the whole system is so easy, there is very little extra detail to be gleaned from the fairly weak manual. As you draw the scanner over your artwork, it appears as if the screen is over-writing itself, but all is well. If the scan is larger than the viewing area, then the standard GEM scroll bars can be used. I should add that the quality of the scan is surprisingly good, and there are very few indications of jagged edges, even on text.

The top icon on the right-hand side of the control panel will produce a further dialogue box asking you if you want to load or save an image. The save routines default to .IMG format. I had no difficulties loading .IMG files created under other systems, even quite large ones. Within the software itself, there are no opportunities for operations such as pixel editing, although this can be done within the supplied HyperPaint package.

Hardcopy output can be sent to any GDOS-supported device, but this is optional. I booted up using the ASSIGN.SYS file I use for Timeworks DTP, and thus could print out on my Atari laser printer, rapidly and without problems. Should you need to select a portion of the scan to be saved to disk, it is only a matter of clicking and dragging the mouse over the relevant part of the image, to define it. A dotted line appears around the defined area, and it can be saved as normal, as if it was a full image. In all, the software performed the few tasks it set itself quite well. I have no doubt we will see it develop and expand.

Image processing

Also supplied with the scanner, is a neat little utility for modifying images. It is quite distinguished, and introduces some novel features into ST graphics handling. Unfortunately, it only works in low resolution. It will permit the user to load a .IMG file and convert it into a .NEO or .PI1 format file. Whilst I could load images created from the DAATAscan, and some supplied images from the demonstration disk, I did have trouble loading .IMG clip art from other sources. Other features available include the ability to shrink the image file to a quarter of its original area, using one of three brightness levels, or a variable re-sizing tool on which a scaled outline of the picture is superimposed on the screen. This would permit sizing with pixel-by-pixel accuracy. Temporary changes to the palette can be chosen, and the user can replot pixels of one colour with pixels of another colour.

Conclusion

The DAATAscan is a worthwhile contribution to the ever expanding range of hardware and software for the ST. It performed with grace, and apart from the problems encountered with the image modifier program, there was no sign of any inhibiting shortcomings. The scanner is capable of taking useful images from a variety of sources, and coupled with HyperPaint, the supplied software suite does all you could ask of it, although it is far less sophisticated than Signa's more expensive Scansoft package. If you cannot afford a flatbed scanner, and you can live with a narrow scan width, DAATAscan could be an answer to your prayers.

Product: DAATAscan
Version: 1.01
Price: £275
Supplier: Kempston Data Limited
Phone: 0908 677886

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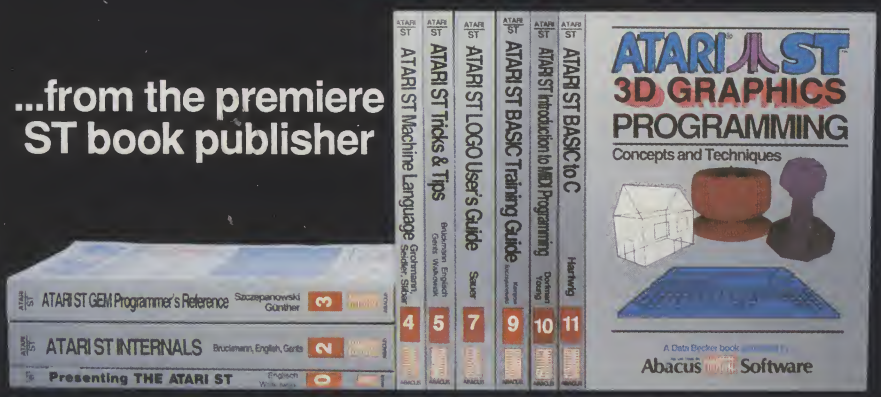

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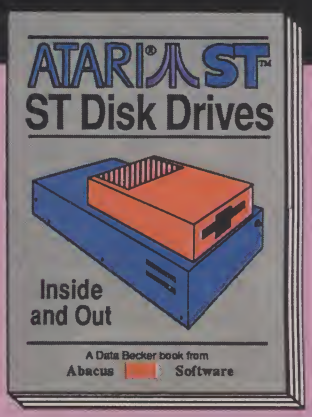

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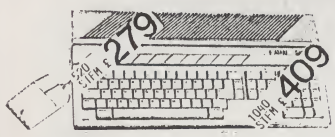

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This month sees the end of the mouse button saga... Probably! Random numbers make a comeback; there are message-passing problems and solutions; resource files are revisited; and among other hints and tips, Mathew Lodge sorts out an embarrassing problem of nomenclature!

PROGRAMMER'S CLINIC

Welcome to the eighteenth edition of the clinic. The content of the previous few clinics has been very technical, and I feel that this could deter those new to programming or just new to the ST. Please don't feel that anything is too simple or is bound to have been covered before. We are all still learning, and that definitely includes myself! Don't stop sending in the detailed stuff though - I would just like to see more of the simpler things to achieve a better balance.

I must start with an apology to Dr Wright whose letter about random-number generators appeared in issue 35. Dr Wright has written politely informing me that :

"I have been called many things in my time, but this is the first time I recall being referred to as Fiona .... just for the record, I spell my name 'Francis' and I am male!"

Quite how 'Francis' turned into 'Fiona' on its way between paper and word-processor has been the subject of much debate in the Lodge household recently, but with no printable conclusions being drawn. All I can do is apologise again to Dr Francis Wright, who continues to say:

"I was not seeking to comment on random number generation or even the linear congruential algorithm in general, but only to dispel some confusion that I felt had been caused by the previously published discussion. I believe that the previous correspondent, Yuk-Lun Wong, cannot have actually implemented a generator using the paramters that he/she recommended, which was unfortunate, because otherwise he would have discovered the problem that I did. I was not intending to recommend any particular set of paramaters, but only to quote correctly those already published in 'Numerical Recipes'."

Brian Ripley, Professor of Statistics at Strathclyde University has written in with another method of generating random numbers, prompted by Dr Wright's letter:

"Random numbers is one of the most misunderstood topics in Computer Science. Not only is 'Numerical Recipies' hard to follow, it is also not very well informed! A simple routine with a much more satisfactory period follows in 'C':

```
double rnd1(iseed)
long *iseed;

{
 register long is, k;
 is = *iseed;
 k = is/127773
 is = 16807*
(is-127773*k)
-2836*k;
 if (is<0)
    is =
    is+2147483647;
 *iseed = is;
 return
    (is*4.6566128e-10);
}
```

This implements X(i) = 16807(i-1) mod (2^31) with a period of 2^31. It is widely used on mainframes and has been recommended recently as a 'minimal standard' by Park and Miller, 'Comm. ACM', Oct 88. As no numbers greater than 2^31-1 are generated, this algorithm can easily be implemented in any language with 32 bit integers.

In Lattice 'C', the XBIOS call and the above alternative take about 500 micro-seconds per call. We are fortunate that the inbuilt generator in the ST is reasonably well designed and reliable; this is not true of much of the opposition."

Missing mouse missives

I should think that wraps up the random-number discussion, but then again, I thought that the mouse-button problem which has kept the clinic in business for so long had also been put to rest. This is not so, and two correspondents have had mouse problems in different situations, and have both arrived at different conclusions as to why there are problems. I'll start with a well researched letter from Dave Chapman in Peterborough.

"The problem of graf_mkstate and/or vq_mouse sometimes saying that a mouse button is pressed, when it has in fact been released, is not exactly a bug.

When the mouse is moved, the IKBD generates an interrupt and reports the direction and size of movement, as well as the current state of the mouse buttons. The 68000 collects this data, then calls the mouse handler routine. This notes the new button settings, updates the X and Y values and exits.

The mouse X and Y values are later picked up by GEM's own VBL routine to erase and draw the pointer in its new position on the screen. These values are also read by vq_mouse and graf_mkstate (actually, graf_mkstate calls vq_mouse via a trap #2 in the same way any program would!)

So, where is the problem? It is in fact hidden away in the (so far unconnected) routines v_hide_c and v_show_c and graf_mouse. Any of these calls that involve erasing or drawing the pointer set a flag saying they are doing so. The IKBD interrupt checks this flag and if it is set, completely ignores the new mouse values it has just been sent! This is so that the interrupt does not update the X and Y values at the time the hide/show mouse routines are using them to erase or draw the pointer.

Therefore, if a program detects a mouse button being pressed via vq_mouse or graf_mkstate, and then acts on that by drawing to the screen and hiding/showing the mouse pointer in the process, the release of the mouse button will be missed if it occurs during a hide/show mouse call. Of course, as soon as another button is pressed or the mouse is moved, the values will be updated correctly."

This ties in with what HiSoft have to say in the Power BASIC manual about v_hide_c and v_show_c :

"... we have experienced the AES missing mouse clicks after certain combinations of these calls."

Lloyd Patton also had mouse problems in different circumstances, and he arrives at a different conclusion to Dave.

