Price: £1.50

ST Applications

The Magazine for Users of Atari ST, STE, Falcon and TT Computers *Issue No. 55 August 1995*

TwiLight

JCA Europe have announced the release of *TwiLight*, a screensaver for all Atari ST(E), TT and Falcon computers. Produced by Delirium Arts, it works with all versions of TOS from 1.02 upwards under any screen resolution down to 320x200 low-res colour (including hi-res mono), and it supports all common graphic cards.

TwiLight is a modular screensaver - the main program is separated from the saver modules, the programs that draw graphics on the screen and play music and sound effects. The manual contains instructions on turning your programs into TwiLight modules. Examples of source code in Assembler and C are held on the TwiLight disk.

The main features comprise:

☞ Coloured sprites and animations are automatically converted to the number of colours your video hardware is able to display.

☞ Interactive modules are possible - one such is included ("Pong").

☞ Modules can change frequently, in order or at random.

☞ Adjustable processor time usage.

☞ Sound samples are played on normal STs without DMA sound abilities.

☞ Password protection with protocol file.

☞ Wake and Sleep corners, hotkey feature.

☞ Flexible routines for your own modules, including a complete sprite engine, collision check, dithering, etc.

☞ Minimal memory used thanks to 100% assembler code.

A hard disk is recommended.

The retail price is £29.95 including VAT and UK delivery. TwiLight is available from: JCA Europe Ltd., 30a School Road, Tilehurst, Reading, Berks. RG31 5AN; Tel: 01734 452416; Fax: 01734 451239.

EXPOSE

In the final stages of production is *Exposé*, a True Colour video digitiser for the Falcon that can grab up to 1024x768 16-bit images or 512x384 animations direct from camera or VCR. The package comes supplied with an enhanced version of APEX Media for £314.04 or with APEX Lite for £254.47 (exc. VAT). It incorporates "Videobox" which texture wraps the incoming live video on to the faces of a cube which can then be zoomed and rotated in real time, and FalCAM, an accessory file for displaying incoming live video from within any GEM program.

APEX offers animation, morphing, non-linear drawing, cell manipulation and post-processing, giving good digitiser support for Exposé. Written in 68030 and 56001 DSP machine code for optimum performance, it allows such features as real time zoom, realistic airbrush, analog masking, image transforms and block manipulation.

Exposé is available from Titan Designs Ltd., 6 Witherford Way, Selly Oak, Birmingham B29 4AX; Tel: 0121 693 6669; Fax: 0121 414 1630.

Also from Titan Designs comes an upgrade for *Thought!*, the "ultimate development tool". Now at version 2.2, the new features include drag and drop, clipboard, Macro-based text language, template editor, output to printer, screen or compiled disk file, and colour support for Falcon/TT users. The price, excluding VAT, is £68.04 or £21.28 for the upgrade.

Positive Image

If you've seen any of the image processing packages available for the PC and Mac and wish you could do something similar with your ST or Falcon, you may now be in luck. Floppyshop announce the imminent arrival of Positive Image, a high-end image processing tool developed primarily for the TT and Falcon. Two versions are available, one for 68000-based machines and the other for 68030 machines including PAK 68/3 accelerated ST(E)s and the Apple Mac running MagiC Mac.

Positive Image is the only GEM-based image processing program to allow the editing of 24-bit True Colour graphics on an ordinary ST in any resolution, including low-res! Although a high-spec system is not necessary to run Positive Image, the program will take full advantage of the increased processing power if it's there. It needs a minimum 1MB Ram, but 4MB and a hard disk are recommended for serious use. It is fully compatible with GDOS 1.1, AMC GDOS, FontGDOS, FSM GDOS, SpeedoGDOS v4 and v5, and NVDI 3. It imports a huge range of graphic formats and saves in most popular formats: GIF, TIFF, BMP, TGA, XIMG, EZA, P?1 and NEO among others.

No price has yet been set, but we are promised that it will not be overpriced beyond the reach of the hobbyist. The release date is likely to be in late summer '95. Contact: Floppyshop, P.O. Box 273, Aberdeen AB9 8SJ. Tel/Fax: 01224 586208.

Non-visual Metaphor

Developed for a blind music student, Metaphor is a new graphical interface for the visually impaired by Aldridge Technology. Windows, menus and other graphic devices that are usually lost to them are given non-visual equivalents and the interface communicates with the user via a voice synthesizer. The system comes with interfaces for Cubase and Cubase Audio on the Falcon but is also ST compatible. It is likely to be distributed by System Solutions, but as yet we have no details about release date or price.

Printed in the U.K.

Post Office: Non-deliverable copies should be returned to FaST Club, 7 Musters Road, West Bridgford, Nottingham NG2 7PP

FaST Club

For users of Atari ST & Falcon computers

7 Musters Road - Nottingham - NG2 7PP
Tel: 0115-945-5250 - Fax: 0115-945-5305

Software

This is just a small selection of the programs that we publish - see our catalogue for a full listing and for product specifications.

❒ 3D Calc Plus	£12.45	❒ Mastering Papyrus	£26.95
❒ Address 1.6	£12.95	❒ Mastering Calligrapher	£24.95
❒ Astronomy Lab	£24.95	❒ Mouse Tricks 2.15	£ 9.95
❒ C-Font2	£ 9.95	❒ Multiprint	£ 9.95
❒ CalAssistant	£19.95	❒ PageAssistant	£29.95
❒ CalAssistant SL	£29.95	❒ STC Calamus Fonts	£14.95
❒ TW Clip Art Catalogue	£ 2.95	❒ STC Fonts Catalogue	£ 2.95
❒ Fontkit Plus 4.1	£24.95	❒ Ultimate Virus Killer 6	£12.95
❒ Fonty: Calamus Font Editor	£11.95	❒ Universal Item Selector III	£14.95

Imagecopy 4

❒ Imagecopy 4 £34.95

The following features are new in Imagecopy 4.0

❒ Page layout option: multiple images can be arranged on a page using the mouse or by typing coordinates, and pages can be printed and/or saved for future use. Individual images can have their own colour settings, and can be freely moved and resized (as in a publishing program). This option can also be used to do colour DTP work by overprinting output from a monochrome publishing program, or you can use text images from Textstyle to create greetings cards or posters.

❒ Interactive screen catalogue option: this displays thumbnail miniatures of images which can be clicked on to view, print, or convert the original images.

❒ Imagecopy can be used by other programs to print images.

❒ The ability to load images with incorrect file extensions, and an option to rename these files with their correct extensions.

❒ Faster LZW decoding: GIF and LZW TIFF images load three times as fast as previously.

❒ Faster random dithering: the default (Floyd-Steinberg) option is nearly three times as fast as previously.

❒ Faster colour mapping.

❒ Improved timesharing with other programs. Imagecopy's print routines detect when the printer buffer is full and allow other programs to use this time. More time is given to other programs by 'task priority' option.

❒ Ability to print PRN files.

❒ New (read-only) image formats: MTV Raytracer (.RAW or .MTV), TMS Enhanced Simplex (.ESM).

❒ Option to save interlaced GIF images.

❒ Option to select transparent colours in GIF and IFF images.

❒ Images can be copied from programs which change screen resolution.

❒ 'Scatter' dithering option.

❒ Option to change image resolution (dpi).

❒ The pop-up image menu contains a 'print' option which can be used to print the image as it is displayed on screen.

❒ There is an 'Auto select' video option for video cards that are not directly supported.

❒ Choice of thumbnail sizes.

❒ Pop-up menus can be displayed using the left or right mouse button.

❒ Clicking the right mouse button on a window title bar causes it to be moved behind other windows on screen.

❒ Improved monochrome print density option.

❒ Text and filenames can be printed with 'IMG file' output.

❒ 'Fix TOS arrow bug' option for scrolling accessory windows.

❒ Reset printer option in 'print layout' dialog.

❒ 'Normal' orientation option.

❒ Improved 'close windows' option.

❒ 'Disable warnings' option in 'system preferences' dialog.

❒ Option to sound bell after multiple-file operations or for feeding paper into the printer.

❒ 'Cycle' option in pop-up image menu.

❒ Textstyle is supplied free with Imagecopy 4

❒ Imagecopy 4CD £39.95

Imagecopy 4CD can load Photo CD images in any of the five standard resolutions (memory permitting), and can also load blocks from any resolution, without having to load the complete image.

❒ Upgrades

(return disk 1, plus CD disk if applicable)

❒ From Imagecopy 3.5:	£6.95
❒ From Imagecopy 3.5CD to 4CD:	£6.95
❒ From Imagecopy 3.0:	£7.95
❒ From Imagecopy 2:	£17.95
❒ From Imagecopy 1.5:	£22.95
❒ From Imagecopy 1:	£24.95

❒ Textstyle is supplied free with Imagecopy 4; add £5 to receive a copy of Textstyle with an Imagecopy 4 upgrade.

❒ Add £5 to the upgrade price if you want to upgrade to Imagecopy 4CD from a version of Imagecopy other than 3.5CD.

PD and Shareware

❒ 24-hour Catalogue Hotline

Phone 0115-945-5250 to request a copy of our latest 52-page A4 catalogue.

❒ FaST Club Catalogue Free.

Probably the most comprehensive catalogue for the ST. Details on hundreds of PD and Shareware disks plus specifications of all of the products listed in this advert. **PD Disks cost £1.25 each!; or £1 for subscribers!**

Spreadsheet

❒ 3D Calc Plus £12.45

3D Calc is a true 3-dimensional spreadsheet with an integrated text editor and programming language, graphics, and extended statistical functions. It will rapidly generate bar and line diagrams, pie chart, multiple bar and line graphs, stacked bar graphs, function graph etc. 3D Calc needs one megabyte of memory.

Save £5.00

❒ Int. ST Machine Code £14.95

Introducing ST Machine Code is an excellent book that takes the beginner step-by-step into the secrets of programming the ST in assembly language. The accompanying free disk contains a complete programming environment - there is no need to buy a separate assembler or resource kit! The books 24 chapters introduce the gamut of ST applications programing from formatting a disk to constructing drop down menus and dialog boxes.

Textstyle

❒ Textstyle £19.95

Another cracking program from Jeremy Hughes, author of Imagecopy. Enter your text into Textstyle, select a Calamus or GEM font, add text effects and justification, and the resulting picture file can be imported into a whole range of packages. Great for generating headlines for wordprocessors like First Word Plus, Redacteur or Write ON; or use it with an art package such as PixArt or HyperPaint to make posters, banners, logos, greetings cards, etc. Thousands of applications.

❒ Textstyle £FREE!

Order Imagecopy 4 and get a free copy of Textstyle! (£5 if upgrading)

ST Applications

For the last four years we have been publishing a monthly magazine for ST users. Full of informative and authorative articles ST Applications is an essential read for all Atari users who are serious about getting the best out of their machine.

❒ 12-issues: £15.00
❒ 6-issues: £8.00
❒ 3-issues: £5.00
❒ Sample issue: £1.50

New lower prices!

Don't take our word for it, here are some unsolicited comments from happy readers: *unfailingly interesting, superbly written* NWF, *really excellent value* GFS, *invaluable service for ST users* PS, *consistently impressed* AS, *no hesitation in renewing my subscription* PPK, *you can read it again and again* RF. Originals of these letters available for inspection at our offices.

Fantastic fonts

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❒ PageStream Font Set	£ 8.95
❒ PostScript Set #1	£ 8.95
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All the above sets comprise 10 DS disks of PD and Shareware fonts in a Slimpack disk box.

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❒ TrueType Set#2	£10.95
❒ TrueType Set#3	£10.95
❒ TrueType Set#4	£10.95

Truetype sets #1 to #4 comprise 12 DS disks of PD and Shareware fonts in a Slimpack disk box.

❒ TrueType Set#5 £28.00

1200 PD and Shareware TrueType fonts in Sets #1 to #4 on 28 HD disks.

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❒ FastCopy PRO 1.2 £14.95

The best disk utility for Atari computers has just got better! FastCopy PRO features: highly efficient disk copying and formatting, creates and copies both extended format and MS DOS disks, fast hard disk backup with data-compression, built in disk editor and virus killer with virus immunization. Now fully Falcon compatible.

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Features:

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- # English and French spell checking plus verb conjugation
- # Editor for user-defined dictionaries
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Articles/Reviews

Our apologies to Martin Milner who was not credited in the last issue for his Mouse Boot and Cardfile reviews.

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Contributions

The articles in *ST Applications* are written by users for users. Everyone reading this magazine will have something to contribute; even if you do not feel able to do a full-length review or article there is the Forum section for short hints, tips and questions. If you are interested in writing for *ST Applications* - regularly or irregularly - please write for a copy of our terms and conditions. We always do our best to reward quality work with appropriate remuneration.

Advertising

There is a limited amount of space for commercial advertising in each issue of *ST Applications*. Contact Nicky Wilson on 0115-945 5250 for further details and to request a media-pack. Subscribers can place free classified advertisements — see page 27 for details.

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3 issues:	£5.00	N/A	N/A
12 issues + 6 D/Mags:	£27.00	£31.00	£37.00

Subscription and Order form will be found on page 30.

Disk Mags

These are bi-monthly compilations of the best PD software to come to our attention in the preceding couple of months - not magazines on disk. The next Disk Mag, DMG.48, will be dispatched along with issue 56 of *ST Applications*.

OUTSIDE

Jon Ellis has been looking at **Outside**, *the virtual memory manager for Falcons and TTs.....*

Ever run out of memory at a critical moment? Ever longed for an extra few megabytes to record a longer soundtrack or create a more complex animation? If so, Outside could be just what you are looking for. The idea is quite simple: Outside takes the free space on your hard disk drive, and allows you to treat it almost like RAM. With a large enough hard-disk, you could give your Falcon or TT the equivalent of 512 megabytes of RAM.

Magic? No, not quite, just some rather clever programming. The extra space is not real RAM, but *virtual memory*, and Outside is a virtual memory manager. Box 1 gives a brief introduction to virtual memory and how it works.

Installation and Configuration

The package itself is rather unimpressive: one high-density disk and a tiny manual, about which more later. Installation is easy - simply copy OUTSIDE.PRG into the AUTO folder on your boot drive, and then configure it to your needs. This is done using a GEM program that modifies the program file directly (Figure 1).

The most important part of configuration is to decide where to put the virtual memory storage. Since one of the biggest influences on the performance of a virtual memory system is the speed of the hard disk, it makes sense to have Outside use a partition on the fastest drive in the system.

Unlike some virtual memory systems, Outside does not demand a partition all to itself. As long as there are no errors in the filing system of a partition, Outside is capable of working around existing data without harming it. However, to prevent conflicts between Outside and GEMDOS, the partition is write-protected whenever Outside is active.

The second important variable is the performance of the page-management algorithm — the fewer page swaps the better. Without being able to predict the future, no virtual memory algorithm is going to achieve optimal results under all conditions, but it is important to avoid continual hard-disk accessing, a condition known as thrashing.

Outside offers little in the way of fine-tuning options. The only user-adjustable variable is the memory page size, which can be set to 8K, 16K or 32K. Most of the time the program seemed to work best with 32K pages, though the manual suggests that some programs might be better with 8K pages.

In addition to virtual memory, Outside can also perform a couple of other memory management tricks. For example, it can be configured to copy the operating system into RAM and run it there. This can yield a significant performance advantage on TTs.

Outside is quite fussy about the hard disk used to hold the virtual memory. In particular, it is not compatible with some hard disks formatted using ICD software. ICD driver software can be used, but the Outside documentation suggests that the performance of the system will be reduced. Instead, it is recommended that the Atari AHDI or Maxon's HD-Driver software are used instead. To make this restriction less irksome, HD-Driver is bundled with Outside (see Box 2).

Operation

In use, Outside can be quite unobtrusive. In many applications, all that could be noticed was an occasional disk access or a momentary pause when a menu item was activated. Some operations were accompanied by much more disk access: searching through a huge document in the Tempus text editor for example.

Even under harsh conditions, the program proved quite robust. One test involved a lengthy multi-font That's Write 3 document which was too large to load without removing all desk accessories. With a few megabytes of virtual memory, the same document could be loaded, edited and printed, in the presence of a full complement of desk accessories. To be sure, the system slowed down considerably, but it never ground to a halt.

Outside's software compatibility seems to be very good. For programs to be able to use virtual memory, they simply have to be compatible with the TT's FastRAM, because that is what the virtual memory looks like. Virtually all modern application software meets this criterion, and so works well.

Trying to use software written before the TT is rather more of a lottery, though through no fault of Outside. Depending on the way in which the program is written and what it attempts to do, it may or may not be compatible with FastRAM, and thus with virtual memory. As a general guide, applications are usually all right, but anything that plays tricks with the disks or screen may be problematic.

The operating system detects whether a program is FastRAM-friendly by the state of a couple of flags in the program header. The Outside package includes a program to change these flags (Figure 2), so you can test

What is Virtual Memory?

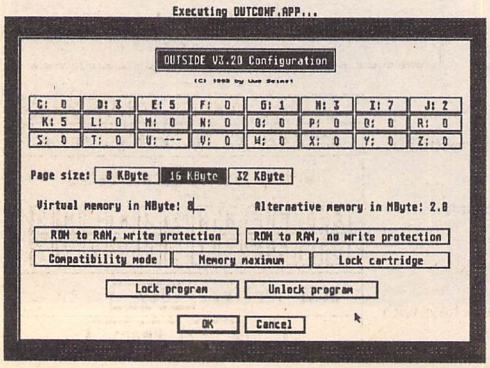
Virtual memory is a method of giving a machine more working memory, using spare space on a storage system, usually a hard disk drive. If you have 4Mb of RAM and 20Mb of free hard disk space, then virtual memory can make your machine behave as though it had 24 Mb of RAM.

What the virtual memory manager (VMM) program — in this case Outside — does is to take the 24 Mb of space, and divide it into blocks or *pages*, typically 16K or 32K in size. Some pages are held in RAM, and the majority on disk, but to the user program, it simply looks like one big block of memory.

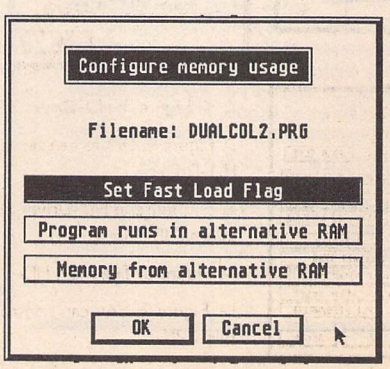
When the user program tries to access a memory address that lies in one of the pages on disk, the VMM takes control of the system. It selects a page in RAM that has not been used recently, and copies it to disk. The page containing the required address is then loaded into the free RAM space, and control returned seamlessly to the user program which carries on with its work. This process continues, with the VMM swapping pages between disk and RAM according to the program's needs.

In short, virtual memory is a juggling trick. To perform it successfully you need hardware assistance in the form of a *memory management unit*. This is part of the 68030 microprocessor that lies at the heart of the TT and Falcon, and is the reason why Outside only runs on these machines. For a more detailed technical introduction to the MMU, see the recent series in *Programmers' Forum*, beginning in STA 53.

In the real world, you never get something for nothing, and this is true of virtual memory too. In our example, the computer will never have more than 4 Mb of data in memory at any one time. Indeed the useful real RAM will be less than this, due to the overheads of setting up the virtual memory system. Also, it takes time to read and write the memory blocks from the hard drive, slowing down the program.



◁ Figure 1: The main Outside configuration screen.



▷ Figure 2: Outside includes a utility to set the flags that allow a program access to alternative memory (TT FastRAM and virtual memory).

out the behaviour of older software. Even if a piece of software is incompatible with FastRAM, you can still run it with Outside active, but it will be confined to running in the real RAM that Outside is not using.

Outside is also partially compatible with MultiTOS, though installation is a little more fiddly. The partial compatibility arises from competition for memory management hardware. MultiTOS uses the hardware to implement memory protection, an essential feature in multitasking environments. The same resource is needed by Outside to run its virtual memory system. As a result, when running MultiTOS and Outside together, memory protection is disabled.

Documentation

And now for the bad news. Quite simply, the standard of documentation is disgraceful. A scrappy 10-page A6 booklet is all that is provided to serve as a guide and reference for all the software in the package. Inside the flimsy yellow cover, the text is rendered faintly in a tiny typeface, making reading difficult and unappealing.

Unfortunately the poor presentation is an accurate guide to the standard of writing. Typographic and grammatical errors are liberally scattered throughout the short paragraphs, and odd German words are also thrown in for good measure. The inaccuracies even extend to the disk label: it claims that Outside is for ST/STE/TT and Falcon. Virtual memory is only possible on the TT and Falcon as the other machines do not have the right hardware.

Installation and operation of the programs are covered extremely briefly, with the barest minimum of background information. Many of the configuration options offered by HD-Driver are either not documented at all, or mentioned only in passing. Addenda to the manual are contained in a German README file on disk — not very useful.

The manual makes few concessions to the non-technical user. There are no screen dumps or guided examples on how to use the software. This is a serious flaw in a package of this kind. Most users will feel rather apprehensive at the thought of fiddling with the software that interfaces directly with their hard disk, and this documentation does nothing to inspire confidence.

As if this were not bad enough, almost a third of the booklet is employed to bring us some truly vacuous drivel in the form of a short 'story'. To give the flavour, here are the opening lines of *The Quest for RAM:*

Hear O Prince, for I am grey of years as I tell you this, it is only a wise man who can answer the deepest questions about life, death, the afterworld and what to do about limited RAM.

The story continues, punctuated at intervals by the line: *"Who ordered the chicken fried rice?"* This juvenile rubbish is the sort of thing you might expect to find attached to some public-domain hack, not a commercial package costing £70.

Conclusions

Outside achieves what it sets out to do — running a virtual memory system. Whether it does the job as well as it is possible to is difficult to assess, as there is no mainstream competitor product to match it against. Certainly for occasional use, say to manipulate the odd outsize file, the slow-down imposed by swapping pages to disk is quite acceptable. Severe documentation problems do nothing to make a complex and technical package accessible to the average user. This is a pity, because Outside and HD-Driver are actually rather good pieces of software.

Points For:

- ✓ Extra working memory when you need it
- ✓ Compatible with many recent well-written applications
- ✓ HD-Driver is a quick and reliable hard disk driver system

Points Against:

- ✘ Appalling documentation

Product:	Outside
Version:	3.20
Hardware:	Falcon or TT with minimum of 2Mb RAM and hard disk drive
Supplier:	16/32 Systems 173 High Street Strood, Kent ME2 4TW
Tel:	01634 710788
Fax:	01634 295895
Price:	£69
Manifest:	High density master disk; 10-page A6 manual

HD-Driver

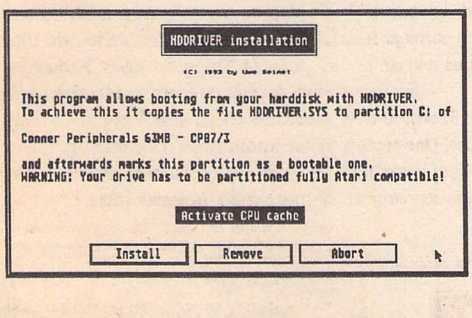
In addition to the virtual memory manage, the Outside package includes a second commercial program by the same author. HD-Driver is a hard-disk driver system like Atari's AHDI or the ICD package, and is also sold separately.

