

Volume 5  
Issue 6

# RISC USER

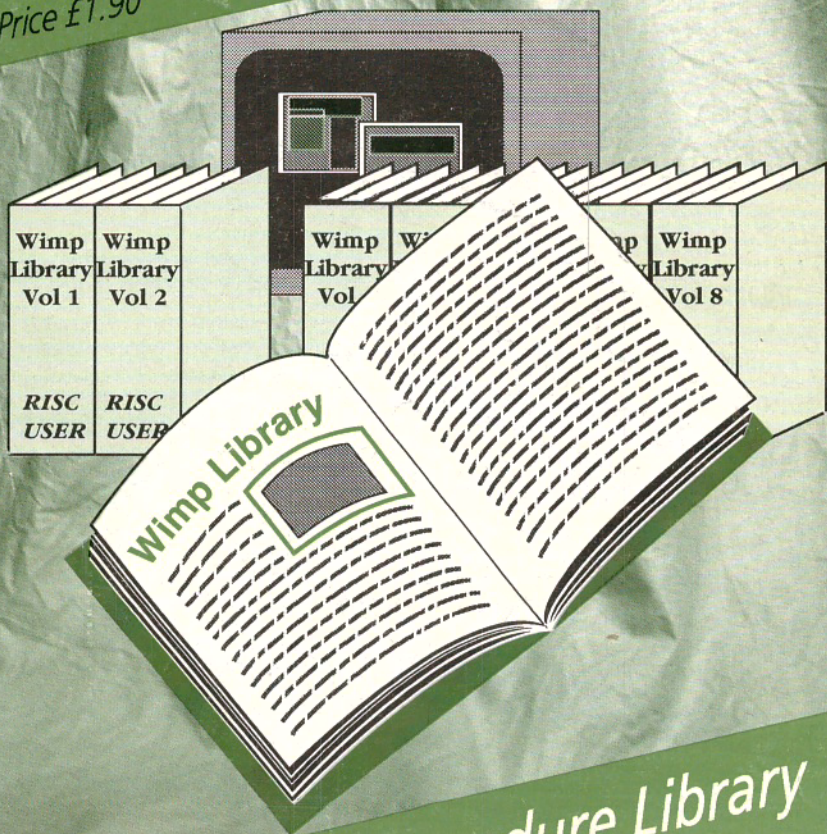
May 1992  
Price £1.90

Using Acorn's New PC Emulator

Archimedes Gets the Fax Straight

Lingenuity's Presenter GTi

Notate from Longman Logotron



Wimp Function/Procedure Library

The magazine and  
support group  
exclusively for users  
of the Archimedes





ISSUE

VOLUME 5

MAY 1992

6

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RISC  
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MAGAZINE AND  
SUPPORT GROUP

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## **Beebug's Tenth Anniversary**

As you will know, *RISC User* is published by RISC Developments Ltd., itself formed last year from Beebug Ltd. Beebug started in 1982 as a User Group for the then new BBC micro, and April 1992 marks the tenth anniversary of that magazine, and of Beebug Ltd.

Much now seems like history. The BBC micro was launched in the autumn of 1981, but was not really available to most purchasers till spring 1982, when the first issue of Beebug appeared. The BBC also launched its Computer Literacy project at the same time, and with all the publicity the BBC micro sold in huge numbers.

However, hard facts were in very short supply, and Beebug magazine rapidly became an indispensable source of information on the many features not covered in the provisional User Guide supplied with the machine. From such beginnings, Beebug has subsequently grown to be one of the best-known companies supporting users of both the original BBC micro range, and the more recent 32-bit Archimedes range.

As readers will be aware, Beebug and RISC Developments between them are responsible for magazine and book publication, the development of both software and hardware products for the Archimedes, and for running one of the largest Acorn dealerships in the country.

We are pleased to be part of the Acorn scene. We hope that we have made many friends over the years, and that we can look forward to interesting times ahead. None of this, of course, would have been possible without Acorn and the original BBC micro. Our congratulations to them as well, and to those who have worked so hard in producing the machines we all love.