"The program I was working on used evnt_multi exculsively for data input and during development I found that if all three of the following conditions were true then GEM's copy of the mouse button state was incorrect :

***1)** Evnt_multi returns a button down event*
***2)** There is a significant delay before another AES call is made*
***3)** During this delay the user moves AND releases the button. The problem occurred during screen updates, but I found that by calling evnt_timer(0) regularly within the AESless routine cured the problem; actually any AES call which returns immediately (wind_find, wind_get, objc_find etc) prevented the bug from happening.*

Disassembling the mouse state interrupt in ROM shows that very early on in the code a call is made through a vector which normally points to a routine in the AES part of the operating system, but there are at least three other routines which affect this vector directly. One alteration changes this vector to point to a RTS instruction, one saves it to another part of the OS's data area, and the other retrieves it from the saved data area.

Although I can't be certain, I think that the vector is changed to point to the RTS instruction during an interrupt routine and is replaced when an AES routine is called. Thus, if the mouse button is released during this time then GEM remains unaware of the fact.

Therefore, to ensure that the GEM copy of the button state is maintained, you should make regular calls to the AES."

I seem to remember reading somewhere in the mass of GEM documentation, that if a routine does not need to call the AES for a long period of time, it should make regular

PROGRAM ONE: FINDACC.C

```
/* FINDACC.C - Demonstrates finding of
   desk accessory index
   Author : Lloyd Patton */

#include <gemdefs.h>
#include <obdefs.h>
#include <strings.h>

OBJECT MenuBar[] = {
-1,1,5,G_IBOX,0,0,0L,0,0,80,25,
5,2,2,G_BOX,0,0,4352L,0,0,80,513,
1,3,4,G_IBOX,0,0,0L,2,0,12,769,
4,-1,-1,G_TITLE,0,0," Desk ",0,0,6,769,
2,-1,-1,G_TITLE,0,0," File ",6,0,6,769,
0,6,15,G_IBOX,0,0,0L,0,769,80,19,
15,7,14,G_BOX,0,0,16716032L,2,0,20,8,
8,-1,-1,G_STRING,0,0,"  Your message here ",0,0,20,1,
9,-1,-1,G_STRING,0,8,"--------------------",0,1,20,1,
10,-1,-1,G_STRING,0,0,"  Desk Accessory 1  ",0,2,20,1,
11,-1,-1,G_STRING,0,0,"  Desk Accessory 2  ",0,3,20,1,
12,-1,-1,G_STRING,0,0,"  Desk Accessory 3  ",0,4,20,1,
13,-1,-1,G_STRING,0,0,"  Desk Accessory 4  ",0,5,20,1,
14,-1,-1,G_STRING,0,0,"  Desk Accessory 5  ",0,6,20,1,
6,-1,-1,G_STRING,0,0,"  Desk Accessory 6  ",0,7,20,1,
5,16,16,G_BOX,0,0,16716032L,8,0,13,1,
15,-1,-1,G_STRING,32,0,"  Quit        ",0,0,13,1
};

#define NIL  -1
#define FALSE 0
#define TRUE 1
#define NULL (0L)
    typedef int WORD;
typedef long LONG;

extern void ApplyFunctionToTree(),FixObjectTree();
/* forward refs */
extern WORD gl_apid;

main()
 {

 WORD buff[8],ix,fixed = FALSE;

 appl_init();
 graf_mouse(M_OFF,NULL);
 FixObjectTree(MenuBar,&fixed);
 menu_bar(MenuBar,TRUE);
 puts("\33H\n");
 print_acc(MenuBar);
 ix = FindDeskIndex(MenuBar,"  Control Panel");
 if (ix >= 0)
  activate(ix);
 else
  form_alert(1,"[3][Control Panel not installed][ OK ]");
 graf_mouse(M_ON,NULL);
 appl_exit();
 }

activate(ix)
 WORD ix;
 {

 static WORD msg[8] = {AC_OPEN};
 WORD id;

 id = appl_find("CONTROL "); /* blanks to 8 chars */

 printf("\nControl Panel id == %d\nAnd it's menu index ==
        %d\n",id,ix);

 msg[4] = ix;     /* set the menu index */
 msg[1] = gl_apid;    /* and application sending program */
 id = appl_write(id,16,msg); /* send to accessory */
```

evnt_timer(0) calls. Dave Chapman's suggestion is that a new mouse handler and hide/show routines are needed. This would involve buffering mouse input during the hide/show routines. I've certainly had problems which would be explained by Dave Chapman's conclusions. I've also had situations where GEM thinks the mouse button is down when it is up, but I can move the mouse around and GEM still thinks the left button is down, so sometimes mouse button states appear not to be sent with movement data. Has anyone else had any experience in this area?

Message Crashing

Dr Wright (he of random number fame) is a regular user of EasyDraw, but has had some problems using the EasyTools message-passing desk accessories when Computer Concepts BackPack is present.

"You mentioned that the EasyTools extension to EasyDraw is implemented as a desk accessory. I find that it works if it is the only accessory loaded, but if I load it together with BACKPACK.ACC then most attempts to use EasyTools cause catastrophic crashes. I have not tried EasyTools with other accessories, nor taken the problem up with the supplier, but I suspect that this problem is similar to that whereby desk accessories tend to clash with switcher programs."

I have evidence that BACKPACK.ACC has caused problems with other programs, so this problem could be due to BackPack or EasyTools or both. I'm quite willing to be persuaded either way, so if anyone has any evidence, send it in.

Lloyd Patton has also passed on a hint for potential message-passers which was pointed out by Tom Hudson (author of Degas and CAD-3D) in STart magazine. There is a bug in the appl_find call which can cause problems, as Lloyd explains:

"Apparently, if you request appl_find to return a handle for a program which has just terminated then appl_find returns a valid handle. Tom Hudson suggests that after receiving a handle, the desk accessory should send a message to the program it wishes to communicate with requesting the program to confirm its presence. Having sent the message, the accessory should make an evnt_multi call requesting a message and a timer event, the time delay should be about two seconds. Then if the timer event occurs before the message event, the accessory should warn the user that the program is not present."

Lloyd has also pointed out that if the string the accessory places in its menu slot is known, the index of the accessory can be determined without any guesswork. He has provided an explanation and a program (listed as Program One) to illustrate this, but be warned that it helps if you have a grasp of pointers and GEM object trees to completely understand the following.

"The index of the accessory is between 0 and 5 not 1 to 6 and this index can be determined after the menu has been displayed by menu_bar, as a rigid structure is imposed on menu trees.

Examining the structure of a menu, we find that starting from the root of the tree, the menus ob_head points to a G_BOX object whose children describe the menu bar. The ob_next field of this object, which is also the root object, points to a G_IBOX whose children describe the drop down menus. Each drop down menu is contained within a G_BOX object, the first of which is the drop down menu for the desk accessories.

```
menubox
= menu[0].ob_tail;
desk_parent
    = menu[menubox]
    .ob_head;
first_ob_id
    = menu[desk_parent]
    .ob_head;
```

Thus, following the object pointers for the example program (Program one), we can find the first item of the desk accessory menu by following the index chain:
Now, if we follow the ob_next fields of this item we will visit all the children in the desk accessory menu eventually arriving back at the desk_parent object.

The function FindDeskIndex does just this, searching for the string that the desk accessory places in the accessory slot. If we reach the parent object then the accessory is not present and -1 is returned. Otherwise we cal-

culate the index of the object in the drop down menu relative to the 3rd object from the desk_parent object. This gives us the accessories index as returned by the menu_register function.

Program one (FINDACC.C) displays all the strings in the Desk Menu after menu_bar() has been called, then uses FindDeskIndex() to find the index for the CONTROL.ACC. Finally, it activates CONTROL.ACC and then terminates."

Resource file format

In issue 34 I printed a suggested resource file header layout from Thomas Kasperkiewicz. After complimenting ST World as 'the only publication available which addresses the serious ST user', Alex Kiernan from Bitterne in Southampton gives a few notes about resources, and adds his comments to the continuing documented/undocumented routines discussion.

"There are three points to note about Thomasz Kasperkiewicz's table: Word 0 contains the resource construction set version number (the DR RCS and Megamax MMRCP set this to zero, K-Resource uses a value of 1); Word 6 should not be relied upon for the offset of the first free string, the original AES ROMs have this incorrectly set for the AES's and the DESKTOP's resource files; Word 12 is simply the start of the data, not the specific position of the first free string, and it is entirely dependent on the RCS what it stores first. As a result the resource file header has the form shown below:

Finally, I would like to 'put my oar in' over the legal/illegal routines discussion. The ST is so badly documented that we are forced to use officially undocumented techniques, i.e. we must use the effects of the OS as it is actually implemented, rather than the tall stories put about by the official documentation. For instance, the documentation talks about GEM 1.1, however, the ST uses GEM 1.2, and as such many of the calls actually implement GEM 2.0 routines, rather than the GEM 1.1 variants."