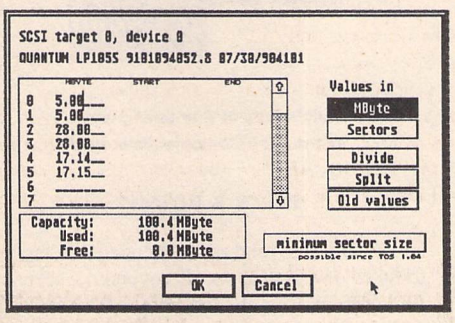
HD-Driver is fully compatible with the Atari standard hard disk software (AHDI), and also includes some nice extra touches. It is also compliant with another standard, XHDI, which allows programs that need direct access to the hard disk (Outside for example) to run efficiently. The package also includes full details of the XHDI standard in the form of an archive containing a technical specification and example source code — a valuable resource for interested programmers.

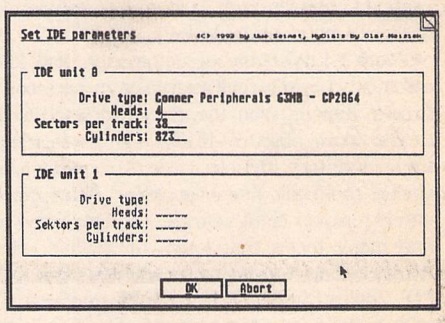
The hard-disk driver itself is easy enough to install (Figure 3), though instructions in the documentation are scanty to say the least. The package does not include a hard-disk formatter: it assumes that the Atari utilities have been used to format the disk first. Repartitioning is possible though, using a rather basic utility (Figure 4). Low-level access to the configuration variables of the Falcon's IDE drive is also supported (Figure 5).

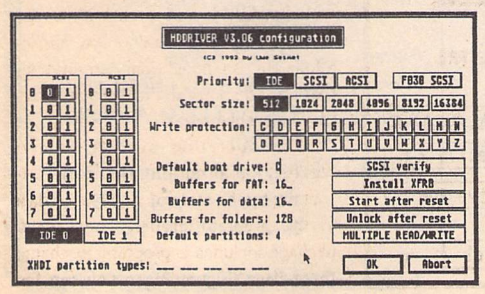
One of the advantages of HD-Driver over Atari's AHDI is its flexibility. HD-Driver can be configured to scan only for the disks that are normally connected to a machine, minimising boot-up delays. In machines with multiple hard-disk interfaces (Falcon and TT for example), the order in which these are processed can also be altered. The program also includes cache software to speed up hard-disk reads and a fix for the GEMDOS folder limitation. Many people use AUTO folder programs to provide these functions — these can be discarded if HD-Driver is used.

Other features include the facility to write-protect a hard disk partition and control over removable media drives. Configuration of all of these options is through a GEM program that modifies the driver program (Figure 6). Most changes require a reboot to take effect, though a neat little CPX allows write-protection of partitions to be changed at any time (Figure 7).









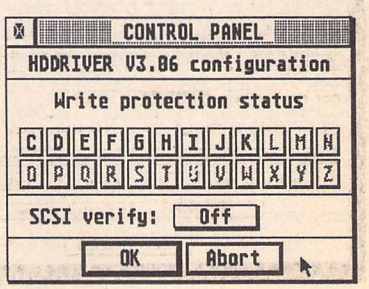
△ ◁ Figure 3: HD-Driver installation is easy...just click.

△ Figure 4: Drives can be repartitioned but not reformatted by HD-Driver.

△ ▷ Figure 5: HD-Driver knows all about the Falcon's internal IDE drive.

◁ Figure 6: The main HD-Driver configuration screen.

▷ Figure 7: You can control write protection at any time with this CPX.



The Atari A-Z

Review by Steve Delaney

The Atari A-Z will be familiar to many ST Applications readers as it has been serialised here in the past. The book of the same name is now available and is a much more in-depth work than the excerpts would lead you to believe. It is an extensive dictionary of computing terms and much more. Running to 340 pages, Atari A-Z contains 2,238 individual entries, 101 Dalmations (sorry, tables!) and 128,000 words! These are rather impressive-looking figures, but do we really need such a thing as a dictionary of computing jargon?

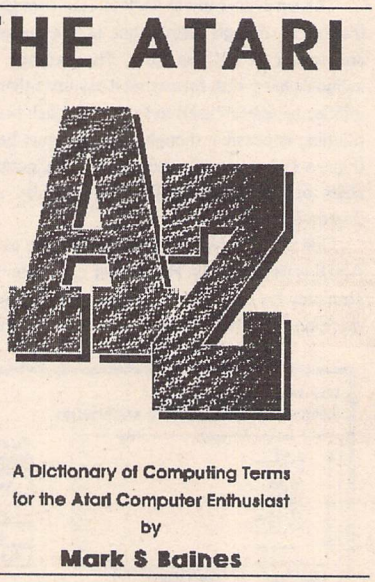
To be fair, calling Atari A-Z a dictionary is somewhat misleading. In fact an encyclopedia is probably a more accurate term, although that's not exactly what it is either. I prefer to think of it as an invaluable reference guide, my right hand book, so to speak! Although primarily aimed at the Atari computer user, A-Z also deals with as many general computing terms as Atari specific ones. It even touches on the various hardware 'standards' which have established themselves solely on competing platforms such as the PC and Mac.

The book itself is supplied in an A5 loose-leaf ringbinder. It was typeset using Protext and printed using an HP Laserjet at 600dpi. To be honest, I thought it was done in Calamus because of the DTP style of layout and high definition of the fonts. This is of course where Protext shines through in its ability to use the Laserjet's inbuilt scalable fonts.

Mark's knowledge of commonly (and less commonly) used jargon and acronyms is second to none. Ranging from the straightforward ACC to the more obscure JEIDA (Japanese Electronic Industry Development Association) he covers them all. I've been using Atari computers for over eight years and still managed to find many terms that I was unfamiliar with. After reading A-Z, no longer will you think that PDL stands for Public Domain Library or that PGA is the governing body of your favourite sport. You will gain enlightenment by discovering that PIL has absolutely nothing to do with birth control and WYSIWYG (pronounced wizzywig) is not something a balding gentlemen wears on his head!

OK, so it's clear to see what A-Z offers the beginner, but what about experienced users, programmers, hardware boffins and your average tinkerer? Would you like to know the hardware specifications of the entire range from the 'humble' ST to the TT and Falcon? What about some basic information on the Motorola 68000 series and the DSP56001, or an easy to follow piece on GDOS. Yes, these can all be found in Atari A-Z. How do you know what TOS version is fitted in your machine (without running Profile!) and what are the main differences between the various versions? Would you expect to find the pinout connections of a standard SCSI port, the Falcon's internal expansion bus, the standard cartridge port or the printer and floppy disk ports in the A-Z? You'll find everything you need to know about these and other ports in just one of the six appendices.

Notable amongst the other appendices are the first two which deal with addresses of Atari based companies and recommended reading for those who wish to progress beyond the scope of A-Z. The address list features 100 useful contacts, many of which are relatively new on the scene. However, as with everything which makes it into print, obsolescence sets in before the ink dries on the paper. Consequently, a significant number of the companies listed are either no longer in business or no longer support the Atari. The book list features 75 Atari specific publications and the other three appendices are listings of common file extenders (over 250 of them!) and tables showing the Atari character set and the ANSI character set.



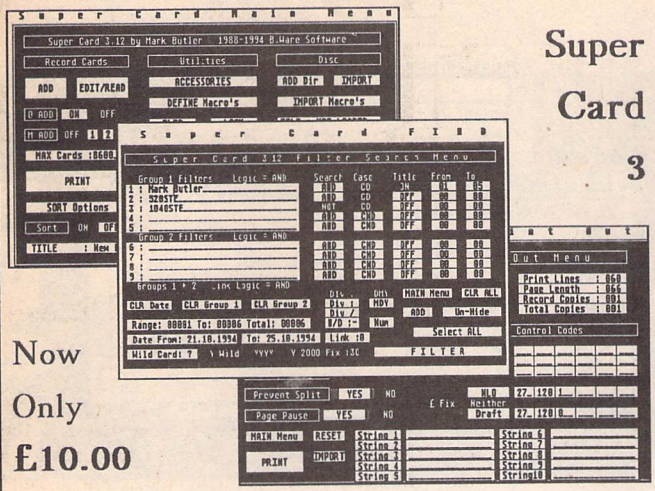
As a relatively new Internet user, I found Mark's coverage of comms terminology and Internet specific terms particularly helpful. How else will you ever find out what AFAIR, ATM, BCNU, BFN, IMHO and so on, mean? Before you are able to do anything 'useful' on the Internet, you'll need to know about TCP/IP, e-mail, ftp, telnet, gopher and, of course, the illustrious WWW. Oh yes, and what exactly is Usenet all about? That too is covered in A-Z, as is NeST (the ST BBS network) and indeed the predecessors to Internet, Arpanet and Darpanet.

There's listings of exception vectors, interrupt assignments, the operating system header block, TOS system variables, the official Atari Cookie Jar IDs, an explanation of the BIOS parameter block and a full description of the meanings of every entry in your DESKTOP.INF or NEWDESK.INF file.

Anyone who knows Mark's writing knows how good he is at making complicated terms sound understandable to ordinary computer users. This shines through in A-Z and if he uses a term in a description that you are unfamiliar with, it's highly probable that it too is listed in the publication. In fact the number of cross-references is staggering. No longer will you fail to grasp what magazine reviewers are prattling on about with A-Z by your side. Although reading A-Z from cover to cover is an education in itself, I see it more as a reference aid than a text book, just the thing to keep handy by your computer. A-Z is guaranteed to open up a whole new world to those starting out in computing and is an invaluable reference guide to programmers and technicians who need to know that bit more than the rest of us.

Product:	Atari A-Z
Manifest:	340-page ringbound reference guide
Author:	Mark S Baines
Price:	£12.50 (EEC £14.10, US & Canada £17.00, Australia £18.10)
Supplier:	Mark Baines, Linnhe, Shore Street, Inver, by Tain, Ross-shire IV20 1SF.

B.Ware Software



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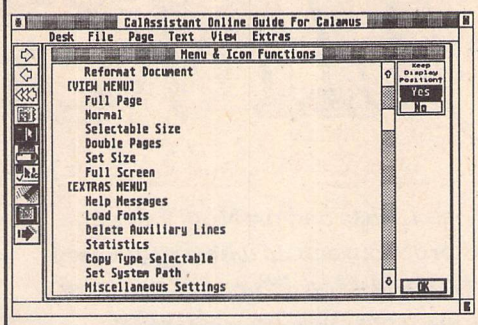
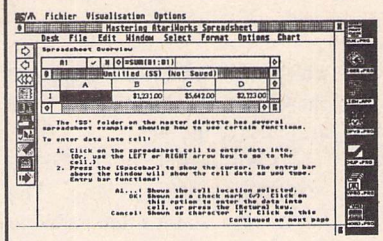


The latest version of the Spar Systems online help accessory for Calamus has the 'new look' electronic book interface that is now used in all Spar products. Price: £19.95; upgrade from earlier versions: £2.50 (return master disk).

Mastering AtariWorks



The latest version of the Spar Systems online help accessory for AtariWorks now includes a help accessory for the AtariWorks Spreadsheet Module. Price: £29.95; upgrade from earlier versions: £2.95 (return master disk).

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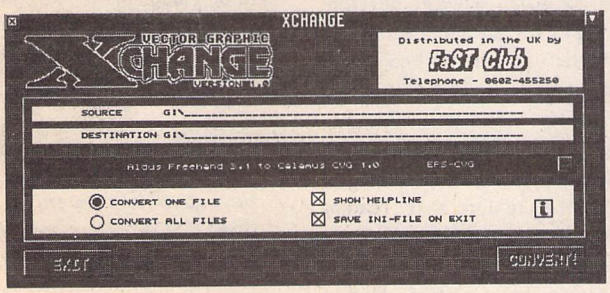

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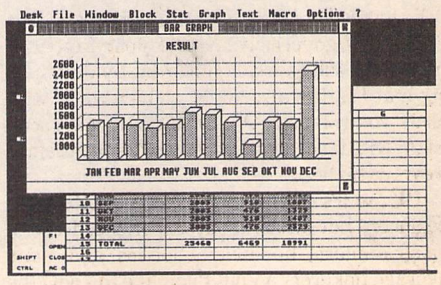

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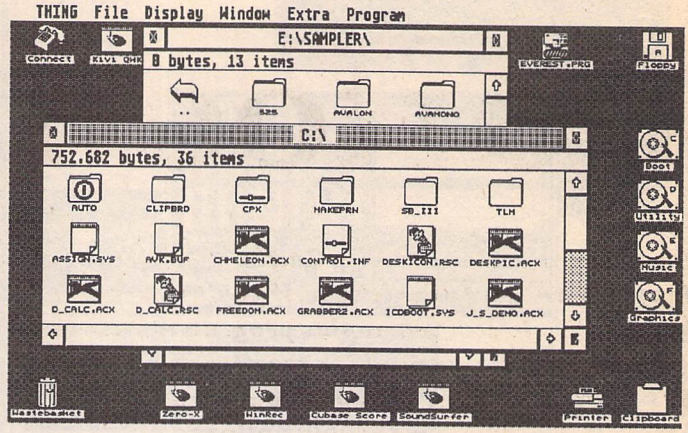
THING

Review by Carl Löfgren



The Thing desktop: It's more than just icons...

If we would mix Gemini, Ease and the Mag!X desk together, we would probably end up with a result very similar to the new Thing desktop. It's one of the latest replacement desktops from... yes, you guessed it, Germany. Originally it started out as a replacement for the Mag!X desk. In the UK, Thing desktop is supported by Joe Connor.

The Documentation...

...is in the ST-Guide hypertext format (also supported by Joe Connor), and it shouldn't be a problem to find a copy of it. It covers everything from explaining the menu options to more advanced technical features (such as the AV and Thing protocols). It even includes a very interesting series of FAQs (Frequently Asked Questions).

What you see...

Let's start with the icons. They are stored in a resource file, so it's possible to edit and modify them with a good resource editor. Thing supports 2, 4, 16 and 256(!) colour icons, and each icon may vary in size between 16x32 and 64x32 pixels. An editor for assigning the icons is included.

You can change the font inside text windows, and it works very well together with monospaced or with proportional fonts. Thing can show the size, date and even the attributes of the files.

It's not possible to change the resolution inside Thing. The author says that it's impossible to do so 100% legally in normal singletasking mode. With MagiC and (in the next version of Thing) MultiTOS this isn't a problem. If you only run your system in one resolution (such as ST high) this isn't a serious drawback, but if you are using several different resolutions, it is.

Unlike most other desktops, you can't use a picture or an image as a background pattern. At least not yet. The author writes that he thinks there are more important things to do first. I guess he's right.

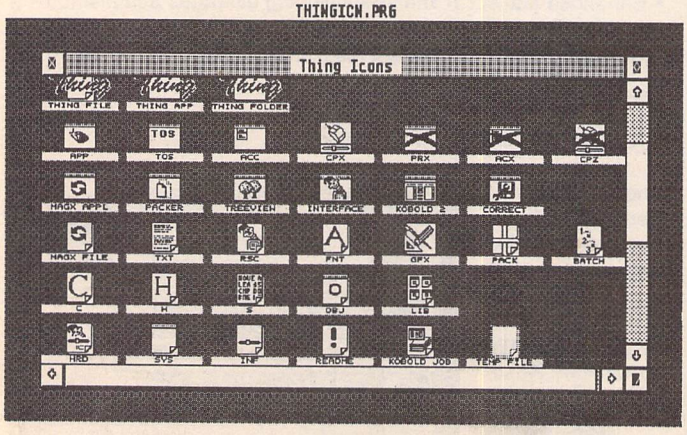
...and what you don't

When I first tried to view a plain text file — by double clicking on it — Thing gave me an error message saying "There is no application for opening file!" Huh?!? Do I have to install a viewer to read my text files? Doesn't the desktop include such a basic feature? I was slightly disappointed when I found out that I wasn't wrong. However, after a couple of days running nothing but Thing, my mind slowly began to change. When you are used to it, you can make the desktop much more efficient than the built in GEM desktop. Unlike the GEM desktop it's possible to install several different file types for an application. For example, you can let Imagecopy take care of all .TGA, .JPG and .TIF pictures, and let PixArt display .IMG and Degas images. Just by clicking on the icon.

Another feature that's slowly becoming more and more common, is the implementation of the ST-Guide help system. If you have installed ST-Guide as an accessory you can — wherever you are — press the HELP button and ST-Guide pops up with information about the thing(s) you are currently doing. Wonderful! It finally looks as if ST-Guide has become some sort of standard. I hope more programmers will take advantage of this system.

If you are a happy owner of Kobold, you can let Thing automatically call Kobold for fast copy/move/delete operations.

Thing also supports alternative filesystems, such as MinixFS, with filenames up to 32 characters.



Here you assign your icons to various file types.

Conclusion

Thing is a very nice and useful replacement desktop. But I feel that it's best suited for use under a multitasking environment. If you use MagiC and want a desktop other than the Mag!x Desk (but don't want to spend a fortune), then Thing might be exactly what you're looking for. Thing won't start a revolution, but please keep in mind that this isn't v1.00 yet... I believe that the future development of Thing can get very interesting. V0.31 is the first English version available, and it's a very good start.

Points for:

- ✓ Very easy to install
- ✓ Very good Help system
- ✓ Good FAQ in documentation
- ✓ Kobold integration

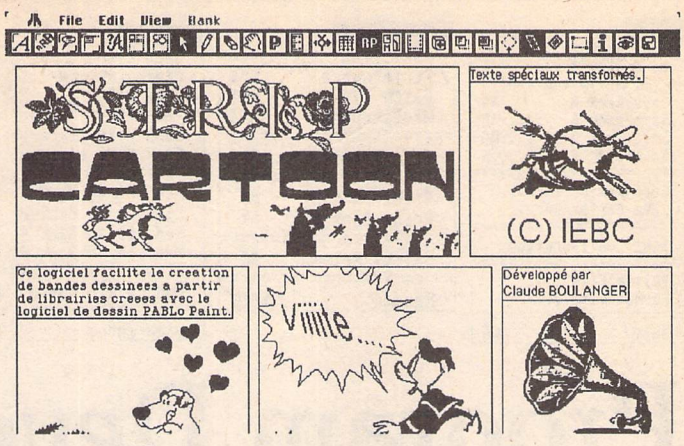
Points Against:

- ✘ Only for those with TOS 1.04 (or higher) or MagiC
- ✘ Not possible to change resolution without MagiC or MultiTOS
- ✘ Sometimes crashes

Product:.....Thing
Version:.....0.31e
Price:.....Free donations (shareware).
UK support:.....Joe Connor, 65 Mill Road, Colchester, CO4 5LJ.

STrip Cartoon

David Smith reviews "STrip Cartoon" written by Frenchman Claude Boulanger. If you're a keen (or budding) strip cartoonist, this program aims to give you all the tools you need for creating them on your ST – graphics, text, balloons, thoughts, commentaries, with a variety of layout options.



The top half of a sample board that comes with the program.

I was rather bemused by this at first – you know, "Er yes, but WHY?" (I have to say that this may have something to do with the fact that I'm not a cartoon enthusiast!) But further investigation into the program, a few sessions fiddling around to see what certain parts of the French manual were going on about, made me a little happier and I even started to have a bit of fun.

This is not a standard GEM program. It uses menus, true, but scrollable windows are nowhere in sight. It even has its own file selector, which, in its misguided attempt to mimic the Windows version, leaves much to be desired. It is heavily 'iconised' – there are twenty-eight of them, ranged across the top of the workspace. They are not entirely 'intuitive', but the English version of the manual makes up for this by having them numbered across the top of each page for easy reference.

How it Works

A cartoon is created on a 'board', only half of which can be seen on a standard hi-res screen at any one time. In the absence of scroll bars, scrolling the board is a rather fussy manoeuvre – why the author decided not to use standard GEM windows is beyond me. Boxes, both the rectangular and elliptical kind, are drawn on the board with the mouse. These normally have a visible outline, but the rectangular ones can be drawn without, in which case they are known as 'virtual' boxes. Irregular polygonal boxes can be drawn by laying boxes one over another and using the 'eraser' tool to get rid of any unwanted lines.

STrip Cartoon works on a bitmap basis, like most paint programs. Bitmap graphics are imported from disk into the library bank, a separate menu heading. These libraries are compilations of smaller pictures (or 'symbols') in Pablo Paint format. The separate elements in each screen-size picture are defined in the file format, and clicking on any one of these symbols transfers it alone to the clipboard, whence it can be copied to your board. This seems very fussy at first, but it works OK and you soon get used to it.

Two kinds of text are available – normal and special. Normal text is typed straight into a box, balloon, thought or commentary. Fonts are available from icon number 5 and others may be loaded from disk if needed. Special text needs a dialog box in which it can undergo various transformations – enlarge, reduce, stretch, distort, rotate, etc. Symbols in the clipboard can also be changed; there are three horizontal and three vertical transformations along with one that works in both dimensions. They can also be rotated.

There is a good selection of drawing tools: lines, K-lines, arcs, bezier curves, boxes (with or without rounded corners), ellipses, freehand and paint. Various effects can be bestowed upon defined areas: zoom (for pixel corrections), 3D perspective, shadow, inverse and outline.

When you add anything to your board, it is done in whichever 'overlay mode' is currently active: opaque, transparent, AND, XOR and interior and exterior masks. These modes give ample opportunity for special effects when text and symbols are overlaid. The gaps between boxes also have two operation modes. If you lay a symbol over two adjacent boxes, you can determine whether or not it shows in the gap between them. I remain unsure why you would ever want it not to, but the possibility is there should you need it.

Printing

Printing a whole board is possible if you have a 24-pin printer. If not, you can save the top and bottom halves of the board (which in the present version add up to an A4 sheet of paper minus the margins) as PI3 files which can then be printed consecutively by a utility such as Imagecopy.

Libraries

You can add to your stock of libraries by converting PI3 files to Pablo Paint format. There is a separate program that does this. It loads a PI3 file, displays it and gives you a small tool box. You then lasso the different 'symbols' in your picture with the mouse, and when this is finished you save the picture as a Pablo Paint v2.0 file ready for use in STrip Cartoon.

The Manual

The manual is a translation from the original French. There are ??? A5 pages, and the program icons are neatly displayed across the top of each page.