## **Help for Contributors**

We always welcome contributions for potential publication in *RISC User* magazine, or on the *RISC User* magazine disc (and RISC Developments is always prepared to consider more substantial applications for publication as self-standing software). We have for long had a document entitled **Notes of Guidance for Contributors to RISC User**. With the changes which have taken place since it first appeared, this document has become very much out of date.

We are pleased to say, therefore, that a completely rewritten edition has now been produced, and this is available to anyone sending us a stamped addressed A5 size envelope. If you are thinking of contributing in any way, then it is essential that you read these notes first, and that anything submitted conforms as closely as possible to these guidelines - to do so will certainly increase the chances that your contribution is accepted.

## **Write-Back**

Let me finish this by reminding you of our new readers' feature called Write-Back. This forum replaces our previous Postbag, but offers more opportunity for readers not only to express their own point of view, or make comments, but to seek help and information (using a **Pin board** feature) from other readers on all subjects relating to Acorn and the Archimedes range. Address all your letters to **Write-Back**, *RISC User*, 117 Hatfield Road, St Albans, Herts AL1 4JS. You can also telephone (0727) 40303 or fax (0727) 860263 as well. Remember to ask for the Publications Department.

**M.W.**



## CJE MEMORY UPGRADES AND PRICE CHANGES

CJE Micros has announced its RAM upgrade for the A5000, which is available in both a 2Mb or 4Mb version. At the time of writing certain aspects of the board were being redesigned, and CJE was hoping to have boards available by late March. CJE has also just released a 4Mb RAM card for the A540, costing £345 inc. VAT, and has reduced the price of its ARM 3 boards for the Archimedes 300/400 series to £199 + VAT (£233.83 inc. VAT). As if that wasn't enough, it has also released an ARM 3 board for the A3000 computer at the same price, £199 + VAT, but the A3000 ARM 3 has to be fitted at an extra cost of £41.13 inc. VAT which includes courier collection and return of your machine. CJE lives at 78 Brighton Road, Worthing, West Sussex BN11 2EN, tel. (0903) 213361.

## ALEPH ONE REDUCES ARM 3 PRICE

Aleph One, the first company to produce ARM 3 upgrades for the Archimedes, has reduced the price of its ARM 3 chips to £199 + VAT (£233.83 inc. VAT). Contact Aleph One at The Old Courthouse, Bottisham, Cambridge CB5 9BA, tel. (0223) 811679, fax (0223) 812713.

## CALLIGRAPH'S NETWORK PRINTING

Calligraph, producer of the direct drive laser printer *ArcLaser*, has released a laser printer for use in shared network printing. *ArcServer* consists of a laser printer, an interface card and software. The printer is a heavy duty 8 page per minute 300 dpi laser printer, with a 250 page paper cassette. The interface card has been custom built, and transfers data at two Megabits per second, thus allowing text and graphics to be printed from the Archimedes at the full speed of the printer engine; Calligraph claims that this cuts typical page rendering times from several minutes to just a few seconds.

The system costs £1069 (£989 to education). More details are available

## ACORN UPGRADE PC EMULATOR AGAIN

Acorn has just announced a new version of its PC Emulator, version 1.80. It was due to be launched on the 1st April and should be available from 21st April. It will cost £99.00 ex. VAT, and will include the new emulator, MS-DOS 3.30, a revised manual and the MS-DOS CD-ROM extensions (MSCDEX 2.20). Its product code is AKA70.

The major new feature of version 1.80 is that the Emulator can now be configured to support VGA in full, rather than the EGA+ support before. This means that more applications that use VGA can be now be run, including the CD-ROM titles from the NCET CD-ROM scheme for schools. Another addition is that the emulator supports expanded memory LIM 3.2.

If VGA is not configured, then memory usage for version 1.80 is the same as for 1.70 (and 1.60), i.e. the Emulator will run on a 2Mb machine. With VGA configured, some applications (including the NCET CD-ROM titles) may need more than 2Mb if they are to run in multitasking mode, but all should run on a 2Mb machine in single tasking mode.