I think that it is important to distinguish between the different parts of the ST Operating System. I'm going to stick my neck out and attempt to break it down into five different sections, starting with the BIOS, XBIOS and the various routines executed when the ST is turned on or reset. This also includes all the system variables from $400 to $600. This part of the OS is excellently documented in 'The Hitchhiker's Guide to BIOS', and not nearly as well in 'Atari ST Internals' from Abacus, and 'The Atari ST Programmer's Reference Guide' by Katherine Peel.

Next comes the A-line emulator, which appears to be part GEM and part XBIOS, and which would be called a graphics device driver were the ST a complete functional clone of the IBM PC, which it thankfully isn't. No-one seems to understand these various routines completely, especially when it comes to the (hidden?) flood-fill routine, $A00F.

Thirdly, there is GEMDOS. This includes all the routines accessed using the TRAP #1 call, and is functionally equivalent to MS-DOS on the PC (even the function numbers are the same). Apart from rumours about some memory allocation bugs, I don't think

```
typedef struct
{
  WORD rsh_vrsn;     /* RCS version no. */
  WORD rsh_object;   /* offset to object[] */
  WORD rsh_tedinfo;  /* offset to tedinfo[] */
  WORD rsh_iconblk;  /* offset to iconblk[] */
  WORD rsh_bitblk;   /* offset to bitblk[] */
  WORD rsh_frstr;    /*offset to free string index */
  WORD rsh_string;   /* first free string */
  WORD rsh_imdata;   /* image data */
  WORD rsh_frimg;    /* offset to free image index */
  WORD rsh_trindex;  /* offset to object tree index */
  WORD rsh_nobs;     /* number of objects */
  WORD rsh_ntree;    /* number of trees */
  WORD rsh_nted;     /* number of tedinfos */
  WORD rsh_nib;      /* number of icon blocks */
  WORD rsh_nbb;      /* number of blt blocks */
  WORD rsh_nstring;  /* number of free strings */
  WORD rsh_nimages;  /* number of free images */
  WORD rsh_rssize;   /* total bytes in resource */
} RSHDR;
```

```
 graf_mouse(M_ON,NULL);
 evnt_keybd(msg);    /* and let GEM take over */
 graf_mouse(M_OFF,NULL);
 }

print_acc(menu) /* prints the strings in the desk men */
 OBJECT *menu;
 {

 WORD desk_parent,ob_id;

 desk_parent = MenuBar[MenuBar[ROOT].ob_tail].ob_head;
 ob_id = MenuBar[desk_parent].ob_head;
 while (ob_id != desk_parent && ob_id != NIL)
  {
  if (MenuBar[ob_id].ob_type == G_STRING)
   printf("\"%s\"\n",MenuBar[ob_id].ob_spec);
  ob_id = MenuBar[ob_id].ob_next;
  }
 }

/* FindDeskIndex() - Returns the registration index of a
 * DESK ACCESSORY
 *
 *    This is the same value as that returned by the
 *    menu_register function.
 *    Returns a WORD value between 0 and 5 or -1 if ACC
 *    is not present.
 *
 *    NOTE: This function should be called after a
 *    menu_bar(TRUE)
 */

FindDeskIndex(menu,string)
 OBJECT *menu; /* ptr to tree that describes the menu */
 char *string; /* the string that appears in .ACC slot */
 {

 WORD desk_parent,ob_id,index;

 desk_parent = MenuBar[MenuBar[ROOT].ob_tail].ob_head;
 ob_id = MenuBar[desk_parent].ob_head;
 while (ob_id != desk_parent && ob_id != NIL)
  {
  if (MenuBar[ob_id].ob_type == G_STRING)
   if (strcmp(MenuBar[ob_id].ob_spec,string) == 0)
    break;
  ob_id = MenuBar[ob_id].ob_next;
  }
 index = ob_id - desk_parent - 3;
 return (index >= 0) ? index : -1;
 } /* FindDeskIndex */

/*******************************************************/
/* ApplyFunctionToTree() - Recursively traverse tree from
 * 'this' object to 'last' object. Applying function at
 * each node.
 *
 * Two WORD params will be passed to the called function.
 */

void ApplyFunctionToTree(tree,last,this,func,p1,p2)
 register OBJECT *tree;
 register WORD last,this;
 register WORD (*func)();
 WORD p1,p2;
 {

 if (this == NIL this == last)
  return;
 (*func)(tree,this,p1,p2);
 ApplyFunctionToTree(tree,this,tree[this].ob_head,func,p1,p2);
 ApplyFunctionToTree(tree,last,tree[this].ob_next,func,p1,p2);
 } /* ApplyFunctionToTree() */
```

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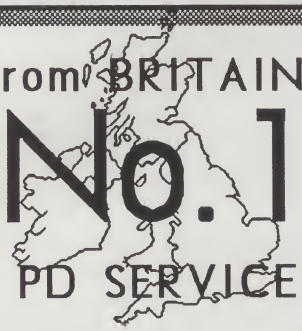

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```
/* FixObjectTree() - Converts object tree from character
 * coordinates to pixel coordinates.
 *
 *  An integer pointer is passed to this function which
 *  must be a pointer to a none zero value if tree is
 *  already converted to pixel coordinates.
 *
 *  WARNING!! If a pixel coord tree is converted again,
 *  user program will crash when tree is next displayed.
 */

void FixObjectTree(objc,obfixed)
 LONG objc;  /* address of tree */
 WORD *obfixed; /* Must indicate TRUE/FALSE depending on
                   whether tree already converted to pixel
                   coordinates */
 {

 extern WORD rsrc_obfix();

 if (!*obfixed)
  ApplyFunctionToTree(objc,NIL,ROOT,rsrc_obfix,NULL);
 *obfixed = TRUE;
 }
```

PROGRAM TWO: TOS SCREEN OUTPUT FROM GEM

```
Power BASIC TOS screen output from a GEM program

' Permits GEMAES components such as: file selectors, alert
' boxes and menus to be used, but still allowing the
' program to PRINT to a TOS screen.

LIBRARY "GEMAES"    ' Open GEMAES library.

REM $OPTION Y+      ' Don't open window when program starts

OPEN "O",#1,"CON:" ' Open screen device

POKE systab-2,1     ' Ensure output goes via TOS

CLS

PRINT "Look no slow GEM window!"
```

PROGRAM THREE: DESKTOP.INF PROGRAM MOD.