Conclusion

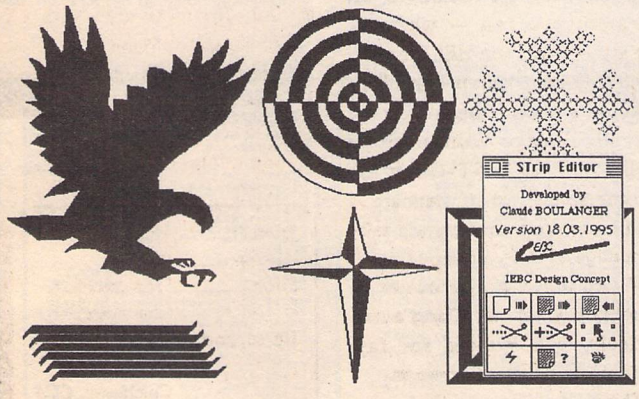
Although STrip Cartoon is not entirely my cup of tea, it does what it sets out to do rather well. If you are into this sort of thing, then you will probably get a lot of fun out of it. (Memories of Jean Brodie: "Well, for those who like that sort of thing, that is the sort of thing they like.")

Points For:

- ✓ Good tools
- ✓ Different overlay modes
- ✓ Easy choice of symbols
- ✓ Symbol and text transformations

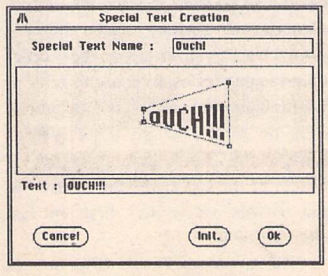
Points Against:

- ✘ No scrolling windows
- ✘ Limited print facilities

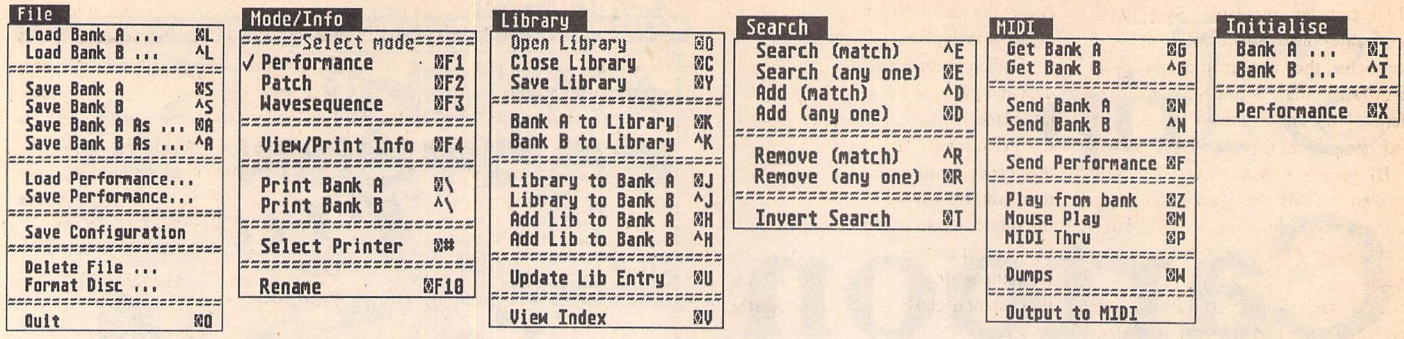


△ Editor.Prg converts a Degas file into a Pablo Paint file with marked off sections.

The Special Text dialog box ▷



Product:	STrip Cartoon
Version:	1
Author:	Claude Boulanger
Supplier:	FaST Club
Tel:	0115 945 5250
Price:	£14.95
Manifest:	One d/s disk, 16-page A5 manual



Program Development

Fred Fee tells us how he 'cracked the code'.....

Introduction

I recently finished writing what turned out to be quite a large program — full Performance Librarian for the Korg Wavestation. The Wavestation is a synthesiser with a more than usually complicated data structure. The program was the culmination of years of learning by reading manuals, magazines and books, but most of all by learning from experience and my own mistakes.

If you have a knowledge of a programming language and a grasp of hexadecimal and binary numbers, writing such a program should not present any insuperable problems: it just takes time and lots of doggedness.

The following account of how the program came to be written may be familiar to those who program as a hobby and may help less experienced programmers to carry on and become experienced.

Since my days with a Sinclair Spectrum and its fast Z80 chip, I have always been fascinated with synthesising sounds and have needed to store data from various synthesisers to a computer. HiSoft Basic (latterly version 2) became my chosen language for the ST because I knew Basic from the Spectrum and didn't want to have to learn 68000 machine code. For programming MIDI applications, it generally affords enough control of the ST to enable any dumps from a synthesiser to be successfully transferred to Atari disk.

Writing a new program involves three different tasks, namely design, coding and debugging. Each one takes about the same length of time. Everyone works to their own system, and I will describe the system that works for me and relate it to the writing of this particular program. I apply these tasks to each of several stages. Each stage is debugged as far as possible before moving on to the next stage.

STAGE 1
What will the program do?

This stage is mostly design. The Librarian had to take bulk data as a bank from the synthesiser and organise smaller pieces of data called Performances into a database (or Library) complete with search facilities. Two banks had to reside in ST memory at a time and Performances could be copied from one bank to another. Performances could also be plucked from a bank and held in a library. The program had to be very simple to use - musicians have enough trouble learning electronic instruments and music without having to try too hard to learn a program. Considering that I had not written a database before, this was a bit ambitious.

The program had to function in a GEM window.

After a few false starts, about two months and reams of paper, together with much reading of manuals, I at last had produced a workable data structure for the database that formed the core of the program. The actual data for the Performances from the synthesiser was to reside in individual files on disc - there was too much data to hold in ST memory. This data was to be tied together by a file in memory that had a repeating structure of records, with each referring to one Performance on disc. Each record was to hold indexing data and the name of the Performance together with data indicating whether or not it was selected in a search. Performances could then be located and presented on screen in alphabetical order by arranging for each record to refer to the previous and next record alphabetically no matter where these records were in the file. A dummy record or header at the top of the file referred to the records which were first and last alphabetically.

The layout of Performance names and any buttons and suchlike on screen was also worked out, as was a simple menu structure. Now all I had to do was write the code!

There were two outstanding problems.

The first was silly. How do you print in inverse video using the VDI? I couldn't find any VDI calls that did this so I wrote to STA Forum and asked. My thanks to the correspondents who replied with comprehensive information on the subject.

The second problem was more difficult and typical of programming problems - simple once you have the answer. How do you delete a record without leaving redundant data on the database tie-up file? If you left the redundant data in the file every time you deleted a record and bypassed the redundant data, the file would eventually grow to an unwieldy size. After much depression and gnashing of teeth and about a fortnight working on the next stage (this is called displacement activity by psychologists), the answer finally came to me - you copy the last record of the database, overwriting the redundant record, and alter any alphabetical references to suit. If you are a programmer, you will know the happy feeling of relief and achievement you get when you "crack" a long-standing problem. I could now approach the next stage in a more relaxed (slightly less perplexed?) frame of mind.

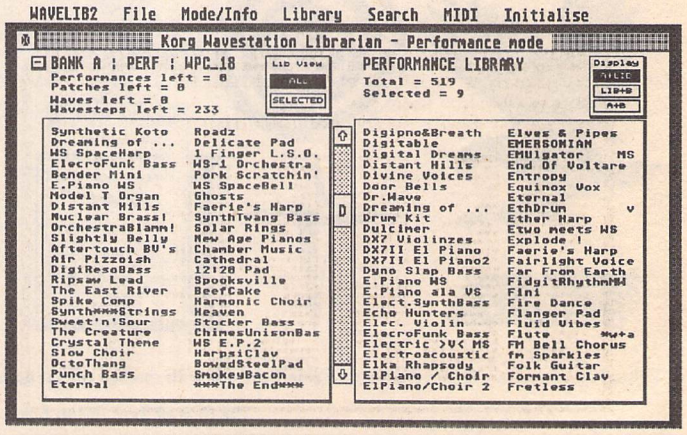
STAGE 2
Data input and output

Reading and writing data to and from disc is now no problem. I have a small Basic library of routines, and so it was just a matter of copying the disc input/output routines that I knew worked well.

As a digression, it is always worth keeping a library of everyday routine that are reliable and work for you. It saves a lot of effort and may even lead to your own "House Style" if you come to write several related programs.

MIDI input and output routines present more of a problem. My Basic library contains many small MIDI routines, the result of a few years' experience that has taught me some of the pitfalls of MIDI programming in Basic.

Errors in MIDI transmission can be caused in numerous ways. Some relate to other programs. Programs that affect the printer ports (e.g. to speed them up or to remove bugs in the ST) can make



MIDI transfer unreliable. Some desk accessories also affect MIDI transfer even when they appear to have nothing to do with MIDI. If you run some versions of the more popular sequencers and close them, they can leave the ST MIDI ports less than reliable. The main problem is that the normal ST input routines can only just cope with MIDI data input rates: it is very easy to miss a byte.

Also, each synthesiser manufacturer has its own method of transferring data, and most change their method regularly just in case you get used to it (Roland being an honourable exception). After a month or so of spare time devoted to the job of trying to understand the MIDI specification, in particular of the Wavesequences, at the back the Wavestation manual, I had the dumps (as MIDI data transfers are called) all working. I'd lost some hair in the process thanks to a few judicious "economies" in the information in the manual — thanks Korg! Omissions and errors in the synthesiser manual required the use of a disk editor to check data to see exactly what had been collected from the synthesiser. The manual has now been annotated almost as much as the program!

STAGE 3
The program display

Now that data could be transferred you had to do something with it. To display the synthesiser data according to my general design involved using AES calls to create and manipulate a GEM window and to keep track of where the window was on the screen so that printing using the VDI always took place in the same place in the window no matter where it was.

This is again made easy by a couple of routines in my Basic library. One largish routine creates and manipulates a window in which all the window features (arrows, sliders, title, etc.) are active and the other, used as the basis of the librarian, merely allows the window to be moved and closed. Each routine contains coding for a spoof screen and resource file. Both were readily replaced by coding particular to the program. Again, the use of the library saved hours of needless duplication of effort.

Coding to take the raw synthesiser data and put it on the screen quickly fell into place. It was a simple matter to take the Performance name from the synthesiser data and, after a little manipulation, print the name in the right place on the screen. Up to now all had been relatively plain sailing. The names of Performances from two banks of the Wavestation could be displayed neatly on screen.

STAGE 4
Manipulating data — copying

The nightmare was to begin. Each Performance in a Wavestation is just the top of a hierarchical data structure. A Performance refers to Patches. A Patch refers to Wavesequence headers. A Wavesequence header refers to Wavesequences which are really small databases that the synthesiser uses to vary a sound with time. (By the way, thanks is due to Korg. The structure of the Wavesequence data, once I'd worked it out, gave me an insight that led to a redesign of the program database.)

It took many long nights and a lot of deep thought to come up with a design for routines to copy a Performance and its hierarchical data from one bank to the next accurately.

Simply copying data was not enough. You had to keep track of what had been copied at each hierarchical level (by means of arrays) to make sure you didn't duplicate data already in a bank and to make sure that the copied Performance referred to the copied Patches and Wavesequences and not to the originals. Deleting was also a problem since you first had to check that none the data belonging to the Performance was used in any other Performance in a bank first.

The routines took twice as long to debug as to design and put into code because the data manipulation was so fiddly and because my typing is flakey. The final copy routines take four pages of A4 to print out at over 100 lines per page! About a month was spent mumbling about oddly-named and obscure routines not doing what they should. Once finished at a cost of mega doggedness units, that happy feeling of achievement came back as a reward for the many more hours poring over the Wavestation and Basic2 manuals, and endless printouts of the BASIC coding. My wife said that I started talking out loud again.

STAGE 5
Manipulating data — the library

The indexing system was designed to be as easy to apply as possible. A full window was crammed with suitable index words which could each be selected by a mouse click. An array kept track of which ones were clicked on. Tokens representing the words were added to the name of a Performance in a database record in numerical order to speed up searching. A routine for searching and alphabetising Performances was designed and coded with (for me) surprising ease.

By using or adapting many of the routines from the Performance copying part of the program, routines for saving individual Performance data to disk and reloading it were quickly designed and coded.

At last you could now put Performances in the library and retrieve them from disk into a bank.

I must mention that the Wavestation stood up well to the welter of faulty data that was sent to it while testing the routines and that I sadly lost the data which made the Wavestation crack up and display psychedelic patterns in its LCD display.

STAGE 6
The manual

I made the mad decision to sell the program so it had to have a manual. Text was written using Protext. Screen shots of the menus and a few icons smartened up a twenty-odd page job printed on the ubiquitous Timeworks Publisher. I soon realised that photocopied A4 pages from a 24-pin dot matrix printer were not going to be good enough. Timeworks was eventually used to produce a manual with oversize type (14 point if I remember) and pages were reduced to A5 to give much better looking finished quality.

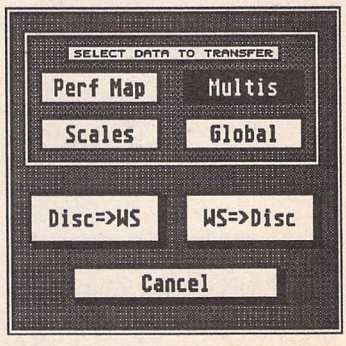
STAGE 7
Development

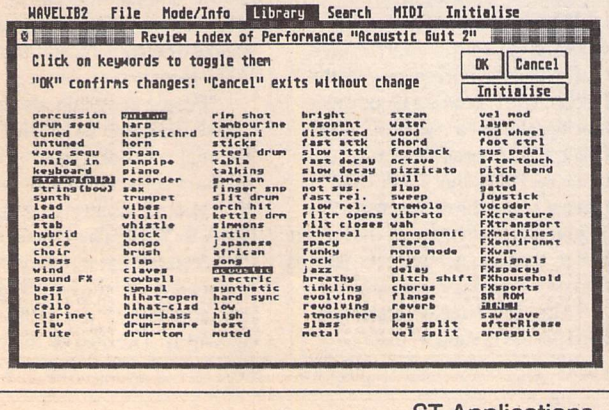
In the year and a half since the initial program was finished, the code has tripled in size. The program can now handle data from all levels of organisation of all models of the Wavestation and has many more features including interrupt-driven MIDI input for rock steadiness.

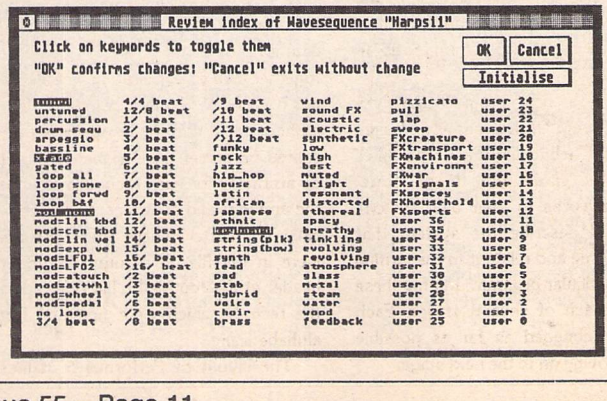
This stage has been made much more interesting by feedback from customers. It's marvellous talking to people with the same interests and even to a few fellow midiots. I have been amazed at how tolerant they have been of the bugs which inevitably crop up. I have always tried to squash them very quickly. The program has become more tolerant of the amazing variety of odd things that people do to it and the weird data that is thrown at it. (If Stuart is reading this, you actually found a bug in one of the HiSoft Basic2 libraries - well done!).

Final Tip

ALWAYS annotate your code, no matter how small, simple or obvious it seems to be at the time you write it. Otherwise, you will waste many a frustrating hour trying to work out what a routine does when you try to adapt it for use months or years later.







COMPANY PROFILE

16/32 Systems

The Atari market may well be changing, with stories of doom and gloom abounding in the Atari press. There still remains the fact that some companies just seem to keep going, and refuse to lie down and die. One such is 16/32, and David Howell spoke to its proprietor Nick Harlow at his shop in the High Street in Strood.

Beginnings

Although games cover most of the shelf space Atari hardware can also be seen displayed throughout the shop. I began the interview by asking Nick to cast his mind back to the beginning of this venture and tell me about how it all got started.

"I have always been involved with comms. It has always been one of my great interests ever since I had a Spectrum. When I got the Spectrum I got this free membership to Prestel. I got hooked, I still am hooked. I still know some of the guys from Micronet. It just went from there.

"In between having my Spectrum and my Atari kit, I had gone through an apprenticeship, in working controls. I worked for a company called ITT based in south London. I got my HND. I'm a good engineer, but it's not really my stock-in-trade. I tried out different jobs, even becoming a manager for McDonalds. I'll tell you what, it is a really good learning experience for sales. I then spent a couple of years travelling. This is about the time I got hooked with the Atari. Also at this time I had migrated to a job with BT. I then got made redundant from BT. After that I got a job with a computer company called SDL. And I also worked on the Atari help line, which further fed my interest in the Atari.

"Then still doing comms I bought my first Atari. I sold all of my Spectrum equipment: the 128, the disk drives and hundreds of games. I just managed to scrape together enough to buy this £499 computer. My parents couldn't believe it. They thought I was mad. It was one of the first that came into the country.

"At this time I also got a modem. There weren't a lot of Atari users at that time. I was playing a thing called Starnet. I played this game, and this area called 16/32 started up. There were all of ten users. This was the very beginning. We were all saying, ooh we've got these ST's, what do we do with them. We couldn't even download software from Prestel because its uses this archaic way of downloading stuff that no one had ever heard of before. So I said, I know we could start a library. We all said who are we going to get to do that. Muggins here put his hand up. That's how the library started, just for ten users. I have now a mailing list of over five thousand. The actual area closed when Micronet died about three years ago.

"I then started selling via mail order. I opened the shop, but I nearly tried to find a bridge to jump off as we had just taken our very first major loss — it nearly finished me actually. It has taken just under two years to recover from that, that was how bad it was. Now we're relatively stable. A lot of good people have helped us in the past. The person that deserves most mention for that is Neal O'nions (Compo UK). We're here and we're staying.

"I look back at it, I could have waited for the 520 STFM or the 520 FM, but I went out and did the whole thing. I have never regretted it. Atari has always been a pet of mine, a favourite. I have used other computers, I am reasonably good with most types of computer. I can certainly find my way around them, fault-find them and repair them if necessary. I know when I haven't got the equipment or expertise and farm it out. But Ataris have always had that little corner. I have met some real characters since I starting with Atari. Most of the decent people are still in the game."

We then talked about the news that there would be an Atari emulator for the Macintosh and the fact that a lot of Atari users are moving to Apple as the obvious up-grade for them.

"I have a Mac, not a tremendously powerful one. I will be buying a new Mac — I am looking at the Quadra series. I think for anyone who is leaving the Atari, the Mac is the obvious up-grade route. OK, so what's in front of me? A bloody big powerful PC, does the job, I hate it. I could not run my business without it. It runs my accounts. If there was a package on the Atari, I would use it. My TT would then be in front of me, as it was, up until about a year ago."

Atari bashing

I asked Nick about the Atari bashing that has gone on for years. As he had worked for the Atari help line for a time, I wondered what his thoughts were on this subject.

"My honest opinion is that Atari couldn't have done it any differently. I think Atari could work at their PR a bit, but considering they are here and Commodore aren't, I don't see how they could have done it any differently.

"They are a commercial company that have produced a mass market machine, one that has sold very well and still has a hard core user base. The machine is years old. They have to move on. They cannot keep pumping money into a technology that is dead, in terms of the technology that it is based on. It has had a bloody good life span. The machines that we have to be looking to are now are: TT's, Falcons, Eagles and the Medusa. If that's the new Atari route, fine. It is up to third parties now to support the machine and keep the public interested. That is really all we can do. What Atari could do is make it easier to get hold of Atari machines. But personally I can't see how Atari could have done it any differently. I don't think Atari have done that badly considering we have been through the worst world recession since the 20's.

"The best route to have taken would have been for Atari to have reaffirmed their presence with the Falcon. The Falcon is a bloody nice machine. It's got a couple of major failings, but overall it's a really nice machine. I think that if Atari had taken some of the money from the Jaguar and used it to push the Falcon better, then it may have been seen as the natural successor to the ST.

"Atari could make it easier for third parties to support their machines in some cases. I'm thinking that it has taken a long time for products such as Ease to hit the market. If Atari had licensed their architecture a little earlier, we could have had a few more clones on the market. It would have been nice to have a really portable ST. Imagine that!

"The fact is that Atari are not going to produce any more ST's or Falcons unless they have some money up front. If the Jaguar proves to be a success, and everyone who has an Atari, even if they don't get one, should be hoping that it is a great success. That is going to be the major money spinner for the next five years. If Atari can make a success of the Jaguar, then there will be more money that should go into 'son of Falcon' or whatever. But if anyone expects it to be in the next six to eighteen months, forget it. It won't be for five years at least."

The Falcon

Atari in the end didn't push the Falcon as hard as they could have. I asked Nick if he felt its relative high price was its Achilles heel, that and the fact that there are so few programs that take full advantage of its features.

"The fact is you still cannot get a computer with a DSP chip for under £1,000, with reasonable memory and a reasonable hard drive. I must say that there are some Macs that do but only just. You have a computer that can do video better than the Amigas, you have computing here that handles sound like nobody; you have a computer that can be connected to any amount of industry standard equipment, and work. What more do you need?

"People complain about the cost of hard drives for the Atari. The main cost of a hard drive for an Atari is the translator cable to give you the ability to go from DMA to SCSI. The Falcon solves that. You can go into any Mac dealer, any PC dealer and just pick a box up of the shelf and connect it. The cost of the cable? £25, end of story. You now have

everything we have been asking for the last few years. There are a few shortfalls, but its here.

Market

As Nick had been operating in the market for as long as I could remember, I asked him how he saw its future.

"I see the market contracting. There are perhaps five major Atari companies left. The big guys are companies such as Compo, System Solutions and Titan. The others in the market are companies such as CGS. Ray (Cross) has some of the best software on the market in the graphics field. DA Vector is superb. My company has some good products. Sometimes I can't do as much with them as I would like, but we do what can.

"I do say the market is contracting, yes the market is becoming smaller, but I should clarify that. The market is smaller in relation to new Atari users. There are also people who have bought their first Falcon, such as musicians who want to do a bit more. There are still people doing baseline DTP who are buying TT's and Falcons. What I mean by the contraction in the market is the number of companies that are still in it.

"In Germany their market is declining, but there will still be good product, and this product will keep Atari alive for quite a few more years. But for a revival, anyone who has an Atari should show what it can do and be upbeat about it.