Upgrades to 1.80 from earlier versions will be available from 1st June through to 1st September 1992, and the upgrade will consist only of the new Emulator disc and manual, not the CD-ROM extensions as well. Users will also have to keep their current DOS discs for use with the new version. This upgrade is available to all existing users of the PC Emulator, regardless of whether MS-DOS or DR DOS is being used - it seems that Acorn has settled on the MS-DOS standard rather than DR DOS. Prices for the upgrade depend on which version you presently own. Upgrading from versions 1.60 and 1.70 costs £9, and from versions earlier than 1.60 it costs £29. Both these prices are exclusive of VAT. The upgrade is available only from Acorn Direct, rather than Acorn Computers, and has product code AKA71.

Educational institutions that are using versions 1.60 and 1.70 are allowed to upgrade just one copy of the new version, and copy this for use on all their machines. To this end the new PC Emulator manual (product code AKJ35) can be purchased separately for £8 (no VAT to pay).

Acorn Direct is at 13 Dennington Road, Wellingborough, Northants NN8 2RL.

## FOURTH DIMENSION PLAY ON

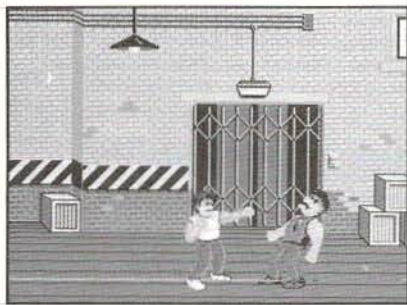
The Fourth Dimension, Archimedes games specialist, has been rather busy lately. It has made all its Archimedes software compatible with the A5000, except for *Boogie Buggy*. It has also just released three new games for the whole Archimedes, A3000 and A5000 range. *Cataclysm* is a watery simulation in which you have to guide water through numerous screens using various blocking and dispersion aids. The fluid motion is simulated using a cellular automaton, and the game has the same addictive appeal as *Lemmings*.

*X-Fire* is an exciting arcade game that involves moving your vehicle round a two dimensional and destroying various enemies, using a number of nasty weapons that you collect as the game progresses. *Grievous Bodily 'ARM* is described as an arcade "Beat'em Up", in which your character has to fight through crowds of bad guys, in search of a mad scientist who is making vast quantities of cheap narcotics to push on the streets. All three of these games are available now at £24.95 inc. VAT each.



# • News • News • News • News

The next release from The Fourth Dimension looks set to be *Chopper Force*, which should be out by the time this appears. In this simulation you pilot a futuristic helicopter, complete with a formidable array of weapons, and try



Previous Bodilly ARM

to complete various missions against the enemy. The price for all this will be £29.95 inc. VAT.

Finally, two more games on the cards from The Fourth Dimension, *The Exotic Adventures of Sylvia Lane* (a platform arcade adventure with fighting skills) and *Spitfire Fury* (a new flight simulator from

from Calligraph at 53 Panton Street, Cambridge CB2 1HL, tel. (0223) 461143, fax (0223) 316144.

## WHAT, NO CANON?

Rumour has it that a major player in the printer scene, whose machines have found much favour amongst Acorn enthusiasts, is planning to release a laser printer in the near future that will not use the Canon laser engine, but will incorporate an engine designed "in house". This should mean that the cost of the printer should be a lot less than before, as there will be no royalties to pay for the engine.

## EUREKA DELAY

Longman Logotron is still working on its eagerly awaited Eureka spreadsheet package announced at the start of the year. The user interface has been completed, but Longman Logotron is keen to make sure the product is well tested before releasing it to the public. The date for release has been put back to late May, and there will be a site licence available for the package for £400 (the price of a single user copy will still be £119). Longman Logotron is at 124 Cambridge Science Park, Milton Road, Cambridge CB4 4ZS, tel. (0223) 425558, fax (0223) 425349.

## TESCO LAUNCH "COMPUTERS FOR SCHOOLS" SCHEME

Tesco has launched a major scheme aimed at education that will enable schools to obtain free Acorn computers and software. The scheme works in the following way: from Monday 6th April, customers will receive one "Computers for Schools" voucher for every £25 that they spend in a single transaction at Tesco stores. They will be informed that local schools will be collecting the vouchers, and that by giving the vouchers directly to their local schools, they can help that school get free Acorn computer equipment.

