The Best of PD Software

Aleph One PC Board in Detail

Grey-scale Image Enhancer

Cartesian Function Plotter

Primary band/ 438542/TMG
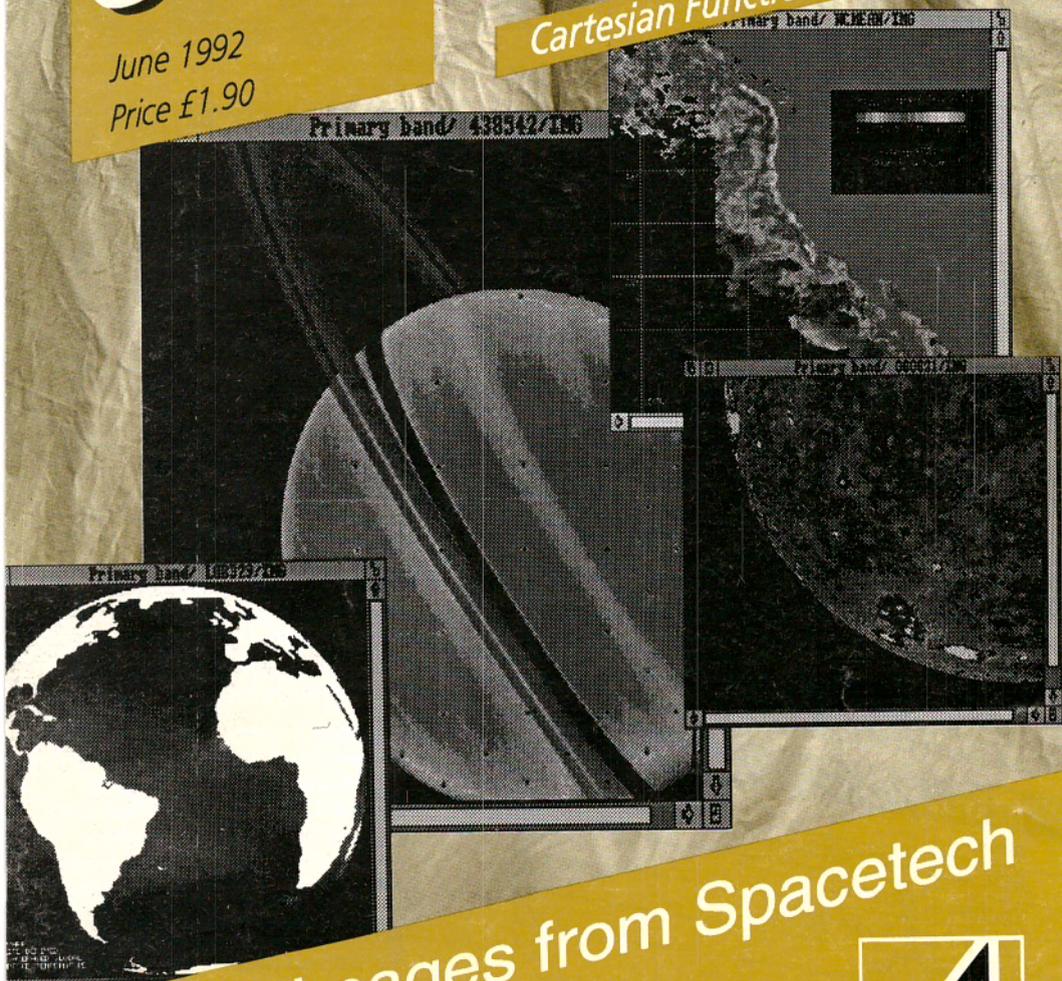
Satellite Images from Spacetech

The magazine and
support group
exclusively for users
of the Archimedes

ISSUE

7

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RISC USER

THE ARCHIMEDES MAGAZINE AND SUPPORT GROUP

All About Credibility

Much has been made recently in the computer press (by that catering for the Acorn market at least) and on television of the fact that 1992 marks the tenth anniversary of the the advent of the BBC micro. In all the hype that has appeared, one small but significant fact seems to have been overlooked, and that is the fact that Acorn's Archimedes range of 32 bit machines is itself five years old this year, having been launched in June 1987. Thus half of the last ten years have also covered the appearance and evolution of a computer system which must be hailed as a major achievement for a British company of the size of Acorn.

When the Archimedes first appeared, it was claimed to be the world's fastest micro, and the first affordable computer embodying RISC technology. It uses its own proprietary operating system, RISC OS, widely acknowledged to be superior even to the Apple Macintosh's legendary desktop. There is now a wealth of software from a variety of sources, the best of which can compete with major applications from the PC and Macintosh worlds (Computer Concepts' Impression II was recently voted "Best non-PC Business Package" in the Computer Shopper Show Awards). Innovative hardware in the fields of scanning, digitising and image processing is generally second to none in a field where the Archimedes offers considerable potential in comparison with other machines. And not least, the Archimedes range (particularly the A3000) outsells all other makes of computer in our country's schools by a ratio of 5 to 1.

Yet how many of you reading this, and presumably owning an Archimedes, might well admit in casual conversation about personal computers, "Well, actually I use an Acorn Archimedes", and then prepare to defend that choice. Despite its many excellent qualities, the Archimedes range still seems to lack what I would call credibility, particularly in commercial and professional areas. Its very success in British education sometimes seems like an millstone, dragging the reputation of the system down to the levels of not being a "real" machine.

One argument often put forward is lack of compatibility with PCs (MS-DOS), but that hasn't stopped the Macintosh achieving a high level of success. And like the Archimedes, Macintoshes are made by a single source - unlike the many clones available in the PC marketplace.

It is true that there is more choice in software for other systems - you have only to look at the pages of PC and Macintosh magazines to see this for yourself, and much of that originates from the States, probably the largest market for computers and software in the world.

However, the Archimedes is very good at quite a number of things. Desktop publishing is one, and the joint development of a professional quality DTP platform by Acorn and Computer Concepts is a strategic step which is long overdue. More such ventures would surely help, and I cannot but feel that given the currently limited and somewhat parochial nature of the Acorn market, Acorn itself needs to take a more positive role with software houses and hardware developers, and actively to promote more joint ventures in order to gain greater market acceptance.

I can offer no simple or easy panacea; however, it is in all our interests to do what we can individually to extol the virtues of the Archimedes system (where this is warranted), and to encourage other potential users to be more open minded. I hope that I can look forward to the day when we can all say with pride, "I use an Archimedes" and bask in the envy of lesser mortals who still have to put up with the likes of the PC.
M.W.

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LONGMAN LOGOTRON PINPOINTS A LANDMARK

Longman Logotron has been busy lately with a new version of PinPoint and four new packs in the Landmarks series. PinPoint has been upgraded to version 1.16, and has a number of new features including grid options for page editors; visible print borders; a show rulers option; the ability to print the current sheet during data input; a selection menu on page editors; editing of text style of selected non-frame objects; a configure option for the pen and question tool; horizontal bar and line charts; and the ability to swap axes in bar and line charts dynamically. All registered users should have received an upgrade disc with instructions by the end of April.

Four new Landmark packs have been released by Longman Logotron and BBC Enterprises to join the four titles available at the moment *(The Victorians, Second World War, Egypt* and *Rainforest)*. Available in July 1992 are *Columbus* (in which you join Columbus on his historic voyage) and *The Aztecs* (in which you experience life in the fabled city of Tenochtitlan, capital city of Montezuma's Aztec empire). Then in September 1992, *Elizabeth I* (visit a large country house in Tudor England) and *The Civil War* (battle between the Roundheads and the Cavaliers in the Stuart period) should be available. The packs are developed from the most popular television programmes in the BBC's Landmarks series, and *Columbus* and *The Aztecs* complement the Landmarks Explorers unit to be broadcast in Autumn 1992. Each pack costs £28.20 inc. VAT.

Longman Logotron can be found at 124 Cambridge Science Park, Milton Road, Cambridge CB4 4ZS, tel. (0223) 425558, fax (0223) 425349.

SILICON VERSIONS

Silicon Vision has announced a new version of its RiscBASIC compiler, Release 3, which offers increased execution speed performance, robustness and ease of use over the previous version 2.06. The compiler includes a Desktop Developer's Environment (DDE) system for editing Basic programs in an Edit window, from which programs can be compiled simply by dragging the file to the RiscBASIC icon. Errors are then highlighted in the Edit window, making program development much easier. The Twin and Basic editors are also directly supported by the DDE, and the user can swap between using the DDE, using icons to drive the compilation and using the command line without the need to reconfigure the compiler.

Silicon Vision has also updated its entry level electronic PCB design package ARC-

COMPUTER CONCEPTS GOES WILD

Computer Concepts has announced the acquisition of a majority stake in Wild Vision, the hardware developer which specialises in video and multimedia cards. Wild Vision has been manufacturing Computer Concepts' expansion cards for a while, and the decision to cement their business relationship could yield some interesting products. It is intended that Wild Vision should retain its identity in its daily business, with Computer Concepts taking only a background role and lending support as and when required.

The takeover will result in the two companies joining forces on selected ventures, with Wild Vision concentrating on the hardware and Computer Concepts on the software. Peter Wild, Wild Vision's managing director, indicated a likely market strategy: "We are now poised to forge ahead in multimedia applications... I believe that this turn of events will prove to be catalytic in giving Wild Vision's Desktop video products a considerable step-up in the multimedia arena as a whole."

According to Wild Vision, the Computer Concepts merger will bring financial security and will lend a market presence which would otherwise have been beyond their reach. Hopefully this will mean that its Eagle Desktop video board, which was on show at the BBC Acorn User Show last year, will get over its design problems and see daylight soon. Wild Vision is also working on a full technical support facility to complement its growing range of products.

ACORN'S REPLAY MULTIMEDIA VIDEO SYSTEM

Acorn has developed an exciting full motion video system called *Replay*. This is a piece of software that enables compressed pictures, stored on mass media such as CD-ROM, to be shown in a Desktop window at a rate of 12.5 frames per second (from a CD-ROM - hard disc storage would increase the speed, but would decrease the storage space). This is no mean feat, as the amount of information needed to display a sequence of pictures is considerable.

Replay takes a normal sequence of uncompressed pictures and reduces their storage size by removing very detailed data from the image which the eye can't detect. It then reduces the size further by employing Delta compression, which concentrates on the moving parts of an image and enables static parts to be stored in very little memory. Finally the compressed images are put on hard disc or CD-ROM, enabling about 12 seconds of pictures at 12.5 frames per second to be stored on one 800K Archimedes disc. The data can also include multiple channel stereo sound to go with the pictures.

Although Replay requires expensive extra equipment to create the sequences, it opens up new possibilities for multimedia systems. Magpie and Genesis (two popular multimedia packages) both contain support for Replay sequences, so moving pictures can now be a part of multimedia

releases (for example, the *Dictionary of the living world* CD-ROM mentioned in April's news).

DT SOFTWARE SEES THE LIGHT

DT Software has announced two new products for the Archimedes. The first is a 21Mb floppy disc drive (yes, twenty-one megabytes!), which uses optical tracking technology to store huge amounts of data on special 3.5" discs. The so-called *Floptical* drive uses discs that have concentric rings etched on them which the head can follow, allowing data to be saved at over 1000 tracks per inch (compared to conventional 3.5" discs which have 135 tracks per inch). The drive can also read and write to PC format 720K and 1.44Mb floppies, but the drive requires a firmware change to access Acorn format discs - apparently the manufacturer is aware of this and will implement it if there is sufficient demand from the Acorn marketplace for the alteration to be worthwhile. The drive costs £449.95 inc. VAT, and the special discs, each of which can store 21Mb, cost £24.95 inc. VAT.

The other new product from DT Software also has an optical connection - it is a hand-held portable electronic still camera which can take and store up to 32 pictures in its on-board battery-backed RAM, for subsequent downloading to a computer. Image resolution is 376x288 in 8 bits per pixel monochrome, and the software supplied allows manipulation of the image brightness, contrast and "tone" (gamma correction), as well as basic image processing functions including sharpening and smoothing. The output from the *Fotoman* camera is claimed to be of a much higher quality than comparable colour digitisers because the camera takes pictures digitally, avoiding the need to convert the conventional analogue signal. The Fotoman for the Archimedes costs £553.15 plus VAT. DT Software is on (0223) 841099.

IRLAM ANNOUNCES ITS FAX/MODEM CARD

Irlam is planning to release its *Fax-Im* card around June of this year, at a cost of £289 plus VAT. The card not only performs fax reception and transmission (like the Computer Concepts' FaxPack), but can also be used as a modem. The list of features is impressive - the card has full group 3 fax compatability with document transmission up to 9600 bits/sec; it can auto-answer after a programmable number of rings; it will transmit sprites as a fine fax (approx. 200x200 dpi) if the sprite's resolution demands it; support is provided for fast DTMF or Pulsed dialling; sprites can be compressed using MH coding (as in the group 3 specification), allowing typical compression ratios of around 10 to 1; a modified printer driver supplied with the fax allows RISC OS applications to produce monochrome sprites for transmission; the modem supports V22, V22bis, V23, MNP 2,3,4,5 compression/error control, and V42bis compression (like MNP 6); the fax operates in the background during reception and transmission.

Irlam has also improved its *Moving i-Mage* Desktop video system. The driver module has been enhanced to reduce loading and saving times of images, and images can now be panned off screen. A new demonstration application supports zooming and can remove motion artefacts, and

PCB. Release 1.7 provides faster and improved automatic routing, oval and circular pads with fully variable sizes, faster redraw, extended library part manipulation and instant editing operations. The full range of RISC OS printer drivers are also supported via a Draw file export facility, which also enables further editing in Draw and the inclusion of a design in a DTP package.

The cost for RiscBASIC 3 is £149.95, and ARC-PCB 1.7 costs £195.00. To upgrade your present software, simply return your original disc(s) to Silicon Vision with the correct payment. Upgrading to RiscBASIC 3 costs £30 from version 2.06 with the DDE, or £55 from version 2.06 without the DDE and earlier versions. The upgrade price for ARC-PCB is £55. All prices include VAT and post and packing, and Silicon Vision is at Signal House, Lyon Road, Harrow, Middlesex HA1 2AG, tel. 081-861 2173, fax 081-427 5169.

L'ART SMART

4Mation has gone international and released French and German versions of their Faces, Homes and Leisure smArt packs; Spanish and Welsh versions are under preparation. There is also a Modern Languages pack which features French, German, Dutch, Portuguese, Spanish, Turkish, Italian, Greek and Hebrew, and comes on two discs, one about meals, and another about items you might find on a shelf.

The complete range of smArt packs comprises Fashion, Heraldry, Homes, Leisure, Trees & Gardens, Dinosaurs, Faces, Smartoons, Aliens and Look Smart. Each of these packs and the French and German versions cost £16 plus VAT, and the Modern Languages pack costs £20 plus VAT. The smArt package which is needed to use these packs costs £64.65 inc. VAT.

On a more serious note, 4Mation has recently employed FAST (Federation Against Software Theft) to act on its behalf against a bulletin board, after it discovered that the board had 35 4Mation Draw files in its downloadable software. On this occasion it was decided to take no action

scaling factors and acquisition addresses can now be defined by the user. Moving i-Mage costs £989 plus VAT. Irlam is at 133 London Road, Staines, Middlesex TW18 4HN, tel. (0895) 811401.

CHEAP DIGITISING FROM HCCS

HCCS Associates has announced its extremely low cost black and white *Vision Digitiser*, which should be available as this goes to print. The board takes a signal from a standard video source (like a VCR or a CamCorder) and produces a black and white sprite in a Desktop window. The image takes approximately 5 seconds to materialise, but the capture time is "real-time" (i.e. within one video frame). The image size is 640x256 pixels with 128 effective grey scales using so-called ETT (Error Transfer Technique).

The software includes on screen brightness and contrast controls, and there is a fast preview mode to enable speedy setting up and focusing. The digitiser costs just £49 plus VAT for an A3000 internal podule or an Archimedes half width podule, or £62 plus VAT for the A3000 external board. A colour upgrade will be available in June at approximately £30, with a discount to existing owners.

HCCS is at 575-583 Durham Road, Gateshead NE9 5JJ, tel. 091-487 0760, fax 091-491 0431.

FOURTH DIMENSION CHECKS IT OUT

The Fourth Dimension have announced a new game that they plan to release in early June 1992. It's called *Cyber Chess*, and is claimed to be "the definitive Chess playing program". As with Micro Power's *Chess3D*, the board is displayed in a Desktop window, and can be viewed in 3 dimensions or directly from above. Cyber Chess is fully RISC OS compliant -

you can even have multiple windows, each containing a different game.
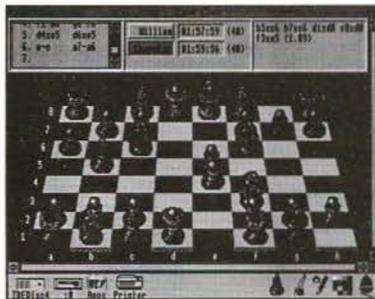
All the rules of Chess are implemented, including en passant, underpromotions, the 50/75 move rule and draw by agreement and repetiton. The package includes a tutorial, and with 100 beginners' levels, you can graduate from a very easy game up to "full strength mode". The computer can also give you hints on the best move to make, enabling the unscrupulous to improve their game statistics.

The game can also be installed on a hard disc, which will be a feature of all future Fourth Dimension games. Cyber Chess will cost £49.95 inc. VAT. For further information contact Steve Botterill at The Fourth Dimension, 1 Percy Street, Sheffield S3 8AU, tel. (0742) 700661.

after the SysOp agreed to remove the copyright material.

4Mation can be discovered at 14 Castle Park Road, Barnstaple, Devon EX32 8PA, tel. (0271) 25353, fax (0271) 22974.

LAPPING IT UP

It seems that the eagerly awaited and rumour-bound Archimedes portable will appear in public sometime in the next few months. You can be sure we'll bring you bang up to date with any developments on this front at the earliest opportunity.

RISC OS 3

The new operating system, RISC OS 3, will be available for RISC OS 2 machines "sometime in the summer" according to Acorn, and a RISC OS 3 Programmer's Reference Manual is being produced which will stretch to 6 volumes. All A5000s will continue to be supplied with version 3.00, despite a number of bugs in the operating system.

ARCHIMEDES CONVERSES WITH PSION

!CL is a multi-tasking application that allows the Archimedes to be connected to a Psion series 2, and hopefully at a later date the package will be updated to include communication with the other Psion personal organisers. Using the Psion's protocol enables a host of features to be used including error detection and correction, and being able to open a file on the Archimedes and read, write and transfer it. !CL costs £25 and entitles the customer to free upgrades as well as discounts on any further products. For more information, connect up to Godders Ware, 13 Prestbury Close, Blackpole Village, Worcester WR4 9XG.

CLASSY SOFTWARE

Class 3 at St George's RC Primary School in Newcastle-upon-Tyne have been studying various topics in lessons, and have put everything they have learned onto disc. Now the class has formed their own software company called *No Frontiers Software*, and the first releases are *Hyper-Viking* and *Halloween*, with another title *Hyper-Europe* which should have been released by the time you read this. The packages are in the form of multimedia "books", and use sound and graphics to make the information appeal to children. The discs are only £2.50 each inclusive, and cheques should be made payable to St George's School and sent to No Frontiers Software, St George's Primary School, Bell's Close, Newcastle-upon-Tyne NE15 6XX, tel. 091-267 5677.

Aleph One's 386 PC Card —

Reviewed by Andrew Benham

When Acorn launched the Archimedes in 1987, one of the intended upgrades was an 80186 co-processor card. Unfortunately this product never reached the marketplace, and so for users wishing to use a DOS environment with the Archimedes the only route available has been Acorn's software PC Emulator. Until now....

Five years on, Aleph One has produced an upgrade similar in concept, although with a more powerful processor. This upgrade has caused considerable discussion and interest, mainly concerned with speed, compatibility, and comparisons with Acorn's PC Emulator. I was therefore pleased to be offered the chance to put the product through its paces.

The product supplied for review was supplied with pre-production software. The Aleph One upgrade requires that the Acorn PC Emulator is present on the Archimedes, and it appears that Aleph One are working together with Acorn to finalise the production software. The software offers both single tasking and multi-tasking (even on a 1 Mb machine) options.

The 386PC upgrade comprises a single half-width podule card, accompaning software on a single 3.5" disc, and (for the review version) an 8 page A5 User Guide.

The podule card comprises an 80386SX processor running at 20MHz, 8 socketed RAM ICs (providing 1 Mb of RAM on the review product, although these ICs can be replaced to provide 4 Mb of RAM), a parallel port, a serial port, a socket for an 80387SX numeric co-processor, a "single chip PC motherboard", and sundry support hardware. The software supplied might be pre-production, but the podule itself seemed to be of production build quality, with none of the all too common cuts and straps that

often accompany pre-production boards (and some production boards too!).

The accompaning software includes version 0.1 of the ARCMouse Archimedes mouse driver ("AMOUSE.COM"). The review software did not support Acorn's GETFILE and PUTFILE utilities (Aleph One are working on this), and so one of the well known Desktop PC transfer programs would had to be used to install the mouse driver.

For review purposes, I installed the 386PC in an early Archimedes 310 (ARM2 not ARM3). This has an 8 Mb DOS partition on a 20 Megabyte ST506 Hard Disc, and is equipped with version 1.60 of Acorn's PC Emulator running version 5.0 of MS-DOS. Using the PC Emulator, the total conventional memory available is 568K (with the configuration used).

Installation of the 386PC is simple: the podule has to be inserted into a free backplane slot, and the software copied to the hard disc. The application's "Config" file needs to have the pathname of the hard disc partition entered, and then the 386PC can be started by the normal RISC OS method.

IN USE

From comments received, it is the twin issues of speed and PC compatibility that interest potential purchasers most. I'll deal with them in that order. References to 'PC Emulator' are to Acorn's software emulation; references to 386PC are to Aleph One's hardware.

SPEED

In order to test the speed of the 386PC, I endeavoured to run the same tests on a range of machines. I was not keen on using benchmarks for the review, if only for the

fact that these would be dependent to some degree on how well the PC Emulator managed to emulate the PC's internal hardware timers. Nevertheless I include the results of the benchmarks run, but would advise readers to treat the results for the PC Emulator with caution.

Firstly, Central Point Software's well known PC utility "PC Tools" offers a speed rating for the processing power of machines, giving a percentage based on the speed of the original 4.77MHz 8086 based PC. The results are:

Archimedes:	
Aleph One 20MHz 386PC	850%
Acorn Emulator 1.60	65%
Real PCs:	
8MHz 286 PC AT	375%
20MHz 386SX PC	1140%
33MHz 386DX PC	1150%

The result for the Aleph One 386PC is slightly (1.3 times) lower than that of a real 20MHz 386SX machine. The figure for the Acorn Emulator looks suspiciously low.

I also ran the well-known "Dhrystone" Benchmark (compiled from C source code using Borland's "Turbo C") on a range of machines. The results for this benchmark are:

Archimedes:	
Aleph One 20MHz 386PC	3714 Dhrystones/second
Acorn Emulator 1.60	229 Dhrystones/second
Real PCs:	
8MHz 286 PC AT	1700 Dhrystones/second
20MHz 386SX PC	5688 Dhrystones/second
33MHz 386DX PC	9750 Dhrystones/second

The results of these two tests seem to indicate that the 386PC is executing some 12 - 16 times faster than the emulator, but somewhat (1.3 - 1.5 times) slower than the speed of a real 20MHz 386SX. The tests are concerned solely with the processing power of the machine, do not involve disc accesses whilst running, and should not be affected by screen output.