"Atari should have allowed people to clone their kit. Atari were a big enough company to say: yes, you can clone our kit but we want this as a licence fee. If they could have kept going and kept an idea of what was being produced, which was a beautiful computer that worked beautifully. They should have said, yes we can see the end. And as we had different clone manufacturers doing different things with Atari's internally, such as redesigning parts, etc., then I think that we would have been competitive with these boxes (points at his PC), because then there would have been more than one manufacturer. That's what might have been."

Staying with the market, I asked if he had any idea of who his customers were. I wanted to know if he had any idea of his customer profile.

"The average customer profile really depends on whether I'm at a computer show or in the shop. My average customer in the shop is somebody who has had an Atari for a long time. They generally haven't upgraded it. If I can't do it in the shop, I can farm it out to various companies that do it for me. I don't have the time to do everything in the shop. If it is someone who has just acquired one, then they need someone to lead them gently through the mine field. That's the average shop customer.

"At the shows you get a completely different type of customer. You get some people who want to know, who want the cheapest and want it now. I enjoy shows when I can sit down and talk to people. I have a good crew that help me with that. I don't enjoy shows where I am so crowded I can't think straight."

Survival

I asked if Nick now saw the market splitting into those that have Atari hardware and those that have moved to another platform and are emulating the ST either through MagiC on the Mac or through the Gemulator or Janus cards on the PC. I also asked if he thought the Atari would one day only exist as an emulated machine on another hardware platform.

"I think that's a bit of a blind alley, personally. I don't see why people are going to write stuff because your Mac can emulate an ST. In the short term this may happen, but they may as well write it for the Mac in the first place. I think it's a good selling point, and all power to it and to those that move over to Mac. I think that it is a product they will buy (MagiC Mac) if they are coming from ST's; but it will eventually be put more and more to one side. I think we still need the Atari machines, either as they are today or the clones when they appear."

The Atari market is certainly changing, but more importantly the computers that are in the market around it are also changing. We now have very cheap PC clones and Mac equipment that most users only dreamed of when they brought their kit, but the fact remains they still stay with the Atari. I asked Nick if he had an idea of why the market has lasted so long and why users still stay with the machine no matter what.

"It's a disease, it's a bug, you've been bitten. You can't put your finger on it."

Magazines

Having talked about the market as a whole. I asked Nick what he thought of the current trend in the publishing side. The news that Atari Review was closing had just broken, and a great number of Atari users had thought that with only ST Format as their life line to the Atari community the market was going into rapid decline. I asked if Nick had any thoughts on this development and the Atari publishing world in general.

"Let's not forget one little thing: whilst I disagree with what they (Future Publishing) have done, it makes the best business sense for a magazine like ST Format. However ST Format is strictly a lightweight read. It's an amusing read once ind a while. I get it on reflex usually as it has the word Atari on the cover. I will be advertising in it again. As an advertiser I am very disappointed that Review has gone down because my rates have just gone up. I would like to advertise in ST Applications."

This interview took place after the changes that had been made to ST Applications. I asked Nick if he had any comments about the new look and the direction in which it was moving.

"Paul needs some experienced guys working with him who know about producing a magazine. Forget the colour. One of the most successful magazines is a magazine called Just Amiga Monthly, which is black and white and promoted itself as such. If he can do it on the Amiga, we can do it for the Atari. Jeff Walker produces this magazine — it's his full time job. I think Paul could do a similar job but needs more help from the UK users.

"It's really a two-way street. One cannot exist without the other. A magazine can't exist without articles, but then again it can't exist without readers either. I think Paul had a problem where not enough people contributed to it.

"Money is also another problem. People expect to be paid. For a user magazine, contributors nine times out of ten cannot be paid, because it's not earning that type of money. Paul feels he has to pay people something, but Just Amiga Monthly doesn't pay its contributors, and is heavily pushed by its readers."

Lexicor

Lexicor are best known in the USA for their excellent graphics software. They are also the distributors of the Nova graphics card in all of its varieties. They have put in an appearance at a number of Atari shows over the last couple of years. 16/32 have UK distribution rights for their products. I asked Nick how he got involved with Lexicor and what plans he has for future products from them.

"We have a couple of things at the moment, which I can't really talk about much, in fact not at all. One of the things that I hope to release is a replacement for Cyber Sculpt. By the time your readers read this we should also have had a few price reductions."

Future

Looking to the future of the Atari, I asked Nick his thoughts on the multimedia bandwagon that has been rolling for the past year or so and if it will ever make an impact on the average Atari user.

"Multimedia is a very nice buzz word. Let's get something straight. The idea of multimedia is the idea of sound and vision integrated with a bit of interactivity. Well, I hate to say this, but that has been in existence for the last twelve years. It may not be at the same level, but multimedia as a generic term is a great buzz word, and that's all it is. We've been doing video work and graphics work, admittedly not in the same way, but we can already do that.

"They say an example of multimedia would be Encata '95. That can all be done on the Atari quite easily. It would be nice to have a dedicated CD-ROM system for the Atari but I am quite happy just plugging in a SCSI drive and encouraging people to write the programs we need to enable us to use those CD's.

"You can pick up a Macintosh CD-ROM drive for about £85. But it's not really worthwhile for Atari users unless they are into DTP and graphics, and then it's a major plus. Atari users at the moment have to regard CD-ROM as just a storage medium. But that will change in the near future.

"The Atari is in roughly the same position as the old Spectrum was. But it can still be so much more. As I keep saying, you have to be upbeat about it. Not everything is bad. People are not going to buy an Atari if all they hear is how bad the situation is. The Atari needs selling, and it's up to us."

With that we finished the interview. 16/32 are one of the few companies that still carry the torch for the Atari platform. With companies like them and guys like Nick, the Atari still has a great deal of life left in it. The market is changing, emulation on other platforms may be the way forward, but an installed user base of Atari hardware will always be a guide to how buoyant the market is. At the moment there are still plenty of users with Atari hardware on their desks who will continue to have that kit for a while yet.

Atari Home Page

A Report by Stephen Ticehurst

Just as I was about to start writing this article it seemed that all was lost. If a new home for the Atari Home Page was not found soon it would have to close. It shows that Mark Smith had started something very popular: around 60% of all access to Daresbury Laboratory, where the page was based, was for the Atari Home Page and not anything related to work at the Laboratory. The page had to close, which gave Mark Smith five days to find another site, one which was found by Denesh Bhabuta (of Hensa fame) at the Manchester Computer Centre. It was a close one — I suppose that's the price you pay for being popular! Popular it should be because it has become the unoffical offical Atari Web page, containing everything an Atari owner ever needs.

There are a lot of different Web pages throughout the Internet written by Atari enthusiasts, which are little more than just an outline of the author's personal tastes and maybe some links to their favourite pages. Instead of the Atari Home Page just copying this idea it has set itself out as a skeleton, containing a number of its own pages of reviews and news, but also giving a full index of the huge range of other Atari pages such as the ones written by the enthusiasts, as well as commercial pages such as ST Format and Toad Computers. This makes the Atari Home Page just that, a starting point for any Atari owner wanting to "explore the Web" or find advice on a product, or for just an Atari read. This includes ST, Falcon, Lynx, Jaguar, and even 8-bit computers.

A Magazine Online

The main part of the page is basically a magazine online. This contains software and hardware reviews, mainly written by Andy Curtis and Frank Charlton of ST Format fame, news and announcements which contain news and rumours normally before you see it in the paper-based magazines. There is a section of questions and answers which allow readers to submit their questions or help out with an answer. This is done in the form of a continuous list, and so it is hard to keep an eye on a particular problem as you have to wade through all the other questions first. It would be quite nice if there were a contents page to this section, which Mark has said he would look into, although your Web viewer (which is basicaly NetScape for 99.9% of the users) should have a search function in it.

The Internet holds information on nearly everything you ever want to know, and this includes Atari-related subjects. The Atari Home Page groups all these together to give you a complete reference to the Atari computer range. This includes all the Atari related FAQs (Frequently Asked Questions) that together gives you all the information you have ever wanted to on subjects such as GDOS, TOS and so on.

It doesn't take long for you to find Hensa mentioned and a number of back issues of the Hensa Atari newsletter listing all the new software available at Hensa each month. This, and a list of new and useful software available, can be found in the Atari ST/STE/TT/Mega STE and the Falcon Page. Mark tries to make sure that he chooses the best PD/shareware to include within these pages.

Related Links

The other part is the skeleton of Atari-related links which invloves enthusists' own pages as well as commericial ones. It has to be the biggest collection of Atari-related links that you can find — at the last count it contained 47 different sites. Names such as Hensa (once again), CAIN, ST Format, Ben Hall, EMagic, Cybercube and Jeff Minter appear. Topics include programming, disk mags, Licenceware, Atari Lynx, MiNT, Ghostscript, Calamus and so on.

You find these personal home pages as a great reference and a type of Atari family. If you need help with MiNT then you choose one of the pages that deal with MiNT and ask the owner of that page your question. You already know that the owner of the page is an enthusiast and maybe expert in that subject and so will probably know the answer to your question. You also know that the person will probably be glad to help you if they can because they have taken the time to write about their interests and splash it across the "Net".

Atari Heaven

You have this home page which is an Atari heaven: it contains a link to every good Atari-related page, as well containing its own reviews and information. Any Atari enthuiast could spend hours going through this site — it is just a huge home page to start your trek through such an information base on the Atari range of computers. The only thing missing is Atari Corp. themselves, but then it seems to be getting along fine without them. It also shows you that there is a lot more interest in the Atari range of computers than your average PC or Mac user would have you believe, and it keeps growing.

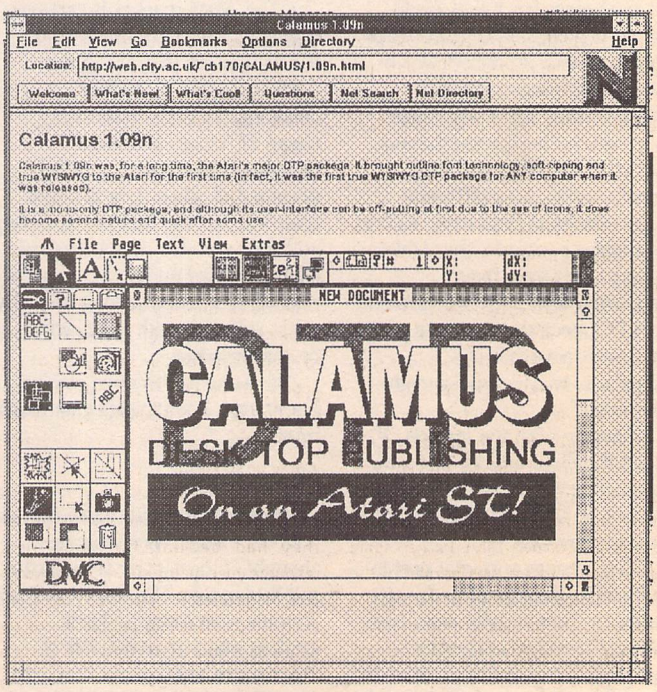
In true Atari fashion they are all friends and bend over backwards to help each other. Mark is very happy for people to send him any comments, criticisms, ideas and submissions. In fact, he is only too happy to hear from users with their comments, meaning that if you think something should be different or added, he will look into it. Future plans include a Portfolio section which would mean that the page would cover virtually the whole Atari range of computers.

If you have access to a Web viewer then the address for the Atari Home Page is http://www.mcc.ac.uk/~dlms/atari.html. Alternatively, Mark Smith's email is msh@dl.ac.uk.

Web?

Comms have come a long way from the plain VT100 text only based systems to full colour graphics and sound systems that you can find on the Internet. The World Wide Web (as such as system has been called) is basically a hypertext document that contains not only text and links within this text, but also colour graphics, sound, and even animations, all over the phone line. This brings a full multimedia environment to your computer where you can spend hours travelling through all the links, looking at the pictures, listening to the sound samples, and watching the MPEG animations.

Unfortunately, there are only two different programs available that allow you access to the Web and neither of them is for the Atari range of computers, although people are working on solving this problem. The alternative is a text-based program called Lynx which is not only available for UNIX, but for MiNT-equipped Ataris as well. Of course, you can't view any of the graphics, listen to the sounds, or watch the animations (although you can download most of them), but because it is text only it is much faster.



History

I asked Mark to email me some details about the Atari Home Page, covering topics such as the history, the future, and, more importantly, why? First, a bit about the history:

"I started the Atari Web pages on the 16th September 1994. At the time I was learning about the Web in work, and as part of my practice in writing HTML scripts I decided to make a start on what was to become the Atari Web Pages. At the time there were very few sites that catered for the Atari on the Web (fewer than 5), the best of them being Hensa and the "ZFC" pages by Annius V. Groenink. I thought that there was a gap on the Web for someone to serve all the major Atari formats with information and other useful resources.

"I put together a simple introduction page which was almost empty, with my next priority, having created a page, to make it accessible to the public. I sorted this out a couple of days later. On the 20th September 1994 the Atari Web pages went live on the Internet. I announced the pages in several of the Atari related newsgroups and most of the existing Atari Web authors came forward straightaway, offering to make links to my pages and for me to do likewise.

"At the time the pages were almost completely bare with next to nothing of interest in them. I had some good ideas and started collecting together news and other pieces to include. The strongest thing in my pages at the beginning was the links I had to other useful pages; they really were sparse and useless. We all have to start somewhere, though.

"Clive Parker approached me, wanting some information on what browsers were available for the Atari, and he was interested to see my pages. He was writing for a new magazine that had not yet came out called ".net: The Internet Magazine". Through my contacts with him I ended up with my Web page getting a mention in the first issue (around 76,000 copies went on sale). Obviously, I thought this would be a big boost to the amount of interest and feedback I'd get. As far as I know I only ever got two emails with regard to that mention.

"The first problem I came across was that the location of my pages was in a directory linked with a specific, specially funded project, and because this was nothing to do with this project it had to be moved fast to prevent any problems. My page address changed to the one that has been used all along until recently. I informed Clive Parker again and the new address was printed in the next and following issues of the .net. As an added bonus he was writing an Internet guide for the Atari in "ST Format" and again my pages got a mention. This got a greater response, and has been since included in ST Format in its net directory section.

"Luckily, as a result of my contact with Clive two freelance writers from "ST Format" came along offering to help out with reviews in what little way they could. These were Andy Curtis and Frank Charlton, to both of whom I owe a great debt for all their work and kind offer of their services. The pages with Andy and Frank now had a reviews section which grew nicely at the rate of 2-3 reviews a month. I continued to track down information to include and built up a large collection of useful documents, FAQ's which are maintained, and newsletters from different sources. New Atari sites started popping up everywhere but most of them didn't have much to offer of interest and so I wouldn't include links to them. Some of the more interesting sites included CAIN and I got to know Mark Lair at CAIN as a result of this. I started getting more and more involved in the Internet and found myself no longer just working on the Web pages but writing reviews and other articles for CAIN, AEO and other sources. This, along with maintaining the FTP list, my monthly Web pages update and doing a full time job, was a tremendous strain at times.

"After a while I decided the pages needed a certain amount of restructuring owing to the increase in their size. Newsgroups were added, the newsletters got their own pages and other areas expanded into fresh dedicated pages. I decided I should include a complete list of all the Atari related sites I could find and went about following the links from page to page and noting addresses. I compiled after two days' full work (9 to 5) a list of pages consisting of nearly 40 Atari related pages. What really surprised me was the number that had links to my pages who I'd never heard of.

"Expansion continued and a News and Announcements section was also added. Then, just as things were going really well, when the pages were well established and things were well organised, I got the news my Web pages had to go."

Closure

"The news that my pages had to go came as a shock. With having to return to University for the final year of my degree at the end of September '95 I had thought about finding somewhere else for the pages but never thought it would be so soon.

"The problem was the pages were so well established and well used that they had became the most used resource ever on my site. I had Newsletters, Magazines, People, Web pages, and even shops all telling people about my pages as a source of Atari information. The Atari Web pages were accounting for 60% of all on-site accesses, with roughly one access taking place every minute. This had came to the attention of the people who are in charge at Daresbury and as the computer resources were only meant to be used for work-related duties and as the pages had such a large number of accesses they had no choice other than to close the pages down. Luckily I had a week, so the first day was spent contacting people I thought might be able to help. Most of these were people I'd got to know well and they were very shocked and saddened at the pages' loss but promised to do what they could.

"The next day I put a message about the pages closing and a request for a new site in several of the newsgroups. The response was overwhelming and it felt good to see my work was so greatly appreciated. Some of the responses I had were very funny but not really repeatable. I had all kinds of offers from people offering a few hundred kilobytes on their University account, to offers of a mirror for the site. The day however was saved by Denesh Bhabuta, the moderator for the Atari section at Hensa. I really can't thank him enough for all his help, and without him I don't know what would have happened to the Web pages today. He put an enormous amount of effort into finding me another site and managed to get me some space at the Manchester Computing Centre. My thanks also go to them for kindly giving me this space.

"Starting the Web pages on a new site took a lot of time getting all the files across. I resisted the temptation to make a fresh start and re-do some of the pages so that I could quickly get the new site operational again to prove the pages still existed. With all the files across and the main page in place, I announced the new site and started updating the files so that all the links were correct. I had a few complaints from people saying 'links didn't work' but with a lot of hard work the pages were fully operational within three days.

"With work and the transition, updates to the pages have been slow but are now picking up and should be fully up to speed again next month (May 1995)."

The Future

"Well, I have several ideas for the future. Apart from the usual updates the pages are going to include a lot more news and announcements. I think it is important to include this information, and in the past I had often collected it but omitted it from the pages. This won't happen in the future. I may even include a new section that whilst not strictly news will cover any rumours that exist, and which I will fill out as time goes by. These can be on any topic that is of interest to Atari owners or that may cause a stir in the Atari world.

"The Questions and Answers section will start growing also. I must answer between 5-10 questions a day but none see the Web pages as I answer them directly by email. I will start including these questions in my pages even if I've answered them as the information may help other people. This section will require some reformatting as it is too hard to follow and as it grows this will get worse.

"What I'd really like to do with the pages and what a lot of people have requested is to include a MIDI or Music section. The problem is so far there hasn't really been any information forthcoming, and there's no point having a music section without anything to put in it. I simply don't have the time to track down information myself and I therefore urge people to send information to me.

"If I get more time I will be writing more reviews, and I'll probably start doing some tutorials on different programs and the Atari in general. As time goes by I'm getting to know more and more people who are in positions to give advice or help out, so in the future the pages should be much more comprehensive than they already are. I hope that people who have became invaluable such as Andy and Frank will continue to contribute and the pages will improve."

What's in it for me?

The best part of the Atari world is the number of normal users who put themselves out to help other users, either directly or through producing a fanzine, or, in this case, a Web page. But for all the work they do, they don't get paid and only sometimes thanked. So why do it?

"A good question and to most people the answer would appear nothing. I don't get any money to do the work, it takes up a lot of my time, not just doing the pages but finding the information and writing reviews, etc. Sometimes with other things I have to do it can be a burden which has to take second place. The problem is if I neglect the pages I start feeling guilty. I like to make roughly the same number of updates a month as there are days in that month, and I feel it's been a poor month if I manage fewer than 20 updates to the pages.

"What I do get is a sense of pride in my work, and knowing they are definitely the most frequently maintained Atari pages has some value. Also by the response I sometimes get from users, and the sheer number of users, it is very gratifying to know my work is appreciated. On the upside my name is now fairly well established in Atari circles and I have made a lot of friends as a result of my work. Having built up a good reputation I try my best always to treat other people with respect and never to lie or do anything that would damage all that I've worked for."

LOTTERY

The STatiSTics of Luck

Graham McMaster

If you use your ST to reveal the options and to make rational selections, the odds against winning can be reduced from 1 in 14 million to better than one in a million...

Can A Computer Really Help?

Two 'ST's in the mathematical aspect of the lottery problem are appropriate and bode well (touch wood) for success in reducing the odds against winning and in banishing Mystic Meg from our screens forever. If all that is known about the lottery is that there are almost 14 million different sets of six numbers that can be formed from 49 numbers and that each has the same probability of being chosen, then the odds of winning are 1 in 14 million and it does not matter what method is used to make selections. However that is not all the information which is available about this random process.

Suppose I tell you that since the first week of the lottery a certain quantity (it is called entropy and is defined in the panel Frequency, Probability and Entropy), which depends on the frequency with which each of the numbers from 1 to 49 have been selected, has been increasing steadily week by week in an attempt to reach the magic value of 3.89 (=log49) — see Fig 3 — and that next week 70% of the 14 million possible sets of numbers will result in a further increase. Given that information, would you want to submit an entry that would cause a fall in entropy? That piece of information alone reduces the odds from 1 in 14 million to better than 1 in 10 million. And there is more information available.

The entropy value of 3.89 comes from the theory of random processes and a computer is needed to calculate its current value, while the prediction of 70% is obtained by simulating the lottery process and counting the number of 6-number sets (sextuples) that increase the entropy.

Random Processes

By simulating the lottery process I don't mean deriving the equations of motion of 49 rubber balls bouncing around inside a rotating cylinder. All that is mainly for spectacle. The defining characteristic of a random process is the probability law which it obeys and all systems that obey the same probability law — however different they may be physically — are statistically equivalent. Since we know the probability law governing the lottery, the computer can be programmed to simulate and to study the process.

Most games of chance (e.g. rolling a dice or spinning a

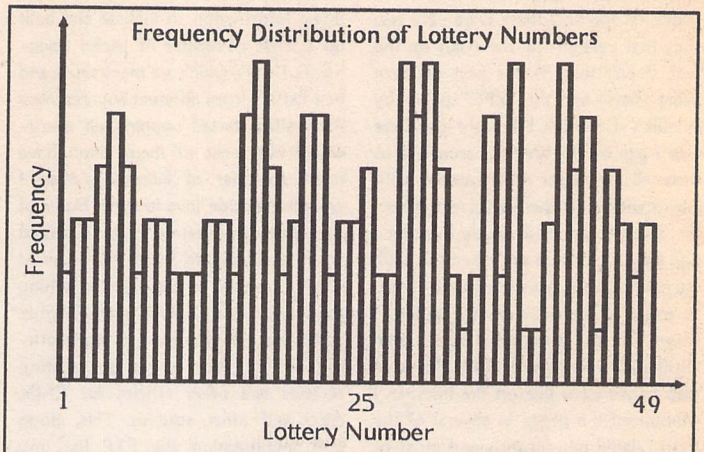


Fig 1. Fluctuations which are a characteristic of all random processes, are the source of additional valuable information.