The range of equipment available is quite comprehensive, and includes, for example, an A5000 colour system for 4000 vouchers, an A3000 colour system for 3000 vouchers, and Ovation DTP for 1000 vouchers (yes, these numbers are correct - an A5000 "costs" only four times as much as Ovation!). Software is available from 200 vouchers for the smallest packages, and the scheme covers the 8-bit range, the 32-bit range, printers, hard drives and educational software. Vouchers will be issued for 6 weeks only, between 6th April and 17th May, and Tesco will be advertising the scheme on television and in the national press.

## COMPUTER CONCEPTS PRINT IN COLOUR

Computer Concepts will soon be launching *ColourDirect*, which as the name suggests will be a colour companion to the LaserDirect range. The printer used is the new Canon BJC800 colour inkjet which will print on A3 paper at 360 dpi. The price should be in the region of £1995 + VAT. The system uses a 24-bit colour printer driver, but the high speed board that characterises the LaserDirect range is not present. Printing can take some time, but this is mainly due to the high quality and comparatively low speed of the printer rather than any constraints within the Archimedes, and the printer driver will print in the background, allowing you to use your machine at the same time. Computer Concepts are at Gaddesden Place, Hemel Hempstead, Herts HP2 6EX, tel. (0442) 63933, fax (0442) 231632.

## CLUB A3000 GET MUSICAL WITH EMR

The Club A3000 user group are organising a musical masterclass/ tutorial day in association with Archimedes music specialists EMR. The day is aimed at owners of EMR software who may want some help and advice, rather than being a straight sales demonstration. Mike Beecher of EMR will be there to answer questions on any EMR product with the emphasis on Studio 24+. The date is Sunday 17th May, and the class will be held at Mill Hill School, London from 10am to 4pm. To reserve your seat (limited to 18), send an SAE and a cheque to Mick Cooper, 3 Artillery Close, Paulsgrove, Portsmouth, Hants PO6 4HD. The cost is £20 for one seat, or £30 for two from the same family, or £40 for three from the



## Hearsay II

Hearsay II is the latest development of the highly acclaimed Archimedes communications package, Hearsay. It is multi-tasking and RISC OS compliant, and provides more advanced features in an even easier-to-use package. It is ideal for use with Prestel, Telecom Gold, Campus 2000 and Compuserve, and also provides very high quality VT320, VT102, VT52 and Tektronix 4105 Colour terminal emulations for direct connection to mini and mainframe hosts.

Hearsay II also gives access to Minitel systems such as the French Teletel service, and includes Xmodem, Ymodem, Zmodem & Kermit file transfer, comprehensive script language and auto-dial number directory. Most popular modems are supported, including Hayes, DTT and SM2400. *'It does everything we want, and is a pleasure to use.'* ARCHIVE Jan 92  
**Members Price £67.50 + VAT**      **Site Licence £350 + VAT**



## TypeStudio

TypeStudio is a complete text manipulation package ideal for producing professional quality adverts, posters, banners, logos, letterheads etc. Drawing tools allow lines and curves to be drawn, along which text can be flowed to follow any shape. Pairs of lines may be linked to create shapes into which text and Draw files may be moulded. A wide range of special effects are available, including: shadow, slant, mirror, 3D etc.

Designs may be printed directly from TypeStudio, or exported as Draw files to other applications. The package includes 7 fonts and a 64-page user guide containing many worked examples. *'Of the three (packages), TypeStudio is the most comprehensive. All of the tools you are likely to need are included and there is no need to use any other application with it.'* ACORN USER Mar 92  
**Members Price £40.50 + VAT**      **Site Licence £75 + VAT**



## Hard Disc Companion II

Version II of this hard disc backup program is a vastly enhanced version of the original program, re-written to make it twice as fast and even easier to use. It provides a structured approach to the backing up of hard drives, and the recovery of files in the event of disc failure or accidental file deletion. Both Full and Incremental backups are supported, and the files to be backed up or ignored may be specified using simple drag operations. The entire backup specification may be saved in a script file for use at a later date.

Hard Disc Companion II uses an efficient compression system to backup as much data as possible onto as few floppies as possible without increasing the backup time. Separate applications are included to restore entire backups or individual files.