The speed of the PC Emulator did not appear to be affected by the presence of the 386PC podule in the machine.

Both of these tests give very poor results for the PC Emulator. Once again, I must stress that the tests are dependent on the PC's internal hardware timers, and thus the emulation of them in the PC Emulator. On the principle that the best test is to use the machine, I tried some PC applications.

Many of the applications I tried worked under the PC Emulator, but would take an age (tens of seconds) to start execution after all the disc access had stopped. In contrast, Aleph One's 386PC was very much faster, and whilst some very processor intensive applications made the 386PC work quite seriously, it was most definitely in a completely different league to the PC Emulator.

I can't imagine anyone wanting to use the 386PC to play games, but I tried a couple of PC games on the 386PC and the PC Emulator (on the grounds that games programs often are quite taxing on the machine's capabilities). The difference was as marked as the previous comments would indicate. As one example, the cult game "Lemmings" was all but impossible on the PC Emulator, but ran perfectly normally on the 386PC.

One very interesting test would have been the compilation of a large DOS application I have (in fact the source code for an Amateur Radio TCP/IP Networking suite), written using over 100 C source code files, the whole application (source, object, and executable files) occupying some 4 Mb of disc space. I have never before dared to compile this under the PC Emulator: a 33MHz 486 based PC takes about 15 minutes to compile the program, and an 8MHz 286 based PC takes 1 hour 20 minutes to do the same job. Using the 386PC to compile the application took 1 hour 20 minutes as well. My 8MHz 286 PC has a similar 20 Mb ST-506 hard disc to that in the Archimedes so this probably indicates that the compilation time for both these machines is limited by the disc performance.

In some trepidation I tried the same task on the PC Emulator - after 30 minutes nothing seemed to have happened so I aborted the exercise. The MAKE process had started but no files had been processed (nor had any error messages appeared), so I put this down to another of those annoying compatibility problems.

COMPATIBILITY

The other bugbear of the PC Emulator is compatibility. With the 386PC, the compatibility problems that beset the PC Emulator are greatly reduced, although not entirely eliminated. The compatibility problems with the PC Emulator can be broken down into several categories, and one of these categories remains.

1. The "Internal Stack Failure, System Halted" problem. This is usually the result of the emulator simply not running fast enough to service a device (e.g. the serial port). I have not seen this problem with the 386PC.

2. The "Invalid Opcode Error, System Halted" problem. This is because of a problem in the software emulation of the processor. (During the course of the review I discovered 2 causes of this error, and I have advised Acorn of the causes and the suggested solutions. This may enable some more programs to run under a later version of the Emulator). This problem does not occur with the 386PC, since a genuine processor is being used.

3. The "wrong or missing hardware" problem. The PC Emulator has to emulate various hardware devices that would be present in a "real" PC, and also interface the Archimedes devices (drives, screen, serial port, parallel port, keyboard, mouse etc) to the Emulator in such a way that they appear to be PC devices to a program running on the Emulator.

The 386PC has genuine hardware to handle much of the PC environment, but still has to interface the Archimedes drives,

video display, keyboard and mouse. This can still cause programs to fail to run on the 386PC (as it can on genuine PCs). For example, some PC backup programs directly access the disc hardware. The emulation of the disc interfaces in the PC Emulator (and used by the 386PC) is only at the BIOS (i.e. system call) level, and so these programs do not work. Another problem area is that of sound: almost all the programs tried on the Archimedes ran silently - the only sound that is produced is from programs which ring the console bell.

Programs which require high resolution graphics also experience problems, as the Archimedes cannot emulate some of the more recent PC graphics modes. The 386PC also has no provision for adding IBM bus cards to expand the system or provide enhanced features.

PROBLEMS

The 386PC was not entirely without problems. However, most of these were resolved by a later version of the software supplied by Aleph One, and the remaing problems may be resolved too by the time you read this.

The 386PC seems to become rather fragile when the AMOUSE.COM mouse driver is installed. For example, running the MS-DOS V5.0 Editor and initiating a drag operation on the title box causes the screen to return to the RISC OS style, with a single error box informing the user "ERROR: (internal) Resume, bad stop code 1". Aleph One say this has been fixed, but I have not yet been able to confirm this.

On the 1 Mb review product I was unable to access the High Memory Area or the Upper Memory Blocks using MS-DOS version 5, despite the indications in the DOS User's Guide "Optimising your system" chapter. This presumably means that the extra 384K of memory (over and above the conventional 640K) is not readily available to the user. Aleph One are working on this.

DELIGHTS

In general, the 386PC performed so well that it was perfectly possible to believe that one was using a real PC. Occasionally I was brought back to earth with a bump - for example, several times I automatically put a 1.44 Mb 3.5" disc into my Archimedes drive, forgetting that the Archimedes hardware (except for the A5000) cannot cope with them.

The "real" serial and parallel ports work just as on a PC. I needed to transfer some files to the 386PC as part of the testing process, but a disc transfer was foiled because the 386PC could not access drive B:. I simply connected the serial port of the real PC to the serial port of the 386PC and ran the "Kermit" file transfer package on both machines. With both machines set to the maximum PC serial speed of 115200 baud (yes, 115.2 kilobaud!) the transfer zipped along quite happily. The serial port with the PC Emulator is limited to the maximum Archimedes speed of 19200 baud, and anyway has problems running at lower speeds than this maximum. The parallel port of the 386PC was also pressed into service to connect a PC tape streamer. Once again, this worked perfectly and I was able to back up and restore directories and files at high speed. The PC Emulator was unable to find the tape streamer - a problem with incomplete emulation of the parallel port.

The emulation of the CGA screen was very much better than that of the PC Emulator. All the text editors I tried worked perfectly under 386PC, whereas under the PC Emulator many of them had screen updating problems (characters not erased and lines out of sync when scrolling backwards). The video attributes seem to be well catered for with the 386PC CGA screen, although the blink attribute is implemented as a "low brightness" attribute instead. Enhancement to cater for the VGA standard is promised for the future.

CONCLUSIONS

Technically, the 386PC wins against the PC Emulator hands down. The PC Emulator, whilst a spectacular achievement, is just not in the same category. Commercially, however, the product must be up against some serious opposition - genuine PC systems. Even with the recently announced price cut by Aleph One (£495 ex. VAT for a 1 Mb version) the cost of the upgrade is on a par with that of a complete PC system, especially as PC prices are currently tumbling - for example, a 25MHz 386SX system with 1 Mb of RAM (but less hard disc, and only mono VGA graphics) is advertised for £460 ex. VAT.

If one has a need to run the occasional PC software, then (provided it is compatible) the PC Emulator seems a reasonable route for a modest outlay. But if one wishes to run PC software on a more regular and serious basis, then one ought to think carefully as to whether the sensible solution would be to buy a genuine PC. A real PC would have no compatibility problems, and offer better disc drive and graphics screen options than can be achieved with the Archimedes. A real PC would also provide perfect "multi-tasking" with an Archimedes. It would however require desk space for two machines.

The Archimedes is a fine machine, but it is not a PC. It will, however, never achieve the huge popularity and user base of the PC family of machines, and it would negate the purpose of having an Archimedes if its main use was to run PC applications. Nevertheless, the 386PC does provide a fast PC environment amazingly well. For owners of Archimedes machines who need to have better PC compatibility than can be offered by the PC Emulator, the Aleph One 386PC must be worthy of consideration.

Product	386PC Card
Supplier	Aleph One
	The Old Courthouse,
	Bottisham,
	Cambridge CB5 9BA.
	Tel. (0223) 811679
Price	£495 ex. VAT (1 Mb)
	£625 ex. VAT (4 Mb)

Select and Collect

Simon Burrows makes a selection from the best of current Public Domain software.

Public Domain Software is widely available for the Archimedes, and it can be difficult to identify useful or interesting items from the hundreds of discs' worth available from PD libraries and bulletin boards. The large amount of PD software in circulation (despite the comparatively small user base) reflects the quality of BBC Basic and the RISC OS Wimp interface, which makes the Archimedes pleasant and relatively easy to program.

This occasional series hopes to introduce some of the best PD software, so that the task of choosing worthwhile items is not so much of a lucky dip. A few PD programs are not worth even the cost of postage, whilst it would be justifiable to go out of your way to get hold of others. Remember that software may only be distributed if explicit permission is given in the accompanying files, and then any attached conditions must be followed.

DRAWPLUS

Many programs build on the facilities already provided by Acorn, the most notable of these being *DrawPlus*, written by Jonathan Marten. This invaluable application, written in C, provides a complete replacement for Acorn's Draw, and boasts many extra features of use to anyone who ever needs to produce or manipulate Draw files. The features are really too numerous to cover in detail. For example, it allows complex pictures to be built up layer by layer, and each can be made invisible or locked so that they cannot be accidentally altered whilst the rest are completed. Libraries of graphics, symbols and other clipart can be created, and Draw files can be extracted from these as required, providing an excellent means to preview the different Draw files which you may have available.

DAILY

The simplest programs are often the most useful - an example of this is *Daily*, by Joe Abley. This module displays a small

digital clock in the top right corner of the screen, in the style of Channel Four's Breakfast TV clock. It is very unobtrusive and attractive to look at, using system font characters adhered to the backdrop, and comes complete with the small bar which moves underneath the digits every fifteen seconds. The worst feature is that it can remind you how many hours have been spent on the computer, although on reflection this may be a good thing!
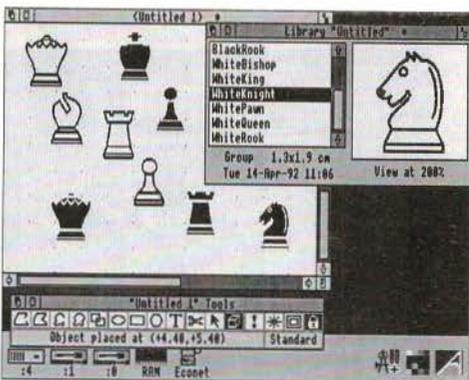
The DrawPlus library feature

Some PD software is so good that it seems wrong that the author gains no financial reward for it. Take for example RiscBBS, by Carl Declerck of BASS, a group from Belgium who have produced many excellent applications. It allows any user with a modem to run a substantial bulletin board system, although actually it is fun to play with even without a modem! It sits on the icon bar allowing the machine to multi-task, and yet supports numerous BBS facilities, including Fidonet-compatible Electronic Mail, conferences, uploading and downloading of software, real-time games and so on. Several layers of privileged access are available, even allowing the command line to be accessed remotely. Incidentally, RiscBBS is so good that Acorn have adopted it as the basis for their on-line support system.

TEMPLATE EDITORS

There are several utilities available to assist help authors produce templates. Acorn's *FormEd*, which is not Public Domain can be used to create template files, which greatly simplifies the creation of windows in the RISC OS Desktop. Several enhanced versions have been produced by other people, so it is worth checking exactly which one you have. An equivalent program to deal with menus has been written by David Andrews, simply called *Menus*. This contains a module which greatly simplifies the creation and handling of menu structures, a great boon since this can be one of the most time-consuming parts of writing a program to work in the Desktop.
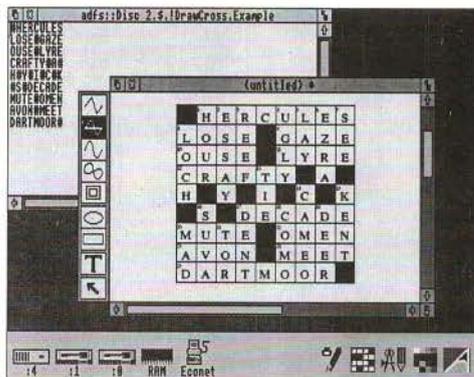
Creating Crosswords

MAIL-MERGE

Computer Concepts are not well known for producing PD software, but they have released their *Impulse II* system (not to be confused with Impression II!) into the Public Domain. This module, complete with documentation and example programs which demonstrate mail-merging with Impression II, allows Wimp tasks to communicate in ways which were not possible before, and is the basis for hotlinking between many commercial and PD programs.

INTERFACE

If you want your Desktop applications to look impressive, take a look at the *Interface*

module written by Simon Huntingdon, which comes complete with full documentation on disc. This makes it easy to produce 3D effects similar to those used in Impression II, and is widely used in PD applications since so many people prefer the appearance to that laid down by Acorn.

ADVANCED GRAPH PLOTTER

The interface module is put to good use in *AGP* by Ben Harris. AGP stands for Advanced Graph Plotter, and would be of particular use in the classroom. It enables a variety of graphs to be plotted in a Desktop window, including more than one at a time, and these can be saved as Draw files for use in other packages. Like many PD programs, AGP makes good use of Acorn's interactive help facility, so if you have any difficulty using it, load the Help application off your RISC OS Applications disc.

SHAREWARE

A proportion of so-called PD software is actually *Shareware*; this means that if you find the software useful, you should send off a registration fee to the author. Paying is not optional, but is dependent on people being honest. Doing so usually means that the author will send you some free upgrades, perhaps enhanced versions and even printed manuals. Authors are also more likely to implement extra features for you if you are registered (provided they would be of interest to other people). In general, Shareware can be obtained in exactly the same way as PD software.

TRANSLATOR

For people with an interest in graphics, John Kortink from the Netherlands has produced a whole host of useful Shareware programs. The most useful of these is *Translatr*, which allows graphics images from other computers to be converted into sprite files for use on the Archimedes. It copes with a large number of different image formats, and even makes it possible to buy discs of graphics images from PD libraries for other computers (providing that you have the means to read their disc formats). John is particularly keen that people should register as required, and upgraded versions are only available to registered users. Furthermore, users can

send examples of other image formats to John, and he will happily update Translatr to handle them. This is a classic example of a program which is constantly being improved, and it is well worth upgrading if your version is earlier than about v6.80.

RAY-TRACING

Another popular form of image manipulation is ray-tracing, and Pete Goodwin has recently released his Archimedes version of *PVray*. This comprehensive package, which would take up several discs if not compressed, provides many of the features which you would normally expect to pay a lot of money for. As with most ray tracers, *PVray* takes a long time to produce the final images, but it is worth the wait, and stunning pictures can be produced, especially from the numerous examples included. PVray is also available for use on other computers, and the files are interchangeable. A powerful screen designer called *Model* is available for use with PVray, making the complete package even more flexible. Several ray-tracers are available at minimal cost, but I would recommend that you consider this latest offering.

MEMPHIS

Brian Brunswick writes many useful applications, one of which is *Memphis*. Quite simply, this provides a replacement for the RAM filing system which automatically resizes itself according to the length of the files to be stored in it. The MemFS filing system allocates no more space than needed, so it is no longer necessary to store files somewhere else whilst trying to alter the size of the RAM disc.

LABEL

The RISC OS Outline Font manager is great for most types of printing, but the majority of users still use dot-matrix printers. When using labels, outline font printing is unnecessarily slow and the print quality may not be as good as the printer's internal fonts. Various utilities are available to facilitate such printing - one of the most versatile is called *Label* by Jonathan Marten

of DrawPlus fame. It caters for all sizes and configurations of labels, and can send control codes to the printer to select from any print styles available.

ADDRESS

If you wish to print address labels, then *Address* by Alex Hopkins may well suit your needs. This Shareware program allows names, addresses and other details to be entered, searched and stored, and has the capability to print out chosen details from selected (or all) records onto a variety of labels. The latest versions are fully RISC OS compatible, and are ideal for storing and printing addresses.

HANGMAN

A number of PD programs can be of particular benefit in the classroom, and in this category I would include *Hangman*, by Brian Trott. This plays a great game of Hangman, and uses excellent ray-traced graphics. The best part is if the player actually fails to guess the word in time, in which case the unfortunate person actually swings on the end of the rope, complete with ray-traced reflections! The dictionary of words can be altered, so it is simple to adapt it to use words from a foreign language.

CROSSWORDS

For all crossword fanatics (and magazine editors), *DrawCross* by Liam Corner is well worth trying out. This program takes a text file, with # symbols representing black squares, and converts it into a corresponding Draw file containing the crossword puzzle. This makes it simple to create attractive and professional looking crosswords for use in desktop publishing.

IN CONCLUSION

A large proportion of PD software is written outside of the UK, and often it rates amongst the best - offerings from Germany and the Netherlands are common, but have you seen the software written in Australia, New Zealand, Canada, France, Japan, Italy, Iceland or even Russia? Some recent items

First Few
A Rapid File Identification Utility

by Oliver Schön

FirstFew is a short Wimp compliant Basic application that allows you to have a look at the first 217 bytes of any file dragged to it. This can be very handy, for example, when trying to sort out the latest versions of various programs or modules, as the version identification is usually given in the first couple of lines of code. Thus, to check which version of CLib you have, just drag the CLib module to the FirstFew icon, and a window will pop up displaying the version number.
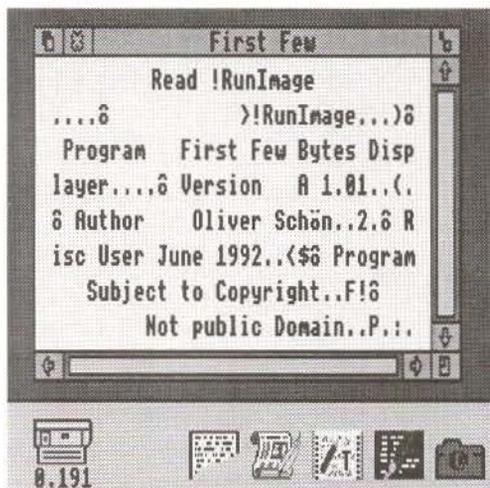
Checking a Basic file with FirstFew

To enter the application, first of all create a directory called *!FirstFew*, and open it up by double-clicking on it while holding down Shift. Next use Edit to create an Obey file called *!Run* containing the following three lines, and save it inside the *!FirstFew* directory:

```
WimpSlot -min 16K -max 16K
Run <Obey$Dir>.!RunImage %*0
```

Next type in the listing given and save it inside *!FirstFew* under the name *!RunImage*.

Finally use Paint to design a sprite called *!firstfew* (mode 12, 34 pixels wide by 17 pixels high) and save this file as *!Sprites* in the *!FirstFew* directory.

USING THE PROGRAM

Running the application will install an icon on the right-hand side of the icon bar. Dragging any file out of a directory viewer to this icon will open a window displaying the first 217 bytes of the file as ASCII text (unprintable characters are displayed as full stops). Dragging a directory results in an error box being displayed.

HOW IT WORKS

As the initialisation and polling loop are in no way peculiar I will only explain the reading procedure. When a DataLoad message is received from the Filer it is first checked for the filetype. Filetypes &1000 and &2000 (directories and applications) will cause an error to be reported. If the file is of any other type, reading is attempted. Should reading fail (e.g. the Filer did not get the user to insert the right disc, the file has no read access set etc.) the procedure is aborted. Only when the file has been read correctly will FirstFew acknowledge the DataLoad message and update the display window.

```
10 REM          >!RunImage
20 REM Program  Show First Few Bytes
30 REM Version  A 1.01
40 REM Author   Oliver Schön
50 REM Risc User June 1992
60 REM Program  Subject to Copyright
70 REM          Not Public Domain
80 :
90 ON ERROR PROCerror(ERR,REPORT$+"("
+STR$ERR+") in "+STR$ERL)
```

```
100 PROCinit
110 REPEAT
120  PROCpoll
130 UNTIL quit%
140 PROCquit
150 END
160 :
170 DEF PROCinit
180  SYS "Hourglass_On"
190  DIM mblk% &40,iblk% &30,wblk% &60
200  DIM tblk% &100,ublk% &200,eblk% &
40
210  SYS "Wimp_Initialise",200,&4B5341
54,"Version Identifier"
220  PROCinstallicon
230  PROCinitwindow
240  SYS "Hourglass_Off"
250  quit% = FALSE
260 ENDPROC
270 :
280 DEF PROCinstallicon
290  iblk%!0=-1
300  iblk%!4=0: iblk%!8=0
310  iblk%!12=68: iblk%!16=68
320  iblk%!20=&1700300A
330  $(iblk%+24)="!firstfew"
340  SYS "Wimp_CreateIcon",,iblk% TO i
h%
350 ENDPROC
360 :
370 DEF PROCinitwindow
380  LOCAL A%,pt%
390  wblk%!4=300:wblk%!8=200
400  wblk%!12=840:wblk%!16=600
410  wblk%!20=0:wblk%!24=0
420  wblk%!28=-1:wblk%!32=&FF000012
430  wblk%!36=&00070207:wblk%!40=&000C
0103
440  wblk%!44=0:wblk%!48=-400:wblk%!52
=540:wblk%!56=0
450  wblk%!60=&3D:wblk%!64=0:wblk%!68=
1:wblk%!72=0
460  $(wblk%+76)="First Few":wblk%!88=
0
470  SYS "Wimp_CreateWindow",,wblk%+4
TO !wblk%
```

```
480  !ublk%=!wblk%:ublk%!4=8:ublk%!12=
532
490  ublk%!20=&07000139:ublk%!28=-1:ub
lk%!32=32
500  FOR A%=0 TO 7
510   ublk%!8=-(A%*48+56):ublk%!16=-(A
%*48+8):ublk%!24=tblk%+A%*32
520   SYS "Wimp_CreateIcon",,ublk%
530  NEXT
540  $tblk%=STRING$(255," ")
550 ENDPROC
560 :
570 DEF PROCpoll
580  LOCAL reason,A%
590  SYS "Wimp_Poll",&81833,ublk% TO r
eason
600  CASE reason OF
610   WHEN 2: SYS "Wimp_OpenWindow",,u
blk%
620    FOR A%=0 TO 28 STEP 4 : wblk%!A
%=ublk%!A% : NEXT
630   WHEN 3: SYS "Wimp_CloseWindow",,
ublk%
640   WHEN 6: PROChandle_button(ublk%)
650   WHEN 9: quit% = TRUE
660   WHEN 17,18: PROCreceive_mess(ubl
k%)
670  ENDCASE
680 ENDPROC
690 :
700 DEF PROChandle_button(ublk%)
710  CASE (ublk%!8) OF
720   WHEN 2:IF ublk%!12=-2 THEN PROCh
andle_menu(ublk%)
730   WHEN 4:PROCshowdata
740  ENDCASE
750 ENDPROC
760 :
770 DEF PROChandle_menu(ublk%)
780  $mblk%="FirstFew"
790  mblk%!12=&00070207
800  mblk%!16=124:mblk%!20=44:mblk%!24
=0
810  mblk%!28=128 : mblk%!32 = -1
820  mblk%!36=&07009039 : $(mblk%+40)=
"Quit"
```

```
 830  SYS "Wimp_CreateMenu",,mblk%,!ubl
k%-66,140
 840  ENDPROC
 850 :
 860 DEF PROCshowdata
 870  SYS "Wimp_CloseWindow",,wblk%
 880  SYS "Wimp_GetWindowState",,wblk%
 890  SYS "Wimp_OpenWindow",,wblk%
 900 ENDPROC
 910 :
 920 DEF PROCreceive_mess(ublk%)
 930  CASE (ublk%!16) OF
 940   WHEN 0: quit% = TRUE
 950   WHEN 3: PROCread(ublk%)
 960   WHEN &502: IF ublk%!32=-2 THEN P
ROCanswer_help
 970  ENDCASE
 980 ENDPROC
 990 :
1000 DEF PROCread(ublk%)
1010  LOCAL num%,B$,do%,A%,C%,D%,F$
1020  LOCAL ERROR
1030  ON ERROR LOCAL ENDPROC
1040  A%=ublk%+44
1050  WHILE ?A%>31
1060   F$+=CHR$ ?A% : A%+=1
1070  ENDWHILE
1080  IF ublk%!40=&1000 OR ublk%!40=&20
00 THEN
1090   PROCreport(100,"Cannot view dire
ctories.",1)
1100  ELSE
1110   ublk%!12=ublk%!8 : ublk%!16=4
1120   num%=OPENIN F$
1130   C%=tblk%+32 : D%=0
1140   $tblk%=STRING$(255," ")
1150   FOR A%=1 TO 7
1160    SYS "OS_GBPB",3,num%,C%,31,D% T
O ,,C%,,D%
1170    ?C%=13 : C%+=1
1180   NEXT
1190   FOR A%=32 TO 254
1200    IF (tblk%?A%<32) AND ((A%+1)MOD
32 <>0) THEN tblk%?A%=46
1210   NEXT
1220   $tblk%="Read "+FNname(F$)
```

```
1230   CLOSE# num%
1240   SYS "Wimp_SendMessage",17,ublk%,
ublk%!4
1250   PROCshowdata
1260  ENDIF
1270 ENDPROC
1280 :
1290 DEF FNname(F$)
1300  LOCAL B$
1310  B$=RIGHT$(F$,13)
1320  WHILE INSTR(B$,".")
1330   B$=RIGHT$(B$,LEN B$ - INSTR(B$,"
."))
1340  ENDWHILE
1350 =B$
1360 :
1370 DEF PROCanswer_help
1380  !ublk%=&D0
1390  ublk%!12=ublk%!8
1400  ublk%!16=&503
1410  $(ublk%+20)="This is the First Fe
w Utility.|M Drop files (no directories)
here to view their first few bytes.|M C
lick MENU to choose Quit."+CHR$(0)
1420  SYS "Wimp_SendMessage",17,ublk%,u
blk%!4
1430 ENDPROC
1440 :
1450 DEF PROCquit
1460  SYS "Wimp_DeleteWindow",,wblk%
1470  iblk%!4=ih%
1480  SYS "Wimp_DeleteIcon",,iblk%
1490  SYS "Wimp_CloseDown"
1500 ENDPROC
1510 :
1520 DEF PROCerror(!eblk%,$(eblk%+4))
1530  SYS "Wimp_ReportError",eblk%,1,"F
irst Few"
1540  SYS "Wimp_CloseDown"
1550 END
1560 :
1570 DEF PROCreport(!eblk%,$(eblk%+4),f
lags%)
1580  SYS "Wimp_ReportError",eblk%,flag
s%,"First Few" TO ,!eblk%
1590 ENDPROC                        RU
```