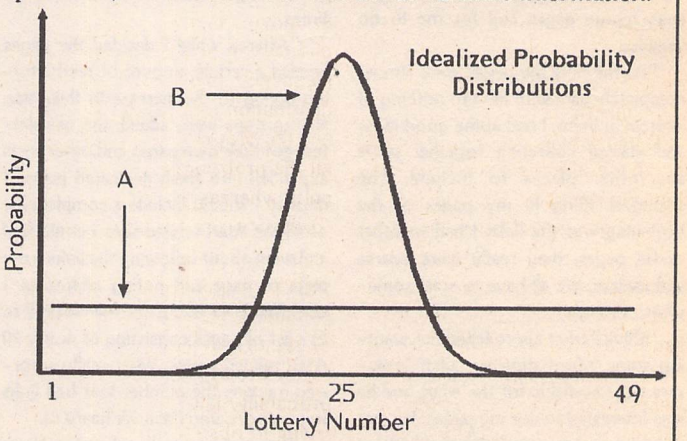


Fig 2. Probability distributions are derived from a corresponding frequency distribution and contain valuable information.

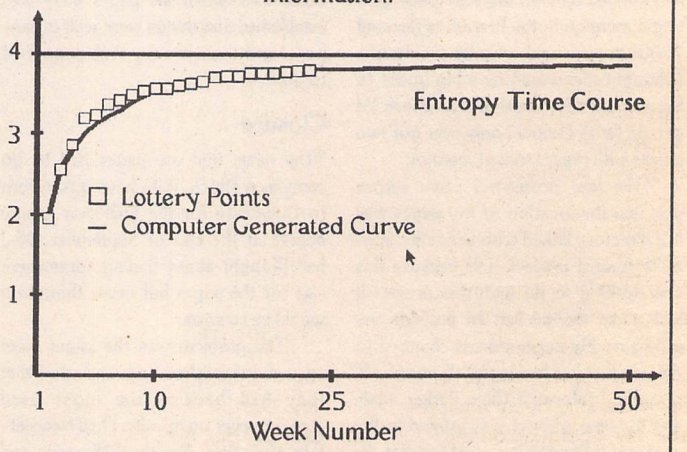


Fig 3. The amount of information in a probability distribution is its entropy which, for the lottery, is tending to a value of log49=3.89.

roulette wheel) follow the same probability law which satisfies two basic games requirements: in the long term it should be fair i.e. all outcomes should occur equally often; but in the short term there should be fluctuations from equal frequency that allow 'runs of luck'. The lottery outcomes are sets of six numbers (sextuples) and of seven numbers (septuples) of which there are approximately 14 million and 86 million respectively. Therefore compiling graphs to show how often each set has been selected would take an eternity even if the process were simulated on an ST. Fortunately we can argue that if all septuples and sextuples occur with equal frequency then all 5-number, 4-number and so on down to all 1-number sets will also occur with equal frequency. In other words, each of the numbers from 1 to 49 should occur equally often in the long term (Fig 1) and all we need to know about the lottery process can be deduced from this frequency distribution (see panel insert).

When simulating the process the above argument works in the opposite direction. The random number generators provided by most programming languages create individual numbers which would form an equally probable distribution and we assume that if these numbers are collected in sets of six or seven then these sets too will occur equally often. [It is worth noting that random number generators obtain numbers from a mathematical function and if a large number of calls are made to the procedure, the sequence will start to repeat itself. The language manual should specify when that would happen but I can find no mention of it in the GFA literature. As a precaution I reseed the generator every 10,000 calls.] Hence the equiprobable law of the lottery, acting on sextuples and septuples, is reduced to, or is approximated by an equiprobable law operating on the individual numbers 1 to 49 and a lottery outcome is no longer regarded as a set but as six or seven individual numbers that contribute to a frequency distribution on 49 individual numbers. Fig 1 for example, is the current frequency distribution obtained by using all seven numbers that are generated each week. A similarly shaped graph is obtained by using the first six numbers. I maintain and use both frequency distributions.

At the present early stage of the lottery - and the whole of the first year must be regarded as part of the early stage - Fig 1 hardly qualifies as a frequency distribution. A minimum frequency of about five is needed before we can have full confidence in the results derived from it. It is also clear that the frequencies are not all equal but that has nothing to do with the early stage: it is a consequence of fluctuations which are a feature of all random processes and which are the source of additional information. When discussing information it is usual to convert the raw frequency distribution to a relative frequency (or probability) distribution (see panel). The latter has the property that the sum of all the probabilities is always unity whereas the total frequency just goes on increasing from week to week.

A probability distribution contains information. That can be seen from graphs A and B in Fig 2. Graph A which is the probability law the lottery is trying to obey in the long term, says that all outcomes are equally probable and is therefore completely non-committal as to the likely outcome. Its entropy is a maximum for a 49-outcome process (i.e. log49=3.89). In contrast graph B is highly informative. It says place you shirt on numbers around 25 — great if no one else knows the law. Its entropy is much less (2.80).

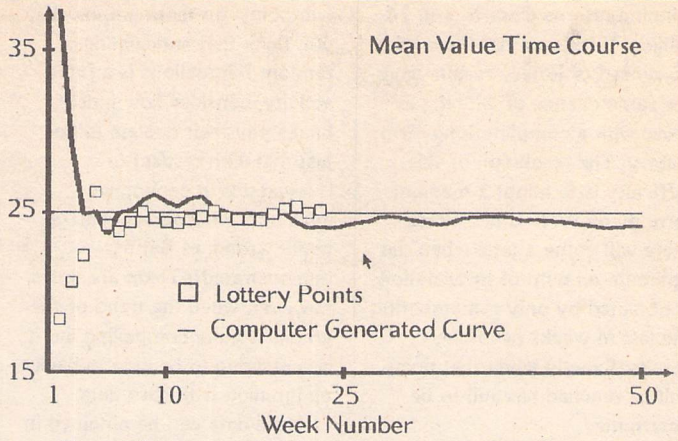


Fig 4. The expected value of the mean of the lottery numbers is 25 and no matter how different the starting values, they quickly converge.

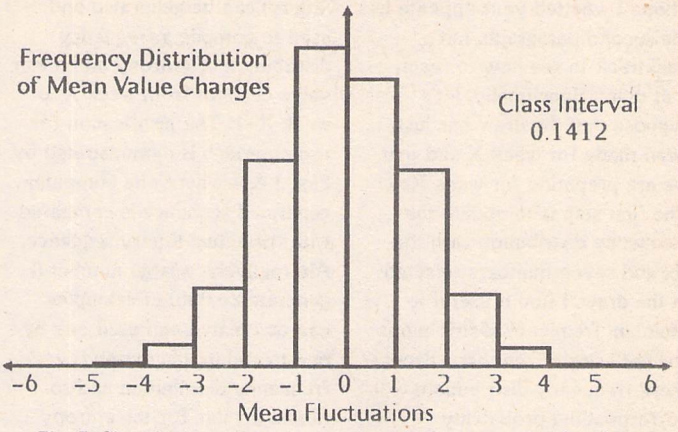


Fig 5. Simulation allows us to project from week X to X+1 and to see that the most likely outcome is a fall in the mean.

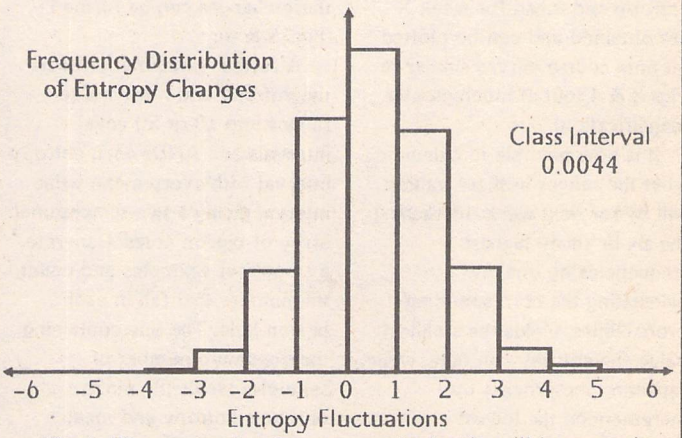


Fig 6. The projection for entropy is that it will increase in week X+1.

Fluctuations

There appears to be an anomaly here. On the one hand I am asserting that the lottery follows an equiprobable law which is a maximum entropy, minimum information regime while on the other hand I am suggesting that additional information is available which reduces the odds against winning. What is the source of the information?

Frequency fluctuations which are the source of uncertainty in random processes are also, in the short to medium term, the source of additional information. If the frequency distribution is not flat, the entropy cannot reach its maximum value and anything less means information is available. In the long term the fluctuations don't die out but they become a smaller and smaller proportion of the total frequency. Consequently the probabilities tend to converge to the same constant value, the entropy tends to its maximum value and the probability of

winning returns close to 1 in 14 million. It follows that those with no record of lottery results have the same chance of winning as those with a complete long term history. The resolution of this difficulty is to adopt a medium term memory. In other words there will come a time when the optimum amount of information is obtained by only remembering the last M weeks of lottery results. Exactly when that point will be reached has still to be determined.

Using The Information

I hope I whetted your appetite in the second paragraph. Let's backtrack to see how to reach that point. Specifically, let's suppose that the draw has just been made for week X and that we are preparing for week X+1. The first step is to update the frequency distribution with the six and seven numbers selected in the draw. I find it useful to maintain frequency distributions for both sets of numbers. From these frequency distributions corresponding probability distributions are derived and hence the values of current entropy and mean for week X are obtained and can be plotted on time course curves similar to Figs 3 & 4 (but at much greater magnification).

It is now possible to calculate what the ranges in these values will be for next week. Increasing the six or seven highest frequencies by one and calculating the corresponding probabilities, yields the smallest value the entropy can take; while repeating the process by incrementing the lowest frequencies gives the greatest value the entropy can take. Approximate but accurate values can be obtained for the mean by incrementing the frequencies of the numbers {1,2,3,4,5,6/7} and {43/44,45,46,47,48,49}. These extreme sets yield the extremes in the mean.

At this stage we have the raw frequency distribution, large scale graphs of the entropy and mean value time courses and the ranges within which the entropy and mean will fall next week. The problem is to plot the next two points on these graphs. (If you think that anticipating random fluctuations is a futile activity, consider how much banks pay their dealers to do just that with respect to fluctuations in economic indicators. Of course it can go badly wrong, as Barings demonstrated!) There are times, however, when the trend of the graphs is quite compelling but it is reassuring to be able to back up intuition with hard data.

Hard data can be obtained in two ways. A large number of sequences of X+1 sets (i.e. simulations of X+1 weeks of the lottery) can be generated and used to compile a frequency distribution of entropy and mean value changes from week X to week X+1. The justification for this approach is demonstrated by Figs 3 & 4 where one computer generated sequence is compared with the actual lottery sequence. Alternatively, a large number (I generate 20,000) of sextuples can be created and used one by one to update the existing frequency distribution and so obtain a value for the entropy and mean value at week X+1. Again a frequency distribution of these changes can be formed (Figs 5 & 6).

A further refinement disects the entropy and mean value ranges into 10 or 20 equal intervals and ANDs each entropy interval with every mean value interval giving a two dimensional array of pigeon holes. Generate a sample of sextuples and count the number that fall in each pigeon hole. The one containing the maximum number of sextuples yields the most probable entropy and mean value intervals. It is then a simple matter to reverse the procedure and ask the computer to find sextuples (or septuples) which, when used to update the current frequency distribution, would yield an entropy and mean value within the stipulated range. There will, of course, be a large number of sets that satisfy these conditions but if selections are made consistently from the most probable subset, the odds of winning are increased from 1 in 14 million to about 1 in a million.

Accompanying this article is a set of three programs which will probably appear in the next Disk Magazine and which perform most of the operations I have described. They are in GFA Basic 3.5E and are intended as a vehicle for you to develop your own ideas. The first produces weekly bulletins of current values and future projections. A second generates time courses of the mean and entropy by simulation and the third makes selections for the next draw and includes an option for entering bankers.

Frequency, Probability and Entropy.

A frequency distribution on the set of lottery numbers is just a set of integers

$$\{n_1, n_2, n_3 \ldots n_{49}\}$$

in which n_1 is the number of times the number 1 has been selected, n_2 is the number of times the number 2 has appeared etc and which can be plotted as a histogram (Fig 1). The total frequency is

$$N = n_1 + n_2 + n_3 + \ldots + n_{49} = \sum_{j=1}^{49} n_j$$

where the expression on the right is a short hand notation for, and is defined by the sum which precedes it. The corresponding probabilities are

$$p_1 = \frac{n_1}{N},\ p_2 = \frac{n_2}{N},\ p_3 = \frac{n_3}{N},\ \ldots\ p_{49} = \frac{n_{49}}{N}$$

A probability distribution $\{p_1, p_2, p_3, \ldots p_{49}\}$ contains information and the amount of information is given by the entropy (S) of the distribution where

$$S = -\sum p_j . log(p_j)$$

The entropy has its maximum value and the probability distribution contains a minimum of information when all the probabilities are equal. For a 49-outcome process that means $p = 1/49$ at which value

$$S = log(49) = 3.89$$

The mean value of the lottery numbers is given by

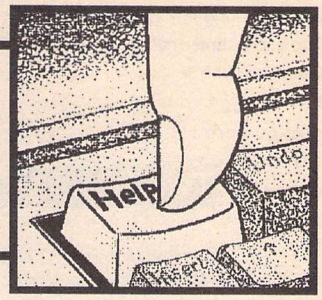
$$J = \sum j.p_j$$

and for the equiprobable distribution its expected value, denoted by $\langle J \rangle$, is 25 (Fig 4). These are the main macroscopic quantities I have been working with but there are others although they are not independent. In particular, there is a group of quantities of the form

$$\chi^2 = \sum_j \left[\frac{(\langle X \rangle - X_j)^2}{\langle X \rangle}\right]$$

For example if X represents raw frequency then the expression is the sum of the squares of the deviations of the observed frequencies from the expected frequency (the total frequency divided by 49), normalized by dividing by the expected frequency. The long term trend is then to zero.

FORUM



Credits

Q Some of the articles in ST Applications appear without credits as to the writer. Is this an oversight, or do they wish to remain anonymous? It is interesting to know who wrote the articles.

V Gutzu

● Whoops. A few omissions in the last issue: Martin Milner wrote the Mouse Boot review and the Cardfile review. In general all articles should be credited, although some authors do want/need to remain anonymous and so use a pen name.

Folder Recovery

Paul Dion - STA 54

I I have found a little bug in Disk Workshop. When undeleting files which are exactly a multiple of 1024, DW takes one cluster too many.

Doing correct file recovery is however still possible if you 'help' DW by reducing the file size by one. This can be done without touching the file. On the recovery dialog, there is an editable file size field that you can change at will before and after the recovery.

Since recovery is not a daily exercise, better make a note of this.

With a HEX editor, you can write it in the RSC itself, overwriting the four lines of German text which are on top of this dialog box. It is a more or less superfluous warning about some obvious common limitations of automatic recovery.

In DW.RSC, the four lines are at positions 879, 929, 953, 999 (with a nul in between), starting with 'Die automatische...' and ending with '...blich!)'.

Paul Dion

SToop

V Gutzu - STA 54

I First, thank you for publishing my "Users' View" of SToop. Second, since my article the programmer Phil Hodgkins has made numerous revisions and enhancements to the program and it now stands at Version 1.04. SToop is available from Phil Hodgkins, 106 Knighton Fields Rd. East, Leicester LE2 6DQ.

V Gutzu

Ceefax ST

J Furness - Forum STA 30
Richard Hunt - Forum STA 35

Q I have been trying to obtain the Microtext Developers' Pack which is no longer available from Microtext as they do not now support the Atari Computer. I would be grateful if anyone can suggest where I could obtain a copy.

Bob MacClay

DeskJet Refills

I I wrote (as a follow-up to Paul Keller's article on food dyes and DeskJet refills) that I had experimented with the food dyes and was satisfied with the output obtained by using them. I now have to temper these observations with the following.

I have experienced some problems whilst refilling with the dyes — slight/severe blocking of the jets. Sometimes this can be cleared with a moist tissue applied to the print-head or standing the cartridge in a half inch of water for an hour or two. Possibly the dyes are not filtered as well as "commercial" inks. The jury is still out on this one. A possibility is that the degree of "blocking" is dependent on the proportions of "commercial" and "food dye" inks present in the cartridge.

The next avenue of exploration is to try filtering the ink through filter papers. Also, it is important to refill the cartrige before it runs out of ink as this leads to overheating of the internal "propelling" mechanism and results in them being ruined with the effect of severe banding being evident on re-use. Usually, I refill the cartridges when they get down to about a quarter of an inch in ink level, as with the violent reversals of the cartridge during printing the ink gets thrown up on to the side walls of the cartridge, thereby starving the printing mechanism of ink.

V Gutzu

Opus

David Guest - Forum STA 52

I Encouraged by David Guest's contribution to Forum, Issue 52, I sent off $20 to Doug Harrison at PO Box 66236, Baton Rouge, LA 70806-6636, USA, on April 8th. On 19th May, my letter was returned with "Box Closed - No Order" stamped on the envelope ($20 intact).

Please pass this information on save others the trouble. I'm sorry, though, because I do like Opus.

John Henderson

Shareware Ripoff

Phil Trory - STA 54

I As well as enclosing an international reply coupon (in case they are there!) it is a good idea to put your address on the back of the envelope (in case they are NOT there!). This ensures the rapid return of your letter and the coupon.

The above procedure let me know in less than

The Forum pages are a regular feature of ST Applications, enabling readers to exchange ideas and help each other out with problems. Whilst we attempt to briefly answer questions here, if you have additional information or ideas please do submit them for publication. What you consider to be trivial information can often be of considerable use to other readers!

Please send your letters on disk if possible. Disks will be returned with a PD of the writer's choice. Longer submissions may appear as articles, in which case you will receive payment at our standard page-rate.

Key:

The following codes are used for each Forum entry:

J Pringle - Forum STA 20: Author who first raised the subject, and in which issue.

Q Question

A Answer

I General information or 'Input', advice, discussion, hints and tips, etc., with or without reference to previous Forum pieces.

● Editorial reply

14 days that the word processor MARCEL v2.3 is no longer supported by the author at the address given on the disk.

Perhaps you could start a list of 'dead' programs with this program? If such a list could be published, say, every three months, it would be very useful to subscribers.

Jim Dickie

Two Wrinkles

Rex Boys - Forum STA 52
Rex Boys - Forum STA 54

I As one geriATARIc (82) to another, I would discourage Rex Boys from pursuing the idea of viewing the screen through the lower part of his glasses. That way leads to neck strain as I very quickly discovered. It is much better to invest in a special pair of specs to the prescription of the appropriate part of his multifocals and to keep the monitor dead ahead. I have used this method for some years without any trouble. I keep my computer pair on top of the ST and change them by reflex action when switching on.

John Higham

I I agree with Rex Boys, but it doesn't only apply to men. I am female age 50 and if I use bifocals to view the screen I get a headache through looking up too far.

I now have two pairs of glasses, one for reading which I use for the screen as well (which is only three feet away and sits on a support under which my keyboard sits under when not in use), and one pair for distance.

I am more and more in need of the distance glasses, and in the future I can see myself wearing two pairs of glasses around my neck in order to be able to view my screen and then get up and not fall over the dogs.

I have tried many different set-ups on my desk to lower the screen but have in the long run to look up. If I put it to one side, I get back ache leaning to one side.

I use the computer most days, and produce Newsletters for our local Residents' Association, and a "WALKIES" mag for dog walkers in our local woods, as well as for my part-time dancing business and my husband's music business.

So I would also appreciate a screen which was sloped up from front to back and was a maximum of 6-7" off the desk. How about it, somebody?

Thelma Brown

P.S. Thank heavens for the zoom facility in Timeworks and Papyrus — without it I wouldn't be able to get such good quality DTP!

Apex Viewers

I Was mightily surprised to find that the Apex GIF, JPG, TGA, and FLC file viewers show the files in 18/24-bit colour modes whatever resolution you are in at the time. I have them installed on the desktop as icons and on dragging a file on to these icons the file is shown in colour even if you are in ST High, 2-colour Falcon mode, or whatever. The files are displayed within seconds (a 250KB GIF typically within five seconds). Pressing the Escape key returns you to the desktop. Very handy. Saves running Imagecopy to look at the file to see if it is the correct file.

V Gutzu

Viruses

I We have just been hit by a particularly pernicious virus.

Corresponding as we do with some wise old Atarians, their reaction was that the question of viruses on Ataris was somewhat over emphasized and scaremongering. Most said that we had no virus but a chip had gone down.

At first we tended to agree but soon found out that this was not so.

We ordered Richard Karsmakers' UVK from the ST Club which we strongly recommend everybody should do. This program does not entirely solve the problem but, amongst other things, it does indicate the nature of your machine's developed disease. Richard lists some 83 different Atari viruses and what they do, but by their very nature he can only be but one step behind the virus maker. You cannot cure a disease until it appears, can you?

The first thing we learned from his program was that a problem we had some years back when we lost some 35 important files was indeed a virus. But we were even more naive than we are now and had no Hard drive. So the first cold boot cleared it and fortunately we threw the infected disks away.

First piece of advice... If ever you have a disk that acts strangely, e.g. will not load first time, chuck it out. Do not keep trying to load it. So you have lost 40p. A small price to pay for a clean machine.

Now as you progress through Richard's list of viruses, it is noticeable that they become more virulent.

The later ones can resist a reset. They can spread all the way through your hard disk. They can infect just about any type of program or file, totally destroying it. And there is more, the worst of which is that some are practically undetectable. Some hide under the guise of being an MS-DOS instruction hidden in your boot sector. You only know they are there when they scramble up your work.

Richard tells us in his many paged documents that accompany the program that some virus makers send him their dastardly work as they finish it, pseudonymously of course. So now there is a vendetta underway between him and them.

Who are they? Well it seems that many are behind what we used to call the Iron Curtain, Russia, Poland, Slovenia and all points east. One nasty cow calling herself 'Lucky Lady' is a university student in Slovenia.

Things like the old Ghost virus or the little Green Goblins are easily removed by UVK but this latest bunch are very nasty.

Our one came wrapped up in an LZH compressed file. When it was decompressed, it showed a row of non-alphabetical characters and a sum of some billions of bytes in the partition window header. We put it into EDGE.prg to check it out, which it promptly destroyed. From then on, no program would open but when clicked upon would return you to the desktop. The whole thing spread rapidly and completely destroyed the hard drive's files and programs.

We decided to reformat the hard drive but that came up showing over 70,000 bad sectors when there were actually none. At that figure AHDI showed we had run out of memory.

Richard had nothing as destructive as this on his list, and so, as he asked, we sent it to him and are very pleased that it is now an ocean away from our machines.

So here is how we got rid of it. Firstly, fortunately, we had previosly backed up each partition with FASTCOPY.PRO. making two backup copies. If you do not do that, you are lost.

Then we threw away all the infected floppies, switched off the computer and waited a good five minutes just to be sure. Using our reformat program for the hard disk (write protected of course), we reformatted the hard drive. Finally we reloaded from our backup. Our machine was at last clean.

Second piece of advice: chuck out any infected disks as they will invariably re-infect your system. We chucked out fourteen. Only use those disks that were made before the virus entered your system.