```
#E: Directory information
Example: #E9813 Format: #E1122
  Byte      Bit       Meaning            Value
  11        0,1,2     Not used
  3                   Confirm copy       0 = no
                                         1 = yes
  4                   Confirm delete     0 = no
                                         1 = yes
  5,6                 Sort by            00 = name
                                         01 = date
                                         10 = size
                                         11 = type
  7                   Display type       0 = icon
                                         1 = text
  22        0,1       Screen res         01 = low
                                         10 = medium
                                         11 = high
  4                   Blitter Active     0 = no
                                         1 = yes
```

PROGRAMMER'S CLINIC

there are any major surprises here, but if you can prove me wrong, by all means do so.

The Graphics Environment Manager follows, and this includes all routines accessed by the TRAP #2 call, so this means GEM AES and GEM VDI. As pointed out by Alex, this part of the OS is appallingly badly documented, and books such as 'GEM On The Atari ST' from Abacus do not improve on this.

Finally, we come to GDOS, The Part They Didn't Include (or perhaps hadn't finished in time?). Richard Seel noted that no-one quite knows why it was left out a few months ago. The latest current version is 'Release 1.1', but again no-one seems to know quite what works and I still can't open a workstation to the screen without crashing the machine.

Hints, tips and prizes!

A couple of quick tips to round off this month from David Stewart and Simon Mullenger from Hertford (in Hertfordshire, believe it or not). The first concerns using some of the GEM features (such as alerts and file selectors) of HiSoft BASIC without having to output text to a GEM window. This tip originates from HiSoft, and is given as Program Two with full commentary.

As I was sifting through the large heap of letters Richard kindly sent me when I took over the clinic, I found a disk with Simon Mullenger's name on it, but with no mention of what it contained. Eagerly, I thrust it into my drive, and I found that it held an addition to the information about the DESKTOP.INF file which concerns those lucky owners of Mega STs fitted with blitters. Sorry this is so very late, Simon.

"I have just bought a Mega ST2 and had a Blitter installed. With some desktops the blitter was active after boot-up and with others it wasn't. From inspecting two DESKTOP.INF files with the only difference between them being the blitter on or off, when saved, I have a slight correction to make to the DESKTOP.INF article of issue 29's clinic." (See listing on left).

Choosing the winner of the regular prize was very difficult this month, but taking it by a narrow margin is Dave Chapman, who will receive the ProSound digitiser and Dungeon Master. That just about finishes things off for another month.

Keep the letters rolling in - especially the solutions and comments on other people's problems and ideas. Remember to include your full name (or title, if preferred) and please give your phone number if possible. Also tell me what you would like if you win the monthly prize - remember it's one or two items with a total value of up to £80.

It could be two months before your letter gets into print, so if you can get your contribution to me before the last week of the month it stands a good chance of appearing two months later. Some contributions may have to wait longer; I have to try to get a good mix of topics, and it may be better to keep yours for another issue. Please don't write and ask for individual replies; I haven't got time to deal with them, and I don't want to disappoint you. *(Mathew will welcome any bribes offered, although they are unlikely to have any effect - Ed.)*

If you have a listing longer than about 15 lines, then please include it on a disk - I don't have time to type long listings in. I know this can be difficult for overseas readers and I do try to make an exception for them. If you want the disk and/or listing back, also include a stamped addressed envelope. If you are sending a complete program, then I also like to see it running before putting it into the column, so please include a double-clickable version of your program if at all possible.

Mathew Lodge
"Programmer's Clinic"
"Maen Melin",
Holmes Chapel Road,
Lach Dennis,
Northwich,
Cheshire,
CW9 7SZ

Users of GEM software on the ST probably ask themselves what is wrong with the right mouse button. Why doesn't anyone use it? GEM programmers know. In this article Malcolm McMahon aims to explain one of the great software 'jokes' of our time and how programmers can get ound it.

CLINIC SPECIAL
THE OTHER BUTTON

Probably every programmer who ever sat down to write his first GEM application has plans to use both mouse buttons. People who have played with the Amiga will, perhaps, think in terms of menus popping up; people interested in drawing-type programs will want the right button to erase what is drawn by the left. Almost all such ideas will founder, thanks to an almost incredible design flaw in one critical GEM routine: The event wait routine, evnt_multi.

The evnt_multi call is perhaps the most important AES call. Its function is essentially simple: it waits for the user to do something. The program gives it a list of user actions, and when any of these actions occur, the routine immediately returns to the user's program telling it exactly what happened.

The problem occurs when we try to ask the routine to return when either of the mouse buttons are pressed. Whatever parameters you try, it just can't be done.

It goes like this: The mouse button state is represented by a word where bit 0 is one when the left button is down, bit 1 is one when the right button is down. When you ask the evnt_multi call for mouse events, you give it two parameters. A mask representing which buttons you are interested in and the value you are waiting for them to achieve. Simple enough, right? Wrong. If you are trying to use both buttons, the odds are you want the call to return when either button is pressed. You don't know what value you want them to achieve. What you want is for it to return on any value other than zero. The way the call should have been written was to return on any value other than the given one.

A solution

There is one official way of waiting for either button. You can identify programs that use it - they are sluggish and have a sort of "fluttery" feel. It is done by repeatedly sampling the current mouse state until a button down is detected. To do this you can either use graf_mkstate or use evnt_multi with a short or zero timer event enabled: This is not a satisfactory solution; you can't really handle double clicks this way and the response is too slow. A brief click will often not be detected at all.

Incidentally, I have recently discovered that this joke appears to have been fixed on GEM release 2.0 and above on I.B.M. systems. It is really too late now for Atari to do anything about it since, if you are writing software you hope to sell, you must write it so it will run on all issues of the ROMs back to 1.0.

After much irritation, I have finally come up with a solution which I present here. It is not ideal, but it works and should be adaptable to any programming system that permits assembler language routines. It should also work with GEM on IBM clones even using three button mice. The trick uses the VDI level exchange mouse button vector call vex_butv. This routine allows you to insert your own assembler routine to be called in place of the standard one whenever the button state changes.

What you can't do is to jump back into your program from this exit routine. For one thing, according to the mouse position, the mouse click might be intended for the screen manager or for a desktop accessory. More importantly, the routine you supply will be called asynchronously from inside an interrupt routine and the system will be in a very funny state. Instead, my routine modifies the button state vector by replacing the left button's bit by the eXclusive OR of both buttons. The state of the resulting flag now changes when either button goes up or down. It then jumps into the standard button-change handler routine. You can now wait on just this flag using a mask and state value of 1 in evnt_multi and the routine will return if either button is pressed.

There is a further complication. If the button is clicked briefly it will be up again before the call returns. If you have a release of the operating system earlier than 1.0, evnt_multi will not tell you which of the buttons were pressed. To get round this, the button vector records the button states in the variable clickTrace, shifting each successive state in as a 4-bit value. You can easily discover which button was pressed by examining the latest non-zero state. The supplied routine 'lastDown' gives you this value.

Remember that graf_mkstate and evnt_multi will return the modified button state. If the right button is down, the left button flag will be the inverse of the true value. The values in clickTrace and returned by lastDown give true values.

It is vital that your program re-instate the old button handler before it terminates. As usual the system does little cleaning up after itself and, if the new handler is left in, the system will crash as soon as a new program overwrites its code.

What you do with the right mouse clicks now that you have them is, of course, up to you. I would, however, like to offer a suggestion. Most of the roots of WIMP lie in the Xerox Smalltalk system (whatever Apple might claim). In Smalltalk, the second button is normally used to pop up a context-sensitive menu - A menu whose contents depend on where the mouse is on the screen. This is copied in Intuition on the Amiga. I think you could do a lot worse in many types of program.

About the supplied code

The supplied code is written for the Manx 'C' system and naturally you will have to modify it for other systems. The first entry point is the routine "_setRightButton" (the underscore is required on this system to make assembler routines accessible from 'C'). This routine takes a single 16-bit argument which is non-zero to install the vector, and zero to remove it. The second entry point is the routine "_lastDown" which returns the latest mouse state where one of both buttons were down. It is used to determine which button was clicked. The 32-bit value "_clickTrace" is also made available in case your program needs to know more. _clickTrace is initialised so that if _lastDown is called before the vector is installed, it will always tell you that the left button was clicked.

The global references from the routine are to

"_vdi_handle" and to "_vex_butv". The former is a 16-bit global variable in which the value returned by the "open workstation" call is stored. If you are programming in a compiled language you will probably have some equivalent variable already. In Basic it might be harder to find. The _vex_butv routine is a standard VDI call executing a trap call. It expects three arguments: the VDI handle; the address of the new exit routine; and the address of a variable in which to store the old routine address.

It is important to be aware that none of the registers on entry to the vector will have the values that might be set by your program. Some assemblers like to access static data items like _clickTrace relative to some register (usually A4) that is usually left pointing to the data segment of the program. The vector code cannot afford to do this because the register will have the wrong value. This is the significance of the "far data" statement in Manx assembler. It tells the assembler to use extended addressing mode for static variable access. If you are using Megamax, this will be a problem because Megamax cannot generate absolute address references. For Megamax, the two static variables must be embedded in the code so that program-counter-relative addressing can be used. In this case, remember that you cannot use a program-counter-relative reference as the destination of an instruction. Instead, use LEA to move the address of the variable into a register.

The use of the BSR instruction in the _setRightButton routine might be a little odd to some. In this case it does not really call a subroutine but, instead, it is used to place the address of the vector code (which follows it) onto the stack and then skip over it. _vex_butv expects to find its arguments on the stack above the return address.

```
;
;     right button handler routines
;
     bss       oldv,4          ; variable to store old vector
     public    _setRightButton,_clickTrace,_lastDown
     xref      _vex_butv,_vdi_handle
     cseg

_setRightButton:
     link      a6,#0
     pea       oldv            ; stack the address of the old vector variable
     tst.w     8(a6)           ; are we installing or removing ?
     beq.s     undo            ; branch if removing
     bsr       docall          ; stack new vector address
;
; The actual exit routine
; D0 holds button state values
;
     far       data            ; we cannot use base registers here
     move.l    d1,-(sp)        ; save old D1 value
     andi.l    #15,d0          ; just the bottom bits of state
     move.l    _clickTrace,d1  ; load the old trace
     lsl.l     #4,d1           ; move it up one nybble
     or.b      d0,d1           ; insert new state
     move.l    d1,_clickTrace  ; and save it back
     btst      #1,d0           ; is the right button down?
     beq.s     noflip
     bchg      #0,d0           ; if so invert the left button flag
noflip:
     move.l    (sp)+,d1        ; restore D1
     move.l    oldv,-(sp)      ; put the old vector address on stack
     rts                       ; and jump to it
;
;   end of the vector code now more install code
;
     near      data            ; base registers are O.K. here
undo:
     move.l    oldv,-(sp)      ; deinstall path - stack the old vector
docall:
     move.w    _vdi_handle,-(sp)      ; common code - stack VDI handle
     jsr       _vex_butv              ; and call the exchange vectore routine
     move.l    #$01,_clickTrace       ; ensures the lastDown routine returns
                                      ; left button state after we have removed
                                      ; the vector
     unlk      a6
     rts                              ; return to main program