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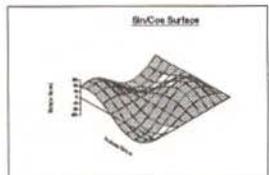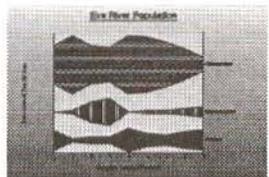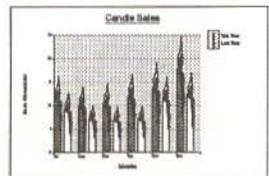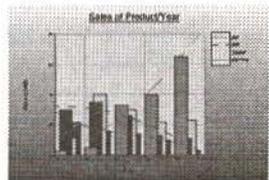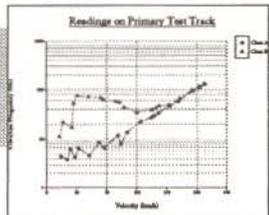
Optical Character Recognition

Mark Sealey looks at a pre-release version of an exciting new software development from Irlam.

I magine the scenario: you have a document, a lengthy document with perhaps some unfamiliar spellings or terminology, repetitive wording and small print. Maybe you are even working with a document in a foreign language. You wish to alter it and reprint it or to use it in a desktop publishing (DTP) environment. Your heart sinks at the prospect of typing it all into a word processor or text editor.

Say you also own a scanner of some sort which is capable of scanning pages from the document and storing them as sprites. But to import them as sprites directly into your word processor would be nigh on impossible, and to drop them - grey smudges and all - into a DTP frame would be ungainly and unsightly.

To avoid hours spent tediously retyping the original (with errors), the ideal solution would be if the sprite could somehow be converted into raw text, as faithful to the original as possible, which could then be manipulated as if it had been entered or imported as ASCII text from scratch. Then you could spool it into the text editor or DTP package as cleanly as if it had been typed in from the keyboard.

At least two software houses are now in the process of developing packages that will do just that, one of which is previewed this month. A full review will follow soon.

The technique of converting from what is essentially a graphic to text is called optical character recognition (OCR). Text imported using OCR still needs further corrective work to be performed on the text, but it is better
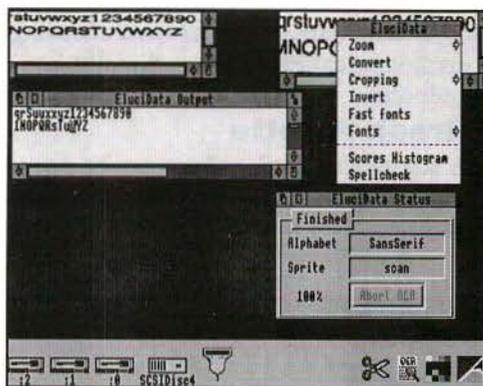
Scanned image plus EluciData output

than a complete retype. Irlam Instruments (already known and respected for their high quality scanning and similar hardware) are about to launch *EluciData*, an OCR package for the A3000, A5000 and Archimedes range. It will attempt to convert any mode 0 or mode 18 sprite that contains text into an ASCII file. It works in the Desktop and the pre-release version worked well in preliminary trials, but detailed examination will have to wait for the final product.

What is more, if you have bit-mapped images from other computers and/or full colour sprites, then you can convert them into two-colour sprites (which the OCR software requires) by means of the several utilities available to do this. A typical and popular one would be *ChangeFSI* from Acorn.

EluciData is fully Desktop compatible and appears to obey the rules of the Wimp environment. This is important, essential even, since it must be possible to deal with file import and output in an easy and fluent way.

The software sent for preview was supplied on a single disc, which required a registration process to be performed; then it could be copied to a hard disc or another floppy disc. It is a relatively easy package to get to grips with and also supports the Acorn Interactive Help system.

Before use, EludiData must have "seen" the *!Alphabets* folder provided. It is from here that data is obtained for use when comparing and decoding the graphic characters.

There is a series of options which can be set for the conversion process. The size and amount of cropping of the sprite, the fonts to be used, and so on can be set before the sprite is converted. There can be a graphical display of how accurate the conversion has been, and even (rather ambitiously) a spelling check afterwards. There is also the possibility of altering the threshold of error from the default of an 80% match.

It is also possible to select the font of the text in the scanned sprite, resulting in a generally more accurate rendering of the sprite. So, for example, you can tell the software that you are about to scan some text in Times Bold, and then the software knows what shapes the letters should be, increasing the chances of recognising the characters correctly. Alternatively you can choose a fast fonts option, which promotes faster processing.

To start conversion, all you need to do is drop the scanned sprite onto the EluciData icon bar icon, and you are away. There were - as there always will be with pre-release versions - one or two crashes and blips, but for something as complex as this, though, there were surprisingly few.

Once conversion has been attempted, a window offers the user the chance to correct suspected errors as detected by the software.

As soon as this process is complete, the text is saved as a file for later use.

ARTIFICIALLY INTELLIGENT

OCR software needs to make intelligent guesses as to the identity of each character that it 'sees' in the sprite which is being converted. To do this it needs to have a typeface with which to compare each character. This is, for example, so that serifs (the tiny slabs at the foot and head of letters, as in the letter i for example) are not misinterpreted, nor the chunkiness of the Courier (Corpus) typewriter style mistaken.

Also, some method has to be found of producing a complete character set for any existing typeface as encountered in a sprite, and some means of producing OCR typefaces of your own. The advantage of this is that the next time you use a sprite with the same or similar typeface, EluciData can be told where to look for all its comparisons, regardless of their size.

The application *AlphaBite* that comes as part of the Irlam package deals with these problems, and effectively adds an alphabet training component to the scene.

CONCLUSION

EluciData performs an extremely complex task, and the fact that it works at all is very impressive. Hopefully a full review will appear in the near future to address the pros and cons of the system in operation, when it will be complete enough to allow criticism of performance and robustness.

WP/DTP

More on Penguin Graphics in Ovation and Impression

by Richard Hallas

The much-acclaimed new features of PipeDream 4 include what Colton Software terms Penguin Graphics, whereby your own Draw files can be used to fill the rows or columns of a graph, and give an attractive pictorial representation of what might otherwise be a rather uninteresting bar chart. Being an integrated package, PipeDream can produce such graphs with the minimum of fuss, but similarly impressive results can also be achieved in dedicated DTP packages quite easily without recourse to any other packages such as Draw.
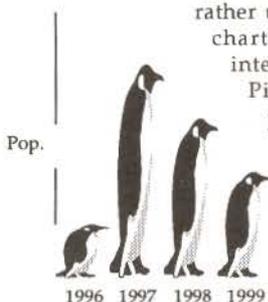
Pop.

1996 1997 1998 1999

Using Penguin Graphics

In the explanations below I shall refer to the columns of the graph, but of course you could equally well be creating a horizontal graph with rows instead. This article leads on from Pictographs in Ovation and Impression which appeared in RISC User 5:4, and which explained how to make a Penguin Graphic chart where each column consists of several repetitions of the same individual graphic.

ELASTIC PENGUINS

Instead of the pictograph considered in the previous article, a common alternative is for a single picture to be stretched to make up a complete column, and this kind of graph is rather easier to create. It also benefits from a more precisely labelled axis, with numbers at intervals along it. It is this which I want to discuss now from the viewpoint of both Impression and Ovation users.

USING OVATION

Create a parent frame as before, and within it create a frame for the first column. All column frames should be of the same width. If you do not want your picture to touch the edges of the frame, remember to enter a value in the Inset box in the Modify Picture Frame dialogue box.

Now import your graphic into the frame and then duplicate the frame enough times to make all the columns of your graph. Next, select each of the frames in turn and make sure it is the right size, either by dragging the centre handle of the edge you need to adjust or by using the Modify Picture Frame box. The page rulers will probably be a help here. For each column, choose Fill Pict Frame from the Object sub-menu. Finally, create axes with lines and labels with text frames as described in the previous article.

USING IMPRESSION

As in the previous article, create a frame the same size as your final graph and give it two borders for the axes. Add labels to these axes using text frames. Now create a null frame the correct width for one of the columns. If you do not wish the imported graphic to touch the edges of the frame, call up the Alter frame box and enter a figure into the Inset V or Inset H box. You could also consider adding a thin border to three sides of the frame to outline its rectangular shape and give a more accurate reading against the axis (you don't need a border, of course, for the side of the frame which sits on the axis).

Now copy the frame however many times you need to make up the columns of your graph. The Snap to guides feature will not help much here, since it only snaps the cursor to the top and left edges of existing frames, not their bottom and right edges. Now import your graphic into the first null frame, and click on all the others with Adjust as described before.

Go through each of your columns in turn and make them the correct size, either by dragging the centre handle of the edge you need to adjust or by using the Modify frame box. For each column, call up the Alter graphic box, deselect the Lock aspect switch, and then click on the Fit to frame icon.

When your graph is complete, you might like to group all the frames which make it up, so that you can move and copy it (or even embed it) easily.

FURTHER IDEAS

You could consider adding a background colour to either the whole graph or to the columns themselves. If you use a coloured background (or even one with a graphic in it) you should make the individual column frames transparent. The colours you choose should be picked carefully, since on most monochrome printers all shades of grey come out rather heavily, far more so than the monitor screen might suggest, and these could easily obscure the graph itself.

In my experience, the two best colours in the standard palette to use as general background shades are colours 12 (cream)

Penguin Draw file
(from 4Mation's Poster)

and 1 (very light grey). Using these alternately in the columns would differentiate the columns from each other and provide an accurate reading against the axes. However, such effects should be used with discretion, as they can easily look cheap and gaudy. Beware also that coloured backgrounds could have an adverse effect on the graphics you are using, as Draw files sometimes contain objects which you may expect to be filled with white, but which are in fact not filled at all. In these cases the background would show through.

A further type of graph which could be presented is very similar to the first, with the same graphic repeated a number of times up each column, but which contains a cropped graphic at the top of each column. This kind of graph is suited to presentations in which absolute accuracy is not needed, but a greater level of accuracy is required than the nearest hundred penguins, say.

For this type of graph, proceed as in the first article, but label the axes with numbers, and let one graphic represent, say, a hundred penguins. For the top of each of the graph's columns, round the actual figure required up to the nearest hundred above it, and import the pictures into your graph. Finally, with the pictures in place, use the middle handle at the top of each columns frame to adjust the column height to exactly that required. You should find that the top graphic of each column is cropped. If a single penguin graphic represents a hundred penguins, then half a penguin represents fifty, and the effect is a more accurate-looking graph.

Improving Handheld Scanner Images

by Ledger White

INTRODUCTION

This article is the result of my experiences with the Scavenger hand held 105mm mono scanner, but the images produced by other makes suggest that they too can be improved. If you believe that mono scanners are not really good enough for producing grey scaled pictures then you are in for a couple of very pleasant surprises. The first is just how good an image you can get from such scanners, and the second is how unexpectedly simple it is. You'll be delighted!

The *Scanty* routine given here improves the output of mono scanners so much that users should feel confident in recommending them as highly worthwhile additions to an Arc system.

WHY IMPROVE?

If you use one of these scanners you will be aware that when scanning mono images such as line drawings or illustrations the results are very good indeed. But you will also be aware that when converting grey scale images from the mono scan the results are usually disappointing. The results exhibit 'banding' and cannot be zoomed up or down without further degradation, and this makes them pretty well unusable for any DTP or imaging work. You might think that it is after all just a mono scanner and you cannot therefore expect much more. That's exactly what I thought until I reasoned that with equipment of this quality at 400 dpi, surely I should be able to get a much more convincing grey level image. After some experimentation, I discovered that I could get a dramatic improvement from a very simple correction.

HOW IT WORKS

In 'photo' mode my hand held scanner produces an intermediate raw image as a sprite which can then be processed by 'anti-aliasing' into a final image of 16 grey levels. This 'anti-aliasing' process appears to have been misunderstood by some vendors and consequently their routines produce only an inferior image.

Scanned Image processed by Scanner Software

To see how the scanner handles images in a 'photo' mode, copy the raw output of your scanner into Paint, zoom up to about six or seven times, and set the grid on in a contrasting colour. Now you can examine the way in which the image is represented using only black and white. There are several things you notice:
1. The image is made up of structured patterns of dots within blocks.
2. A particular block of grey is always represented by the same pattern of dots.
3. The blocks are made up of 9 dots in 3x3 blocks.
4. You never get all of the pixels blacked in.
5. On darker shades the 3x3 blocks are dithered into 6x6 blocks.

All the manufacturers instructions and all the reviews I have seen say that the final 16 grey level image is produced by adding up set and unset pixels in a 4x4 block in the original. It will only take you a few minutes to convince yourself that this is quite the wrong way to do it! Shade in a 3x3 pattern on some graph paper and then 'anti-alias' this by counting pixels in adjacent 4x4

blocks and you will see why a single shade of grey comes out as a jumble which repeats itself every 3 pixels - this is where the familiar 'banding' comes from. The correct technique of course, is simply to anti-alias using multiples of 3x3 blocks. Since you never get more than 7 pixels blacked in, you get 8 grey levels at 133 dpi. Because of the dithering within the 3x3 block, you can use 6x6 blocks to get about 28 grey levels at 67 dpi.

Same image processed by Scanty

The standard Archimedes can display only 16 grey levels and I find that with normal monitor settings only about 12 of these are readily distinguishable. The darkest four all look the same. My 300 dpi inkjet printer is very similar - it works best on lighter images. I have used this to allow some contrast enhancement in my routine, but despite some claims there is very limited scope with only 16 levels of grey (see the article *Improving the quality of half-tone printing on a dot matrix printer* in RISC User 5:5).

THE ROUTINE

The *Scanty* anti-aliasing routine given here accepts a parameter for block sizes from 2x2 up to 6x6. Only the 3x3 and 6x6 blocks are really useful, but the others are there for completeness and to show you the

result of selecting the wrong size. If you select 4x4 you get an image much the same as the manufacturer's version. It also accepts a contrast parameter low (L), medium (M) or high (H).

To use the routine you will need to type it in and save it. To use it, first scan your image in a 'photo' mode and save the output sprite file without using the anti-alias function. Then run the program (by double-clicking on it in the Desktop), which will ask for the parameters above, and the full pathname of the image to be processed. The routine will use your parameters to produce a new sprite file with the same pathname as the original sprite but with an "X" appended to the filename. You can then use the image just like any other scanner sprite but without the 'banding' problems. An unzoomed 6x6 image comes out about full size and a 3x3 about twice as big. You should pick the size appropriate to your requirements. I have printed many A6 scans on an inkjet printer zoomed to A4 size and the results are very good indeed.

```
  10 REM            >Scanty
  20 REM Program    SCAN Terrifically
  30 REM Version    A 1.0
  40 REM Author     Ledger White
  50 REM RISC User June 1992
  60 REM Program    Subject to Copyright
  70 REM            Not Public Domain
  80 :
  90 ON ERROR PRINT REPORT$;" at line "
;ERL:END
 100 PROCinitialise
 110 PROCassemble
 120 PROCreadFile
 130 PROCnewFileHeader
 140 PROCconvertOldFile
 150 PROCcompleteNewFile
 160 PROCsaveNewFile
 170 END
 180 :
 190 DEFPROCinitialise
 200 *FX15,1
 210 PRINT"Dithered pattern size (2,3,4
,5,6)?"
 220 REPEAT
 230 dither%=INSTR("123456",GET$)
 240 UNTIL dither%>1
 250 dsquared%=dither%*dither%
```

```
260 *FX15,1
270 PRINT"Contrast (L,M,H)?"
280 REPEAT
290 contrast%=INSTR(" LlMmHh",GET$)
300 UNTIL contrast%>0
310 contrast%=contrast% DIV 2
320 *FX15,1
330 PROCgetFileName
340 DIM oldFile% oldFileSizeK%*1024
350 DIM newFile% newFileSizeK%*1024
360 ENDPROC
370 :
380 DEFPROCgetFileName
390 PRINT"Enter file name "
400 INPUT oldFileName$
410 SYS "OS_File",&05,oldFileName$ TO
r0%,,,,r4%,r5%
420 IF r0%<>1 THEN VDU7:PRINT"FILE ";o
ldFileName$;" NOT FOUND":END
430 oldFileSizeK%=r4%/1024+1
440 PRINT"Old file size is ";oldFileSi
zeK%; "K"
450 newFileSizeK%=oldFileSizeK%*4/dsqu
ared%+1
460 PRINT"New file size is ";newFileSi
zeK%; "K"
470 diff%=(HIMEM-END)-((10+newFileSize
K%-oldFileSizeK%)*1024)
480 IF diff%<0 THEN VDU7: PRINT"Memory
too little by ";INT(ABS(diff%)/1024)+1;
"K":END
490 ENDPROC
500 :
510 DEFPROCreadFile
520 PRINT "LOAD "+oldFileName$+" "+STR
$~(oldFile%-4)
530 OSCLI "LOAD "+oldFileName$+" "+STR
$~(oldFile%-4)
540 ENDPROC
550 :
560 DEFPROCnewFileHeader
570 !(newFile%+&04)=&1
580 !(newFile%+&08)=&10
590 FOR X%=&14 TO &1F
600 newFile%?X%=oldFile%?X%
610 NEXT X%
620 !(newFile%+&20)=(!(oldFile%+&20)-1
)*4/dither% - 1
630 !(newFile%+&24)=(!(oldFile%+&24)+1
) DIV dither% - 1
640 !(newFile%+&28)=0
650 !(newFile%+&2C)=&1F
660 !(newFile%+&30)=&AC
670 !(newFile%+&34)=&AC
680 !(newFile%+&38)=&14
690 FORx%=0TO&0F
700 !(newFile%+&3C+x%*8)=(x%<<4)+(x%<<
12)+(x%<<20)+(x%<<28)
710 !(newFile%+&3C+x%*8+4)=(x%<<4)+(x%
<<12)+(x%<<20)+(x%<<28)
720 ?(newFile%+&3C+x%*8) =0
730 ?(newFile%+&3C+x%*8+4)=0
740 NEXTx%
750 ENDPROC
760 :
770 DEFPROCconvertOldFile
780 PRINT"Start conversion..."
790 oldLineInBytes%=(!(oldFile%+&20)+1
)*4
800 newLineInBytes%=(!(newFile%+&20)+1
)*4
810 oldNumberOfLines%=!(oldFile%+&24)+
1
820 FOR X%=1 TO oldNumberOfLines%-dith
er% STEP dither%
830 A%=oldFile%+&4C+X%*oldLineInBytes%
840 C%=A%+oldLineInBytes%
850 D%=newFile%+&BC+((X%-1)/dither%)*n
ewLineInBytes%
860 E%=(!(oldFile%+&20)+1)*4
870 CALL code%
880 NEXT X%
890 PRINT"End conversion"
900 ENDPROC
910 :
920 DEFPROCcompleteNewFile
930 !(newFile%+&0C)=(!(newFile%+&20)+1
)*4*(!(newFile%+&24)+1)+&BC
940 !(newFile%+&10)=!(newFile%+&0C)-&1
0
950 newFileLength%=!(newFile%+&0C)-4
960 ENDPROC
970 :
980 DEFPROCsaveNewFile
990 PRINT "SAVE "+oldFileName$+"X"+" "
+STR$~(newFile%+4)+" "+STR$~newFileLeng
th%
1000 OSCLI "SAVE "+oldFileName$+"X"+" "
+STR$~(newFile%+4)+" "+STR$~newFileLeng
th%
1010 PRINT "SETTYPE "+oldFileName$+"X"+
" "+"FF9"
1020 OSCLI "SETTYPE "+oldFileName$+"X"+
" "+"FF9"
1030 ENDPROC
1040 :
```

```
1050 DEFPROCassemble
1060 DIM code% 800
1070 FOR I%=4 TO 6 STEP 2
1080 P%=0
1090 O%=code%
1100 [
1110 OPT I%
1120 STMFD R13!,{R14}
1130 SBC R0,R0,#1
1140 BL getNextSetOfBytes
1150 MOV R1,#2
1160 .loop
1170 MOV R6,#0
1180 BL getNextSixteenBits
1190 ORR R6,R6,R5
1200 BL getNextSixteenBits
1210 ORR R6,R6,R5,LSL #4
1220 BL getNextSixteenBits
1230 ORR R6,R6,R5,LSL #8
1240 BL getNextSixteenBits
1250 ORR R6,R6,R5,LSL #12
1260 BL getNextSixteenBits
1270 ORR R6,R6,R5,LSL #16
1280 BL getNextSixteenBits
1290 ORR R6,R6,R5,LSL #20
1300 BL getNextSixteenBits
1310 ORR R6,R6,R5,LSL #24
1320 BL getNextSixteenBits
1330 ORR R6,R6,R5,LSL #28
1340 STR R6,[R3],#4
1350 CMP R0,R2
1360 BLS loop
1370 LDMFD R13!,{PC}
1380 .getNextSetOfBytes
1390 STMFD R13!,{R14}
1400 ADD R0,R0,#1
1410 MOV R1,R0
1420 LDRB R7,[R1],R4
1430 LDRB R8,[R1],R4
1440 ]
1450 IF dither%>2 THEN [OPT I%:LDRB R9,
[R1],R4:]
1460 IF dither%>3 THEN [OPT I%:LDRB R10
,[R1],R4:]
1470 IF dither%>4 THEN [OPT I%:LDRB R11
,[R1],R4:]
1480 IF dither%>5 THEN [OPT I%:LDRB R12
,[R1],R4:]
1490 [OPT I%
1500 MOV R1,#1
1510 LDMFD R13!,{PC}
1520 .getNextSixteenBits
1530 STMFD R13!,{R14}
1540 MOV R5,#0
1550 ]
1560 FOR X%=1 TO dither%
1570 [OPT I%
1580 TST R7,R1
1590 ADDEQ R5,R5,#1
1600 TST R8,R1
1610 ADDEQ R5,R5,#1
1620 ]
1630 IF dither%>2 THEN [OPT I%:TST R9,R
1 :ADDEQ R5,R5,#1:]
1640 IF dither%>3 THEN [OPT I%:TST R10,
R1:ADDEQ R5,R5,#1:]
1650 IF dither%>4 THEN [OPT I%:TST R11,
R1:ADDEQ R5,R5,#1:]
1660 IF dither%>5 THEN [OPT I%:TST R12,
R1:ADDEQ R5,R5,#1:]
1670 [OPT I%
1680 MOV R1,R1, LSL #1
1690 CMP R1,#&FF
1700 BLHI getNextSetOfBytes
1710 ]
1720 NEXT X%
1730 IF dither%>4 THEN
1740 IF contrast%=1 THEN
1750 [OPT I%:ADD R5,R5,R5,LSL #1:MOVR5,
R5,LSR #3:]
1760 ENDIF
1770 IF contrast%=2 THEN
1780 [OPT I%:MOV R5,R5,LSR #1:]
1790 ENDIF
1800 IF contrast%=3 THEN
1810 [OPT I%:ADD R5,R5,R5,LSL #1:MOV R5
,R5,LSR #2:]
1820 ENDIF
1830 ENDIF
1840 IF dither%<5 THEN
1850 IF contrast%=2 THEN
1860 [OPT I%:ADD R5,R5,R5,LSL #1:MOV R5
,R5,LSR #1:]
1870 ENDIF
1880 IF contrast%=3 THEN
1890 [OPT I%:MOV R5,R5,LSL #1:]
1900 ENDIF
1910 ENDIF
1920 [OPT I%
1930 CMP R5,#15
1940 MOVHI R5,#15
1950 EOR R5,R5,#&F
1960 LDMFD R13!,{PC}
1970 ]
1980 NEXT I%
1990 ENDPROC
```

Titler

Ian Robinson reviews a new video titling application to liven up all your old home videos.