Brutal surgery is called for.

Third piece of advice: when running any new floppies, switch off your hard drive and disconnect it. Use your basic machine only to thoroughly test any newcomer. Boot that system with UVK on your bootdisk.

Finally we would like to pass a message to any virus makers reading this. Atarians are in the main poor people. Big firms like British Airways, B.T. and the High Street Banks do not use Atari machines. You have cost us two weeks of work and quite a few pounds and being a struggling company, we can ill afford it. You are hitting your own kind. If you must use your intelligence in a negative manner, pick on the big boys, not us minnows.

Nicky Baker

● I can't see any way that unpacking an LZH archive could alone activate a virus contained in the LZH file unless the unpacking program was in on the act. I suppose that it is possible that the data in the LZH archive may have been so badly corrupted as to force the unpacking program to write data on top of the wrong part of your hard disk, but I doubt it. The most likely cause of your troubles would seem to be hard disk corruption.

That said, your advice about backups and being aware of the threat of viruses is very valid. One additional point: reformatting infected disks will remove all trace of a virus — there's no need to throw them away.

DMA Fitter

Q For a few months the DMA chip has been giving me problems, and so I attempted to buy one and have a local shop (Bridgend) do the replacement job. This would save me the inconvenience of sending my machine away. But I discovered when I was in town that it had closed down. Now I have no option but to send it away. Can someone tell me of a reputable and dependable company to fix my DMA? My machine is four years old and has given excellent service. It would be the best time to give it a complete overhaul.

D Smith

● Try any one from: Atari Workshop, Ladbroke

Computing, C&P Rossiter and Analogic. I'm sure they can all offer advice on some of the other enhancements you can have done to the machine at the same time as swapping the DMA chips :-)

Falcon Tip

I Recently I got into considerable trouble regarding booting-up and the correct saving of configuration files for my boot-up manager (STOOP). The cause was that I'd let the Newdesk.INF files grow to above 4K in size, and that I'd forgotten to include SHBUF.PRG in the Auto Folder (and Gemram, which is necessary when using SHBUF but which hogs some 180K of memory). As a result, I reconfigured my set-up to reduce the "extras" which I had but never really used. Newdesk.INF files are now kept down to approx 3K, out went the modified DESKICON.RSC files — which gave me a colourful Desktop but were not really necessary — and in came ALIBI the freeware program launcher.

Previously, I'd used ALIBI to launch programs from the Desktop, but I'd used it (as recommended) with the "aliases" in a folder on drive C. Thing is, opening a folder and then double-clicking on an "alias" takes nearly as much time as going to the drive that the program you wish to launch is in and double-clicking on the program. Hence Alibi was hardly used and, in fact, disposed of. However, with the above problems I decided to unearth Alibi again. One small difference, though, in the way I use it now. Aliases are prefixed with the number 1 (one) before the "›" sign that Alibi uses. This way I can use the aliases directly on the root of Drive C AND they will be the first items shown, other than folders, when I open the "C" window, thanks to the way that TOS deals with files beginning with a number. Much handier. Examples: Retouche.Prg becomes "1›RTC.PRG", K Resource becomes "1›K_RSC.PRG", Filelist.Prg becomes "1›FILELS.PRG". In this way I reduce the desktop clutter, the size of the Newdesk.INF files, eliminate the need for SHBUF — and thereby GEMRAM (and free up about 180K in memory).

V Gutzu

Gemulator

Q Can you tell me whether Gemulator 4 will run Protext 4.3, HiSoft Basic 2 and programs compiled therefrom, and PageStream v2.2?

PageStream, my front-line DTP program, would benefit greatly from an enlarged screen. As my PC will have a 15" multiscan monitor, I would like to know whether Gemulator uses internal (on-card) video hardware, or can take advantage of the large memory in a high-performance graphics card in a PC? If the former, I expect that Gemulator is stuck with the standard ST resolution of 640 x 400; whereas by using the PC's graphics hardware, much higher monochrome resolutions, e.g. SVGA like the Falcon and beyond, should be attainable.

Dr. Philip Taylor

● No problems with Protext or PageStream. We haven't tried HiSoft Basic, but the programs we have that were written with it load fine.

Gemulator 4 comes with a GEM patch that allows it to run at any screen size supported by your hardware and Windows drivers — up to 1200 x 1600 and beyond in two, four or sixteen colours. Support for 256+ colours is planned for the next version of Gemulator 4.

ST or not ST

I As a group of computer users we are of course used to doom-laden warnings that the ST market is about to collapse. In reality, however, there seems to be no reason why ST users should not enjoy a few more happy years with their favourite computer. We still have a knowledgeable and apparently very prosperous user base, some trusted suppliers and some absolutely brilliant software authors.

What is plaguing us at present is an identity problem and it is this identity problem which could well see the end of us eventually. It is all to do with the ST label. Most people use this to describe the area in which ST, TT and Falcon users, their suppliers and software developers operate. We talk about the ST market, ST software, ST users and even the ST world. Two of our three magazines wisely incorporate the term into their titles. There are very good commercial reasons why any computer market should have a good, strong, specific identifying label and, as the vast majority of us operate ST computers, then the ST label seems to be a very good one.

But there are problems. The ST is no longer in production. None of us can go out and buy a new one off the shelf to replace our ageing machines. Our suppliers cannot tempt new users with new machines and schools and colleges can't order them through their educational suppliers.

We are assured by our leaders that all this does not matter because there exist "huge" stocks of secondhand computers, and besides, the Gemulator and MagiCMac give the opportunity for ST software to operate on other systems. In addition CLab is now producing a Falcon Mark II and GeSoft has just brought out the Eagle. So runs the conventional wisdom.

But these developments provide no real hope for any long term future. At best they give some short term encouragement to software developers. Very few ST users will upgrade to these expensive German produced computers costing £2000 upwards. Yet many ST journalists apparently assume that we are just waiting to rush out for these as soon as they become available. In reality they appeal only to heavily committed midi specialists who are probably not in the ST market at all and probably do not read ST magazines. So all the detailed coverage which has adorned the magazines recently is just so much needless hype — a useless diversion via the Paris show. Similarly it is just unrealistic to think that most of us will happily hop into the Mac or PC operating systems or that the ST market could go on existing even if we did. These are nice extras but they will not make a great deal of difference.

As for the huge stock of secondhand computers — just where are they to be found? I recently went in search of a replacement for my eight year old ST which is now beginning to show its age. It was a depressing experience. I found no evidence of any stocks at all. Those few STs which were around were expensive and in very poor condition. My conclusion is that buying secondhand STs is a minefield to be avoided. They were produced in many variations each with their differing defects and weaknesses. A £60 "bargain" can conceal a nightmare of repair and upgrade bills. Of course there will be a few good machines around somewhere. But finding one is largely a matter of luck. Hardly a basis on which the ST market can exist in the future.

The only hope I can see for the future is if ST market leaders both here and in Germany turn their efforts to persuading someone to produce a brand new, affordable and easily upgradeable ST with all the known defects ironed out. It would have to be manufactured in this country to make it affordable both here and in Germany. It is the only thing which could restore market identity and market confidence and give any hope of arresting market decline over the next few years. If it could be marketed for less than £300 then my cheque would be in the post straightaway.

It is reported that Escom have plans to re-start the manufacture of Amigas. Surely an enterprising firm could be persuaded to do the same for the ST. We don't need expensive Eagles or Falcons. A lively sparrow would be good enough.

John Watson

T-Cache

I Recently, I did some testing of my hard drive as to perfomance and found out that it was somewhat lacking.

Rate HD gives it a Data Transfer Rate of 737 Kb\second and a poor Access time of 42ms. It was with these in mind that I started experimenting with caching programs. Cold Hard Cache showed a fabulous improvement in the order of 2 to 3, but unfortunately scrambled most of the character read-outs in the windows and the file selector, and so out it went.

T-Cache, on the other hand, doesn't show as vast an improvement — around 150% to 220% — but seems, after pretty exhaustive testing, to be completely compatible. The only downsides to it are the loss of between 188Kb to 321Kb of RAM (user configurable — but the two amounts represent a reasonable compromise between speed and memory usage) and the German documentation. Suprisingly, even though all the partitions are optimised to prioritize Reading operations, at the expense of Write operations, the Read\Write figures rarely diverge by more than approx 25%, unlike the non-cached figures where the Read figures are often three times higher (i.e. faster) than the Write figures.

If, like me, you spend a lot of time with your ST\Falcon and your work is hard drive intensive then the savings in time gained by using T-Cache are considerable. All the programs that I use that are hard drive intensive are so much quicker and even opening a window to a drive seems snappier. (I used HOWFAST for the testing of the different configurations possible within T-Cache.) You can even have the green LED on the Falcon flash for every disk access — sometimes useful if you are unsure whether the program you are running has frozen or not.

V Gutzu

UFO

Q The enclosed disk which holds an unzipped file, UFO (Ultimate File Organiser), taken off your disk

UT.160, has presented me with a somewhat peculiar effect. When loaded from an internal or external disk drive and after cancelling the opening spiel and before the program runs the following dialogue appears:
Floating Point Overflow

Cancelling the dialogue then presents another:
Error in Function ENTS_AVAIL
at line 108
at PC $00016c5A

My computer operates normally in all other respects.
a) Loading a RAM disk (but not using it) and then loading the UFO program from disk drive A or B makes everything perform correctly.
b) Loading the UFO programme into the RAM disk and then running it from RAM again makes everything OK.

My computer is a standard STe with 4MB Ram, TOS 1.62, and used in mono. The presence or absence of Desk Accs, apart from the RAM disk, has no effect.

Ray Tufft

● Yes, there are some programs that will only work on a 4 megabyte STE if there is a RAM disk installed. I forget the reason for this bug and why adding a RAM disk to the system cures it.

Calamus

Nikky Baker - Forum STA 54

I After reading Nikky Baker's Forum letter in issue 54 I tested the different printer drivers from SL collections. Before that, I was using an old driver from 1989. I had not noticed that among my many font disks, I had a utility disk with a version 1 of CPDG.PRG from March 1990 (PDS_KONV.PRG for Canon/Epson and LAS_INST.PRG for HP printers). Recently I got CPDG.PRG/CDTG.PRG 2.08, but it looks very much the same as the old versions following 1.09n.

All SL drivers seem to be compatible with my Calamus v.1.09n. I had some trouble to start with because of a 'PAPER=1' line in Calamus.SET. This makes Calamus look after a second paper format. The drivers I was testing had only one format. I just had to use 'PAPER=0'.

Compared to the old driver I have been using so far, the new drivers have the big advantage of being editable and allowing spooler printouts.

To configure a new driver, you can use CPDG.PRG as suggested by Nikky Baker, or you can edit the CPD file (CDT in German) directly provided you have some practice at editing binary files. In a new CPD file, the parameters are grouped in sections each beginning with an easy-to-understand leading word: FRMT for page fprmats, PRTC for printer codes, etc. The bottom clearance code is located 30 bytes after FRMT, as the last of four HEX numbers which are values in 1/720 inch defining the area to be printed. Make the bottom value larger if you want Calamus to print more of the bottom region. Make it smaller if you experience that an additional sheet of paper runs through the printer after each page.

In the PRTC section, the Print-Exit code is 45 bytes after PRTC. You may wish to have or not have a Form-Feed character there. In the printer INIT code you can add $1B6Cxx if some additional left margin is needed. I use this in order to reduce the need for horizontal scrolling on my SM124 monitor.

All new drivers provide the choice to print direct (bypassing TOS and eventual spoolers) or to print under TOS i.e. serial or 'other'(normally parallel). Used to having Mortimer installed, I have a flexible spooler at hand. When I have to test a printer driver, I would switch my printer off-line to start with and click on print serial or 'other'. Then all output goes to the Mortimer spooler. Printing a test page with a flat frame on top and another one at the bottom does not involve more than say 100K output. The spooler should have this capacity at least. (Much more if you want to print real documents and save the print data for later printing from the desktop.)

With Mortimer it is very easy to access the spooler data. When trying different driver configurations with CPDG.PRG, I could run dozens of trials within a short time. Using Mortimer's RAMeditor, I did not even have to reload the driver each time. Searching FRMT in RAM took me right to the active CPD data displayed in the same way as in the CPD file. Be aware that the same data will also appear at another place if you have the CPD file loaded in an accessory editor or copied on a ramdisk.

I must say that I have been fiddling with Epson printer drivers for many years, so I know that printer language. Just looking at the data in the spooler was enough for me to see how this would print on my Epson Stylus 800 printer. It should be possible to do the same with HP printers although they use a more complicated language. As long as the only problem is that of vertical margins, all that you need to know is the line spacing code. Then you know how many lines your printer is able to print on a page. Just look in the spooler how many lines Calamus has produced. With Mortimer or Edhak/Editplus, lines of any length are allowed. Spooler content is then nice to look at.

Note that CPDG.PRG is a printer driver generator, not an editor. You cannot read in an existing printer driver and configure it. CPDG loads driver descriptor files (CDD) from a collection covering the usual Epson, Canon, HP range of printers and several others. CDDs are ASCII files. You can replace $0A0D with $0D0A if it fits better with your editor. Just as with files like DESKTOP.INF, however, great care is needed. There is a set of default drivers built in CPDG but I think one should rather start from a CDD file. I got bad crashes from the defaults. All together it took me long time and many trials to get confident with CPDG.PRG

My conclusion is that as long as you are only interested in changing a bottom margin, hacking directly in a CPD might be easier than learning to dance with CPDG.PRG. In any case for the sake of environnement, and this applies to any kind of printer testing, use some visible spooler to examine the output instead of filling your waste basket with new paper. It also makes it much easier to understand what your software is doing.

Paul Dion

Requests

Q Could we have an all-encompassing article to update us with the present state of affairs regarding:

a) Accelerators available for the Falcon and STs, together with "perceived" speed increases, costs, compatibility, compatibility with memory upgrades, requirements as to space within the computers, i.e. would you need Desktopper, etc.

b) Memory upgrades — type, minimum speed of chip necessary i.e. 70ns, 60ns. Adaptor required and the options therein i.e. 4x4 Mb chips or 1x16 Mb chip... and once again whether they will fit in an unmodified machine or need Desktopper. Special types of SIMMs, or are they cross-compatible with other platforms?

c) Hard drives — IDE (2.5 inch and 3.5 inch), SCSI, cables needed, Translator or Link, internal or external fitment; as above re case modifications.

d) CD ROMs — types known to work with the Atari family, and most of the above comments.

e) The Mac option — MagicMac — cost of program, compatibility with existing programs. Costs, types, speeds etc. of the different Macs. 6100\7100\8100 compatibility with MagicMac.

Also a request for a review on Dextrous.

V Gutzu

Fast Basic

F D L Selkirk - Forum STA 53

Q I am not clear about the status of Fast Basic, as Computer Concepts appear to have wound up. Who now owns the copyright?

I have the disk version but I am reluctant to give a copy to anyone for fear of being branded a 'pirate'. There seem to be several items missing on my original disk e.g. TOOLBOX.FST, a linker and others. How can I obtain these?

I was delighted to read of someone else who thinks highly of FAST BASIC. I bought a copy, second hand for £20 (Computer Concepts 1986) and I certainly prefer it to GFA or C for the reasons given by FDL Selkirk. I do have SPEAKER.BSC and SPEAKER.PRG which, with a minor alteration, work well on my STE as described in Forum - STA 45, p.45.

Max Wirth

● No idea what happened to the rights to Fast Basic. I presume that it either remains an asset of Computer Concepts Ltd and was sold on to whoever aquired the assets of the company or the rights reverted to the original author. Either way, technically you should not pass on copies to a third party.

Programmers' Forum

ST Applications' regular programming column continues its mini-series exploring the 68030 memory management unit.

Introduction

In last month's edition of *Programmers' Forum*, the basic structure of the translation table was introduced. This is the look-up table used by the 68030 memory management unit (MMU) to translate logical addresses (those that the microprocessor sees) into the physical addresses used by the memory chips.

Moving on from that area, this instalment will focus on the MMU's registers, and also feature the C source module for the table-decoding program introduced in the first part of the series. Several terms and concepts used in the discussion below were defined in the last two articles, so it might be useful to refer back to them if anything is unclear.

On with the Show!

Figure 1 shows the layout of all six of the 68030 MMU's registers. In this diagram, the small numbers indicate the boundaries of each field in bits. For example, the TIB field of the TC register occupies bit 8 to bit 11 inclusive of the whole 32 bit value.

At the top of the list are the two root pointers, CRP and SRP (standing for CPU root pointer and supervisor root pointer). These are concerned with the location of the translation table in memory. Each is 64 bits (two longwords) wide. The upper longword is rather similar to a long-format table descriptor (Figure 3 in last month's article). It too has fields controlling the limits of acceptable index values (the L bit and the LIMIT field) - these are encoded just as described last month. The DT field determines the type of table that is pointed to by the lower long-word of the register:

DT	*Table type*
0	INVALID — causes an exception as soon as this value is put into an active root pointer
1	Page descriptor — rather than pointing to a translation table, the lower longword of the root pointer is a constant value to be added to an incoming logical address in order to make a physical address
2	Short table pointer — lower longword points to short format translation table
3	Long table pointer — lower longword points to long format translation table

Note that the lower longword of the root pointer only encodes the upper 28 bits of a 32 bit address. The other four bits are taken as zero, with the effect that all translation tables must start at an address which is an exact multiple of 16.

The CPU root pointer determines the normal translation table for the MMU. Optionally, supervisor mode programs can have their own translation table, addressed by the SRP. This option is governed by the state of the S bit in the TC register (see below).

Transparent Translation

TT0 and TT1 are transparent translation registers. Transparent translation causes a logical address to be used as a physical address without reference to a translation table. The advantage of this is that it is quicker for the MMU to process. Only large blocks of memory space can be transparently translated: 16 megabytes or larger. TT0 and TT1 are identical in structure and effect, allowing two blocks of memory to be transparently translated with separate settings.

The address base and mask fields define the memory block to be translated in this way. Both fields refer only to the upper eight bits of an address, hence the 16Mb minimum on the region processed. The address base field is compared with the relevant portion of the incoming logical address, and if they match, the logical address is transparently translated.

To process larger blocks than the 16Mb minimum, bits are set in the mask field: for each bit that is set, the corresponding bit in the address base field is ignored. As an example, let's take an address base field of $5C, and an address mask field containing $03. The two lowest bits of the mask are set, so the lowest two bits in the base field are ignored. This means that all logical addresses from $5C000000 up to $5FFFFFFF will match the base field and be transparently translated — a block of 64Mb.

The enable bit (E) controls whether a transparent translation register is active (bit set) or not (reset). If set, the cache inhibit bit (C) prevents memory addresses covered by the register from participating in the 68030 instruction or data caches. The M bit controls whether transparent translation applies to both read and write accesses (bit set), or not (reset). If the M bit is reset, then the R bit determines whether read (R set) or write (R reset) accesses should be transparently translated.

Translation Control and Status

The MMU status register (MMUSR) is used to return the result of enquiries about the address translation system. This will be covered briefly next month.

We have already met four of the fields in the translation control (TC) register. TIA, TIB, TIC and TID control the structure of the translation look-up table and were described in detail in last month's article. The IS (initial shift) and F (function code lookup enable) fields control a couple of the more obscure features of the MMU's operation which have been ignored in this series. For a fuller discussion on their use (and that of the related FCB and FCM fields of the transparent translation registers) see *'The MC68030 User's Manual'* (Motorola).

This leaves the PAGE, S and E fields. The S bit determines whether the supervisor root pointer is used or not. If set, the SRP is active for supervisor mode code, otherwise the SRP is ignored. The PAGE field sets the size of the memory blocks or pages listed in the translation table. In last month's article we used an example translation based on a 32K page size, but many others are also possible. Although the field occupies four bits, only eight of the possible sixteen values are legal: the remainder cause an exception during MMU configuration. Allowable settings are:

Value	*Page size*
8	256 bytes
9	512 bytes
10	1K
11	2K
12	4K
13	8K
14	16K
15	32K

Finally, and most importantly, the enable bit (E) determines whether any address translation at all is undertaken. If the bit is reset, logical addresses are used as physical addresses, just as on the ST's 68000 microprocessor.

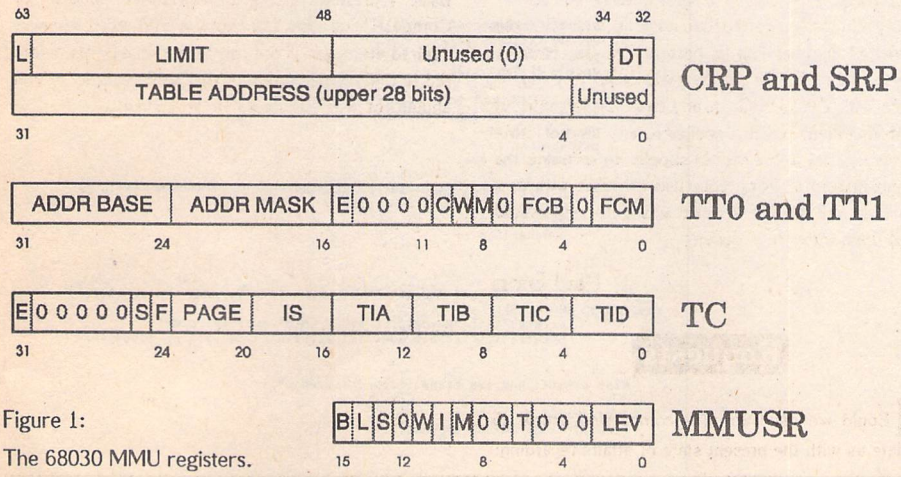


Figure 1:
The 68030 MMU registers.

The Bottom Line

That's all for this edition of *Programmers' Forum*. Next month's article will bring the series on the MMU to a close with a brief look at MMU programming, and also feature some more readers' letters.

Correspondence about issues raised in the column, hints on any subjects, or questions about programming problems should be sent to the address below. All contributions, no matter how simple or advanced, are most welcome. Please include your address on the letter, so I can get back to you if anything in your contribution is unclear. Email addresses are useful too.

One last point, about email. Whilst I am very happy to receive contributions by email, please include your real name in the message, as cryptic alphanumeric user identifiers are not terribly useful. Please send a disk or email if there are large chunks of text or ASCII source code: I have no time to retype lots of material. Naturally, disks will be returned if an SAE is included.

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How It Works

Having introduced the key players in the address translation process (the MMU registers and the translation table itself), the operation of the MMU report program should be fairly clear.

The majority of the code is made up of print statements that decode the groups of fields that make up MMU register values. Rather than have long lists of shift and bitwise-AND operations to isolate the field values from the register values, fields are represented using C's bit-field facility as described in the STA 53 *Programmers' Forum*. Definitions of the bit-field structures for the MMU registers are contained in the header file MMU.H which was published in the same article.