;
;    Routine to get last button pressed
;
_lastDown:
     move.l    _clickTrace,d1    ; get the trace value
lp:  moveq.l   #15,d0            ; set up to mask the bottom nybble
     and.l     d1,d0             ; mask bottom nybble
     lsr.l     #4,d1             ; and move down rest of trace
     tst.w     d0                ; was nybble zero ?
     beq.s     lp                ; if so try the next one
     rts                         ; otherwise that's the value we want

     dseg                        ; data segment
_clickTrace:
     dc.l      $01010101         ; stores last eight states
```

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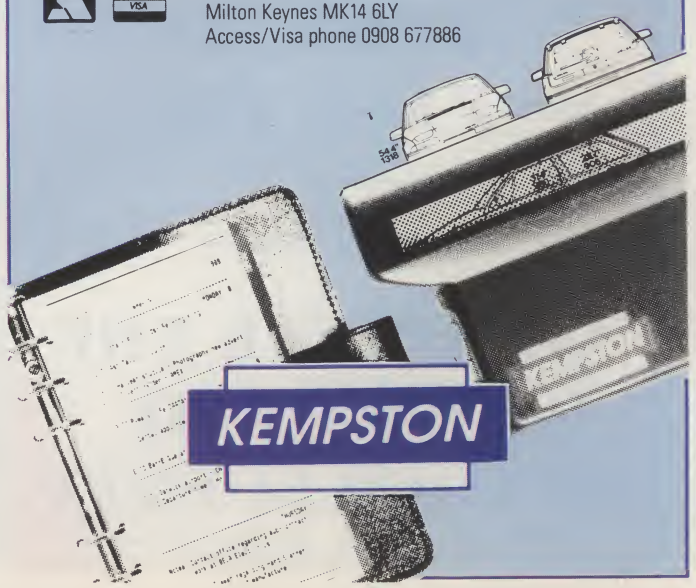

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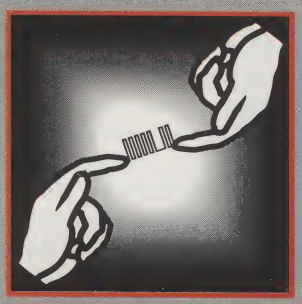

This month, David Jones looks at BIX in comparison to the UK's CIX, Micronet Telesoftware and a few more Bulletin Board Services.

ST WORLD ON LINE

To complement last month's article on the more significant UK comms services available to ST modem owners, I thought it would be interesting to see what similar services are on offer in the US. So we'll be taking a look at BIX, finding out how to use it, and why you might want to. In addition, another quick look at Micronet news, and finally, another couple of BBS numbers.

Not surprisingly, BIX is the US equivalent of our home-grown CIX. To be fair to our American friends, they were on the scene first, and no doubt CIX would not be as it is today without BIX. Both systems are based on the same software package called CoSy.

Before looking at what it offers, you might like to know how you join BIX. It is essentially quite simple. You log on, credit card between the teeth, and just respond to the new user questionnaire. As you use it, BIX simply charges you via your plastic. This is all very similar to CIX of course, but there is another small hurdle to overcome before you drop ST World and rush to your modems. That small hurdle is an IPSS account.

PSS

BIX itself has no phone number to call: instead, it uses Tymenet which is a packet-switching network that operates in the US. You can connect to Tymenet from most countries by simply dialling your local PSS PAD and entering the BIX network address. A PAD, for those not in the know, is a Packet Assembler Disassembler - it refers to the way PSS transmits data around high-speed data links in large chunks, only breaking it up into the bits each user wants at his or her PAD. I won't go into the technical aspects of this here (I'd have to read up on it, anyway!).

How do you get a PSS account, then? With difficulty. No, it's not really that hard - it just requires some low-level BT sales department interfacing via voxmail (i.e. you speak to them). You can start the redtape rolling by ringing BT's freephone sales service number and asking for a PSS application form. There is a small one-time registration fee, a small monthly standing charge, and a pretty large usage charge to pay from then on. The usage fees are hard to assess as they are based not only on time but on volume of data too. In other words, if some user-friendly system decides to scroll 30K of helpful menu text down your screen, you'll be paying dearly for it. If that helpful system is in the US then you'll pay about £2.50 all inc. for the privilege.

Mercury offers a rival to BT's PSS, and it seems to be a cheaper service to use - certainly the data charges are not as steep as BT's, and I've heard several people saying that they are highly satisfied. Though I haven't followed this up myself, you might well do worse than give Mercury a ring and see what their side of the story is.

BIX

Back to BIX. You've received your shiny new PSS account, or rather a mixed kilo of various bits of paper and card, and you are ready to go. Dial your local PSS number, enter your password and user ID, and then the address A9310690157800. Even better, program your comms package to type this for you. Within a few seconds you'll see the BIX logo and you can take it from there.

So how does it compare to CIX? Well it's different, that's for sure. For a start, BIX is run more formally, each conference moderator is paid for his work and not surprisingly only a privileged few are allowed to moderate. This contrasts markedly with CIX's policy where anyone can moderate a conference they create as long as they don't expect payment for it. Both policies have their good points. In BIX's favour is the fact that it is run very efficiently - no mess on the floor over there. CIX's advantage is that it encourages a much wider range of conference topics and doesn't have quite the same pinstripe air of authority. Though CIX is developing a good base of 'key industry figures', it doesn't compare to BIX in this department. As someone on CIX put it: 'On BIX you can discuss technical items with the people who actually design the chips themselves. On CIX you have to make do with the poor so-and-sos who just write software for them.'

Don't expect much in the way of leisure on BIX. It's there if you look, but it's not worth paying for. BIX is a technical resource, a kind of online technical guide if you like, and it is almost always used like that. A lot of impressive names use it for customer, user and developer support - including Atari of course. If you do decide to try BIX out, take my advice: don't browse - grab what you want as quickly and efficiently as possible. Certainly try CIX before BIX; not only will you be able to learn the rather unfriendly command set, but you'll get a taste for computer conferencing. Whether you like the taste is another matter entirely.

Enhanced

CIX compares very favourably with BIX on the software front. As I said previously, both systems use CoSy, but the similarity ends there. CoSy licence holders are allowed to extend the system and, indeed, this is probably vital judging from the way that CIX has developed over the last couple of years. Of the two systems I would say that the CIX enhancements are most noticable, the best extra features being, in my opinion, online ARCing and word-wrap in the message editor. CIX's online ARCing is a great feature: you can store messages and various other bits of text in a personal file (called your scratchpad), have CIX compress it using its own Unix ARC com-

```
Welcome to BIX -- ttyx4b, 1578

= = B Y T E   C O S Y  3.1.9 = =

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603-924-7681 8:30 a.m. to 11:00 p.m. EDT (-4 GMT) weekdays
Name? davjon
Password:

Last on: Fri Jan 20 09:53:48 1989
You have 0 mail messages in your in-basket.
You are a member of 5 conferences.
==========
system.news/**BULLETIN** #411, from sysmgr, 382 chars, Fri Jan 20 13:42:17 1989
 UniTerm © V2.0c Online                                        __D__R_1234
```
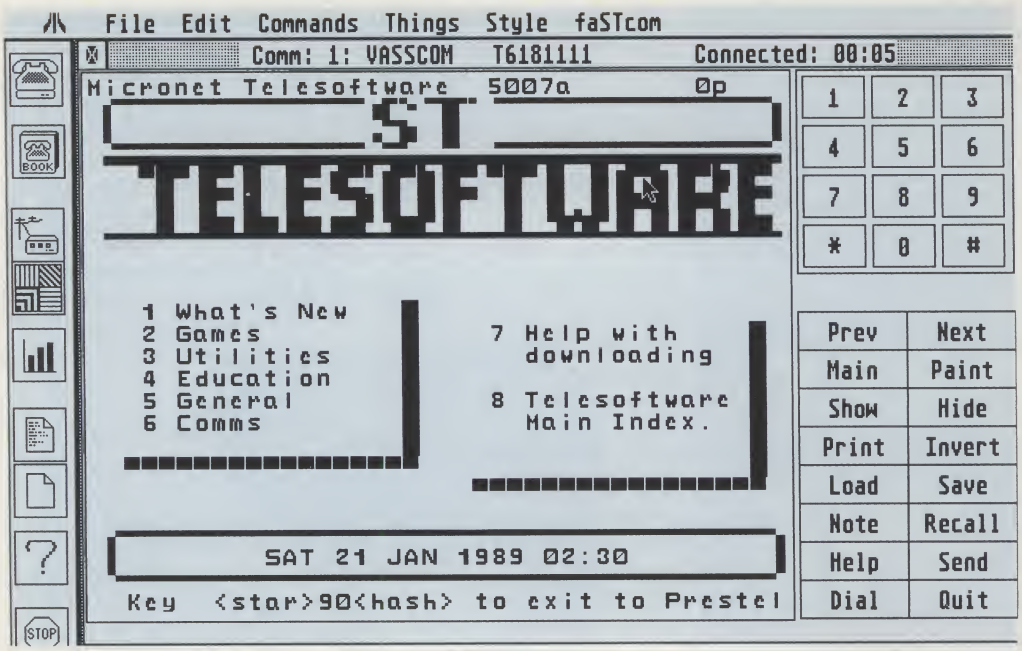

The BIX Login page



Orson, The Telesoftware Gateway

mand, and then download it. ARCing typically halves the amount of data you have to download.

It's difficult to assess the cost of using BIX when using PSS. The highly variable data costs are difficult to calculate and you might end up having a nasty shock when BT sends you a PSS bill. As a very rough guide, I would guess that browsing for half an hour on BIX would cost about 7 pounds for PSS usage and about 3 pounds for BIX itself (off-peak rate). A nice touch for BIX is the way that off-peak times are calculated for your own specified time zone (GMT if you are calling from the UK). It is rather expensive, but if you need particularly technical questions answered quickly, then it's the place to visit. It also provides a morsel of American culture, but not as much as CompuServe (which I'll be featuring in a future article).

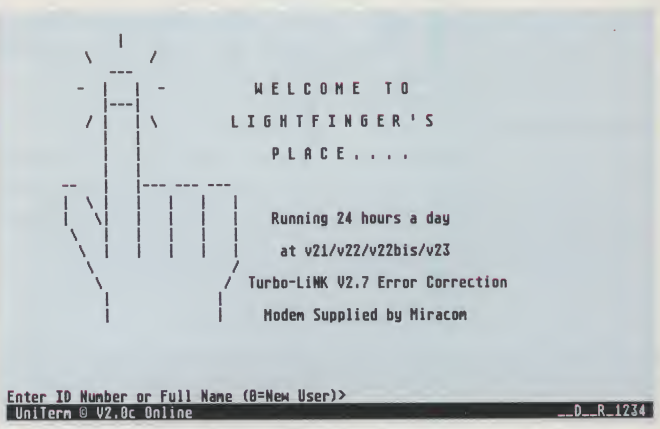
Perhaps the best reason for using one of the US online systems is that they tend to be nearer the source for interesting news. Gossip and press releases tend to be anything from weeks to months ahead of any UK news source. News about the new V1.4 TOS ROMs and the ST 'games console' was posted on US systems some considerable time before anyone had even a vague glimmer in this country. As the ST slumps in popularity in the US and builds up in Europe, this may not remain the case for very long. Hot topics as I write this are not high up on the Richter scale. There seems to be a fair amount of interest in the new Spectre 128 Mac Plus Emulator by David Small, and a cartridge that allows Mac disks to be read and written (and which can copy any disk). Another item which seems ripe for announcement is PC-Ditto 2 - which would appear to be a combination of hardware (8088 processor board) and software to produce an accurate full-speed emulation of an XT type machine, though the silence from Avant-Garde systems regarding any details on this product is becoming deafening. Incidentally, it may come as a suprise that the Atari Transputer Workstation is not causing much of a stir from the look of the US systems. I can't remember reading a single message on the subject for some months now.

Telesoftware

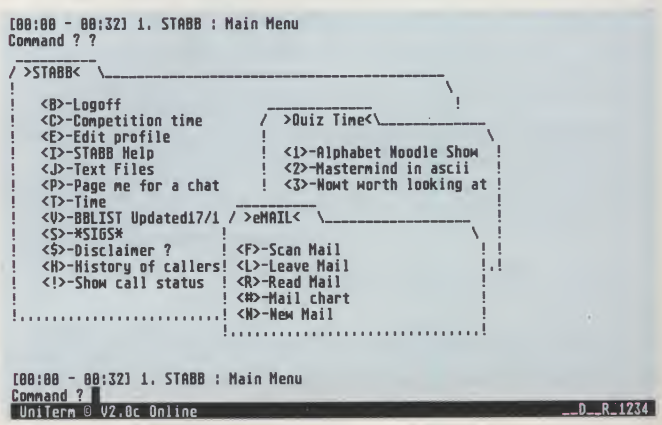
Now, more home news regarding the Micronet Telesoftware Gateway as mentioned in my last column. The Gateway now appears to be functioning correctly after a rather shaky start. The system is running on an Amiga 2000 (which Atari fans might say would explain the shaky start) and is called Orson (don't ask me!). There still appear to be some problems from the feedback I've seen, and right now there is precious little software actually online. There was a recent Celebrity Chatline regarding this new service, but the discussion seemed a bit inane. If I can get hold of a copy of Ruby-View I'll give the Gateway a try, but I don't feel inclined to rush.

Just time to mention a couple of ST BBSes. Twilight Zone (0202-485723, V21/23/22/22bis, 24hrs) has been running for some considerable time now and is now part of a network called F-NET. This system is based on the old Fido Net that connects BBSes all around the world. I'll be discussing networked BBSes another time, but for now I'd suggest giving Twilight a call and reading the F-NET information on there. Another board which looks to be a good bet for the bleary-eyed brigade is STABB (0793-855176, V21/23/22, 24hrs), which is a nicely-laid-out board which has a friendly download policy (i.e. they don't mind you doing it - unlike some boards I could mention). I'm going to be compiling a Top Ten list of ST BBSes for a future column, so I'd better get dialling! Ah well, back to the bit-stream...

David Jones can be contacted on CIX as ID 'davjon'.
CIX is on 01 399 5252.



Lightfinger's BBS



STABB, worth checking out

Now two does go into one

In 1985, when Jack Tramiel announced his Atari ST range of computers complete with WIMP environment and a Mac like mouse, the computer press dubbed the machine the 'Jackintosh'. Three years later it turns out that those headline-hungry writers were not far wrong. Aladin is a small cartridge that proves that the ST has all the power of the Macintosh at a fraction of its price.

When Aladin is plugged into your ST's cartridge port you can use a large selection of the ever growing range of high quality Apple Macintosh software including: MacWrite, MacPaint, Excel, Microsoft Word, Cricket Graf, Double Helix, MacDraft, RedRyder, WriteNow and even PageMaker. Not only is Aladin compatible with literally hundreds of Mac programs, it runs at least 25% faster than the standard Mac Plus and utilises the STs bigger screen to give a display 30% larger than that of the Mac's.

The latest enhancements to Aladin include the facility to use the ST's hard disk, emulation of the Macintosh's sound facilities using a simple hardware add-on, Heirarchical filing system, 400 and 800k format floppy disks and support for Epson and 24-pin compatible printers. Enhancements are always offered to existing users at minimual upgrade charges.

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This month, Barry Freeman concentrates on some of the more useful and original of the Public Domain and Shareware accessories. These can make life very easy for those of us who use their STs for other than games...

THE PUBLIC'S DOMAIN

One situation that frequently occurs, though not as often if you have a hard disk, is having to format a disk while inside an application. It may be a wordprocessor, or spreadsheet that doesn't have a Format option amongst its commands.