In a world increasingly dominated by multimedia, new applications to extend the scope of your trusty Arc appear all the time; the latest is a video titling package, *Titler*, from Clares. Written in New Zealand and currently in use there to produce television programmes, the two applications that make up the package, Titler and Sequencer, promise much. But what are video titles all about?

Every television programme you watch has text and logos superimposed on it, but have you ever considered how they get there? With film, the predominant method is to place artwork manually on transparent celluloid sheets, locate them over a projection of the frame of film where they are to appear, and then re-shoot the entire thing: a painful process which is still the best way to achieve the quality required for movies.

With the advent of video, electronic solutions needed to be developed. The earliest, still employed in certain circumstances, was to use one video camera for the live action and another for shooting the titles. An editor would mix these together, frequently during a live broadcast! With video becoming commonplace, the technology of editing improved significantly and dedicated titling hardware became available. The expense of this hardware has kept versatile titling in the professional realm, until now. The Archimedes and A3000 can accept Genlock expansion cards, and in combination with Titler, you can now accomplish video overlays in your front room.

GENLOCK

In the UK and other countries the 625 line 50Hz PAL television standard is employed. This gives 600 lines of picture and 25 of soundtrack and control signals. If editing more than one video source together (like cameras, playbacks and titlers) the frames need to be synchronised, and this is what Genlock achieves. With a Genlock card, the video output from your computer is synchronised with any video source fed into the card, by reference to their control signals. If you have a video camera you can see what happens without Genlock by pointing it at your TV while a broadcast programme is showing. The unsynchronised frames of the camera and the TV result in a wide black line appearing on the image of the TV in the camera viewfinder.

Genlock is not essential to Titler since output can be displayed on any Arc for its own sake. However, to add titles to video the minimum you will need in addition to a Genlock card are a playback VCR, a record VCR and a television (camcorders can replace the playback VCR).

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Titler - a finished script

USING TITLER

Clicking on Titler when it's installed on the icon bar displays the program window containing six icons with sprites depicting their purpose (e.g. a hammer and a spanner representing tools). Each icon provides RISC

OS menu access to a set of program options; alternatively clicking Menu within the program window produces a menu of these six option categories from which the submenus can be reached.

There are submenus to cover the following: file saving and receiving, fonts, text justification and line spacing. The fun menu is effects, which I certainly played with most, and includes drop shadow, underline, and rubout boxes. A colour menu offers a choice of nine standard and three user definable colours, all twelve being available in 256-colour modes at any one time. User colours are set using Palette.

Genlock is the first option you come across in the tools menu, and is only relevant to owners of a Genlock card. Unfortunately, I did not have access to such a card and so I'm unable to report on the application's performance in this area; however the manual does give enough detail on the subject. Essentially a Genlock Map window allows you to select which colours in your script are to be 'video transparent' (this is usually set to the background colour). The other tools include gridlock, to assist precise positioning of items with respect to each other.

A seventh program window icon provides entry to the Titler work screen (called a "script") where the action takes place. The manual offers a tutorial which guides you clearly through exploratory stages, shows you how to produce and manipulate text at the carat and lists the keyboard block editing functions. The function keys (listed on a keystrip) allow fast and convenient choice of such options as font and drop shadow colours, font size, justification, drop shadow, underline and rubout effects. The keystrip doesn't currently cope with all the options one may want quick access to, such as background colour, but minimal re-design could include these in future versions.

Items such as text or sprites can be moved around the script freehand via the mouse, and fixed in place where desired. In addition an item can be unfixed for further editing. The directory of examples supplied with the package illustrates the use of the program options well, makes one feel at home with the software and doubtless will result in professional looking scripts in a very short time.

SEQUENCES

So, you have produced some credit scripts for your wedding video, or have designed some snappy slide-show scripts for your talk on fly fishing to the local primary school, so where do you go from here to complete your creative concept? How do you link the scripts into a presentation to stun your audience? Prepare to enjoy yourself because this is where Sequencer comes into play.

The similarities between the two applications and their manuals ease introduction to Sequencer. Loaded files are displayed as a list attached to the bottom of the program window. The files can then be displayed in order of appearance, or in a user defined order via Sequencer programs. These programs use a simple set of commands and examples exist to assist you.
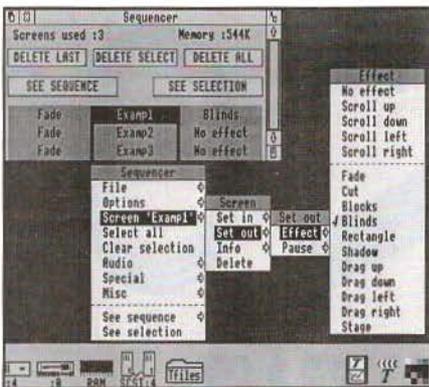
Sequencer - editing an effect

The display of a script is enhanced using the many available effects, which include

fade, cut, shadow, stretch, blinds, blocks and drags. In addition, effects can be customised with the user definable 'function' effect; the default function is a rather nice one giving the script the appearance of being unrolled like wallpaper down the screen. The application provides extensive access to the timing of aspects of a sequence, and the variety of effects produced are numerous and require long experimentation to appreciate fully. The tutorial refers to examples which illustrate the potential of effects.

A good tool for the imagination is the Random Play window, with which you can have your scripts displayed with random effects and pauses while you sit comfortably with your coffee and let what you see inspire you. To complete your presentation, there is an Audio option with which one can add modules from SoundTracker or Tracker and samples from Armadeus to augment the default Internal sound option. Sequencer can save a presentation in different forms, for example with all data or in a run only form.

PACKAGING AND INSTALLATION

Titler comes on two discs, containing the applications Titler and Sequencer, and these and the A5 manual fit neatly into a slim A4 folder. This is a neat package and one I prefer to plastic "video" cases that never seem to close properly once opened. The manual is really two in one, each application having its own section, cleverly identifiable by the use of white pages for Titler and non-white for Sequencer. They are clearly executed and sensibly divided into chapters which lead one carefully through tuition, program windows, menus, and advanced usage. The keystrip completes the package.

It's a temptation to insert the disc and examine the contents before even considering looking at the manual, but a warning sticker on the folder advises that the initial access to the disc through the Desktop runs registration and copy protection routines which if avoided could result in damage. Registration displays a window with name and address fields to be completed by the purchaser, which binds the package: only registered discs are considered for any upgrades. Security is always an issue for software houses, and Clares report that they are considering developing registration for future products.

Installation is either onto a hard disc or onto floppy through two methods (the first needing two discs and providing extended work space). The manual takes you through your choice step by step, but increased automation would be an improvement.

CONCLUSION

It is apparent that Titler will prove useful in many areas. Without Genlock you can still produce professional sequences for exhibitions, talks, lessons and much more. With the addition of video, the uses multiply. For home video enthusiasts, they can add that finishing polish to cousin Jenny's wedding or little Sam's first words. Video laboratories in education could employ Titler to extend the skills of pupils and teachers alike. The effectiveness of commercial videos distributed to retailers as point of sale support material could be enhanced with Titler. It could find a role in TV advertising as well as in displays used by game shows. Titler is already being used by a provincial Police force for their school presentations, and by a secondary school for its video information network. I'm sure that its versatility will make it successful in ways not yet thought of.

Titler is a straightforward package which is easy to use, well organised, well documented and reasonably priced, and one which provokes the imagination from the word go.

Product	*Titler*
Supplier	*Clares Micro Supplies*
	98 Middlewich Road,
	Northwich, Cheshire CW9 7DA.
	Tel.(0606) 48511
Price	*£149.95 inc. VAT*
	(with Genlock card £345.00 inc. VAT)

RU

Into the Arc

The Joys and Tribulations of Upgrading to an A5000

In a departure from our usual format Margaret Penfold relates her experiences on upgrading from an A3000 to an A5000.

I wanted a hard disc. The A3000 is not designed to accept one either cheerfully or cheaply. Upgrading to the A5000 seemed the most sensible solution, so that's what I did.

On unpacking the new system I found three manuals: a slim Welcome Guide, a RISC OS 3 User Guide and a new Applications Guide which included tutorials for Draw and Paint - a big improvement that.

Setting up an A5000 is easier than putting together an A3000. The connections all fit securely. The mouse fits into the rear of the keyboard - no more upturning a whole computer, wondering whether the instruction "arrow upwards" relates to the keyboard surface or to the upside down base.

Once the monitor was in position I found I had too little room in front of it for the keyboard. As the monitor can swivel and the coiled lead connecting the keyboard to the systems box is sturdy I was able (temporarily) to place the keyboard at the side of the systems box.

I switched on the computer and was greeted by a rushing sound. I panicked, checked the instructions, then realised I was listening to the cooling fan in the systems box. The noise becomes less noticeable during use but impinges if the computer is left on while other activities take place.

As soon as the Desktop appeared I clicked on the hard disc icon IDEdisc4. Acorn had already put the contents of Application discs 1 and 2 onto the drive. Later I was to rearrange the files to suit my own needs but it was useful to have them there ready for use.

The most useful applications, Alarm, Calc, Chars, Configure, Draw, Edit, Help and Paint had been moved into ROM, some with extra features.

Draw enhancements include converting outline fonts to paths, grading and interpolating (but I still added DrawPlus to hard disc for the extras it includes).

Alarm, which is also an icon bar clock, has a clearly readable digital display, but you can choose an analogue alternative if that is more to your taste.

Calc is a satisfactory calculator for normal purposes (there is a more sophisticated scientific calculator in the applications suite that automatically loads in Basic VI, good apparently at floating point calculations, but I haven't yet found a real use for it).

Chars' display is too compact for my ageing eyes so I have added André Timmerman's CHARSET to the hard disc.

The new Edit promises to make the Basic Editor redundant. I have used it for editing Basic but I am not yet at ease with it. I have struggled at intervals to use it for text printing but to date it will print out only one line per sheet of any text file. If the new Printer Manager (see last month's Into the Arc) is the true culprit I will forgive it since in all else it has proved an unexpected bonus. For the first time since buying a Canon bubble-jet 130e printer I get real harmony between computer and printer in all modes.

The boot file system is new and easy to use. You load applications onto the icon bar and open the directories you want seen whenever you start up. Then you simply drag the boot file icon into the root ($) directory viewer. If you want to start up with anything more complicated you can type it into the boot file.

Transferring files from floppies to hard disc is simpler than transferring from one floppy to another, but some complications arose from anti-piracy devices and computer incompatibility.

Pipedream 3 transferred with no trouble and is much easier to use from hard disc, especially when it calls upon Draw files. I

only use short, uncomplicated spreadsheets and databases, with less than 100 records and 10 fields, so I have not found RISC OS 3's extra speed particularly noticeable. For some Spell functions that I know take a long time on Pipedream I use David Pilling's superb, value for money, CrossStar. That application transferred happily and seems to work more quickly on the A5000.

Ovation was more complicated. I couldn't uninstall the main program to install it onto the hard disc; the floppy program disc refused to work; and there was no mention of Ovation in the A5000 release notes. I contacted RISC Developments and they replaced the old disc for one compatible with the A5000 absolutely free. Hurray for RISC Developments. Ovation works superbly on the A5000. It had been a little irritating on the A3000 needing innumerable disc changes as I constantly forgot to dismount discs, but I haven't had one fatal error message from Ovation since upgrading.

FontFX, another favourite application, transferred easily enough, but got into difficulties with fonts. The A5000 already has Corpus, Trinity and Homerton in ROM, and Porterhouse and Selwyn in the !Fonts directory. The manual tells you not to transfer other versions of these particular fonts. Fine, until you use FontFX. It won't accept the new fonts. I now provide it with its own font directory filled with fonts it can use.

The monitor (AKF18) which is part of the whole package deserves a mention. Several people have commented on its clarity in the default mode 27, but it was not until I received ModeAid (RISC User 5:3) that I appreciated its full versatility.

While still getting used to the A5000 I experienced two major set-backs. I had a few seldom-used files in 1st Word Plus format. Having been told that 1st Word Plus files could be printed out without using the parent application I sold my 1st Word Plus to help pay for the A5000. I did not retain a backup copy as I felt that would be dishonest. I had no sooner swapped computers than I found myself needing to print out a 1st Word file in a hurry. I put it into Edit only to be confronted by strings of control characters, none of which responded immediately to the normal search and replace facility. There is a section in the User Guide on how to print 1st Word Plus files, but I had not reached that part of the manual.

The other set-back occurred with my PC Emulator v1.34. It does not work on the A5000. There is an option to upgrade to a greatly enhanced version for about `45. This offer closed in March. I am still saving. However, the A5000 can read ASCII files that have been saved on PC format discs without using an emulator.

With so many applications in ROM I expected 2 Mb of RAM to be ample, but the A5000 devours memory, especially in the module area. I start up with the default allocations of 160K for screen memory, 64K for cursor, sound, system etc., 416K for the module area, and a 112K font cache. I boot up Calc(16K), Alarm(32K) and the Printer Manager(160K). This leaves me with only 1056K in RAM and about 150 spare in the module area. An application like Ovation needs 512K to start up. I should imagine it would be unbearably frustrating if not downright impossible to use an A5000 that came with only 1 Mb of RAM.

These few niggles, however, have not made me regret the considerable financial sacrifices needed to make the upgrade.

If other A5000 users would like to add to or comment on Margaret Penfold's experiences then please write in to our new Write-Back feature. RU

RISC User Disc Contents

Assembler Sort Routine

```
          Run adfs::RU_V8518/.$.!RFASoft.!RUn
Enter number of elements to be sorted : 10000

Generating random elements...

Sorting...

Checking ordering...

SORT COMPLETE
Sort took 0.51 seconds.

Press SPACE or click mouse to continue
```

An extended version of the ArmSort routine from last month's magazine, allowing Basic arrays to be sorted, instead of arrays stored directly in memory.

Acorn's FrontEnd Module and Example Application

```
                    Example (Completed)
BASIC -quit "adfs::RU_v05187.$.!Example.Example" InputFi

        [□]        FrontEnd Example
        Input:        InputFile

        ◇One pass        □Faster
        ◇Two passes

        Run                        Cancel
```
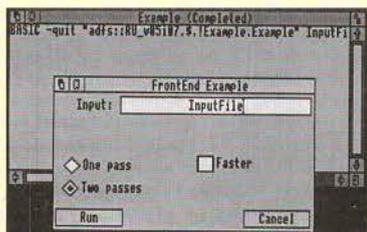
All you need to create a multi-tasking application from a non-multi-tasking routine. An example application is supplied, and all necessary modules are provided on this disc to enable such applications to be created.

FirstFew: A Rapid File Identification Utility

This multi-tasking application allows the first 217 bytes of any file to be displayed in a Desktop window, which can be very useful when trying

```
              First Few
           Read CLib
....P..........$..3......./..
.T...SharedCLibrary.C Library.3
.75 (03 May 1991)....0...0/0-6A
;.ë√sgè?0-é..[ãy.sbt..0.à?9.àUà
.à C..[ã-0 ..0 ..àr......à₪à..[
ã.` .&c°..i ..àtà..^ào.sâc..0.P
gè..[ã.`t..àUà.0 A.`Sà...0.à.ä.
```

to identify the file's contents (e.g. it is very handy for identifying a module's version number). The bytes are displayed as ASCII text, with unprintable characters displayed as full stops.
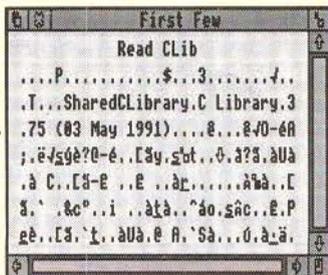
WP/DTP: More Penguin Graphics

Pop.

1996 1997 1998 1999
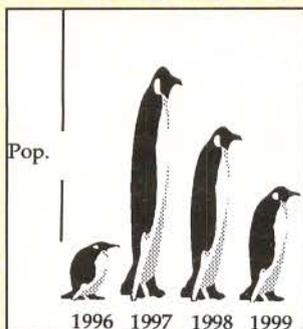
On the disc a Draw fi containing penguin graphic (courtesy of 4Mation), an Ovation document containing a penguin graph, and an Impression document of the same graph. This will allow you to produce your own penguin graphs.

Scanty: Improving Monochrome Scanned Images

Scanty is a routine that takes raw output from monochrome scanners and processes the sprites to improve their clarity. An example sprite is included on the disc to show the quality of output.

Wimp Function/Procedure Library Part 2

The second instalment of the Wimp Library deals with creation of icons. This example application shows how to change icons on the icon bar, how to use menu icons in windows, and how to change the contents of indirected text icons.

```
              Wimp Test
           Change
           State: 2
```

The complete Wimp Library to date is included.

June 1992

ADDITIONAL ITEMS REFERRED TO IN THE MAGAZINE

### High Quality Clip Art: Board Games, Music and Crosswords

The Chess clip art consists of a Chess board, two full sets of pieces, plus numbers around the outside of the board. The Draughts clip art is similar. The Music clip art contains full musical notation and staves, as well as a short example.

Finally, the Crossword clip art contains a template to enable the creation of your own crosswords. Two example crosswords are also included, complete with hidden answers.

Cartesian and Polar Graph Plotters
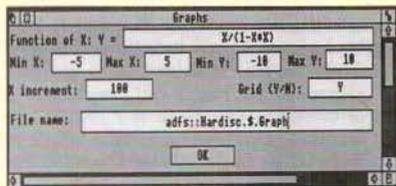
These two applications enable Cartesian and Polar graphs to be plotted in the form of Draw files. The Cartesian plotter has the ability to print asymptotes and axes, as well as an optional grid. The Polar graph plotter is an enhanced version of the application from RISC User Disc 5:3, and includes circular axes, radials, and the ability to plot a graph for negative values of r.

BONUS ITEMS

### KeyWindow: Desktop Function Key Strip
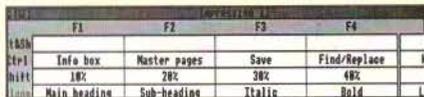
This is a Public Domain application that displays a function keystrip on the Desktop, which can be handy to owners of A3000s, A5000s and A540s who do not have a function keystrip holder. Up to 32 keystrips can be entered and saved to disc, and the function keys can be "pressed" by clicking in the window, which makes applications that use the function keys more user-friendly.


GiantFile and GiantRead
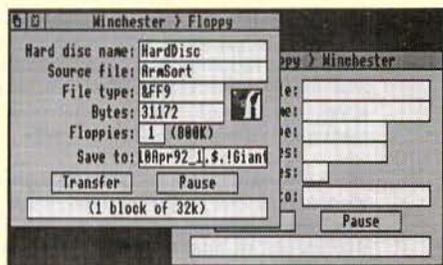
On this month's disc is an enhanced version of the GiantFile application for saving large files onto multiple floppies (from RISC User Disc 5:5), and a version produced for the Public Domain to restore files that have been saved by GiantFile. The read-write application will now detect automatically which filing system it is working on, as does the read-only version, allowing painless backing up of files that are too large to copy onto one floppy.

DDE Front End For ISO Pascal Compiler
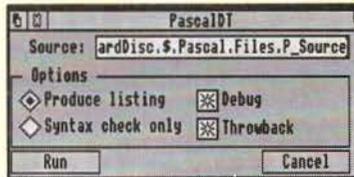
The application given here enables the Acorn ISO Pascal Release 2 compiler to be used from the Desktop, in the same style as the Desktop C and Desktop Assembler compilers. If you own the DDE, then the compiler can now support throwback (using the DDEUtils module supplied on this disc), and the compiled code can be linked. You will need to own the Pascal compiler to use this application.

ArcScan Data ArcScan indexes for this issue of RISC User and BEEBUG Vol.11 No.1.

a selection of bonus items for only £4.75

PDSView ————
Spacetech's Image Processor

Reviewed by Alan Wrigley

Spacetech's *PDSView* is an image manipulation package that was developed primarily for viewing and processing images such as those obtained from weather satellites and planetary spacecraft. The "PDS" in the title refers to NASA's Planetary Data System - a vast range of images collected from various sources and made available on CD-ROMs for the benefit of computer users. Given Acorn's decision to promote CD-ROM as an ideal vehicle for developers to provide applications and data for the Archimedes, this package is timely and should help to further that aim, particularly among educational users.

Although PDSView was designed with these and similar images in mind, it is a general purpose package equally suited for the processing of images from a wide range of other fields - science and medicine for example.

THE PACKAGE

PDSView comes as a two-disc set together with an A5 manual and a tutorial to take you through some of the steps involved in processing an image. One of the discs contains the PDSView application and also a further application *PDSMovies*, which is used to create animated sequences from a set of images. The other disc contains some demo images and a range of palettes to experiment with when processing images.