To complete the working MMU report program, you will need Listings 1 and 2 from the STA 53 column, saved as MMU.H and READMMU.ASM respectively. Listing 1 from this article should be saved as DUMPMMU.C. After compilation/assembly and linking, you should have a file DUMPMMU.TOS that produces reports like those featured last month. Note that, as written, DUMPMMU is not compatible with MultiTOS — it potentially requires access to the whole of memory in order to read the MMU translation table, and so violates the MultiTOS memory protection system.

As usual, the program is written for the default long integer mode of Lattice C 5.6. Compilation under other C systems should be possible, though particular points to watch out for are the fine detail on how bit fields are implemented; the size of integers and the interface between C and assembly language.

Coding

The program starts by checking that it is running on a 68030 machine. This is done by reading the value of the _CPU cookie from the cookie jar. The MMU registers are copied into the bit-field structures by the assembly language function get_MMUregs(), and then the structures are analysed. Note that the entire program operates in supervisor mode — this is necessary for two reasons. First, access to the MMU registers is a privileged operation; and secondly, the translation table may lie anywhere in memory, including the protected area below $800.

The TC register is easily analysed by a series of printf() calls within main() itself. Similarly, the two transparent translation registers are also fairly straightforward: the output is produced by the function decode_tt(), called with the values of TT0 and TT1 in turn.

The root pointers and translation table are slightly more difficult to process, owing to the range of possible structures of table. The problem is solved by noting that the translation table structure has a 'recursive' character — one table contains pointers to lower-level tables which obey similar structural rules. The recursion is performed by the decode_table() function, and controlled by an argument 'depth' which tracks how many levels of table have been processed. The depth marker is used to identify the structure of the table by examining the relevant TIx field from the translation control register.

Much of the apparent complexity of the decode_table() function arises from the need to take account of both long- and short-format tables. A cleaner structure could probably have been produced by creating separate functions to report on these two alternatives.

```
/*
** Listing 1.
** Programmers' Forum STA 55 (July 1995)
**
** Program to dump out a report on the memory management unit configuration. Uses
** the assembly language function from READMMU.ASM and the structure definitions
** from MMU.H published in Programmers' Forum STA 53.
** Requires a 68030-based machine to run.
** Compiler system: Lattice C v5.60 -- Compile options: -cargfku
**  Meaning: Enable ANSI mode, disable trigraphs, enable
**           non-ANSI keywords, assume unsigned chars
** Link with C.O, READMMU.O and LC.LIB
** Written on 22 April 1995
*/


#include <cookie.h>
#include <osbind.h>
#include <portab.h>
#include <stdio.h>
#include <string.h>

#include "mmu.h"

/*
** Function prototypes and extern declarations...
*/

int main(int,char **,char **);
void decode_tt(TT_REG *);
void decode_rp(RP_REG *,TC_REG *);
void decode_table(void *,int,int,int,int,unsigned *,char *,int,TC_REG *);

extern void get_MMUregs(MMUREGS *);

/*
** The program starts here...
*/

int main(argc,argv,envp)

int argc;
char **argv, **envp;

{
    int CPU;
    void *oldSSP;
    MMUREGS mmu;

    printf("MMU Translation Reporter\n");
    printf("\275 Jon Ellis, 26 March 1995\n\n");
    if (getcookie(_CPU,&CPU))
        if (CPU != 30)
            {
            printf("\007Aborting: Program requires 68030 CPU !\n");
            printf("Press RETURN to exit:");
            getchar();
            }
    oldSSP = Super(NULL);
    get_MMUregs(&mmu);

    if (mmu.tc.tc_enable)
        {
        printf("Translation control:\t");
        printf("Address translation enabled\n");
        printf("\t\t\tSRP %s\n",mmu.tc.tc_sre ? "enabled" : "disabled");
        printf("\t\t\tPage size: ");
        if (mmu.tc.tc_pagesize < 8 || mmu.tc.tc_pagesize > 15)
            printf("<Illegal>\n");
        else printf("%d bytes\n",1 << mmu.tc.tc_pagesize);
        printf("\t\t\tFunction code lookup %s\n",mmu.tc.tc_fcle ? "enabled" :
"disabled");
        printf("\t\t\tInitial shift: %d bits\n",mmu.tc.tc_initial);
        printf("\t\t\tTable index A: %d bits\n",mmu.tc.tc_tia);
        printf("\t\t\tTable index B: %d bits\n",mmu.tc.tc_tib);
        printf("\t\t\tTable index C: %d bits\n",mmu.tc.tc_tic);
        printf("\t\t\tTable index D: %d bits\n\n",mmu.tc.tc_tid);

        printf("Transparent reg 0:\t");
        decode_tt(&mmu.tt0);
        printf("Transparent reg 1:\t");
        decode_tt(&mmu.tt1);

        printf("CPU root pointer\n==============\n");
        decode_rp(&mmu.crp,&mmu.tc);
        putchar('\n');
        putchar('\n');
        if (mmu.tc.tc_sre)
            {
            printf("Supervisor root pointer\n======================\n");
            decode_rp(&mmu.srp,&mmu.tc);
            putchar('\n');
            putchar('\n');
            }
        else
            {
            printf("Unused SRP:\t\tLimit word: $%04X\n",mmu.srp.rp_limit +
mmu.srp.rp_lu << 15);
            printf("\t\t\tDescriptor type: %d\n",mmu.srp.rp_dt);
            printf("\t\t\tTable address: $%08X\n\n",mmu.srp.rp_addr<<4);
            }
        }
    else printf("Address translation disabled\n");

    Super(oldSSP);
    printf("Press RETURN to exit:");
    getchar();
```

```
    return(0);
}


/*
** Function to print a report on the configuration of a transparent translation
** register. The input is a pointer to a TT_REG structure. There are no
** return values.
**
** Usage:   decode_tt(register);
**
**          void decode_tt(TT_REG *);
*/

void decode_tt(tt)

TT_REG *tt;

{
    unsigned int base, fullmask, start, end;
    char fc[4];

    base = (tt->tt_base & ~tt->tt_mask) << 24;
    fullmask = ~(~tt->tt_mask << 24);
    start = (0x00000000 & fullmask) | base;
    end = (0xFFFFFFFF & fullmask) | base;
    fc[0] = (tt->tt_fcmask & 0x04) ? 'x' : ((tt->tt_fcbase & 0x04) ? '1' : '0');
    fc[1] = (tt->tt_fcmask & 0x02) ? 'x' : ((tt->tt_fcbase & 0x02) ? '1' : '0');
    fc[2] = (tt->tt_fcmask & 0x01) ? 'x' : ((tt->tt_fcbase & 0x01) ? '1' : '0');
    fc[3] = '\0';
    if (tt->tt_enable)
        {
        printf("Enabled\n");
        printf("\t\t\tFunction code: %%%s\n",fc);
        printf("\t\t\tTransparent block start $%08X\n",start);
        printf("\t\t\tTransparent block end   $%08X\n",end);
        if (tt->tt_rwmask == TRUE)
            printf("\t\t\tRead/write accesses translated\n");
        else printf("\t\t\t%s accesses translated\n",tt->tt_rw ? "Read" : "Write");
        printf("\t\t\tCaching %s\n",tt->tt_nocache ? "disabled" : "enabled");
        }
    else printf("disabled\n");
    putchar ('\n');
}


/*
** Function to print a report on the configuration of a root pointer register. The
** inputs are a pointer to a RP_REG structure, and a pointer to
** a TC_REG structure containing the relevant translation
** control settings. There are no return values.
**
** Usage:   decode_rp(root_pointer,control);
**          void decode_rp(RP_REG *,TC_REG *);
*/

void decode_rp(rp,tc)

RP_REG *rp;
TC_REG *tc;

{
    int f, bits, depth, limiting;
    unsigned logical;
    char prefix[32];
    unsigned index[4];

    limiting = ((rp->rp_lu && rp->rp_limit == 0) ||
                (!rp->rp_lu && rp->rp_limit == 0x7FFF)) ? NONE : TRUE;
    if (limiting == TRUE)
        limiting = rp->rp_lu ? LOWER : UPPER;
    if (rp->rp_dt == INVALID)
        printf("Illegal root pointer value !\n");
    else if (rp->rp_dt == PAGE)
        {
        printf("Constant offset of value $%08X added to addresses\n",rp->rp_addr <<
4);
        if (limiting == NONE)
            printf("No index limits\n");
        else if (limiting == LOWER)
            printf("Lower index limit: %d\n",rp->rp_limit);
        else if (limiting == UPPER)
            printf("Upper index limit: %d\n",rp->rp_limit);
        }
    else
        {
        strcpy(prefix,"  ");
        logical = 0;
        depth = -1;
        index[0] = tc->tc_tia;
        index[1] = tc->tc_tib;
        index[2] = tc->tc_tic;
        index[3] = tc->tc_tid;
        bits = tc->tc_pagesize;
        for (f=MAXDEPTH; f>depth; f--)
            bits += index[f];
        printf("\n$%08X-$%08X: ",logical,logical+(1<<bits)-1);
        printf("Level %d table (%d %s entries) at
$%08X\n",depth+1,1<<index[depth+1],
                        (rp->rp_dt == VALID4 ? "short" : "long"),rp->rp_addr<<4);
        decode_table((void *)(rp->rp_addr<<4),limiting,rp-
>rp_limit,logical,depth+1,index,prefix,rp->rp_dt,tc);
        }
}


/*
** Function that performs the bulk of the translation table analysis and reporting
** The table specified by the arguments is walked through and any lower level
** tables expanded recursively. The function handles both short- and long-format
** tables, index limiting, and indirect entries, though not function code lookup
** tables. The arguments are: 'ptr', a pointer to the start of the table; **
'limiting', a flag indicating the nature of any index limiting; 'limit', the
** index limit; 'start', the first logical address subject to translation by the
** table; 'depth', the depth of this table in the search tree (0 to 3, and 4
** indicating an indirect entry); 'index', a pointer to a table containing the size
** in bits of the table index field for each level of search; 'prefix', a
** string containing spaces used to indent each table; 'type', a descriptor-type
** code for the table; and 'tc', the translation control register settings. There
** are no return values.
**
** Usage:   decode_table(ptr,limiting,limit,start,depth,index,prefix,type,tc)
**
**          void decode_table(void *,int,int,int,int,unsigned *,char *,int,TC_REG
*);
*/

void decode_table(ptr,limiting,limit,start,depth,index,prefix,type,tc)

void *ptr;
int start,depth,type,limiting,limit;
unsigned *index;
char *prefix;
TC_REG *tc;

{
    int f, next_limit, lower, upper;
    unsigned indirect, entries, bits;
    char indent[32];
    LONG_ENTRY *lptr;
    SHORT_ENTRY *sptr;

    if (type == INVALID || depth > MAXDEPTH+1)
        return;
    strcpy(indent,prefix);
    strcat(indent,"  ");
    indirect = (depth == MAXDEPTH+1 || index[depth] == 0);
    if (indirect) entries = 1;
    else entries = 1 << index[depth];
    bits = tc->tc_pagesize;
    for (f=MAXDEPTH; f>depth; f--)
        bits += index[f];
    lower = 0;
    upper = entries-1;
    if (limiting == NONE)
        printf("%sNo index limits\n",prefix);
    else
        {
        if (limiting == LOWER)
            {
            printf ("%sLower index limit: %d\n",prefix,limit);
            lower = limit;
            }
        else if (limiting == UPPER)
            {
            printf ("%sUpper index limit: %d\n",prefix,limit);
            upper = limit;
            }
        }
    start += (1 << bits) * lower;

    if (type == VALID4)
        {
        sptr = (SHORT_ENTRY *)ptr;
        for (f=lower; f<=upper; f++)
            {
            printf("%sEntry %2d:  ",prefix,f);
            if (sptr->st.sftd_dt == INVALID)
                printf("%sInvalid\n",prefix);
            else if (sptr->st.sftd_dt == PAGE)
                {
                printf("Page: $%08X-$%08X -> ",start,start+(1<<bits)-1);
                printf("$%08X-$%08X (",sptr->sp.sfpd_page<<8,(sptr->sp.sfpd_page<<8)
+ (1<<bits)-1);
                putchar(sptr->sp.sfpd_nocache ? 'C' : 'x');
                putchar(sptr->sp.sfpd_modified ? 'M' : 'x');
                putchar(sptr->sp.sfpd_update ? 'U' : 'x');
                printf("%c)\n",sptr->sp.sfpd_wp ? 'R' : 'x');
                }
            else
                {
                printf("Table: $%08X-$%08X\n",start,start+(1<<bits)-1);
                printf("%s  ",prefix);
                if (depth == MAXDEPTH || index[depth+1] == 0)
                    printf("Indirect pointer at $%08X\n",sptr->st.sftd_table<<4);
                else printf("Level %d table (%d %s entries)\n%s  Start address:
$%08X\n",
                        depth+1,1<<index[depth+1],
                        (sptr->st.sftd_dt == VALID4 ? "short" : "long"),
                        prefix,
                        sptr->st.sftd_table<<4);
                if (sptr->st.sftd_dt == VALID4)
                    decode_table((void *)(sptr-
>st.sftd_table<<4),NONE,0,start,depth+1,index,indent,VALID4,tc);
                else if (sptr->st.sftd_dt == VALID8)
                    decode_table((void *)(sptr-
>st.sftd_table<<4),NONE,0,start,depth+1,index,indent,VALID8,tc);
                }
            sptr++;
            start += 1 << bits;
            }
        }
    else if (type == VALID8)
        {
        lptr = (LONG_ENTRY *)ptr;
        for (f=lower; f<=upper; f++)
            {
            next_limit = ((lptr->lt.lftd_lu && lptr->lt.lftd_limit == 0) ||
                          (!lptr->lt.lftd_lu && lptr->lt.lftd_limit == 0x7FFF)) ? NONE :
TRUE;
            if (next_limit == TRUE)
                next_limit = lptr->lt.lftd_lu ? LOWER : UPPER;
            if (lptr->lt.lftd_dt == INVALID)
                printf("%sInvalid\n",prefix);
            else if (lptr->lt.lftd_dt == PAGE)
                {
                printf("Page: $%08X-$%08X -> ",start,start+(1<<bits)-1);
                printf("$%08X-$%08X (",lptr->lp.lfpd_page<<8,(lptr->lp.lfpd_page<<8)
+ (1<<bits)-1);
                putchar(lptr->lp.lfpd_super ? 'S' : 'x');
                putchar(lptr->lp.lfpd_nocache ? 'C' : 'x');
                putchar(lptr->lp.lfpd_modified ? 'M' : 'x');
                putchar(lptr->lp.lfpd_update ? 'U' : 'x');
                printf("%c)\n",lptr->lp.lfpd_wp ? 'R' : 'x');
                }
            else
                {
                printf("Table: $%08X-$%08X\n",start,start+(1<<bits)-1);
                printf("%s  ",prefix);
                if (depth == MAXDEPTH || index[depth+1] == 0)
                    printf("Indirect pointer at $%08X\n",lptr->lt.lftd_table<<4);
                else printf("Level %d table (%d %s entries)\n%s  Start address:
$%08X\n",
                        depth+1,1<<index[depth+1],
                        (lptr->lt.lftd_dt == VALID4 ? "short" : "long"),
                        prefix,lptr->lt.lftd_table<<4);
                if (lptr->lt.lftd_dt == VALID4)
                    decode_table((void *)(lptr->lt.lftd_table<<4),next_limit,
                     lptr->lt.lftd_limit,start,depth+1,index,indent,VALID4,tc);
                else if (lptr->lt.lftd_dt == VALID8)
                    decode_table((void *)(lptr->lt.lftd_table<<4),next_limit,
                    lptr->lt.lftd_limit,start,depth+1,index,indent,VALID8,tc);
                }
            lptr++;
            start += 1 << bits;
            }
        }
}
```

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For Sale

Calamus S v2 £120 (cost £145 for upgrade). Will also supply additional fonts. FOC Korgoi, Roland DSO, Yamaha DX7 Voices available at bargain prices. (NB: original software, not copies!) Tel Robin 01522 752458 (eves). (55)

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STOS plus STOS Word and Game-maker Manual £23*; Lattice v5 £24*; C-Breeze £8, Superbase Personal £10, Fast Basic v1.05 (disk) £12, Timeworks v1.12 and Users' Guide £19, Corporation £6, Starglider 2 £5, ST Internals £10, ST Tips and Tricks £5, ST Graphics and Sound £5, Ultimate Ripper Cartridge £12. Items marked * plus £2 postage. Tel: 01277 226621. (55)

Timeworks 2.00a £30, Timeworks 1.12 £25, Proflight 1.22 £15, Monkey Island £8, SEUCK £5, Balance of Power 1990 £5. The Patrician £7, Pirates £7, Air Bucks £7. Phone Chris on 01452 863137. (55)

External 3.5" disk drive with power supply £24 inc. postage. Tel: 01738 637165. (55)

Falcon 030 4MB Ram 65Mb Hard Drive, improved Mouse, Atari SM146 High res B & W Monitor, some software. All in mint condition:– Offers please. Phone Trevor 01400 281720. (59)

GFA 3.6 Interpreter & Compiler + G Shell £40; GFA GUP £5; HiSoft £10; Wercs £5; Timeworks Publisher 2 £20; Megapaint 2.23 £30:– Phone Geoff on 01273 – 583020. (55)

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Arabesque Pro £60; That's Write 3 £60; Protext 6.5 £45; Convector Pro £45; Flexidump Plus 3 £25; MC68882 + chip set £50; 100ml Black Ink £12; Loads of Clipart and fonts in various format – bitmap, vector: TrueType, Typel, Calamus:– K Hornby, 33 Ingleton Drive, Lancaster LAA1 4RA. Tel: (01524) 381581. (56)

Laser Printer Atari SLM 804 – Good condition £90. Cleveland Area. Phone 01642–315921. (55)

GFA Compiler 3.6 & Interpreter 3.5 £10; Devpac 3.01 £10; Technical Reference Guide Vol 2 £10 & Vol 3 £10; Programming made Simple £5; First Steps in 68000 £5; Introducing Machine Mode £7. or all for £40. Tel 0116 2918502. (55)

DTP: Get started for £25! Timeworks 1 DTP, Imagecopy 2 and 10 disks of good quality clip art. All original manuals plus printouts of clip art included (postage extra). Phone Mike Kerslake on 0114 261 8940 at any reasonable time. (55)

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Multisync Colour Monitor (Taxman) £180 only. Buyer collects. Phone 081 220 6537 or London Mobile 0956 586 708. (55)

Atari STFM, 4Mb, T28 Accelerator, Overscan in separate case/keyboard £250; 105Mb Hard Drive £100; Atari SC1224 Colour Monitor £60; HP Laserjet (needs servicing) £50; or with 1MB Upgrade (for DTP) £110; Smart one fax modem £40; Golden Image Hand Scanner and Touch-up software £40. Call Paul on 0181 672 2597 (evenings) (56)

DA Layout/DA Repro £80; Straight Fax 2.10 £40, or with Smart One Fax Modem £75; Warp 9 £20; various games under £10. Call Paul on 0181 672 2597 for details. (evenings) (56)

SLM804 printer, nearly new toner and drum, £100. Spectre GCR Apple emulator £80. Imagecopy £10. 700+ Calamus fonts on 40 disks plus printed catalogue £25. Internal d/s floppy, nearly new, £18. Games £10 each. 0181 208 1397. (55)

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Music Education Programs Tunemaker and Rhythm Kit; runs in colour or mono on ANY ATARI and has score printout facility. Very much suited to classroom use with resource material provided. Output through Monitor OR MIDI device – £45. Tel Bryan 0117 924 5935 day or 0117 940 1702 eves. (55)

Authorware

If you would like to see your software featured in the ST Applications Authorware column please send us a review copy of the software and a rough outline of the advertising copy you would like to be printed.

Morse Master

The complete morse trainer and simulator. Send Cheque/PO for £29.99 payable to Boscad Ltd at: 16 Aytoun Grove, Balbridgeburn, Dunfermline, Fife KY12 9TA. Phone (0383) 729584 evenings for technical information.

Calamus Manual

113 pages including: Loading modules. Colours and fill patterns. Frame drawing. Text Styles including lists. Page layout. Single and double page spreads. Formatting and rulers. Importing text and graphics. Text flow between frames. Text flow around graphics. Rotating and arranging frames. Raster area and line frames. Master pages. Headers, footers and page numbering. Loading, saving and printing. Using PKS Write. Raster generator module. Price: £8 including postage from David Waller, The Sandon School, Molrams Lane, Great Baddow, Chelmsford, Essex CM2 7AQ. Cheques/POs should be made out to "The Sandon School". The guide for Calamus 1.09 is still available!

STTrack

Use up to four light beams with your ST. Invaluable for Science National Curriculum AT4. F.J. Wallace, 9 High Elms Road, Hullbridge, Essex SS5 6HB.

Graph, Euclid and Stack

GRAPH can draw simple functions, implicit functions, parametric and polar functions and display the gradient functions of any of these. EUCLID enables you to draw any geometrical configuration including conics, circles, perpendiculars, bisectors, etc. STACK is an arithmetic calculator (HP type) for use with very large whole numbers. Michael Girling, Camel Quarry House, Wadebridge, Cornwall PL27 7HZ.

Genealogy

Newgen, my genealogy program, runs on any ST(E) or TT and is easy to use. Large SAE for details or £17 for program. E G Richards, 2 Peckarmans Wood, London SE26 6RX.

Sonix Sound Sampling

We will sample your sounds from tape to disk. Write to: The Lodge, Delly End, Hailey, Witney, Oxon OX8 5XD.

Educational Adventures

For ages 5-13. 88% in ST Format. £12 each. 50p per disk for demo's. CVS, 18 Nelson Close, Teignmouth TQ13 9NH. Tel: (0626) 779695.

SciSet

SciSet scientific font sets for Calamus. Dr. Graham McMaster, Retsum Computing Solutions, 12 High Street, Turriff, Aberdeenshire AB53 7DS; 0888 62328.

Morse/RTTY Transceive

Atari STE - Morse and RTTY transceive. Write: V. McClure, 43 Roman Way, Seaton, Devon EX12 2NT.

Learning a Language?

ACADEMIC SOFTWARE supply several budget foreign language disks to help you in your studies. Call 01296 82524 any time for a brochure. Or write to 78 Narbeth Drive, Aylesbury, Bucks. HP20 1NU. For demo, just send 4 first class stamps or SAE + disk.

Lottery: Analysis & Selection

Statloty.Prg is an upgrade of the three programs that were released as P.D. with my recent article in STA. It incorporates further refinement of the analysis section and now takes data from a disk file which is much easier for the user to maintain. If you don't want the degree of involvement that the P.D. programs require but need a statistically sound selection method, then this is for you. £7.50
Dr Graham McMaster, 12 High Street, Turriff, Aberdeenshire AB53 7DS. Tel: 01888 562328 (55)

Scanner Manager

A specialised database system for all scanner owners. Stuart Coates. 9 Links Road, Kibworth Beauchamp, Leicester LE8 0LD.