Unlike the IBM and compatible range of micros, the ST has its operating system built in to its ROMs. This means that ST programs very rarely, if at all, have an 'Exit to DOS' option which would allow you access to DOS commands without having to exit your program.

More programs nowadays address this restriction by including DOS commands in their options, but applications like 1st Word, VIP Professional and many others don't. So, what do you do if you have a 50-page masterwork in 1st Word, and you haven't got a formatted disk to hand? Easy! You simply pull down the Menu and select the Accessory...

What? You don't have a Format accessory? Ok, well, close down that word processor or spreadsheet, and pay attention! Here's some details of some really useful accessories that you can get for next to nothing that will make your life easy for you!

Last month I mentioned the DC Formatter accessory. This is undoubtedly the best of its kind, offering much more than just a formatter. The main dialog shows the wealth of options available. As you can see, it supports the new Spectre Macintosh Emulator format, and allows for different step rates of drives, as well as IBM format.

The executable boot sector options are especially interesting. The only one that is not clear, is the 'Step Rate B:' option. I assume this makes the format on A: run at the step rate of the drive in B:. The DESKTOP.INF option prevents the file DESKTOP.INF being written to the disk - useful if you have previously set up the disk in a certain way. All the other options are self-explanatory.

All in all, this is by far the best formatter I have come across to date. It is now up to version 3.0. Previous versions did not support the Spectre format or the ability to format 80-82 tracks or 40-42 tracks for PC compatibility.

DC-Formatter is shareware but no specific donation figure is specified. Still, if you can get a cheque in US funds to them, I'm sure they would appreciate it, and you will get extended documentation and upgrades for your honesty.

Another useful little utility is the Notepad. Variously called WORD400, NEWWORD and NOTEPAD this allows you to edit a file in straight ASCII format whilst still in another application. There are variations of this utility, and some have more features than others. Since the names get changed, I can't give any more details as to which names have which features. The one to look out for has a calendar function and several WP functions that the others don't - Sorry to be so vague about this one. It has been very useful to me in the past, the one I use is called NEWWORD, but I have seen it called several other things as well.

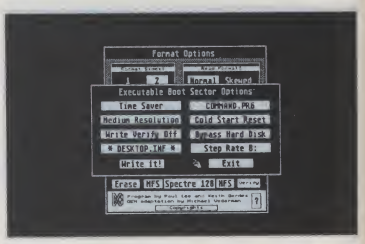
Another interesting accessory I have come across recently is called 'Schizo'. Basically this is a replacement for the ST Control Panel Acessory. In the 'Read.me' option, it has words to the effect that: *"This program is Copyright, but you can distribute it freely"*

It is not Public Domain, but the Author has given express permission for it to be copied and given away. Features on offer are: setting of the Screen default colours; Disk write verify on or off; Keyclick and bell on or off; Mouse double-click speed; set the printer and RS232 ports; flush the ports; set the time; cold boot the computer and alteration of the step rate of the drive. It comes with a companion program called NEUROSIS.PRG which allows configuration of the default path for the setup file.

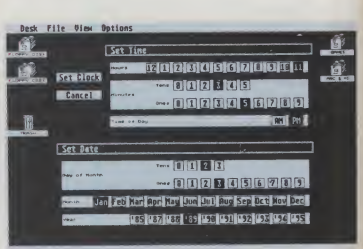
While I've been writing this article, I have had to look at several dozen accessories. You can imagine what a bind it is only to be able to load 6 at a time. Well, not any more! A really neat accessory from Double-Click Software called Stuffer solves this problem by allowing up to 32 accessories at once to be loaded. This version is Shareware, and if you register it, you get another version which has no limit on how many accessories you can load, apart from available RAM.

Before I finish for this month, I would like to thank Roy Stoker of Forest Computer Services for supplying the Software for review. All of the software mentioned can be obtained from there, as well as from many BBS's for those of us with Modems.

Just before I go, a word about Shareware. This is a concept which has not taken off in the UK as much as it has in the USA. Maybe we are just not honest enough! Shareware



DC-Format: Executable boot sector options.



Schizo; how to set the time and date in style! This has to be the fanciest T/D screen ever!

Programs are *not* public domain. They are released onto the market so that you can try them out before paying for them. If you don't pay for them but continue to use them, you are depriving the author of his income, and he is unlikely to continue writing programs for nothing.

Well, that's all for this month. Next month I'll take a look at some rather specialised programs, as well as a few demos. 'Bye for now.

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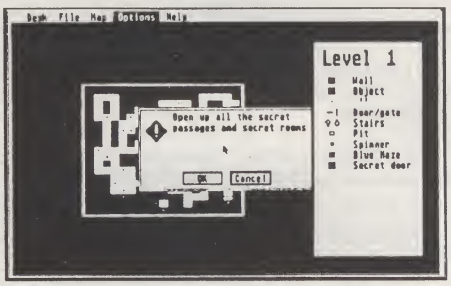

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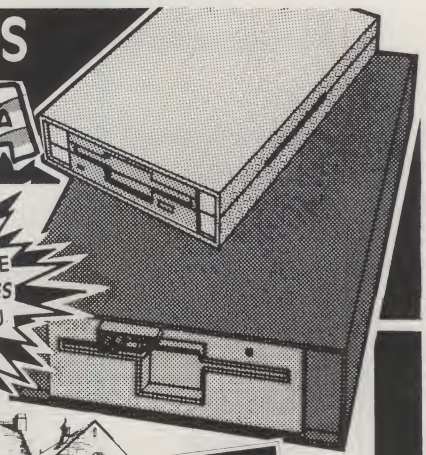

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YOUR CHANCE TO CHANGE THE WORLD - THE ST WORLD READER SURVEY

As you can see from the latest issues of ST World, we have been taking notice of what our readers say. Through your letters, phone calls, complaints, suggestions, and visits to computer shows, we have attempted to make ST World better for a wider range of ST owners. However, this is only the first step; we would like to receive more feedback, more letters and, most importantly, we want every single reader who cares about ST World's future content to fill in this reader survey. It is important and we will take notice of what you want - after all, the magazine is produced for you. Once you have filled in the survey, send it to:

ST World Survey, Gollner Publishing Ltd, 10 Theatre Lane, Chichester, West Sussex. PO19 1SR.

Photocopy if wanted

Which model of ST do you own?

- [ ] 520STF/M
- [ ] 1040STF/M
- [ ] Mega ST1
- [ ] Mega ST2
- [ ] Mega ST4
- [x] I intend to buy an ST

Which other computers do you have/own?

- [ ] Amstrad CPC
- [ ] Amstrad PC
- [ ] Apple Macintosh
- [ ] Apple II
- [ ] Apricot
- [ ] Atari 8-bit
- [ ] BBC Micro
- [ ] Commodore Amiga
- [ ] Commodore 64
- [ ] Dragon
- [ ] MSX
- [ ] PC-Compatible
- [ ] Sinclair Spectrum
- [ ] Sinclair QL
- [ ] Other, please specify:

.....

Which peripherals do you currently own?

- [x] Hard disk
- [ ] Mono monitor
- [ ] Colour monitor
- [ ] Graphics board
- [ ] GenLock
- [ ] 9-pin matrix printer
- [ ] 24-pin matrix printer
- [ ] Atari Laser printer
- [ ] Non-Atari Laser
- [ ] PostScript Laser
- [ ] Scanner
- [ ] Modem
- [ ] Plotter
- [ ] Other, please specify,

.....

Which of the following applications do you run on your ST (tick as many as needed)?

- [ ] Word processing
- [ ] Spreadsheets
- [ ] Database
- [ ] Desktop publishing
- [ ] Midi and Music
- [ ] Comms
- [ ] Image processing
- [ ] Desktop Video
- [ ] Animation
- [ ] Art/Painting
- [ ] OCR
- [ ] CAD/Drafting
- [ ] Prog Languages
- [ ] Games
- [ ] Other, please specify:

.....

Which of the following languages do you own/use?

- [ ] Basic
- [ ] 'C'
- [ ] Modula-2
- [ ] Pascal
- [ ] Assembler
- [ ] Fortran
- [ ] APL
- [ ] FORTH

Which peripherals do you intend to purchase during the next twelve months?

- [x] Hard disk
- [ ] Mono monitor
- [ ] Colour monitor
- [ ] Graphics board
- [ ] GenLock
- [ ] 9-pin matrix printer
- [ ] 24-pin matrix printer
- [ ] Atari laser printer
- [ ] Non-Atari laser
- [ ] PostScript Laser
- [ ] Scanner
- [ ] Modem
- [ ] Plotter
- [ ] Other, please specify

.....

Which of the following applications packages do you intend to purchase during the next year?

- [ ] Word processing
- [ ] Spreadsheets
- [ ] Database
- [ ] Desktop publishing
- [ ] Midi and Music
- [ ] Comms
- [ ] Image processing
- [ ] Desktop Video
- [ ] Animation
- [ ] Art/Painting
- [ ] OCR
- [ ] CAD/Drafting
- [ ] Prog Languages
- [x] Games
- [ ] Other, please specify:

.....

Where do you purchase your software from?

- [x] Mail order via magazine adverts
- [ ] From a local computer shop
- [ ] From a chain store such as WH Smiths
- [ ] Other, please specify:

.....

What software have you purchased during the last six months? Please list titles, approximate price paid per unit and quantity purchased.

Title 1: Outrun £16.99

Title 2: American pool £2.99

Title 3: Int Karate + £9.99

Title 4: Star Trek £9.99

Title 5:

Title 6:

Title 7:

Title 8:

Title 9:

Title 10:

On average, how much do you spend on software per month?

£ ..... Non-games

£ 20-40 Games software

How regularly do you buy ST World?

- [ ] Every issue
- [x] Only issues of interest
- [ ] Most issues

How many people read your copy of ST World?

- [ ] Just Yourself
- [ ] Yourself and 3 others
- [x] Yourself and 1 other
- [ ] Yourself and 4 others
- [ ] Yourself and 2 others
- [ ] Yourself and over 5

Which of the following recent issues of ST World did you buy?

- [ ] September '88
- [ ] December '88
- [ ] October '88
- [ ] January '89
- [ ] November '88
- [ ] February '89 NONE

Where do you usually buy magazines (tick as many as required)?

- [ ] WH Smith
- [ ] Martins
- [x] John Menzies
- [ ] Other, Please specify
- [ ] Fourboys
- [ ] Circle K

How often do you buy ST Action?

- [ ] Every issue
- [ ] Never
- [ ] Most issues
- [x] I've never seen ST Action
- [ ] Only issues of interest

Which of the following computer magazines do you buy regularly?

- [ ] Atari ST User
- [ ] Personal Comp World
- [x] ST/Amiga Format
- [x] ACE
- [ ] Popular Comp Weekly
- [x] Other, please specify: ST ACTION / THE ONE
- [ ] New Computer Express

Which daily newspaper do you read?

- [ ] The Telegraph
- [ ] The Daily Express
- [ ] The Times
- [ ] The Mirror
- [ ] The Gaurdian
- [x] The Sun
- [ ] The Independent

Have you had trouble obtaining ST World or ST Action from local newsagents?

- [ ] I have had trouble
- [x] No real problems

Of the following ST World articles, indicate if you like, dislike or are indifferent to:

Like	Indifferent	Dislike	
[x]	[ ]	[ ]	News
[ ]	[x]	[ ]	I/O (letters)
[ ]	[x]	[ ]	Interviews
[x]	[ ]	[ ]	User features
[x]	[ ]	[ ]	Hardware product reviews
[x]	[ ]	[ ]	Software product reviews
[x]	[ ]	[ ]	Supertests
[x]	[ ]	[ ]	Midi and Music
[x]	[ ]	[ ]	Connections/DIY Hardware
[ ]	[x]	[ ]	Programmer's clinic
[ ]	[x]	[ ]	In-depth programming
[ ]	[x]	[ ]	Intellectual computer games
[x]	[ ]	[ ]	Desktop Publishing
[ ]	[x]	[ ]	Communications
[ ]	[x]	[ ]	Program listings
[x]	[ ]	[ ]	Public Domain

Are you male or female?

- [x] Male
- [ ] Female

What is your age?

- [x] Under 16
- [ ] 40-50
- [ ] 16-20
- [ ] 50-60
- [ ] 20-30
- [ ] Over 60
- [ ] 30-40

What is your occupation?

MARKET OPERATOR

What is your yearly income?

- [x] Less than £5000
- [ ] £15000-£20000
- [ ] £5000-£10000
- [ ] £20000-£30000
- [ ] £10000-£15000
- [ ] Over £30000

How many STs are used at your place of work?

- [x] STs are not used
- [ ] 10-25
- [ ] 1-5
- [ ] 26-50
- [ ] 6-10
- [ ] More than 50

Thank you for completing this reader survey - the information will go to making ST World better able to cover the subjects that interest you. Please use the space on the right to make any additional comments you may have. The ST World team may like to phone and ask about any comments you make so include your phone number if you don't mind being contacted.

Name Tommy Thomas

Phone No Phone.

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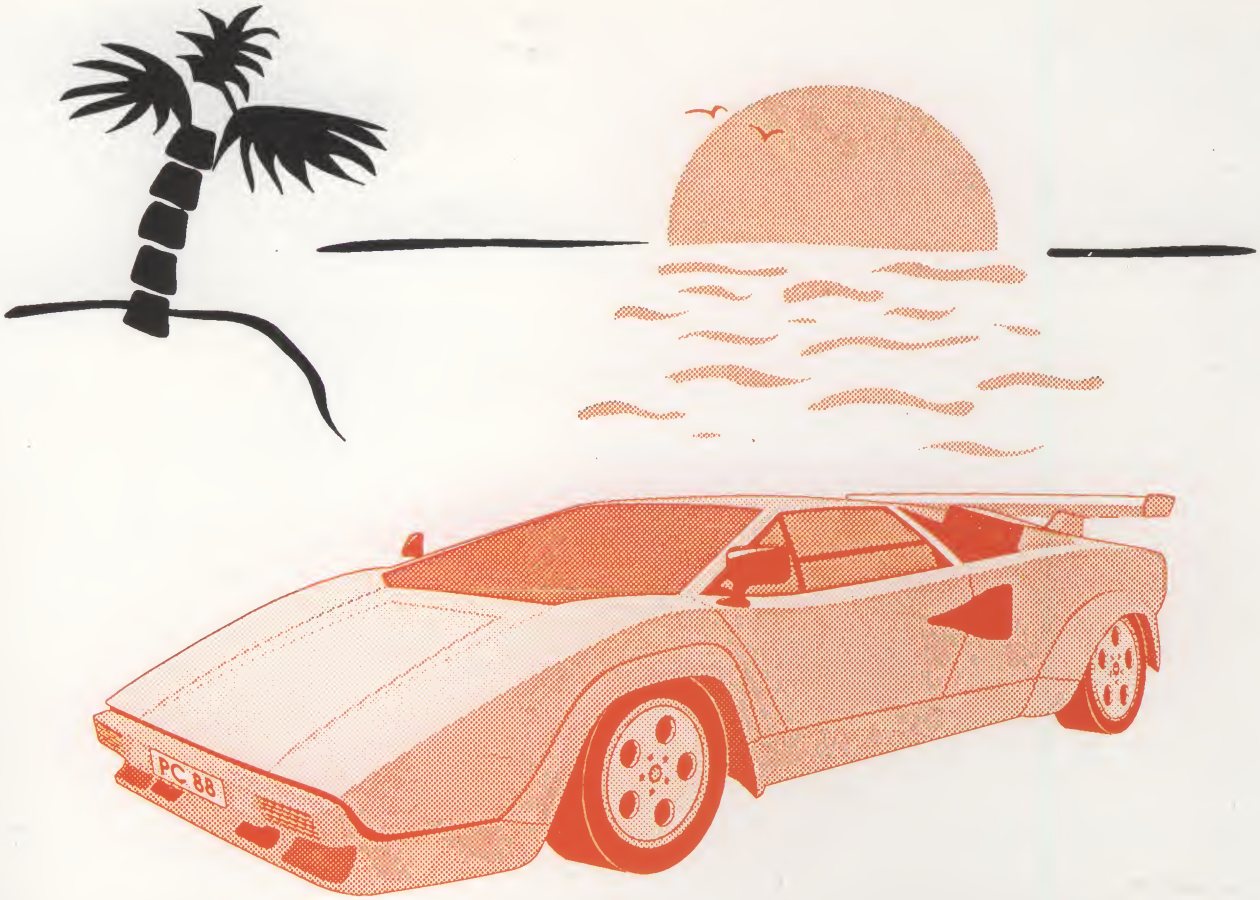

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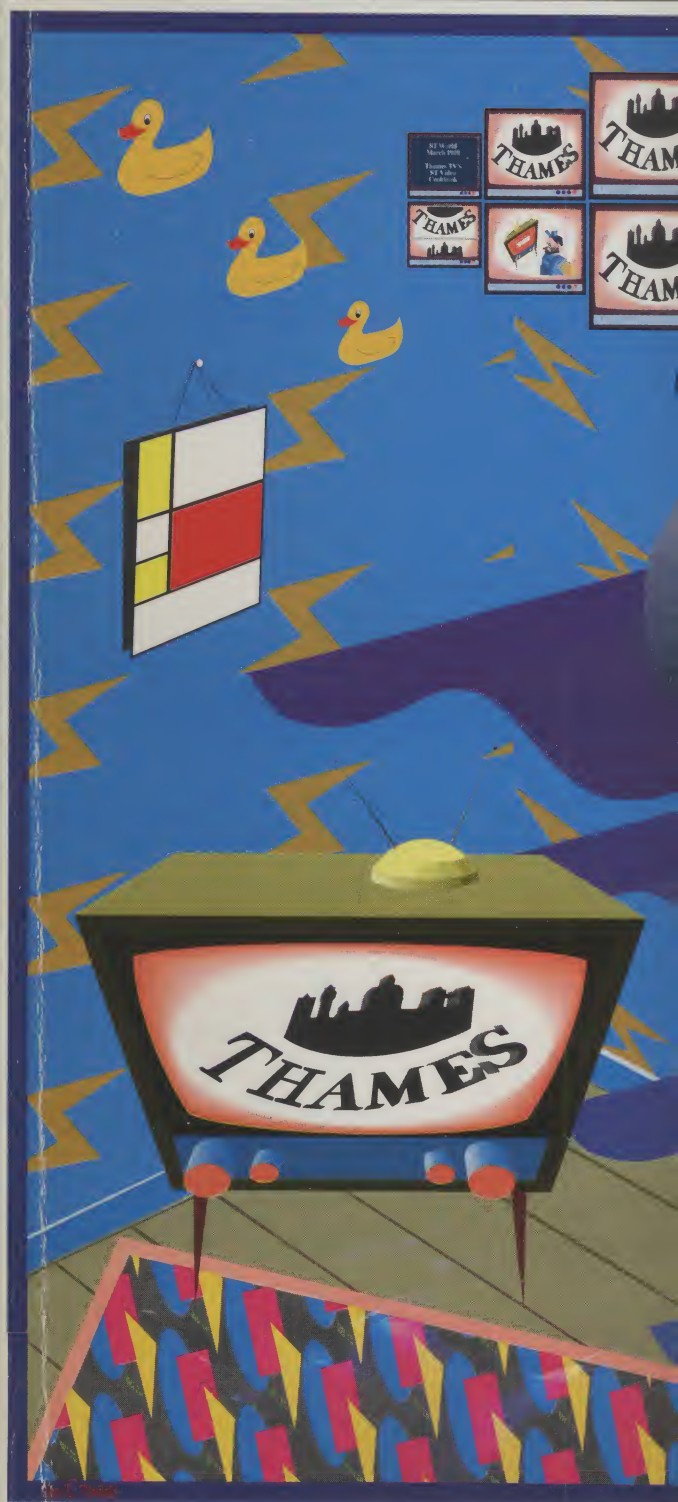

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