Spacetech can also supply CD-ROMs for use with the software. A complete set of 12 CDs of images from the Voyager 2 expedition has been released by NASA and is available from Spacetech. There is also a two-CD sampler set, which was used for this review. The first of these two CDs contains Voyager 2 images of Uranus and its system. The set includes many pictures of Uranus itself, of its major satellites, and of its rings, all taken as the spacecraft flew past. Some are distant images, some are close-ups showing geographical features, often quite stunning. The second CD has a collection of images and data files on a number of subjects. These include Mars, Jupiter, Saturn and their satellites, comet Crommelin, and land and sea images of the Earth. Presumably further sets of NASA pictures may become available in the future if there is sufficient demand.

Each of the CDs in the sampler set has many hundreds of files, all in the form of raw data which makes them ideal for image processing. The images are in 256-greyscale format, but in some cases a palette is supplied with the image, and in other cases it is possible to reconstitute a full-colour picture from three separate images taken through colour filters. A number of the images on both discs were taken consecutively and can be parcelled up into an animated display by using PDSMovies. An example of this is a sequence of the earth rotating.

USING PDSVIEW

Once the application is installed on the icon bar it is ready for an image to be dragged in. Apart from raw data files (filetype "Data"), Clear format files and also sprites can be imported. The image can later be saved in any of these formats (*Clear* is a format often used on other computer systems in which an image is held as separate red, green and blue components).

PDS files contain "labels" which provide some technical and background information on the image. These can be read and displayed by PDSView. Some images also have associated palettes and these can be loaded independently. The current palette can also be saved as a Clear file ready for loading in at any time, for the use either of the current or of any other image.

PALETTES

Once an image is loaded, PDSView provides a substantial range of processes which can be performed. For a start, the palette can be manipulated in a number of ways. Dithering can be applied to simulate 256 grey levels (if you have the PCATS Graphics Enhancer this is unnecessary since PDSView works quite happily with the Enhancer to give a full 256 grey levels). The range of shades from lightest to darkest can be arranged in linear, logarithmic or histogram fashion (the latter concentrates the grey levels at the band in the spectrum which contains the highest

concentration of image data, and is useful for bringing out detail in areas of low contrast).

The palette can also be artificially coloured by using RGB slider bars to select a start colour and an end colour, whereupon the palette will become a graduated scale between the two. The palette can be "stretched" over a small range of intensities; for example, if you have an image whose data is concentrated into a small band within the 256 levels, the full brightness and colour range can be extended over this band. Some images benefit greatly from this. You can also choose different colourings for different bands of the scale; this can result in some attractive posterisation effects.

IMAGE MANIPULATION

The image can be maintained within PDSView as both a primary image, which is dependent on the current palette and on which all manipulative operations are performed, and a set of secondary images consisting of the red, green and blue components of the primary. Menu options allow the transfer of images between the primary and secondary bands, and also allow a composite image to be made from the three secondary images, and each secondary image to be overlaid independently on the primary.

A large number of processes are possible. Arithmetic and binary operators can be applied to the image to alter the values of pixels; geometric operations can move, scale, reflect or (with RISC OS 3) rotate the image; a convolution matrix can be applied which can be user-defined, and the effect of this can be tested in a preview window before being applied to the whole image. It is not possible in this brief review to go into details of these and other manipulations, but overall they provide a range of powerful facilities for image processing.

MAKING MOVIES

PDSView can be used to create a sprite file containing a sequence of images, which can then be loaded into PDSMovies and displayed as a moving sequence. This is a very simple application with a few rudimentary controls to start, stop, reverse direction and alter the frame speed of the "movie". Some of the images on the NASA CDs were actually intended to be seen in this way; there is a sequence showing the earth rotating, and

another which shows a volcano erupting on one of the solar system's planetary moons. Creating the sequence is very simple; PDSView can operate from command scripts and this facility can be used to compile a movie from individual frames with very little effort, though it can also be done manually if required.
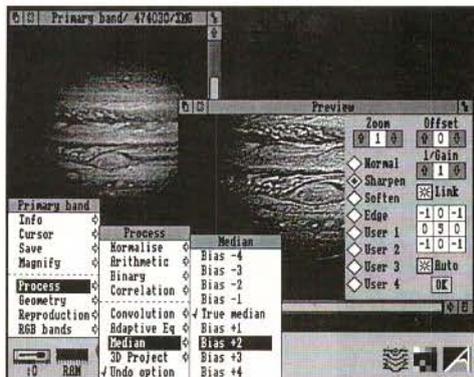
Using PDSView to process an image of Jupiter. The preview window is open to the right

CONCLUSIONS

PDSView has a wide range of facilities and I have not been able to mention or describe all of them here. It takes a little while to appreciate fully just what it can do, and I must say at this point that the manual is not one of the clearest I have seen. The information appears to be all there, but I feel that insufficient attention has been given to making all the options and their effects crystal clear to someone new to image manipulation. I realise that a lot more explanation means a larger manual and more time spent writing it, but when you pay £100 for a piece of software you are entitled to expect a degree of effort put into the documentation.

However, I have no such reservations about the software itself, which appears to work faultlessly and should prove to be very useful for many purposes.

Euclid

is the most widely used
3D graphics system for
the Archimedes.
It allows you to design
and model any set of
objects quickly using
tools which are similar to
those used in Draw.

edited by
Splice

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sprites into films or join
films together.
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gives the most widely used
3D animation system.
Films can be planned
using a spreadsheet
indicating just the key
positions of moving objects
including cameras.
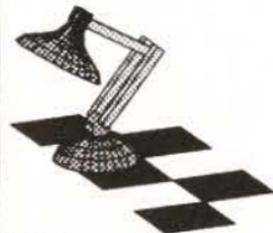
illumination by
ArcLight

which can add realistic
shadows and reflections to
Euclid files and Mogul films
All Ace products multitask
comfortably so that long
processes like Ray-tracing
occur in the background.

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Mathematical Function Plotting

Mike Williams reviews another offering from German software house Klein Computer.

I approached this review with some enthusiasm (having looked at the same company's *BestForm* - see RISC User 5:3), but I have to say at the outset that I ended it with disappointment. *Functionplotter* from Klein Computer of Germany is designed to plot two types of function: $y=f(x)$ and $z=f(x,y)$. In addition to plotting the resulting graphs, Functionplotter will produce 1st, 2nd and 3rd derivatives, calculate values for which $f(x)$, $f'(x)$, $f''(x)=0$ and calculate integrals (the area under the curve). For functions of two variables, the graph is in the form of a surface, with facilities for calculating surface area and volume.
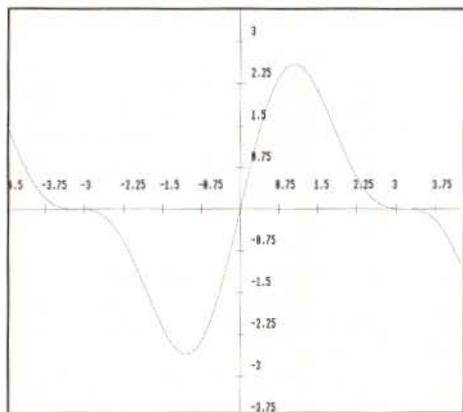

Figure 1. Plot of $y=2 \cdot \sin(x) + \sin(2 \cdot x)$

Functionplotter is installed on the icon bar. Clicking on this icon opens a blank window (ready for graph drawing). Clicking the Menu button over this displays a menu of four options: $y=f(x)$, $z=f(x,y)$, *Save* and *Print*. Selecting either of the first two options then leads to a dialogue box in which parameters can be set.

For functions of one variable you specify maximum and minimum values for the x and y axes, the number of *steps*, and the function to be plotted. The layout of the dialogue box and the use of option buttons is not to RISC OS standards, and the latter

unforgiveably affects other applications. These buttons select other options such as drawing the equations of derivatives, and calculating crossing points, turning points and integrals. Clicking on 'OK' draws the graph (see figure 1).
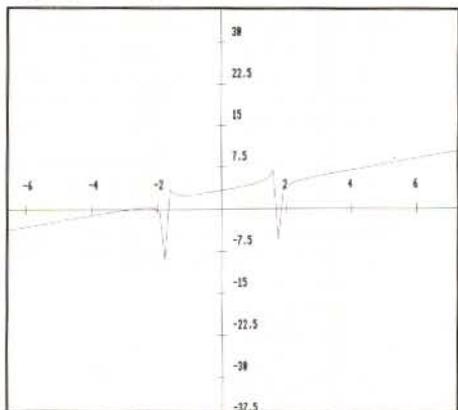

Figure 2. Plot of $y=(x^3+3x^2-3x-10)/(x^2-3)$

The axes are marked with values, but often in curious step sizes - for example, in steps of 0.75 when a range of ±4 was used. The graph itself is shown in red, but I have to question the correctness of graph plotting. For example, curves involving asymptotes would normally result in the curve and asymptotes being joined together (see figure 2), and asymptotes drawn in red the same as the curve. The number of 'steps' is ill defined, but is described as the number of straight lines used to construct the curve, 100 being the recommended value. Other derivatives are displayed in green, blue and yellow, the latter not being very visible against the white background.

There is no facility for defining your own intervals and values to label the axes. It would also have been useful to zoom in and out once the graph was drawn. Any calculations selected are placed well below the graph (using the system font only) and

Using ANSI C
Part 11: Memory Allocation with Flex

by Lee Calcraft

Last month we took a brief look at memory allocation, concentrating on the standard ANSI function *malloc()* and its close relatives. This month it is the turn of *flex*. In contrast to *malloc()*, this powerful set of functions is primarily intended for allocating and maintaining large blocks of memory. It is ideal for use in word processors, databases or any other application where you are dealing with large amounts of data held in RAM, the size of which can vary during use.

The *flex* suite of functions does not form part of the ANSI standard, but is supplied with RISC_OSLib. The header for the suite is *flex.h*, and there are just eight functions (6 if you have not upgraded to C Release 4):

```
flex_init()
flex_alloc()
flex_size()
flex_free()
flex_extend()
flex_midextend()
flex_budge()
flex_dont_budge()
```

flex_init() must be called (with a void argument) just once in a program, at some point before any other *flex* functions are called. *flex_alloc()* allocates the required amount of memory, while *flex_size()* can be used to return the amount allocated, and *flex_free()* to release it.

The two *extend* functions provide alternative ways to increase or decrease the size of the allocated block, while the last two functions (only available on Release 4) can be used to determine whether the *malloc()* heap can expand beyond the original wimpslot boundary.

USING *flex*

The single feature of the *flex* suite of functions which distinguishes it from its *malloc()* relatives is that it takes its memory from the Wimp pool, extending or contracting the task's wimpslot as necessary. In Release 4 with the new extendibility of *malloc()* this distinction is diminished, but *malloc()* is still unable to contract the wimpslot when an allocated area is freed.

Because of its extreme flexibility, you must take great care when using *flex* that your pointers remain valid. Whenever you call *flex_alloc()*, *flex_extend()*, *flex_midextend()* or *flex_free()* the software which maintains the *flex* allocations may move your currently allocated blocks around without warning.

It is for this reason that the so-called *flex* anchor (a parameter used to identify a particular *flex* block) is not simply a pointer as it is with *malloc()*, but the address of a pointer (i.e. a pointer to a pointer). In this way *flex* can keep the pointer updated so that it always points to the start of a particular block, no matter where it has moved that block to.

In his turn the programmer must take great care always to reference the block using the anchor supplied together with his own integral offsets. The moment that he uses a copy of a dereferenced anchor to access his flex block (e.g. by passing the pointer to a function) he is vulnerable to any movement of the block.

A PRACTICAL EXAMPLE

An example should throw some light on all this. The prototype for *flex_alloc()* takes the following form:

```
int flex_alloc(flex_ptr anchor, int n);
```

where *n* is the required size of the block. The function returns 1 if the allocation was successful, or 0 otherwise.

The code below will allocate a 16K block of memory, store the word "Memory" in it, print the size of the allocated block, and print out the word as proof, then free the block.

```
char *ptr;
flex_init();
if (flex_alloc((flex_ptr) &ptr,16*1024))
{
  strcpy(ptr,"Memory");
  bbc_vdu(4);
  printf("size%d\n",\
  flex_size((flex_ptr) &ptr));
  printf(ptr);
  bbc_vdu(5);
```

```
flex_free((flex_ptr) &ptr);
}
```

Note in this program segment the use of the cast to *flex_ptr type*. Another useful point is that *flex_free()* sets **ptr* to zero. This is very handy since it can be used as a flag to check whether a particular block has been released or not. In the above example, **ptr* will be zero after *flex_free()*. By initialising it to zero on declaration, we can ensure its validity as a flag at all times.

At the risk of stating the obvious, *ptr* must be defined so as to remain valid for the duration of the life of the flex block. In many cases this would mean that it is defined as a static variable. In such a case, the allocated block can be used long after the function in which the allocation was made has terminated.

Although it will not be obvious from running this example, the first *flex* allocation that a program makes will grab at least one page of memory from the Wimp pool. This is because *flex* obtains extra memory by extending an application's wimpslot, and this may only be achieved in page sized chunks. So to obtain just a single byte from *flex* will cost you up to 32K of memory - assuming that this is a first call to *flex*, or that previous calls have allocated memory up to a page boundary.

EXTENDING OR CONTRACTING A BLOCK

You can extend or contract an allocated *flex* block by using one of the two *extend* functions:

```
int flex_extend(flex_ptr,int newsize)
int flex_midextend(flex_ptr,int at,\
                              int by)
```

Both return zero for failure, or 1 for success. The first simply extends the block, moving it and its contents as appropriate, while the second adds a new 'slice' of memory at the position *at* and of size *by* within the original block (negative values cause a slice to be removed). Again the block will be moved as appropriate, but this time the contents of the block from *at* to the end will be shuffled up to insert the slice.

As a test, if you insert the following lines immediately after *bbc_vdu(4)* in the example

above, the word "Memorially" will appear in place of the word "Memory". This is because *flex_midextend()* has been used to insert 4 bytes of extra allocation between the "r" and the "y" of the original allocation, and we have then set the extra slice to read "iall". Note in this context that the allocation does not need to be an integral number of words, or to be on a word boundary.

```
if (flex_midextend((flex_ptr)&ptr,5,4))
{
  ptr[5]='i';
  ptr[6]='a';
  ptr[7]='l';
  ptr[8]='l';
}
```

THE RELATIONSHIP WITH THE MALLOC HEAP

As mentioned last month, in Release 4 the *malloc* heap is permitted to automatically extend by increasing the wimpslot. However, this would have a knock-on effect on all allocated *flex* blocks, since each time that *malloc()* grabs another page of contiguous memory, all *flex* blocks must be shuffled up to make room.

Because this would cause applications to crash which were written for Release 3 and which relied on *flex* changes occurring only when *flex* itself was called, Release 4 normally inhibits CLib from extending the wimpslot once *flex_init()* has been called.

Although this is the default on Release 4, two functions are provided to control this state of affairs. The function *flex_budge()*, which cannot be called directly, but is registered with CLib as follows:

```
_kernel_register_slotextend(flex_budge)
```

causes the flex store to be moved up if CLib needs to extend the heap. This can be cancelled at any time by registering *flex_dont_budge()* in the same way:

```
_kernel_register_slotextend\
                    (flex_dont_budge)
```

For further details, see the Release 4 manual, chapter 16. Next month we will take a look at aspects of the compiler and linker, including the use of libraries.

RU

Creating DIY Multi-Tasking Applications the Easy Way

David Spencer shows how Acorn's Desktop Development Environment can be extended to other uses, and all necessary modules are on the magazine disc.

Acorn's DDE, as reviewed in RISC User Volume 4 Issue 9, is a set of linked language development tools all running within the Desktop environment. This set includes the C compiler, ARM assemblers, the linker and so on. These tools all have one factor in common - they were originally designed to run as single-tasking command line applications. In order to make them multi-tasking, Acorn developed a method that would allow them to be started from the Desktop, setting up options through a dialogue box, and run in a window, with any output produced saved with a normal save box.

Although this multi-tasking 'front-end' was designed for Acorn's compilers and language tools, it can equally be applied to any command line driven application or utility, both commercial or home produced. In this article we shall show exactly how this is done.

There are two modules supplied with the DDE that are responsible for the multi-tasking tools. The first of these is called *TaskWindow*, and this allows an otherwise non-multitasking application to be pre-emptively multi-tasked, with all its output being sent to a window. It is a version of this module that is used by *Edit* to create 'Task Windows'. The second module, and the one of most interest to us here, is called *FrontEnd*. The purpose of this module is to provide an icon on the icon bar for the tool, and allow the command line parameters to be set up by way of a dialogue box, and optionally via a menu as well. *FrontEnd* will then handle the calling of the *TaskWindow* module, and provide a window to display the output. Finally, it generates the save box needed to save any output file produced by the tool.

WHAT CAN IT DO?

Before continuing, it's worth noting exactly what type of applications, or tools, can be run in this way. Essentially, the tools need to be non-interactive, which means that once started by a star command, they do their job without requiring any further action from the user, produce their output, and then exit back to the command line. Additionally, if they produce file output, then only one object should be produced. This means that most language compilers and other file 'processors' are eligible, but the likes of text editors obviously aren't.

Some applications offer a mixture of interactive and non-interactive operation. For example, the Acorn ARM Assembler and ChangeFSI will both run non-interactively, but enter an interactive mode if all the necessary information is not given on the command line. This class of tools is OK, because you can easily ensure that all the necessary information is given up front.

FrontEnd allows a dialogue box to be opened, either by clicking on the tools icon bar icon, or by dragging a file to it. Options can then be set in this dialogue box, and through its associated menu, and the tool run. This setup process can optionally be bypassed and the tool automatically run when a file is dragged to it, and similarly, the output file can be saved automatically rather than producing a save box. The layout of the dialogue box is determined by the template that you provide, while the relationship between this and the command line parameters, as well as the menu entries, are controlled by a descriptive text file included for each tool.

Each icon in the dialogue box can add a parameter to the tool's command line. Taking the C compiler as an example, any text within the 'Include' writable icon is added to the command line preceded by the '-I' qualifier that tells the compiler this is a list of *include* paths. This is an example of an icon adding a combination of a fixed part ('-I') and a variable part (the path list) to the command line. On the other hand, if the 'Compile only' icon is enabled this just adds the fixed string '-c' to the command line. In other words, this is a simple on-off qualifier. Menu entries also add to the command line if they are enabled. For single entries they add a fixed string, while entries with writable sub-menus can add the contents of that entry, optionally preceded by a fixed string.

As well as adding to the command line, icons can be made to increase or decrease the numeric values of other icons. This is normally used for up and down arrow icons that modify a value, as in Acorn's *Common* tool. Enabling an icon can also change the dialogue box itself. An example of this is the 'Wildcards' icon in the *Find* tool. When enabled, this extends the dialogue box to display a set of icons representing the available wildcards. As a further twist, you can specify that selecting a particular icon will deselect another if it is currently selected. This is used to prevent clashes between mutually exclusive options, such as 'Compile only' and 'Preprocess only' in the C Compiler. In a similar vein, selecting an icon can grey-out another one. An example of this is in *LibFile*, where selecting the 'Create' icon greys out the writable box for the library name, as a name isn't applicable in this case.

The description file for each tool must define precisely how the dialogue box and menu work, and to achieve this, its structure is rigidly defined in the DDE User Guide by means of a description language called Extended Backus-Naur Form (EBNF). This defines the exact syntax and semantics for the tool's description, but doesn't define the pragmatics (i.e what each entry actually does). EBNF is easily understood, but can be daunting if you have never met it before. The best way to study it is to look at the description file for a particular tool (the file 'Desc' within the tool's application directory) and compare that against the EBNF definition.

USING FRONTEND

To use *FrontEnd* with a new tool, all you need to do is to build an application directory for the tool and provide the appropriate description file. To show how this is done, the remainder of the article will concentrate on producing a very simple tool that will merely display its command line, so that you can see what is going on.

A PRACTICAL EXAMPLE

To start with, create an application directory called *!Example*, and copy into it the files *Messages* and *Templates* from the C Compiler's directory, !CC. Next, create a *!Sprites* file containing a suitable sprite called !example. If you want, you can use the standard screwdriver and scanner tool icon by copying the !Sprites file from !CC, but remember to rename the sprite itself.

The *Templates* file contains a total of nine templates, eight of which are standard for all *FrontEnd* tools and shouldn't be changed. The ninth, 'Setup', is the main dialogue box template. For the purposes of this example, delete the existing 'Setup' template and create a new one. Note that for all tools, icons zero and one must be menu icons containing the text 'Run' and 'Cancel' respectively, and the entry for icon zero must be indirected. In the new template, make icon two writable, icon three an option button and icons four and five radio icons. You can call the icons whatever you want, but the option and radio buttons must have the button type 'Click'.

All applications require a *!Run* file, and again this is best copied from !CC, although you will need to change the line that sets 'CC$Dir' to set 'Example$Dir' instead, and change the final line to read:

```
*FrontEnd_Start -app Example -desc
<Example$Dir>.desc
```

The run file includes the RMEnsure commands needed to load the modules required for *FrontEnd* to operate, and then starts *FrontEnd* using the command *FrontEnd_Start. This takes two parameters, the first is the name of the tool, and the second the filename of the description file that we are about to write.

Before writing the description file, we need to design the command line format, though for existing applications of course this is already determined. Quite arbitrarily, our command line format will be, together with the icons that control it, an input filename (icon 2), and output filename preceded by '-out', and three qualifiers, '-faster' (icon 3), '-onepass' (icon 4) and '-twopass' (icon 5). The last two of these are mutually exclusive. We'll also allow two further parameters to be set from a menu, '-noerrors' and '-listfile', the second of these being followed by a filename. For example, a typical command line may look like this:

```
*example infile -out outfile -faster
-onepass -listfile $.list
```

Note that we do not need to specify the output filename in the dialogue box, as the file will be saved using a standard save box which allows the name to be set anyway.

A suitable description file is given in listing 1. This should be entered as a text file using Edit and saved with the name *Desc* within the *!Example* directory. This file can be split into a number of distinct sections,

each with appropriate keywords marking the start and end.

The first section, the tool details, defines the name of the tool, the command used to run it, the version number and the wimpslot needed. The second section specifies that a window is required to display the output from the program as it is running. The third section specifies that the output filename must be preceded on the command line by '-out'. What happens is that *FrontEnd* provides a temporary filename on the command line, and when you save the output using the save box it copies this to the final destination. The next section controls the dialogue box, and is split into three sub-sections. The first of these specifies that the string in icon two is added directly to the command line, whilst icons three, four and five add the specified qualifiers to the command. This is followed by a sub-section defining the defaults for the icons, and a further one controlling what happens when files are dragged in. In this case, files dragged to the icon bar are put into the writable icon replacing anything already there, whilst files dragged to icon two (the writable icon) are added to it using space as a separator.

The fifth section performs a similar task, but for the menu. It lists each entry name together with the string it maps to, and the title for the sub-menu and its length in the case of the second entry. Again, a second sub-section specifies the default states. The final section controls which icons deselect which others. In this case, it is set so that the '-onepass' and '-twopass' qualifiers cannot be active together.

All that remains now is the example program itself. This is very simply:

```
10 REM >Example
20 SYS "OS_GetEnv" TO A$
30 PRINT A$
40 END
```

This file should be saved as *Example* within the application directory. You are now in a position to try out the new tool, and see what effect changing the icons and menu selections has on the command line.