Music Tutor Part 1

Teaches you to read music. A. Graves, 81A Cambridge Road, Girton, Cambridge CB3 0PN.

MultiCAD

Vector-driven CAD/DTP program for the ST/STE. J.H.Taylor at: 12 West Drive, Cleadon, Sunderland, Tyne & Wear SR6 7SJ.

Bare SCSI Hard Drive, Seagate ST 3235N 248mb giving 1342 k/s and average access time of 16ms. No bad sectors – £120. Also Conner CP2064 63mb 2.5" IDE drive for inside your driveless Falcon – £70. Tel Bryan 0117 924 5935 day or 0117 940 1702 eves. (55)

Use your guitar as a MIDI controller with this ROLAND CP40 analogue pitch to MIDI converter. Can use voice input via supplied microphone. Adjust output channel, threshold, octave shift etc., etc. – £50. Tel Bryan 0117 924 5935 day or 0117 940 1702 eves. (55)

Intelligent Music REALTIME sequencing (and much more!!) MIDI software. Features 256 tracks, Smart Edit, Fills, Probabilistic Loops, Velocity and Articulation Palettes, MIDI files in or out, run other programs all without stopping the music! Runs on any Atari in mono or colour – £90. Tel Bryan 0117 924 5935 day or 0117 940 1702 eves. (55)

Roland SC55 Sound Canvas General – Midi module. Hundreds of high quality sounds, ideal for recording/sequencing. Excellent condition, boxed with manual – £300. Tel: 0161–962–3269. (56)

Mega ST2, Megafile 30 Drive, SM124 Monitor + Stand, PC Speed fitted. Bits include: DMA to SCSI Adaptor, Scart Lead & Monitor, Switch Box, 5 1/4" drive, Spare Hard Drive, Many magazines & Reference Books. Software: Timeworks II, Hisoft Basic, Fonkit 3, Quick ST 3, etc with manuals, plus over 360 assorted disks – £300 the lot! Contact Keith, 01244 880091. (57)

phics/time planning). Boxed with disks, manual, keyboard templates – £15. Calamus 1.09n – £15. Tel Paul on (01772) 797125 (after 6.00pm) (55)

4MB STE, ICD Link + 270Mb HD. 2nd 3.5" drive, software and loads of games – £350 ono. for details. John Price, 2 Farrington House, Cardwell Road, Woolwich, London. SE18 5RB. (57)

Falcon 030 16Mb Ram. 127MB IDE HD, 540 Mb Datapulse HD, 21MB Floptical Drive + 10 Disks, Microvitec 0.28in Multisync Monitor. Lots of software – £1,300 ono. Write for details. John Price, 2 Farrington House, Cardwell Road, Woolwich, London SE18 5RB. (57)

SMS2 alternative operating system – £40, Multisync greyscale monitor (NEC) – £75, Hisoft Lattice C 5.5 – £20, GFA Basic Interpreter 3.5 + Compiler 3.0 – £20. Phone Will on (01628) 794780. (57)

Gasteiner GHD 270Mb Hard Disk Complete with Top Link Controller and software and manual. As new – £250 including carriage. Phone: Wolverhampton (01902) 676096 between 6.30pm and 9.30pm (not Tuesdays) and ask for Steve. (55)

Mastersound II Sound Sampler and software – £10, Supra DMA/SCI Hard Disk Adaptor Board + Supra Hard Disk Utilities Disk – £25, Synchro Express (STFM) Floppy disk copier Hardware with Software – £7.50. All prices include carriage. Phone Steve on Wolverhampton (01902) 676096 Between 6.30pm, and 9.30pm (not Tuesdays). (55)

Spectre GCR Mac Emulator x 2 with v3 software and handbook £100 or £80.
Didot Line Art £50
Falcon Memory Board unpopulated £40
Digita Cashbook Combo £28
Speedo GDOS v4 £20

0181 519 7709 or 0181 539 9729

Evesham Micros Ext 720K Drive – £35 plus p & p. Tel Chris: 01452 863137. (55)

4Mb STE (Tos 1.62/2.06) – £250, SM14 Mono Monitor – £60, ICD Link with cable and software – £40 – £290 for computer and monitor, £320 for all three. Phone James (01684) 569392. (60)

Reflex graphics card for Mega ST or Atari STE, with STE adaptor, NVDI and extra dot clocks – £100, E120 Multisync 6500 21 inch Monitor (suitable for above), absolutely immaculate, cost over £1400 new, accept £750. Atari TT 4MB FastRAM board – £75, Calligrapher Gold (Boxed) – £50. Phone Simon on 01222 869351 or email at spesgw @ cf.ac.uk (55)

DeskJet 500 printer in original box with manuals. Light home use only, so in pristine condition. Recent new cartridge. Prefer collect/deliver in the North West. – £125. Modern Atari System Software book – £8. Logistix (spreadsheet/database/business gra-

Geniscan Hand Scanner with Geniscan Interface + Software. Also Power Computing Interface with Software (16 Grey Scale) – £60 including carriage. Phone Steve on Wolverhampton (01902) 676096 Between 6.30pm and 9.30pm (not Tuesdays). (55)

Supercharger 1MB Emulator. Also Doubles as 1Mbyte Ram Disk with software and manuals – £70 including carriage. Also High Density Disk (1.44m) Adaptor with Software and Fitting instructions – £15. Phone Steve on Wolverhampton (01902) 676096 Between 6.30pm and 9.30pm (not Tuesdays). (55)

2.5 M/B STFM SM124 and Swivel Stand + Vroom and Microprose F1 Grand Prix + Kennedy Approach – £95. Phone David on 01604 586387. (56)

Jaguar (Atari) with Checkered Flag and Cybermorph cartridges – £100. Phone David on 01604 586387. (56)

Proxima DTP package (similar to Publishing Partner) – £20. Metacomco Lisp – £15, Master Sound 2 sampling cartridge and software – £10. Phone 01738 637165. (Chris). (56)

Protar ProGate T60 Tape backup unit for ST/TT Computer, includes 4 tapes + software – £100 ono. Phone Herb on (01437) 741387. (57)

Offers please for Whole system or Individual items. STE–4Meg –PC Keyboard, 170 Meg Hard Drive, 2nd Disk Drive, Phillips CM8833–II, Speedo GDos & Fonts, Multitos, Geneva, Neodesk 4, Atari Works, Hi–Soft Basic 2 + More – 0121 745 5664. (55)

4 Meg STE, SM 125 Monitor, 20 Meg Hard Drive, Extra 3 1/2" Floppy Drive, F.M. Clock II, Script W.P, CAO 3D2 + Design Disks – All Boxed + Manuals – £250. Brighton 01273 – 697080. (56)

Falcon 030: 85MB External Hard Drive, NVDI & Screen Blaster, VGA Monitor, 'Tabby' Graphics Tablet, Plus £100's Free Software – Personal call recommended! – £650 – David, 0121 777 1802 anytime. (55)

1MB Atari STFM Tos V1.02 C/W Int. DS Floppy + Ext D/S Floppy and Clock Cartridge + Software – KGraph 3, Prodata, Neodesk 3, Mouse Tricks 2, Quantum Paint 2, Mini Office Professional Spreadsheet, Lemmings 2 The Tribes, Proflight + Flight Sim.2 all with original manuals + PD Software – £200 the lot. Call after 7.30pm any weekday – 01733 311858 (Peterborough). (55)

Falcon 030, Tos 4.04, 16 Meg RAM 120 Meg HD, Power Up 2 (32 Mbz), MC 68882 Co–Pro, Blow–Up Hard 1, Falcon Wing, Immaculate condition, all boxed, still under warranty – £750. – 01457 854157 (after 7.30). (56)

Wanted

AtariWorks, quality midifiles, Magic, At Ease, Kobold, NVDI3, That's Write v3, Convector. Robin 01522 752458. (55)

Community Resource Centre needs hardware and software for ST or PC. We are a registered charity desperately trying to provide a wide variety of computer resources. If you can help please phone The Ground Floor Project on 01422 844991. Thanks. (58)

HP 256K Ram Cartridge to fit a HP Deskjet 550c Printer (HP Part No 22707B). Phone Paul Work–071–219–4768. Home 081–542–8350. ((59)

Vortex ATOnce 386sx emulator for Mega STE. Phone Paul with price during working hours on 071 219 4768. (56)

Manuals for the following games: A320 airbus, F15 II, Battleship. Phone Paul during work hours on 071 219 4768. (56)

Hard Disk, at least 60Mb. NVD13. Calamus 1.09 – Phone 01738 637165. (Chris). (56)

Microtext Developers' Pack. Microtext Adaptor. PC Speed for STE. Phone Bob 0151–645 6457. (55)

Cubase Version 3 to run on a Falcon. Tel Bryan 0117 924 5935 day or 0117 940 1702 eves. (55)

Software: Labcenter "Cadpak" and "Isis Illustrator". Complete Distribution pack with Manuals. Tel 0745 825 036 Anytime. Ask for Paul. (57)

Has anyone got a Schematic Ciricuit Diagram for the Atari SM124 or SM125 Mono Monitors? If you can help, please send to Paul, 105 Pike Road, Efford, Plymouth, Devon. PL3 6HG. Tel: 01752 255835. (57)

BBS

The Confederation BBS – Support bbs for all "HITCHHIKER" software releases and GFA programmers. All the latest PD/Shareware from Europe and USA as well as Netmail message areas. On line each evening 10.00pm to 7.00a.m., at all speeds up to 2400. Give us a call today and you will not be disappointed as we are the most friendly BBS in the country – dedicated ST BBS only. 0533 413443.

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General

Calamus CDKs printed at 6000dpi: From CRCs to medium print runs. Also A4 scanning 1/8/24 bit, laminating, binding. Extensive clip art and font libraries in various formats:– PolyPress,. 33 Ingleton Drive, Lancaster LA1 4RA. Tel: (01524) 381581. (55)

Falcon FacTT File

The Falcon and TT User Group

The Falcon FacTT File is a free-to-join Membership Club set up to encourage users to help users. Application forms can be obtained by sending a stamped self-addressed envelope (or International Reply Coupons if outside the UK) to:
FFF, 11 Pound Meadow, Whitchurch, Hants. RG28 7LG. UK
When completed, return the form with a High Density disk and return postage. Your details will be added to the FFF at the next monthly update and your disk returned with a selection of the best Falcon PD and Shareware to fill the disk.

May the FFForce be with you!

The Atari A–Z dictionary – 128,000 words, 304 A5 pages, 101 tables, 5 appendices of material for ALL Atari users. Written by journalist Mark S Baines, this is an encyclopaedia of all that perplexing computing and Atari terminology. An invaluable reference source. More details or £12.50 (UK cheque, postal order made out to 'Mark S Baines' or cash) from Linnhe, Shore Street, Inver, by Tain, Ross–shire IV20 1SF or msbaines@cix.com–pulink.co.uk.

Membership of the Cheshunt Com–puter Club is the essential accessory for your Atari. If you live within reach of Herts then give me, Derryck Croker, a ring on 0923 673719 with your name and address and I will send you details. (R)

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Contacts

ST users wanted in Sheffield area who might want to meet up for a chat every now and then. Give Mike Kerslake a call on 0114 261 8940 at any reasonable time. (55)

Atari ST contacts wanted in Coventry – Warwicks. area. DTP/printing interests. Call Steve on 0203 386656.

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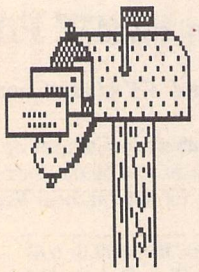

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Gemulator 4.0 runs your Atari ST, STE, Mega ST, and Mega STE software on the Windows desktop, side-by-side, with MS-DOS and Windows programs. Use your existing Atari software on your PC with all your PC's peripherals: modems, printers, sound cards, MIDI cards, mouse, Super VGA monitors, and CD-ROMs. Features include:

* Atari ST, STE, Mega ST, and Mega STE emulation and support for all ST and STE TOS versions (1.00, 1.02, 1.04, 1.06, 1.62, 2.05, and 2.06).

* Emulation of memory sizes from 512K up to 14 megabytes. Your PC requires at least 8 megabytes of actual memory and 16 megabytes of virtual memory available from Windows.

* CD-ROM support. Access your Atari and PC CD-ROMs with your Atari software. No additional Atari CD-ROM drivers are required.

* Unlimited hard disk access. Gemulator 4.0 can access any file on any disk partition on your PC, including partitions larger than 32 megabytes and partitions compressed with Stacker, DoubleSpace, and DriveSpace. You can put your AUTO folder directly on your PC's C: drive or easily share documents between your Atari and Windows programs.

* Unlimited screen size. The GEM desktop can be as large as your Windows desktop. Take advantage of not only 640x480 and 800x600 Super VGA resolutions, but also of 1024x768, 1152x864, 1280x1024, and 1600x1200 resolutions, both in monochrome and colour. It is only limited by the maximum screen resolution that your PC is capable of in Windows.

* Multiple modem and printer support. Atari programs can access any printer or modem that Windows supports, and you can switch between them on the fly. Modem baud rates beyond 19200 baud are also support, including 28800, 38400, 57600, and 115200 baud.

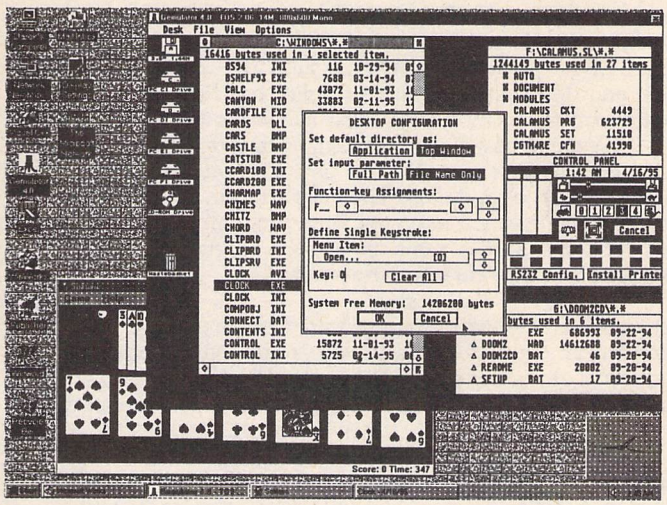
* Stereo sound and MIDI. If your PC is equipped with a stereo sound card and/or MIDI card that is supported by Windows, you can now access it from Gemulator 4.0 and use it with your Atari ST and STE music software.

* Blitter chip emulation. Atari programs that make use of the blitter chip now run on Gemulator 4.0. You still have the option of turning the blitter off, just like on a real Mega STE, as well as using the built-in "Quick ST" emulation. NVDI and Warp 9 are also fully supported.

* Joystick support. Use your PC's joysticks to emulate Atari ST joysticks. Requires a game card and at least one joystick on your PC.

* Easy installation and configuration. Just click on the Gemulator 4.0 icon to run it. Use pop-up menus to configure Gemulator 4.0. Then click on "Save Settings" and you're done! We've eliminated the need to edit the GEMUL8R.INI file, or the CONFIG.SYS file, or the AUTOEXEC.BAT file. Simply click on the options menu any time you wish to change a setting in Gemulator 4.0.

Gemulator 4.0 runs almost 100% of ST and STE software at full Atari ST speed or faster. Only copy-protected and timing dependent Atari programs are not supported.



As this Windows 95 screen shows, you can run your Atari ST and Mega ST/STE programs side-by-side with your MS-DOS and Windows programs. Why wait for Windows versions of your favourite Atari programs when Gemulator 4.0 runs them now! Gemulator users have been running PageStream, Calamus SL, and all their other favourit0e Atari ST programs on their PCs since 1992.

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Gemulator 4.0 is being released worldwide on June 30, 1995.

Gemulator 4: £119.95
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Gemulator 4.0

The Atari ST/STE Emulator For Windows

Gemulator version 4.0 has been written and optimized for Windows 95, the new 32-bit version of Windows coming out this Summer to replace MS-DOS 6.22 and Windows 3.11. This new version of Windows has allowed us to write Atari an emulator that takes full advantage of your PC hardware: higher screen resolutions, better sound, true multitasking with other Atari and PC programs, faster video, and ease of use. When we first released Gemulator back in 1992, the average PC contained MS-DOS, a 386 processor, and 4 megabytes of RAM at best. We had to design the original Gemulator to run on that limited hardware. Today, with Pentium computers selling for the same price as the 386 computer of 3 years ago, but running 10 times faster and with 2 to 4 times the memory and graphics resolution, we are able to introduce a new generation emulator for Windows 95.

Gemulator 4 turns your PC into an Atari clone that's on par with any high end Mega STE or Atari TT030 computer - for a fraction of the price. Gemulator 4.0 supports CD-ROM, Super VGA and Moniterm graphics resolutions, MIDI ports, 14 megabytes of ST memory, joysticks, multiple modem and printer ports, easy menu based configuration, reading and writing Atari files to any hard disk partition on your PC (DoubleSpace and Stacker drives too), and more. Grab clip art from your PC's CD-ROM drive and paste it into your Atari programs. Run multiple Atari desktops at the same time, each running a different program and in different screen resolutions!

You hate File Manager? Use the Atari desktop to copy, delete, and even run your DOS and Windows programs directly. Say goodbye to struggling with File Manager! Here is a sample of what the Gemulator 4.0 Atari Mega ST/STE emulator can do for you...

Planning to upgrade your existing Atari ST, Mega ST/STE, Falcon, or TT030? In a word - DON'T! If you consider the cost of a TOS 2.06 upgrade, Moniterm monitor, 8 meg of ST RAM, CD-ROM drive, hard disk upgrade, and 1.44M floppy, you've already spent more money than the cost of a new Pentium computer with Gemulator 4.0 - and you still can't run Windows software!

Gemulator 4.0 is a card that plugs into your PC (using an 8-or 16-bit ISA slot). It runs on any 468 or Pentium with at least 8 megabytes of RAM running either Windows 3.1 or Windows 95. A 486/66 computer emulates at about Mega STE speed, while a 90 Mhz Pentium emulates the full speed of a 32 Mhz TT030.

Requirements for Gemulator 4.0

Gemulator 4.0 is a combination of hardware and software.

The hardware is an 8-bit card that contains the Atari ST or STE TOS ROMs. The card plugs into any ISA slot in your PC. All desktop PCs have ISA slots and can use the card. Some notebook and laptop computers use PCMCIA slots instead and will require "Gemulator For Laptops" which will be released later this year.

The Gemulator 4.0 software is a 32-bit Mega STE emulator that runs from your Windows desktop. It requires at least 8 megabytes of memory, 16 megabytes of virtual memory, and a 486 or Pentium processor running at 33 Mhz or faster.

The emulator uses 32-bit Windows features and is designed to run best on the new Microsoft Windows 94. It also runs fine on Microsoft Windows 3.1, Windows For Workgroups 3.11, and IBM OS/2 Warp, but not all features will run as fast or as well. We recommend using the Windows 95 to take advantage of its faster screen, printer, and modem drivers.

A 33 Mhz 486 emulates the full speed of an Atari ST or STE. A 66 Mhz 486 emulates the full speed of a Mega STE. A 60 Mhz Pentium emulates the full speed of a Falcon, and a 90 Mhz Pentium the full speed of a TT.

TOS ROMs

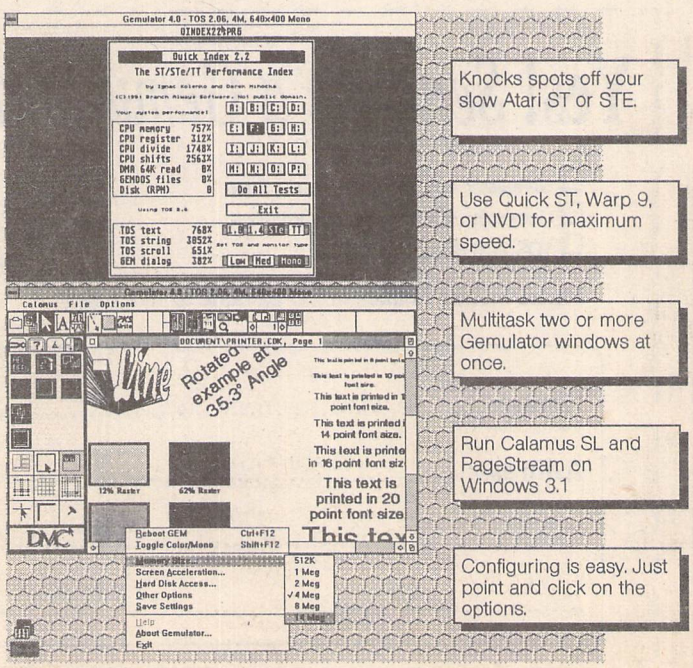
The Gemulator card works with any version of Atari ST or STE TOS ROMs, such as TOS 1.0, 1.02, 1.04, 1.06, 1.62, 2.05 and 2.06 and so guarantees maximum compatibility with your Atari software. Up to four 2-chip sets of TOS ROMs may be plugged in to one Gemulator card, or a combination of one 2-chip and one 6-chip set of ROMS. We highly recommend that you use TOS 2.06 with Gemulator 4.

Order Form overleaf

With Gemulator 4.0 and Windows 95 you can run MS-DOS, GEM, TOS, and Windows programs together, at the same time, on the same desktop.

Does your ST, STE, Falcon, or TT Support all of these features?

True Multitasking
14 Meg of Ram
Large Hard Disk
Compressed Disk
CD-ROM
Stereo Sound
1.44 Meg Floppy
Super VGA Mode
Moniterm Mode
Multiple Printers
Multiple Modems
Fast Baud Rates
Joystick
Blitter
TOS 1.4
TOS 1.62
TOS 2.06



Knocks spots off your slow Atari ST or STE.

Use Quick ST, Warp 9, or NVDI for maximum speed.

Multitask two or more Gemulator windows at once.

Run Calamus SL and PageStream on Windows 3.1

Configuring is easy. Just point and click on the options.

Gemulator 4.0 also runs on Windows 3.1 and OS/2 Warp. The screen shows Windows 3.1 running on a Pentium/90 with Gemulator 4.0 in two windows - one running Calamus SL, the other running the Quick Index benchmark utility.

Feedback

What users are saying about Gemulator...

"... frankly, this product is the only reason for me to remain involved in using the Atari line".
Jeffries R. Ayers

"This is one terrific package... Once I set things up right, Gemulator worked like a champ."
Neron N. Nesmith Jr.

"It took no more than 10 minutes for me to install the board on my first try. Given that I had never opened the case on my IBM compatible before attempting this installation, the ease of use you've designed into your product is commendable" Richard Hunter.

Support

From the day you buy your Gemulator you are entitled to use our comprehensive support service. Technical enquiries may be dealt with by telephone, Email, or post.