WHAT NOW?

The combination of this introduction and overview together with the DDE User Guide and the examples in the form of the tools supplied with the DDE, should allow you to incorporate *FrontEnd* into any suitable application. This is not only useful to add tools to the DDE, but could also be used totally separately. Indeed, you could licence the *FrontEnd* module from Acorn and use it as part of a commercial application.

The modules TaskWindow, FrontEnd and also DDEUtils are included under licence from Acorn on this month's magazine disc.

Listing 1. The description file

```
tool_details_start
    name            "Example";
    command_is      "<Example$Dir>.Example";
    version         "1.00";
    wimpslot        32k;
tool_details_end

metaoptio
ns_start
    has_auto_save        ^.leafname from icn 2;
    has_text_window;
    has_summary_window;
metaoptions_end

fileoutput_start
    output_option_is  "-out";
    output_dft_is     produces_output;
fileoutput_end

dbox_start
    icons_start
        icn 2  maps_to string;
        icn 3  maps_to "-faster";
        icn 4  maps_to "-onepass";
        icn 5  maps_to "-twopass";
    icons_end

    defaults
        icn 3  off,
        icn 4  off,
        icn 5  on;

    imports_start
        drag_to icn 2 inserts icn 2
separator_is " ";
        drag_to iconbar inserts icn 2;
    imports_end
dbox_end

menu_start
    "No errors"        maps_to "-noerrors";
    "Listing"          maps_to "-listfile "
sub_menu "    Listfile:    " 256;

    defaults
        menu  1 off,
        menu  2 off;
menu_end

deselections_start
    icn 4 deselects icn 5;
    icn 5 deselects icn 4;
deselections_end
```

RU

Using Acorn's New PC Emulator (2)

Kevin Bracey continues his quick guide to DOS on the Archimedes.

HARD DISCS

Unlike RISC OS systems, machines running DOS are highly reliant on disc storage for loading the operating system and for overlays in large applications (such as Windows 3). Modern PCs usually have high density (1.44 Mb) floppy drives and 20 Mb to 80 Mb of hard disc storage, and software increasingly expects this. To this end you will probably need to partition off part of your hard disc for the PC Emulator, especially as most Archimedes don't have high density disc drives.

CREATING THE HARD DISC PARTITION

To set up a new PC hard disc partition, first choose how much PC space you want, as it cannot be easily changed later. I would personally recommend 7 Mb or more, but it really depends on what PC software you use and how large your hard disc is. Make sure you have at least this much free space on your hard disc and run the PC Emulator (version 1.60 or later). Call up the *Configuration* window from the icon bar menu, and you will see a section headed *Hard disc drive files: 0.* To create the partition click on the '0', and the drive C icon will light up. Type the desired filename into the writable icon if you don't want to use the default filename, enter the size of drive (a whole number of megabytes) in the space to the right, and then click on the *Create* icon. You now have an unformatted DOS disc.

FORMATTING THE HARD DISC PARTITION

The following instructions apply to MS-DOS 3 which is supplied with the PC Emulator when bought as a separate product. The procedure with DR DOS (supplied with Learning Curve systems) will be slightly different, so consult your manual.

Save your configuration settings as the default (press OK in the save box) and enter the PC emulator, booting up from your MS-DOS disc. Now we come to the tricky bit. At the A> prompt type:
```
FDISK
```
This will present you with a menu of options. Accept the defaults (by pressing Return) to format the whole of drive C as a DOS hard disc.

Now type:
```
FORMAT C: /S
```
to make the hard disc bootable. We now want to copy the whole of the MS-DOS disc onto the hard disc. We do this by typing:
```
MD C:\DOS
COPY *.* C:\DOS\.
DEL C:\DOS\COMMAND.COM
DEL C:\DOS\CONFIG.SYS
COPY CONFIG.SYS C:\
```

The final step is now to tell the emulated PC where to find MS-DOS on the hard disc. We can do this by creating an AUTOEXEC.BAT file. Type:
```
EDLIN C:\AUTOEXEC.BAT
I
ECHO OFF
PATH=C:\;C:\DOS\
[Press Ctrl-C]
E
```
If you already have an AUTOEXEC.BAT file, then you should just add the line:
```
PATH=C:\;C:\DOS\
```
to it.

All you need to do now is remove your MS-DOS floppy (the PC will only boot from hard disc if the floppy disc drive is empty) and press Ctrl-Alt-Delete to reset the PC. It should now boot up from the hard disc. You can now proceed to install your PC software onto the hard disc, as described in the software's manual. Files can be copied using the COPY command (see *Filing System Commands*).

USING MULTIFS

If you want to look around the directory structure of your PC hard disc, or indeed floppy discs, or if you wish to transfer files from DOS to RISC OS (or vice-versa), it is easier to do so from within the RISC OS Desktop than the DOS command line. For this reason Acorn supplies Arxe System's MultiFS with the PC Emulator (RISC OS 3 users see below). This allows you to access your DOS discs in a similar fashion to ADFS discs. Running MultiFS will provide you with an icon, or icons, on the left-hand side of the icon bar representing each of your PC floppy and hard disc drives. Click on these in the normal fashion to look at DOS floppies or the PC hard disc partition.

Problems can be caused by the different format of filenames under DOS. DOS filenames can be up to 8 characters in length, with a 3 character extension (filetype). RISC OS filenames are limited to 10 characters. This means that a DOS filename may not be translated accurately. For example: CONFIG.SYS appears as CONFIG/SYS but AUTOEXEC.BAT appears as AUTOEXEC/B

This will cause no problems when copying from DOS to RISC OS. It may be a problem when copying from DOS to DOS or from RISC OS to DOS, as extensions will be truncated, resulting in incomprehension by the PC. To solve this, two alternative types of name translation are selectable from the icon bar menu. *Full* will attempt to display the entire, untruncated name. This will stop you copying from DOS to RISC OS, but DOS to DOS copying will now work correctly. Note that you will get the occasional *Not a heap block* error on this setting, but this is perfectly harmless.

Hierarchical translation works by placing the files in directories corresponding to the DOS extension. For example: CONFIG.SYS appears as SYS/.CONFIG (i.e. CONFIG in the directory SYS/).

This is more cumbersome, but is the only way of copying from RISC OS to DOS with a full filename and extension.

If you have a hard disc partition that does not use the default filename supplied by the PC Emulator (adfs::4.$.PC.Drive_C), then you must tell MultiFS about it, as it won't otherwise be able to find it. Load the *!Run* file from the *!MultiFS* directory into Edit, and go down to the line:

```
*If "<PCe$Drive_C>" = "" THEN *Set
PCe$Drive_C ADFS::4.$.PC.Drive_C
```

and change the filename to that of your partition, then save it. Then double-click on the application or on the !Run file to make it take effect, or reboot.

RISC OS 3

When designing the new Archimedes operating system, Acorn decided that it was about time that they made the Archimedes more PC-compatible. Thus version 2.50 of the ADFS, supplied as part of RISC OS 3, can read, write and format DOS discs just as easily as if they were ADFS discs. It can understand all DOS formats on both $3^1/2$" and $5^1/4$" discs. If you have a high density drive then you can use 1.2 Mb and 1.44 Mb DOS discs. To look at a DOS floppy disc just click on the floppy disc icon, and the computer will detect automatically that it is a DOS disc, and display its contents in a standard filer window.

To look at your hard disc partition, double-click on it. Its file icon (see figure 1) resembles a directory folder, and when you

double-click on it the operating system treats it as a directory containing all your DOS files. If you are using version 1.60 of the PC emulator, you will need to set the filetype of the DOS partition yourself for this to work, as version 1.60 gives it the *Data* filetype.

NEW USERS

If you are new to DOS, then you will probably find its command-line based operating system somewhat of a shock after

the RISC OS Desktop, and for this reason I have tried to make my instructions above as explicit as possible. I shall now devote a little time to DOS conventions to get you started, but for more detailed information you should refer to a book about MS-DOS.

FILENAMES

Under DOS, filenames take the form:

```
C:\WINDOWS\WIN.EXE
```

In this form, C: is the drive specifier (A:, B: are floppy drives; C:, D: are hard drives). The first '\' specifies the root directory (equivalent to '$.'), and subsequent '\' symbols perform the same function as '.' in ADFS filenames. '.EXE' is the filetype extension, indicating that the file is *EXECutable* (similar to a RISC OS Absolute file). So an equivalent filename in RISC OS might be:

```
adfs::4.$.Windows.Win
```

DOS COMMAND	RISC OS COMMAND
dir [<dirname>] /W	Cat [<dirname>]
dir [<dirname>]	Ex [<dirname>]
a:	Drive 0
c:	Drive 4
cd <dirname>	Dir <dirname>
md <dirname>	CDir <dirname>
del <file spec>	Wipe <file spec> -C
copy <source> <dest>	Copy <source> <dest>
xcopy <source> <dest>	Copy <source> <dest> R
cd ..	Up
type <filename>	Type <filename>
format <drive>	Format <drive>
chkdsk [<drive>]	Verify [<drive>]
print <filename>	Copy <filename> printer:
diskcopy <source> <dest>	Backup <source> <dest>

Table 1

FILING SYSTEM COMMANDS

Table 1 shows a quick cross-reference of some of the more common DOS commands to their RISC OS equivalents. Note that to back up a disc on a single floppy system, you should use:

```
DISKCOPY A: B:
```

and the computer will prompt for disc swaps as appropriate. A similar technique should be used for copying files from one disc to another, e.g.:

```
COPY A:FILE1 B:FILE1
```

To run a file simply type its name at the command line (you needn't include the .EXE extension to run an EXE program).

Being a disc operating system, DOS is stored entirely on disc, and is loaded into RAM when the PC is switched on. So that it doesn't occupy too much of the computer's memory, many of its commands, such as FORMAT and PRINT, are in fact stored on disc and loaded when necessary.

If you have a hard disc, then it should be set up (as shown above) with the DOS kernel and extra commands on it. If you are using floppy discs, then you should have one DOS boot disc (a back-up of the disc supplied with the PC Emulator). You can also make any, or all, of your other discs *bootable* when you format it, using the command:

```
FORMAT <drive> /S
```

If a disc is bootable, then the PC can load up DOS from it when it is reset, so you do not need to put the DOS disc back in unless you want to use one of the extra commands. A bootable disc stores around 64K less than a non-bootable disc.

THE MOUSE

To use your mouse under the PC emulator you will need the Acorn mouse driver, which is supplied with the PC Emulator with the filename AMOUSE.COM. If this isn't already on your hard disc or DOS boot disc then copy it, and you will need to alter your AUTOEXEC.BAT file to load it automatically when the computer is reset. This can be done with EDLIN. Type:

```
EDLIN AUTOEXEC.BAT
100
I
AMOUSE.COM
[Press Ctrl-C]
E
```

The '100' gets you to the end of the file.

CONCLUSION

I hope you have found these articles useful. If you have any queries, or hints of your own, then please write to RISC User so that we can get a regular column on the PC Emulator going. *RU*

High Quality Clip Art
Board Games, Music and Crosswords

by Kell Gatherer

For reasons of space, these applications are only available on this month's magazine disc.

This collection of clip art covers the games of Chess and Draughts, musical notation and crossword creation. The board games clip art consists of a board, all the pieces for both sides, and in the case of the Chess board, numbers and letters round the sides of the board for referencing moves.

The musical Draw file contains all the commonly used musical notations, including all the notes,

The Chess Set

accents, staves, clefs, braces, time signatures and more, and the notes can be copied and dragged in Draw to create any musical score required.
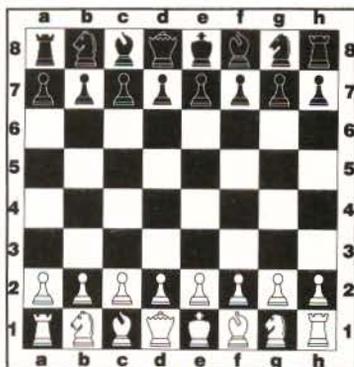
The crossword clip art consists of a blank crossword grid from which you can create your own crossword templates, and two example crosswords complete with clues and hidden answers.

The clip art is of a very high quality indeed, and because the files are in Draw format, the art can be magnified without loss of detail. *RU*

Cartesian Graph Plotter

by Brian Daulton

The Cartesian Graph Plotter application is a companion to the Polar Graph Plotter originally published on RISC User disc 5:3, and an enhanced version of this application is also included on this month's disc.

The Cartesian Graph Plotter allows Draw files containing graphs to be created. Graphs can be of the form $y=f(x)$ and $y^2=f(x)$, and up to five graphs can be drawn on the same axes. There is an option to include a grid, and the resolution of the graph can be determined by setting the x increment (i.e. the distance between each evaluation of the function). The ranges of the two

Example Cartesian Graph
$$y^2=x/1-x^2$$

axes can be entered, and the Draw file can be saved to any disc.

A very useful feature of the program is that if a graph has any vertical asymptotes then they are drawn automatically as dotted lines. All the options are entered through a dialogue box in the Desktop, and the program is written in the same style as the Polar Graph Plotter.

An enhanced version of the Polar Graph Plotter is also included on the disc. This allows the user to choose whether the radial axes should be drawn, whether the circular graduations should be drawn, and whether the graph should be plotted for negative values of R. *RU*

The 80 Column

A4 CONTINUOUS PAPER

In this month's *80 Column* I want to deal with a couple of problems which were raised by visitors at the BETT exhibition back in January. The first of these relates to the use of A4 continuous fanfold paper with a desktop publishing package. When using continuous paper, each time a new page is reached in the document being printed, the paper must be moved up to the top of the next sheet. This is known as the "top of form position". Obviously this position must be the same for every sheet of paper or else the printing will creep up or down the page on each subsequent sheet. For this reason, printers have dip switches to set the form length so that each time a form feed is encountered, the printer can calculate the exact distance from the last form feed or from the start of the document, and move to that position.

However, some printers only allow lengths of 11" or 12" to be set from the switches, because most fanfold paper is supplied in these lengths. Since A4 paper is 11.69" long, either of these settings will cause the printing to be displaced by an unacceptable amount which will accumulate with each successive sheet. Thus the problem is not, as some users believe, due to the package producing the output but rather to the printer itself.

Fortunately there is a solution at hand, which is that most printers also recognise a software code to set the form length. If this is sent at the start of each print job it will override the dip switch setting. It is quite easy to do this by modifying the printer driver's PrData file. Towards the beginning of this file is a line starting *job_prologue:*. Assuming you have an Epson-compatible printer, simply alter this line to read:

```
job_prologue:    "<27>C<70>"
```

This sets the form length to 11.67" (70 lines) which is as close as it is possible to get to the actual 11.69" required.

PRINTER PINS

The second problem concerns printer emulations in the PrinterDM printer driver - specifically the difference between 9- and 24-pin printers. As supplied by Acorn, PrinterDM has a number of emulations already incorporated. The most important of these are the two groups providing Epson FX and Epson LQ emulation, since most printers nowadays claim to be Epson-compatible.

Epson FX series printers have 9 pins, while the LQs have 24 pins. By and large the codes for all the various printer functions are the same between the two types, but there is one crucial difference: because of the different spacing between the pins, the print head on an FX is moved vertically in increments of 1/216", while on an LQ it is 1/180" (or 1/360" in high resolution). However, some of the codes to move the print head are the same for both types of printer. For normal text printing this is irrelevant, since both operate to a standard text spacing of 1/6". For graphics printing, however, or if you want to deviate from standard spacing while printing text, the result will be different for each.

A problem has arisen because it seems there may be some 9-pin printers on the market which claim Epson LQ emulation. This may very well be true if you simply look at the printer codes recognised by the printer, but if you try to print from, say, a DTP package onto a 9-pin printer using an LQ emulation, you will almost certainly hit trouble. Even text printing from a word processor could be affected if the package allows the line spacing to be altered from the standard. So if you have a 9-pin printer, you must use the FX emulation in PrinterDM, or alternatively add a definition to the PrData file for your own printer.

RU

Wimp Function/Procedure Library Part 2

by Mark Moxon

I n this, the second instalment of our Wimp library, the routines are concerned with icons. Before describing the routines, a quick word on the subject of libraries is probably appropriate.

Libraries are collections of routines that can be shared between many programs. A Basic library program is the same as any other Basic program, except that it only contains functions and procedures. If the command:

```
LIBRARY "filename"
```

is included at the start of a program, then the routines in the Basic library program *filename* are automatically loaded into memory by Basic, and can be used as if they had actually been appended to the end of the program.

So whereabouts on disc should we store this library program? Well, for Wimp applications there are two main possibilities: inside the application's directory or in the disc's library. In the case of the former, the library is for the sole use of that application, but it does mean that the application is self-contained. In this case a system variable must be set up in the application's *!Run file*, like this:

```
Set WimpLib$Dir <Obey$Dir>
```

and then the command in the *!RunImage* program that installs the library will be:

```
LIBRARY "<WimpLib$Dir>.WimpLib"
```

If the program is put into the disc's library (normally a directory called Library in the root of a disc) then all that is needed is the line:

```
LIBRARY "%.WimpLib"
```

in *!RunImage* to call the library, and the library can be shared by many applications. However, the application is not self contained, and will only run on systems that have the Wimp library in their library directory. I prefer the former method, and the example applications in this series use it.

In either case, the same library can be used by any applications, as the routines contained in the library are not application specific. The difference is just that in the first method each application has its own individual copy of the library, and in the second many applications share one copy.

ENTERING THE EXAMPLE APPLICATION

The library listing should be added to the library from last month, and saved as *WimpLib* as before. The line numbers are such that this month's listing continues where last month's listing ended.

The example application should be entered exactly as for last month (i.e. create a *!Run file*, a *!Sprites file*, save *WimpLib* inside the directory, and type in the example listing given here as *!RunImage*). Then create a sprite file called *Sprites* in the application directory containing three mode 12 sprites with height 17 and width 34, called *test1*, *test2* and *test3*. The application will display these sprites on the icon bar in sequence.

PART 2: ICONS

Routine 8: FNcreate_icon

Creates an icon definition in window *whandle*. If you have used WimpLib routines to create windows, then the origin for co-ordinates (0,0) is at the top left of the window, and positive x% and y% place the icon below and to the right of this corner. Returns icon handle.

block%	Block for SWI call
whandle%	Window handle
x%	X co-ordinate of top left corner of icon
y%	Y co-ordinate of top left corner of icon
w%	Width of icon (+ve)
h%	Height of icon (+ve)
flag%	Icon flags (see Routine 9)
text$	Icon text or sprite name
icon1%	Icon data word 1
icon2%	Icon data word 2
icon3%	Icon data word 3

Routine 9: FNicon_flags

Returns value of icon flags word.

text%	Icon contains text
sp%	Icon is a sprite
bor%	Icon has a border
chor%	Icon is centred horizontally
cver%	Icon is centred vertically
fill%	Icon has a filled background

anti%	Icon is in an anti-aliased font
redraw%	Icon cannot be redrawn entirely by the Wimp (i.e. redraw requests are returned)
ind%	Icon data is indirected
rjust%	Icon text is right justified
adj%	If selected with Adjust don't cancel others in the same ESG
half%	Icon is displayed at half size (if a sprite) button% Icon's button type
esg%	Icon's ESG number (0-31)
invert%	Icon is selected (inverted)
shade%	Icon is shaded (not selectable)
del%	Icon has been deleted
fcol%	Icon foreground colour (anti%=0)
bcol%	Icon background colour (anti%=0)
font%	Font handle for anti-aliased text (anti%=1)

Routine 10: FNload_sprites

Creates a user sprite area and loads a sprite file into it. Returns a pointer to the sprite area.

file$	Name of sprite file to load

Routine 11: FNicon_bar_icon

Places a sprite icon on the icon bar. Returns icon handle.

block%	Block for SWI call
spname$	Sprite name (must be in Wimp sprite pool)
side%	Which side of icon bar (-2 left, -1 right)

Routine 12: FNchangeable_bar_icon

Places a changeable sprite (i.e. sprite name is indirected) on the icon bar. Returns icon handle.

block%	Block for SWI call
spname$	Sprite name
side%	Which side of icon bar (-2 left, -1 right)
spname%	Pointer to buffer in which to store sprite name
sprite%	Pointer to sprite area containing sprite

Routine 13: PROCchange_icon

Changes first piece of indirected icon data (i.e. indirected text or indirected sprite name).

block%	Block for SWI call
whandle%	Window handle
ihandle%	Icon handle
new$	New indirected data (i.e. new icon text or sprite name)

!Run Image for example application

```
 10 REM          >!RunImage
 20 REM Program   Wimp Library Part 2
 30 REM Version   A 1.0
 40 REM Author    Mark Moxon
 50 REM RISC User June 1992
 60 REM Program   Subject to Copyright
 70 REM           Not Public Domain
 80 :
 90 LIBRARY "<WimpLib$Dir>.WimpLib"
100 PROCinit
110 PROCwindow
120 mask%=FNpoll_flags(1,0,1,1,0,1,1,1
,0,0,1)
130 REPEAT
140  PROCpoll
150 UNTIL quit%
160 SYS "Wimp_CloseDown",task%,&4B5341
54
170 END
180 :
190 DEF PROCinit
200 task_name$="WimpLib2"
210 ON ERROR IF FNwimperror(block%,ERR
,REPORT$+" (internal error code "+STR$(E
RL)+")",task_name$,0,1)=2 THEN SYS "Wimp
_CloseDown":END
220 quit%=FALSE:state%=0
230 DIM block% &1000,ind% 2,spname% 20
240 sprite%=FNload_sprites("<WimpLib$D
ir>.Sprites")
250 SYS "Wimp_Initialise",200,&4B53415
4,task_name$ TO ,task%
260 ENDPROC
270 :
280 DEF PROCwindow
290 bicon%=FNchangeable_bar_icon(block
%,"test1",-1,spname%,sprite%)
300 wflag%=FNwindow_flags(1,1,1,0,0,0,
0,1,1,0,0,0,0,0,0,0)
310 whandle%=FNst_create_window2(block
%+4,200,700,300,100,300,100,0,0,"Wimp Te
st",0,0,wflag%)
320 !block%=whandle%
330 SYS "Wimp_OpenWindow",,block%
340 flags%=FNicon_flags(1,0,1,1,1,1,0,
0,0,0,0,9,1,0,0,0,7,12,0)
350 wicon1%=FNcreate_icon(block%,whand
le%,75,5,150,48,flags%,"Change",0,0,0)
360 flags%=FNicon_flags(1,0,0,0,0,0,0,
0,0,0,0,0,0,0,0,0,0,7,0,0)
370 wicon2%=FNcreate_icon(block%,whand
le%,75,53,100,48,flags%,"State:",0,0,0)
380 flags%=FNicon_flags(1,0,0,1,1,0,0,
0,1,0,0,0,0,0,0,0,0,11,0,0)
```

```
   390 wicon3%=FNcreate_icon(block%,whand
le%,200,53,24,48,flags%,"1",ind%,0,0)
   400 ENDPROC
   410 :
   420 DEF PROCpoll
   430 SYS "Wimp_Poll",mask%,block% TO re
ason%
   440 CASE reason% OF
   450 WHEN 2    : SYS "Wimp_OpenWindow
",,block%
   460 WHEN 3    : SYS "Wimp_CloseWindo
w",,block%:quit%=TRUE
   470 WHEN 6    : PROCclick
   480 WHEN 17,18 : IF block%!16=0 THEN
quit%=TRUE
   490 ENDCASE
   500 ENDPROC
   510 :
   520 DEF PROCclick
   530 IF (block%!8=4 OR block%!8=1) AND
block%!12=-2 AND block%!16=bicon% THEN P
ROCchange
   540 IF (block%!8=4 OR block%!8=1) AND
block%!12=whandle% AND block%!16=wicon1%
 THEN PROCchange
   550 ENDPROC
   560 :
   570 DEF PROCchange
   580 state%=(state%+1)MOD3
   590 PROCchange_icon(block%,-1,bicon%,"
test"+STR$(state%+1))
   600 PROCchange_icon(block%,whandle%,wi
con3%,STR$(state%+1))
   610 ENDPROC
```

Wimp Library

```
   650 :
   660 DEF FNcreate_icon(block%,whandle%,
x%,y%,w%,h%,flag%,text$,icon1%,icon2%,ic
on3%)
   670 LOCAL handle%,ist%
   680 !block%=whandle%:block%!4=x%
   690 block%!8=-y%-h%:block%!12=x%+w%
   700 block%!16=-y%:block%!20=flag%
   710 ist%=((flag%>>6)AND4)+(flag%AND3)
   720 CASE ist% OF
   730 WHEN 1,2,3:$(block%+24)=text$
   740 WHEN 5,6,7:block%!24=icon1%:block
%!28=icon2%:block%!32=icon3%:$icon1%=tex
t$
   750 ENDCASE
   760 SYS "Wimp_CreateIcon",,block% TO h
andle%
   770 =handle%
   780 :
```

```
   790 DEF FNicon_flags(text%,sp%,bor%,ch
or%,cver%,fill%,anti%,redraw%,ind%,rjust
%,adj%,half%,button%,esg%,invert%,shade%
,del%,fcol%,bcol%,font%)
   800 LOCAL flag%
   810 flag%=text%+(sp%<<1)+(bor%<<2)+(ch
or%<<3)+(cver%<<4)+(fill%<<5)+(anti%<<6)
+(redraw%<<7)+(ind%<<8)+(rjust%<<9)+(adj
%<<10)+(half%<<11)+(button%<<12)+(esg%<<
16)+(invert%<<21)+(shade%<<22)+(del%<<23
)
   820 IF anti%=0 THEN
   830 flag%+=(fcol%<<24)+(bcol%<<28)
   840 ELSE
   850 flag%+=(font%<<24)
   860 ENDIF
   870 =flag%
   880 :
   890 DEF FNload_sprites(file$)
   900 LOCAL file%,size%,sprite%
   910 file%=OPENIN file$
   920 size%=EXT#file%+16:CLOSE#file%
   930 DIM sprite% size%
   940 !sprite%=size%:sprite%!8=16
   950 SYS "OS_SpriteOp",&109,sprite%
   960 SYS "OS_SpriteOp",&10A,sprite%,fil
e$
   970 =sprite%
   980 :
   990 DEF FNicon_bar_icon(block%,spname$
,side%)
  1000 LOCAL flag%
  1010 flag%=FNicon_flags(0,1,0,0,0,0,0,0
,0,0,0,0,3,0,0,0,0,0,0,0)
  1020 =FNcreate_icon(block%,side%,0,-68,
68,68,flag%,spname$,0,0,0)
  1030 :
  1040 DEF FNchangeable_bar_icon(block%,s
pname$,side%,spname%,sprite%)
  1050 LOCAL flag%
  1060 flag%=FNicon_flags(0,1,0,0,0,0,0,0
,1,0,0,0,3,0,0,0,0,0,0,0)
  1070 =FNcreate_icon(block%,side%,0,-68,
68,68,flag%,spname$,spname%,sprite%,LEN(
$spname%)+1)
  1080 :
  1090 DEF PROCchange_icon(block%,whandle
%,ihandle%,new$)
  1100 !block%=whandle%:block%!4=ihandle%
  1110 SYS "Wimp_GetIconState",,block%
  1120 $(block%!28)=new$
  1130 !block%=whandle%:block%!4=ihandle%
  1140 block%!8=0:block%!12=0
  1150 SYS "Wimp_SetIconState",,block%
  1160 ENDPROC
```

RU

Wimp Function/Procedure Library Part 1 Example Program

Last month's instalment of the Wimp Function/ Procedure Library referred to an example program that was unfortunately not present but it was on the magazine disc. The missing !RunImage program is printed below.

```
  10 REM           >!RunImage
  20 REM Program    Wimp Library Part 1
  30 REM Version    A1.0
  40 REM Author     Mark Moxon
  50 REM RISC User  May 1992
  60 REM Program    Subject to Copyright
  70 REM            Not Public Domain
  80 :
  90 LIBRARY "<WimpLib$Dir>.WimpLib"
 100 PROCinit
 110 PROCwindow
 120 mask%=FNpoll_flags(1,0,1,1,0,1,1,1
,0,0,1)
 130 REPEAT
 140   PROCpoll
 150 UNTIL quit%
 160 SYS "Wimp_CloseDown",task%,&4B5341
54
 170 END
 180 :
 190 DEF PROCinit
 200 ON ERROR IF FNwimperror(block%,ERR
,REPORT$+" (internal error code "+STR$(E
RL)+")",task_name$,0,1)=2 THEN SYS "Wimp
_CloseDown":END
 210 quit%=FALSE
 220 DIM block% &1000,ind% 50,title% 25
 230 task_name$="WimpLib1"
 240 SYS "Wimp_Initialise",200,&4B53415
4,task_name$ TO ,task%
 250 ENDPROC
 260 :
 270 DEF PROCwindow
 280 whandle%=FNst_create_window(block%
+4,200,700,200,250,1000,500,0,0,"Wimp Te
st - Long Title!",title%)
 290 !block%=whandle%
 300 SYS "Wimp_OpenWindow",,block%
 310 ENDPROC
 320 :
 330 DEF PROCpoll
 340 SYS "Wimp_Poll",mask%,block% TO re
ason%
 350 CASE reason% OF
 360   WHEN 1    : PROCredraw
 370   WHEN 2    : SYS "Wimp_OpenWindow
",,block%:IF !block%=whandle% PROCredraw
 380   WHEN 3    : SYS "Wimp_CloseWindo
w",,block%:quit%=TRUE
 390   WHEN 17,18 : IF block%!16=0 THEN
quit%=TRUE
 400   ENDCASE
 410 ENDPROC
 420 :
 430 DEF PROCredraw
 440 SYS "Wimp_RedrawWindow",,block% TO
more%
 450 WHILE more%
 460   sxmn%=block%!4 :symn%=block%!16
 470   sxmx%=block%!12:symx%=block%!8
 480   wxmn%=block%!4-block%!20
 490   wymn%=block%!16-block%!24
 500   wxmx%=wxmn%+1000
 510   wymx%=wymn%-500
 520   PROCrect(sxmn%,symn%,sxmx%,symx%,
11) : REM Red
 530   PROCrect(wxmn%,wymn%,wxmx%,wymx%,
10) : REM Green
 540   SYS "Wimp_GetRectangle",,block% T
O more%
 550 ENDWHILE
 560 ENDPROC
 570 :
 580 DEF PROCrect(xmin%,ymin%,xmax%,yma
x%,colour%)
 590 SYS "Wimp_SetColour",colour%
 600 MOVE xmin%,ymin%:DRAW xmax%,ymax%
 610 MOVE xmin%,ymax%:DRAW xmax%,ymin%
 620 ENDPROC                      RU
```

VOLUME 4 SPECIAL DISC

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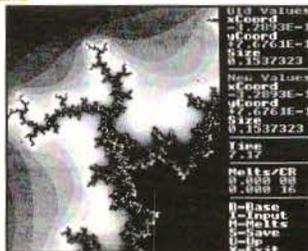
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FILEFIND performs a hierarchical search for a given file, application or directory.

SETTYPE change the filetype of any file by dragging it to the icon bar.

HOTKEYS allows single key presses to perform a wide range of functions.

MOUSE change the mouse speed merely by clicking on an icon.

PRINT allows files to be printed just by dragging them to the icon bar.

NOTEPAD provides for up to eight pages of jottings.

DUSTBIN sits on the icon bar and allows files to be deleted by simply dragging them to its icon.
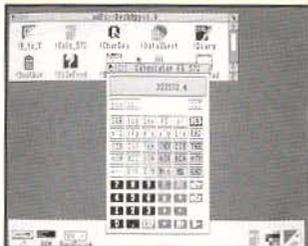
Scientific Calculator

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Twelve powerful multi-tasking utilities, supported by a comprehensive manual - an essential aid to any programmer

SPYGLASS select any running application and display in a window the contents of the memory allocated to it.

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EASYWIMP ready-made Wimp application shell to be used for the creation of single-window applications.

WIMP MESSAGE MONITOR monitors the Wimp polling system.
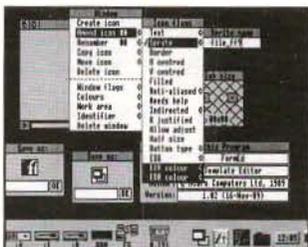
Template editor

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0092b	TypeStudio	47.59	PAL1a	ArcScan III Library Disc	7.95
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0094b	Hard Disc Companion II	47.59	PDA1a	Desktop Applications I	9.95
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C Notebook

Compiled and Linked by Lee Calcraft

RESCUING dbox_fillin() KEYPRESSES
Boris Perryman

When using both writable icons and menu icons in a dialogue box, the functions *dbox_fillin()* and *dbox_fillin_fixedcaret()* do not normally react to keypresses corresponding to the capital letters of the menu icons - such as *Save, reDo* etc. because all keypresses are directed to the writable icons.

But if the writable icon with the input focus contains a validation string which excludes these characters, the problem is solved. So for example a validation string of A0-9 would allow a calculator to use the letter "C" as a shorthand for *Calculate* etc. Note that the new "K" option in validation strings in RISC OS 3 specifically caters for this situation.

WATCH OUT FOR BOUNDARIES
David Pilling

When creating structures it is worth noting that they are always rounded up to word boundaries, and that ints will be put on *word* boundaries, chars on byte boundaries, and shorts on two-byte boundaries. So it is better to write:

```
typedef struct fixedbit {
    int    word;
    char   byte;
    short twobytes;
} fixedbit;
```
than:
```
typedef struct fixedbit {
    char   byte;
    int    word;
    short twobytes;
} fixedbit;
```
The size of the first is 8 bytes, the second 12 bytes.

USING atexit()
Tony Shew

If you want to ensure that vital things such as saving files are performed before *exit()* is called in a non-Wimp program, you can use the standard ANSI function *atexit()* to register functions to be called immediately prior to termination. See K & R for further details. This also works with Wimp tasks, but here the better approach is to use the Pre-quit message.

MORE EOF ERRORS
Alun Evans

The cure given in April's C Notebook for the cryptic EOF message does not always do the trick. Using Source Edit it seems that some invisible character such as a tab may become inserted before the end of the file. I find that the following rigmarole fixes the problem. Use Ctrl-Down to move the caret to the true end of the file, then mark from the final closing brace of your code to the end of the file, and use *delete block* to delete the marked area. Finally insert a final carriage return after the closing brace.

A STAND-ALONE DEBUGGING FUNCTION
David Pilling

The following function can form a simple but effective debugger. It prints debugging information on a specified line (given as the first parameter of the call) on the Desktop, overwriting whatever happens to be displayed there.

Like last month's debugging function it can be passed a variable number of arguments exactly as with *printf()*. Note that its use of *akbd_pollsh()* enables you to pause the program each time that it encounters a call to the function - just hold down Shift, then press any key to continue.

Here is an example of its use:
```
dprintf(0,"x=%d name=%s",x,name);
```
This would display the two variables on the top text line of the screen.

```
#include "akbd.h"
#include "bbc.h"
#include <stdarg.h>

void dprintf(int line,char * format, ...)
{
  va_list args;
  char v[128];

  va_start(args, format);
  vsprintf(v, format, args);
  bbc_vdu(4);bbc_vdu(30);
  while(line--) bbc_vdu(10);
  printf("%-40s",v);
  bbc_vdu(5);
  if(akbd_pollsh()) bbc_get();
  va_end(args);
}
```

Please send us your C hints - all published hints will be paid for. 𝑅𝑈

Technical Queries ??

Alan Wrigley answers more of your questions.

Dear Sir

I would like to display text in a larger than normal size within a window, but I can't see a way to do it unless I use an outline font or draw the characters myself. Is this correct?

Colin Murray

The system font when used in VDU 5 mode *can* in fact be scaled on screen on both the x and y axes, using the multi-purpose VDU 23 command. The full syntax for this particular operation is as follows:

```
VDU 23,17,7,flags,dx;dy;0;0;
```

Bits 1 and 2 of the flags byte are used to indicate whether the character size or spacing or both are to be affected. If bit 1 is set, then *dx* and *dy* are used to set the horizontal and vertical size respectively of any character subsequently displayed on the screen, in pixels. If bit 2 is set, *dx* and *dy* set the character spacing in the same way. The normal character size is 8x8 pixels (in mode 12 for example), so to set both the size and spacing to double on each axis, you would use:

```
VDU 23,17,7,6,16;16;0;0;
```

This is not the end of the story, however, since the character pixel size is dependent on mode. If you are using a multisync mode, for example mode 20, then in order that normal text should look the same size on the screen as with a non-multisync mode, the vertical character size and spacing are doubled to 16 pixels. So to make your program mode independent (which all Wimp programs should be), you must first ascertain the character size and then scale that in the VDU command, rather than scaling an absolute value of 8x8. To do this, you need to call OS_ReadVduVariables to read variable numbers 162-165, which are x-size, y-size, x-spacing and y-spacing respectively for VDU 5 characters. This call requires an input buffer to be passed in R0, in which the variable numbers to be read are placed in

consecutive words, terminated by -1, and an output buffer to be passed in R1, into which the values returned are placed in the corresponding positions. So to double up all the values as before, you would use the following code:

```
DIM in% 19,out% 15
!in%=162:in%!4=163
in%!8=164:in%!12=165:in%!16=-1
SYS "OS_ReadVduVariables",in%,out%
xsize%=!out%:ysize%=out%!4
xspace%=out%!8:yspace%=out%!12
VDU 23,17,7,2,xsize%*2;ysize%*2;0;0;
VDU 23,17,7,4,xspace%*2;yspace%*2;0;0;
```

Note that in this case we have issued two separate commands to set first the size and then the spacing. This is to cater for the possibility that the size and spacing may not have the same value. Note, too, that once you have issued these VDU commands, *all* character output to the screen will be at the new size, regardless of which application is outputting the characters. For this reason you must revert to normal size characters as soon as you have finished redrawing your window, by repeating the VDU commands, this time using the values obtained for *xsize%* etc. above.

Dear Sir

When converting a variable into a string using STR$ there is often a long mantissa. What is the easiest way to control the accuracy of the conversion?

Keith Vernon

While it is easy for a computer to represent integer values, since these can be based simply on a bit count, it is not so easy to represent floating point values with absolute accuracy. Whatever algorithm is used to encode the number, there will inevitably be rounding errors in certain cases. You can see this at first hand by typing in the following line from Basic:

```
FOR i=0 TO 10 STEP 0.1:PRINT i:NEXT
```

At some point you will see numbers such as 3.59999999 begin to appear. Further rounding errors occur when you use STR$, as you have

Technical Queries ??

pointed out. Replace *PRINT i* in the above line with *PRINT STR$i*, and you will see a different set of figures on the screen.

As in so many cases, however, Basic comes to the rescue, this time with the special variable @% which is specifically provided to determine the format in which numbers are to be displayed. Byte 0 of this variable gives the field width when tabulating with commas. By default this is 10, so if you type:

```
PRINT 1,2,3,4
```

you will see that the numbers are spaced out by 10 columns each.

Bytes 1 and 2 of the variable determine the number of digits printed, and the type of format to be used respectively. If fixed format is chosen (byte 2=2), byte 1 represents the number of digits after the decimal point, while in general format (byte 2=0), byte 1 represents the total number of digits. The default is general format with 9 digits. The number of digits displayed affects the accuracy of the number; a greater number of decimal places is more likely to introduce the rounding errors we have described above. For example, if you alter the digits to 8 instead of 9 before typing in the line given above, as follows:

```
@%=&80A
FOR i=0 TO 10 STEP 0.1:PRINT i:NEXT
```

you will notice a marked difference.

However, if you then substitute *PRINT i* with *PRINT STR$i* as before, the rounding errors will still be there. To cure this, we need to set byte 3 of @% to a non-zero value, which indicates that the format set with the rest of the variable should also be used by STR$. For example:

```
@%=&102040A
```

would set a field width of 10 and print all figures to 4 decimal places, employing the same format if STR$ is used. If you set the format to suit your own particular requirements, this should effectively overcome the rounding problems that occur with the default settings.

In some cases, it may be easiest to forget about floating point numbers altogether and work with integers on multiples of 10 or 100 times the actual value. For example, suppose you are writing a program that handles monetary values. Provided that you will not be handling fractions of a penny, you could easily do all your internal calculations in pence, using integer variables, and only introduce decimal points into the actual string displayed on the screen, not into the values themselves. To do this, you could use a function such as:

```
DEFFNstring(val%)
a%=ABS(val%):a$=STR$(a%)
IF a%<100 a$="0"+a$:IF a%<10 a$="0"+a$
IF val%<0 a$="-"+a$
=LEFT$(a$,LEN(a$)-2)+"."+RIGHT$(a$,2)
```

which will turn a positive or negative value passed to it in pence (e.g. 1234 or -12) into a string in pounds and pence (12.34, -0.12).

MORE ON SPRITE ICONS

Technical Queries in the April issue (Volume 5 Issue 5) addressed the question of how to display sprite icons in windows created using FormEd. Richard Hallas has written to say that the methods proposed in the article were more drastic than was necessary, since there is a word in the window definition itself specifically provided for a sprite area pointer. This is at block%+64, and so all that is required is to insert the following line between loading the template and creating the window:

```
block%!64=spritearea%
```

However, this will only work as it stands for text-plus-sprite icons; any sprite-only icons still need to have their own definitions altered to point to the sprite area. The word which needs to be altered in this case for each relevant icon is block%+88+32*icon+24. Also, if you have set the global pointer in the window definition as described above, you cannot then mix sprites from your own area and from the Wimp pool without also altering the icon definitions of one group. *RU*

have appeared from students at the Moscow State University, and are very good, especially considering that the authors cannot afford to buy books, magazines or software, not even discs of PD programs.

All of the items mentioned here are available from any good PD library (including the RISC User PD Software Library - see below) - the quality of a PD library can only be judged from experience or personal recommendations. It is a good idea to compare the catalogues from several different sources (including the RISC User PD library) and choose whichever library appears to offer good value combined with quick service. If you want a particular item, check what other items each library includes on the same disc, and choose whichever one contains the most attractive-sounding extra software.

This article has only covered a few items of good PD software, and we intend to look at many more in the future. If you find a piece of software particularly useful or interesting, please do write in, giving the name and author of the program in question, and saying what you like about it.

All the PD software referred to by Simon Burrows is available a a special collection within the RISC User PD Software Library, at just £1.60 per disc inclusive of VAT and p&p - for more details see our PD page opposite.

Other sources of PD software are:

The Data Stream, 32 Holinwell Avenue, Wollaton, Nottingham NG8 1JZ.

Arch Angel PD Library, P.O.Box 41, Exeter, Devon EX4 3EN.

The DataFile, 22 Duxford Drive, Aldergrove, Co. Antrim BT29 4BG. _RU_

are only visible after much scrolling. The integral calculation uses the specified maximum and minimum x values as the limits - it would have been useful to draw a graph and then specify separately the limits for calculating an integral.
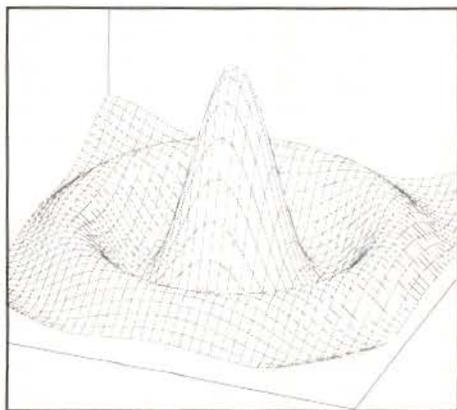

Figure 3. Plot of z=10·sin(sqr(x^2+y^2))/sqr(x^2+y^2)

Three dimensional plots are specified similarly with a choice of function plotting

(grid lines) which gives the best indication of the surface (see figure 3) or contour plotting.

The other menu options allow any graph to be saved as a Draw file or to be printed using RISC OS printer drivers.

Functionplotter is supplied on a single disc with a plain 36 page manual. The features are just about adequately described, but there are no examples here or on the disc.

In conclusion I have to say that this product currently lacks both sophistication and flexibility. Compared with what is available from PD libraries or elsewhere (see the Cartesian graph plotter on this month's magazine disc for example), Functionplotter regrettably is limited in what it has to offer.

Product	Functionplotter
Supplier	Klein Computer
	Haßlocherstraße 73,
	D-6090 Rüsselsheim,
	Germany.
	Tel. (+49) 6142 81131
	Fax (+49) 6142 81256
Price	£20.00 (DM67.00) _RU_

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DEMOS

PD12 Disc 5 sound + graphics demos from Hugo Fiennes of the Serial Port.

PD21 Disc 3 demos, Balls, Balls2 and BIA-Tetris (the latter is also a game).

PD22 Disc 3 demos, Noah, Chips and Demo1

PD23 Disc 4 demos, Bounce, Crimbo, ColDemo and Rotate.

PD24 Disc 3 demos, Demo, Gopher and Overscan.

PD25 Disc 4 demos, Deskballs, DudsDemo, EgIntro, and Z-Brother.

PD26 Disc 4 demos, Sister, SkullDemo and Wibble.

PD27 Disc 2 demos, GrannyChow and Windows

PD36 Disc 3 demos, Leapin' Fish, SinDemo and Swallow.

PD37 Disc A massive four-part demo called 'No RISC No Fun'. This has to be the best demo yet for the Arc. Amazing!

PD42 Disc 4 demos, AceDemo4, Cubitus, Scorpius and 3D_RayPic.

GRAPHICS

PD13 Disc 'Projector application - displays films created with the Ace Computing Mogul package. Six example films are included.

PD18 Disc displays several still and animated ray traced pictures.

PD33 Disc displays several still and animated ray traced pictures.

PD44 Disc A selection of fractal generation programs and utilities.

PD45 Disc 2 applications, Creator and Translator, allowing exchange and display of graphics picture files between Archimedes and other computers. Also some high quality demo pictures plus a mode converter and a mode utility.

DRAWING AND ART

PD15 Disc Arctist+ and BigM, both 256 colour art packages, along with Design, a symmetrical pattern designer.

PD41 Disc 4 applications: 'Display' for displaying of Draw files by dragging them into a window. 'Drawplus' is an object oriented drawing package that may be used as an alternative to Acorn's Draw, with many enhancements over Draw. 'Drawstrip' enables the easy creation of function keystrips using Draw. 'Drop' enables Draw files to be rotated in 3D and then saved again in their new perspective.

EDUCATION

PD14 Disc !REG, a student register system which replaces classroom registers. A system for managing the recording and reporting required by the National Curriculum and data files for Pipedream for NC statements of attainment in science.

MUSIC

PD01 Disc Soundtracker playroutine plus the following tunes: Aces-Hi, Acidbat2, Afl, Alf, ArtNoise, AxelF, Backpopped, Big, Blitzwing, Blizzard02.

PD02 Disc Soundtracker playroutine plus the following tunes: BatMix,

Bobby, Bnll, Burning, Chartmix, Chipgene, Demo2.

PD03 Disc Soundtracker playroutine plus the following tunes: Confusion, Crack, Criminal, Dear, Demons, Dns, Elephant

PD04 Disc Soundtracker playroutine plus the following tunes: Doc1, Funky, Ducksong, Electric_2, EndTheme, Enutorned, Equinoxe5, FinalTFDMI, FinalVis.

PD05 Disc Soundtracker playroutine plus the following tunes: Pyc, GoodTune, Hello, HowDeepIs, Huba, Humanoid, Hunters, Hymn, Idea, Igarun, IntoB.

PD06 Disc Soundtracker playroutine plus these tunes: Jazzid, Jmi_China, LastNinja2, Like, Magnetic4, MegaForce0, Minimize, Mod, New_Biz.

PD07 Disc Soundtracker playroutine plus these tunes: MyWay, Nothing-2, Oooert, Outrun, Pacman, Pat, PetShop, Pretend, SaySaySay2, Steeve

PD16 Disc 230 tunes for loading into the music package Maestro, variety enough to suit most tastes.

PD08 Disc Soundtracker playroutine plus these tunes: Setrox, Tarzan, TGM, TheModel2, TjatMikes, Toccata, Unit, Vprtex, We're, Yezz.

PD09 Disc Soundtracker playroutine plus these tunes: Acid_House, Bananas, Cambod, Crok, Cute, Dallas, Deadlock, Dragnet, Yazoo.

PD10 Disc Soundtracker playroutine plus the following tunes: DemoSmash, FFSound, Five, GSCTheme, HiEnergy, Oxygene2, Piano, PopCorn, PumpUp.

PD11 Disc Soundtracker playroutine plus the following tunes: Rescue, Rockit, Round,Scratch, Scratch2, Show, SmokeOn.

PD40 Disc The Jukebox playroutine plus Tracker tunes: Acid House, Six2, TeddyBears, Canon, Breathe, Rag It.

PD43 Disc An application Coconiser, very similar to Tracker, that allows the creation of tunes by sequencing digitally sampled sounds. Demo tunes.

PD46 Disc The Jukebox playroutine plus the following Tracker tunes: Beginning, Blue Peter, Frog Song, IceIceBaby, Monty Mix, Over The Bow, Rawhide, SkyXmasMix, Thunderbird

PD47 Disc A selection of SoundTracker and Tracker playback routines and utilities including a keyboard and spectrum analyser.

TRICKS AND NOVELTIES

PD17 Disc A collection of 27 amusing novelty programs. Some produce the weirdest effects!

PD32 Disc An application Cookie - puts up a window containing a 'fortune cookie' or a well-known saying or piece of philosophy. Be warned! Very addictive once seen, also rather zany. There are some 6000 sayings. Also a scroll text demo with soundtrack music called Invade which also features a space invaders game within it.

UTILITIES AND APPLICATIONS

PD28 Disc 20 utilities of various types: 1stFile, ASm2, CloseUp, Crypt, Dir, Display, Drawlink, Dustbin, Filetypes,

FileUtils, Find, Keys, Loadprogs, MultiPrint, NewBar, NewCodes, PD _Impress, PrinterTx, ProgCalc, and Set_Type.

PD31 Disc 17 utilities/applications: Address Book, Address Labeller, DiscSpace Display. Desktop Calendar, Cassette Inlay Printer (Two of these!), DPS Disc Reader, Automatic Application Creator, ROM Speed-Up, Arc to Psion Transfer, System Utilities, STD Codefinder, Trash Can, Front end for Twin, Front end for View, Volume Controller, Control of Pointer by keys.

PD38 Disc 15 utilities/applications: a 1st Word Plus file converter, a 1st Word Plus printer driver for Star LC200, a text outliner application, a hypertext program (like Genesis), a CD database, a video tape database, CMOS RAM saver and loader, disc sector editor, file save reminder, fast formatter, font printer, a COPY options setter, TEXT to DTPfile converters, plus a print spooler.

CLIPART AND PICTURES

PD29 Disc Over 4 megabytes of Sprite pictures which can be used as clip art. The files are in a compressed form and the decompression utility is included.

PD30 Disc Over 2 megabytes of Sprite clip art and Draw filess. The files are in a compressed form and a decompression program is included.

FONTS

PD35 Disc Eleven PD outline fonts for use in RISC OS applications: Stencil, American Typewriter, Bodoni, Revue, Brushscript, Cooper Black, Fritz Quad, Garamond, Hull, London and Optima.

COMMS

PD34 Disc Arcterm3, a full comms software package. Arc100, a scrolling text terminal. Grapevine, another scrolling text terminal but multi-tasking. TaskData, a multi-tasking viewdata comms package. Download, an application for transferring files between machines via serial port. Timer, a utility for recording on-line time and call cost. The latest version of Sparkplug, the file decompression program. A complete set of programs for running a bulletin board system on your Archimedes.

GAMES

PD19 Disc 10 games: Adevnture, Battle, Battleships, Connect4, Darts, Fish (Pelmanism), Fruit Machine, Golf, Hangman and Impact.

PD20 Disc 12 games: Invaders, Line Of Five, Othello, Pelmanism, Rocks, Rubik Cube, Simon, Solitaire, Star Trek, Tetris, Tile Trial and Yahtzee.

PD39 Disc 6 games: Pac Man (in a window!), Arc Patience, Breakout (inside an icon!!!), Creepie (Centipede), Pelmanism and International Golf (Brilliant!)

SAMPLER DISC (PDS1)

Contains the following sample programs from our Public Domain Software Library:
SoundTracker, Accounts, SC Label, Follow, Hangman, Multiprint, Rotate, STD and Wanda

---

Public Domain Special Collection

All the PD software referred to in Simon Burrows' article on this subject has been collected together on five discs (in some cases using ArcFS for Compression).

These discs are available to readers at our standard price of **£1.60** per disc (inc. VAT, p&p) as follows:

PDX1	Draw Plus	**PDX3**	ArcFS
	Label		Risc BBS
			Impulse II
PDX2	Address D		
	AGP	**PDX4**	ArcFS
	Daily		PVray
	Draw Cross	**PDX5**	Hangman
	Memphis		Interface
	Translatr		

This special collection will be available for a limited period after which all these applications will be incorporated into the standard PD software library (on a thematic basis).

Public Domain Special Collection

Write-Back... Write-Back...

**Compiled by Mike
Williams**

Comment, appeals, help and information by readers for readers rounded up by Mike Williams. If you want to contribute to these pages in any way then please address all your letters to **Write-Back** at the usual editorial address.

Spontaneous Combustion

Following Tom Wallers account of how his monitor was engulfed in flames when cleaning the screen with an aerosol foam cleanser, we have received details of correspondence between the Fire Research Station in Hertfordshire and RS Components Ltd., suppliers of the foam cleanser used. It appears that current versions of this product have more detailed and explicit instructions regarding safety. In particular, users are urged to switch off any equipment before use. The possible fire hazard derives from the propellant, which is stated in RS's catalogue as being flammable, and not from the foam itself.

RS Components also stated that the cleanser had a recommended shelf life of 52 weeks from time of purchase, although this is not marked on the can, and the current catalogue gives a figure of two years.

A5 Folded Pamphlets on A4 Paper

Bill Hensman writes with regard to Peter Merton's review of the book *First Impression* (see RISC User 5:5):

The review mentions the difficulty of trying to produce a folded A5 pamphlet. Like the reviewer, I found difficulty in working out how to do this, so perhaps my method, though a bit clumsy, will be of interest.

First set up Master page 10 (A4 landscape style). Then drag two frames to this page, side by side to contain the A5 pages you want to print. The sizes of these frames will depend on how much margin you want and guttering for the fold. Text is then typed into these boxes as usual. To print out, set the printer to A4 sideways printing.

It works reasonably well, and I saved a copy of the setup with blank frames so that this can be easily installed. It does seem to me that there must be a better way of doing this - perhaps you can persuade Peter Merton to explain his method.

Reader Participation

Our call for more reader participation has prompted the following response from A.J.Griffon:

Change is inevitable - OK - but please don't let's have too many reviews in RISC User. There are enough other magazines which seem to cater for no other purpose but advertise software, and all seem to cover the same ground.

Your magazine is unique in passing practical information to people who perhaps don't have a professional background in computing, but who want to be more than just users of the machines. Series such as **Mastering the Wimp** *cannot be found elsewhere and are invaluable.*

I feel sure it must be very difficult to keep up the standard which has been set, but my plea is not to water it down as so many others have done.

Mr. Griffon's comments are very apposite. What we have tried to do in recent issues is to improve some aspects of the magazine which we felt were not as strong as the rest, while maintaining the overall flavour and quality of content. *Write-Back*, a development of the previous *Postbag*, is a case in point. As far as reviews are concerned, many readers rely upon RISC User as their only source of information, while any increase in reviews in recent issues reflects the wealth of new products which have been released in the last few months.

Pin Board

Basic Routines for RISC OS Printer Drivers

I have been struggling with two aspects of RISC OS Printer Driver programming:

1. Does anyone have a Basic routine which can replace access to the HardCopy module which is no longer supported by Acorn? This is required so that we can continue to use single-tasking programs originally written under RISC OS.

2. As a variation on the above, does anyone have a Basic routine which can be used to access RISC OS Printer Drivers from within a multi-tasking program?

Any help would be much appreciated.

Greg Herdman

The second point was covered in our series *Mastering the Wimp* - see RISC User 4:5

Intersheet Files on an Arc

Does anybody out there know of a way to import an Intersheet file into one of the Desktop spreadsheet applications (Intersheet is Computer Concepts' spreadsheet application for the 8 bit BBC micro series)?

The people at Clares recently attempted to modify an Intersheet file for me so that it would import into Schema, but without any real success. As the largest of my sheets is in excess of 4000 cells, believe me, I do not want to rewrite it/them again.

David Symes

PC Emulators

Congratulations to Aleph One for at last offering us a hardware PC podule (see detailed review in this issue). With a co-processor, 4 Mb RAM and a parallel port, this will start to address applications such as Windows and CAD which are beyond the capabilities of the software PC Emulator from Acorn.

However, the 4 Mb limit seems low for such applications, and nowadays one cannot even load them without a high density floppy drive. They are also hungry on hard disc space and access time. I would therefore be more interested in a podule which included sockets for 16 Mb RAM, plus interfaces for high density floppies and IDE drive. Otherwise, I might just buy a complete 486 system for the same price and share the monitor.

Does anyone know how to persuade an Arc to replace the keyboard, mouse and graphics adaptor of a physical PC?

Toby Williams

Monochrome Presentation Graphics

There are many graphics packages for the Archimedes - all it seems producing colour output. This looks fine on the screen, is readily transferable to DTP, and so on.

The problem arises when the resultant document is photocopied; the grey scale equivalents lose their individuality, and the graphs no longer succeed. In the IBM world (not that I advocate it, but I live in it) some colours are mapped to patterns, and a pattern fill is also available.

I realise that Acorn has not (yet?) given us a pattern-filled Draw object, and this must greatly limit a developer's horizons, but has anyone addressed the problem? For the great majority of practical purposes, hardcopy output is monochrome, particularly when it is embedded in text. An anonymous grey is simply not good enough for this purpose. The Archimedes needs quality monochrome graphics. Is Acorn doing it? Is anyone doing it?

Graham Wicks

fax
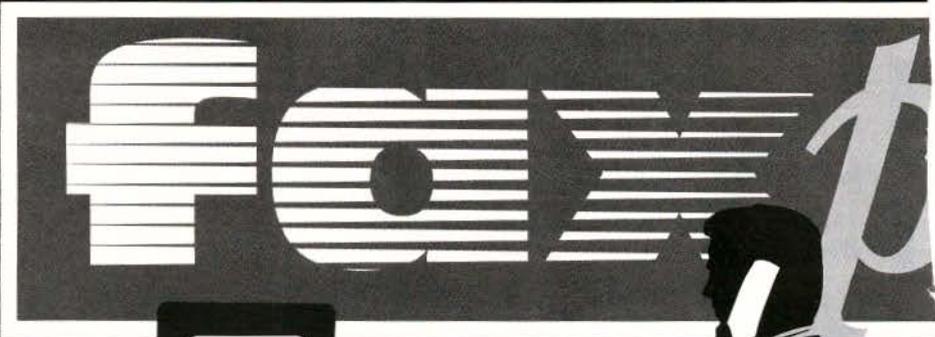
JUST PLUG FAXPACK
INTO THE ARCHIMEDES AND
YOU'RE IN BUSINESS

THE FAX EXPANSION BOARD FO

There are numerous advantages of a **computer** based fax system over **a conventional** machine:

❏ Very high quality, pixel perfect faxes - try sending a fax of 8pt text from a conventional **fax machine!**

❏ Since there is no need to print, then re-scan a document, FaxPack saves time, paper and money when sending faxes.

❏ Rather than junk fax mail wasting your costly fax paper, you can decide to delete unwanted fax files before printing.

❏ By receiving and sending from the computer FaxPack offers a higher level of security than most conventional fax machines.

❏ FaxPack allows electronic archiving of fax messages and is one step towards the truly paperless office.

❏ FaxPack uses your standard Archimedes printer and so can print on plain paper rather than thermal paper.

In addition FaxPack can be used as a data modem, to send and receive any Archimedes file or directory of files to other machines fitted with FaxPack. Because of the 9600 baud rate of fax systems and the use of data compression FaxPack is faster than practically all conventional data modems and permits background data transfer.

FaxPack is a fax expansion board for the Archimedes range of computers allowing your computer to take on the job of a conventional fax machine but with the benefits of being fully integrated into the Archimedes.

FaxPack offers full background send and receive capability. You can send a fax simply by selecting the PRINT option from any RISC OS application, with control returned in just a few seconds. FaxPack then proceeds to dial and send the fax while you carry on using the computer.

Receiving faxes is also completely automatic. FaxPack will answer the phone and store the fax away on your disc while you continue to use the computer. Once received the fax can be viewed on screen (using a special anti-aliased display to improve on-screen readability) and printed. Any portion of the fax image can be saved as a conventional sprite. Alternatively FaxPack can be made to automatically print on receipt of a fax, which with a LaserDirect printer, is completely automatic and in the background.

FaxPack
£299 + £10.00 carriage + VAT (£363.07)

ChartWell

_A sophisticated Graph and Chart Package at an affordable price_

ChartWell offers **24 different graph types** including:
- horizontal and
- vertical bar charts,
- line graphs,
- scatter charts,
- polar plots,
- pie charts.

Fruit Sales
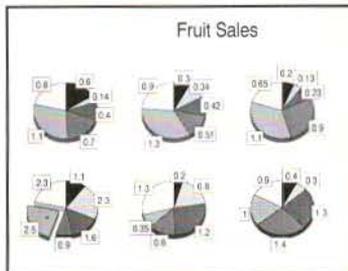
ChartWell allows a variety of **display options :**
- flat or 3D bar and pie charts,
- user choice of angle for 3D pie chart display,
- clustered, stacked or layered bar charts,
- scatter graphs with choice of curve fitting techniques, regression lines and correlation coefficients, and use of error bars,
- line graphs with choice of normal, cumulative area or stacked area displays.

Computer Sales

Acorn User
...ChartWell: simple but effective.

...ChartWell scores on simpler controls over the basic graph types. It also has enough effects to present material prettily at a price that makes it attractive to the home or school user....

...All the options chosen can be saved in a 'Style Sheet file which makes it remarkably easy to create the same type of graph again...

Archive
...This program from RISC Developments uses a really clever approach exploiting the desktop philosophy to the full.

Data can be imported from other applications, such as spreadsheets, databases, or created with a suitable editor as a text file.

Output is in standard Draw format for import into Draw or any other application, DTP for example.

Use of **'style sheets'** allows a set of options to be saved with data for future reference. User choice of start-up options.

ChartWell gives you **complete user control** over:
- choice of colour,
- data point styles,
- bar widths and spacing,
- use of titles and labels,
- legends to provide a key,
- graduated and shaded backgrounds,
- scales and tick marks, etc.

Road Usage
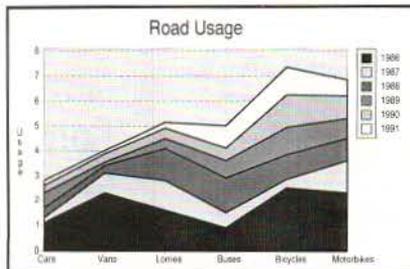
Flexibility
ChartWell allows you to select only part of the data for display. You can also change the order of display - a useful feature when creating bar charts - data can be arranged in ascending order so long bars will not overlap shorter ones.

Chartwell is supplied with an Outline Font Manager and Swiss-B outline font.
The disc includes demonstration data and graph files.
The package is supplied with a full reference manual with an introductory tutorial section.
Price **£24.95** (inc.Vat) to RISC User members and **£29.95** (inc.Vat) to non-members. P&P is extra. Stock Code **PCHW**
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Hints & Tips. . . Hints & Tips

Please keep sending in your hints on anything relevant to the Archimedes, A3000 and A5000. Don't forget, we pay for all hints we publish.

COMMS WITH SERIAL PORT ON A5000

The Acorn A5000 Release Notes contain some important information about the serial port that will especially affect comms enthusiasts. Split baud operation is no longer supported, as the serial chip has been changed, and this will affect those who wish to access boards at 1200/75 baud (V23), for example. Remember that buffered modems can still access V23 on a 1200/1200 speed as the modem will accommodate the speed differential automatically.

Some RISC OS 2.00 applications which interface with the serial port will not work correctly under RISC OS 3 due to changes in buffer vector specifications. There is a module, *SerialUtils* which is provided with RISC OS 3 which should help some of these applications to work - for example, Hearsay I and early versions of Hearsay II need this module, but the latest versions of Hearsay II do not.

Finally, the serial port has had a number of pins swapped around to make it compatible with the PC standard serial port. Generally to make "old" leads work on an A5000 (i.e. those that work on models before the A5000), you should swap over pins 6 and 8 in the A5000 9-pin connector. This is the recommended wiring for Hearsay I and II on the A5000.

MONITOR SAVER PRINTING PROBLEM
Alan Wrigley

The RISC User Monitor Saver (Volume 4 Issue 7) is very useful, but it has one snag. If an application is in the middle of a print job when the screen is blanked, the print job is suspended until the screen is restored by pressing a key or moving the mouse. It can be very annoying if you leave a long document printing, then go back in 20 minutes to find that it has halted halfway down the first page.

Luckily there is a simple solution. The monitor saver works by claiming the event vector, and enabling events 10 (mouse button) and 11 (key pressed). All you need to do is add event 0 (output buffer empty) to the list, since this event will be generated regularly while printing is in progress. To do this, load the program *MakeMod*, and alter lines 320-330 as follows:

```
320 CMPNE R0,#0
330 CMPNE R0,#11
```
and then add the following lines:
```
221 MOV R1,#0
222 SWI "OS_Byte"
551 MOV R1,#0
552 SWI "OS_Byte"
```

Then run the program to create the amended module. The monitor saver will not switch the machine off while the machine is printing, so the print job will not be stopped.

CHANGING LANGUAGE IN DESKEDIT
Lee Calcraft

DeskEdit will only detokenise a Basic program dragged to its icon if it is of filetype Basic. If you have a Basic program of some other filetype (imported from another machine, say) you will need to change its filetype to Basic before dragging it to DeskEdit.

Also, if for some reason you have a text file in DeskEdit that you want to change into a Basic file, you must select Basic from the Language submenu, and also set the correct filetype from DeskEdit's filetype menu. But remember the filetype you want is BasicTx (FD1) - detokenised Basic - since that is what you have - not FFB, Basic.

HARD SPACE BY MISTAKE
Rolf Herschel

When typing text quickly, you can sometimes hit the Alt key at the same time as the space bar. This will insert a hard space (ASCII 160) into the text rather than the usual space character (ASCII 32). This looks just like a normal space and so you will not be able to spot the error. This can cause problems in several areas. For example, if you do this in a Basic program, then you are likely to get a syntax error when the program is run. Listing the program will show the keyword EVAL where you expected a space, because 160 is the token for EVAL.

You could also have problems if you are transferring the text to another application or computer. For example, you might transfer it to a DTP package and then use an outline font which does not have character 160 defined at all, so no space at all will appear in the text. If you transfer the text to another computer, it is quite possible that ASCII 160 is used for a completely different character altogether. Unless you have intentionally

Hints & Tips. . . Hints & Tips

put hard spaces into your text, it is a good idea to perform a global search/replace if these problems are likely to occur.

WAITING FOR THE PRINT JOB...
Will Davidson

It can be very frustrating waiting for an application to print out if it doesn't print in the background. Take Paint for example; a large sprite can take a very long time to print, and there is no way of telling when the job has finished without staring at the screen for ages. However, if you start the print job and wait for the hourglass to appear, then press F12 followed by Ctrl-G and then Return (nothing will appear on the screen, not even the expected * prompt), then when the print job has finished the computer will emit a beep, informing you that you can use your computer again.

TEMPORARY DIALOGUE BOXES
Richard Hallas

Windows may be opened using the calls "Wimp_CreateMenu" and "Wimp_Cre ateSubMenu" in place of the normal "Wimp_OpenWindow". When windows are opened in this way, they are *transient*, and clicking a mouse button outside them or pressing Escape makes them vanish. If a dialogue box opened in this way (i.e. as a box off a menu) contains any writable icons, the caret will be placed in the first of these by the Wimp. You should set the input focus colour to be the same as the standard title bar (i.e. the title bar should not light up) and the window should incorporate no control icons or scroll bars, just a title. It should, however, contain a Cancel and OK icon, and no action should be taken until OK is clicked. The following lines will open a standard Info box using this method, in a similar way to Edit when the Info option is chosen (rather then just moved over):

```
SYS "Wimp_GetPointerInfo",,block%
```

```
SYS "Wimp_CreateMenu",,info%,block%!C
-24,block%!4+24
```

You may wish to open a window as part of an existing menu tree, as the user moves over a submenu pointer. By setting the menu item flag to generate a message (type &400C0, MenuWarning) instead of opening the window in the menu tree itself, the Wimp will pass the co-ordinates for the dialogue box within the message so you can update the contents of your window and then let it open as a submenu using "Wimp_CreateSubMenu".

STANDARD ARCSCAN SEARCHING
Neal Mercer

The indexes to RISC User and BEEBUG magazines have a number of standard entries that can be searched for, like Postbag and Points Arising. The RISC User indexes are generally consistent in their presentation, so that searching for *Postbag*: should give all the Postbag entries in the database. However, some of the early BEEBUG databases may be missing the colon, and have "Postbag " or "Postbag-" instead, so it is wise to search for standard fields using wildcards, e.g. *Postbag** or *News**.

UNPLUGGED SHELLCLI
George Toulmin

A note by Alan Wrigley in Hints and Tips, RISC User 4:6, remarked that ROM modules may get unplugged by certain programs, and that

```
*RMReInit <module name>
```

will restore them. However, there is a problem if the module unplugged is the ShellCLI module, which interprets star commands, because then the above command will give the error "File 'ShellCLI' not found". However, if you get an Edit task window on the Desktop and type the above into it, then the ShellCLI module will be reinitialised and all will be well.   *RU*

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