**Members Price £40.50 + VAT**      **Site Licence £195 + VAT**



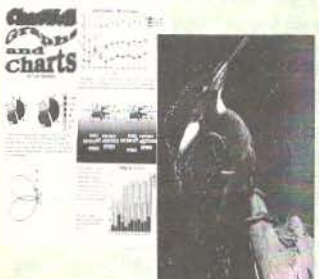
## Colour Printer Drivers

The PrinterDJ printer driver produces near laser quality output from the highly acclaimed Hewlett Packard DeskJet 500C colour printer. It is a release 2 driver and supports 75 X 75, 150 x 150 and 300 x 300 dpi print resolutions in monochrome, grey scale and full colour modes. Release 3 driver for the A5000 and RISC OS 3 available soon.

**Members Price £13.50 + VAT**      **Site Licence £75 + VAT**

The PrinterLC driver is the approved printer driver for Star colour dot-matrix printers. It is suitable for both 9-pin and 24-pin colour printers e.g. LC24-200, LC-200, XB24-10 and LC-10. PrinterLC is a release 2 driver, supporting various print resolutions from 60 x 72 dpi to 360 x 360 dpi depending on the printer model. Also suitable for many Epson and NEC colour printers.

**Members Price £13.50 + VAT**      **Site Licence £75 + VAT**





# • News • News • News • News

## CLARES RECEIVE A TITLE

Clares has announced a sophisticated video titling and presentation package called *Titler*. The package consists of two main programs. The first is *Titler* itself which provides all of the tools necessary to produce title screens for use with the second program *Sequencer* which, as its name suggests, is used to sequence the screens and present them on screen in a pre-determined way.



*Titler* can use any outline fonts in any colours and has many text formatting options and effects such as drop shadows, underline and rubout boxes. *Sequencer* can present screens using a wide range of effects like unroll, scroll, fade, wipe, and can take animations from Render Bender and Euclid, music files from Sound Tracker and standard sprite and Draw files to produce a complete graphical presentation. Adding a Genlock board allows the built-in Genlock map definer to be used, allowing certain colours to be transferred

directly to video tape. Presentations can be saved as stand alone applications, making the software very handy for producing demonstrations. Apparently the software is already in use with Taylor Made Films who produce programmes for New Zealand Television

## CLARES IS AT 98 MIDDLEWICH ROAD, NORTHWICH, CHESHIRE CW9 7DA, TEL. (0606) 48511, FAX (0606) 48512.

**WATFORD JOIN THE PC CARD MARKET**  
Watford Electronics has released details about its forthcoming PC card. The card uses the 25MHz AMD 386SX chip, which is said to be 25 percent faster than the 20MHz Intel chip in the Aleph One PC card. It has also been designed to be a "stand alone" PC that lives inside the Archimedes, rather than being an integral part of the machine. This means that the card does not have to rely on Acorn's PC Emulator for graphics standards, and indeed a VGA monitor can be attached to the card to operate separately from the Arc. 2Mb of memory is provided as standard, and high density drives can be added to accommodate the 1.44Mb discs used in the PC world (which can be used on an A5000 anyway). An expander allowing up to two half size PC expansion cards (i.e. boards used in PCs) to be fitted should also be available, and the price should be very competitive with the Aleph One board. Watford Electronics is at Jessa House, 250 Lower High Street, Watford WD1 2AN, tel. (0923) 237774, fax (0923) 233642.

## IRLAM MAY HAVE FAX CARD SOON

Irlam has got a fax card on the cards, though details were not available at the time of going to press. It is claimed that the great advantage of Irlam's fax card over the competition is that it includes the ability to use the phone output as a modem, something that should increase the appeal of the card. Keep your eyes on these pages for more information.

Irlam's Optical Character Recognition software is also approaching completion, and we hope to bring you news of this exciting development in the next issue of RISC User

same family. For this you will be sent a receipt and a map.

## ACE DRIVING

Ace Computing has just released an A5000 version of their printer driver for the colour Hewlett Packard DeskJet 500C printer, which can also drive the Hewlett Packard PaintJet and the PaintJet XL. The driver can generate a range of resolutions from 75 to 300 dpi and also utilises data compression to speed up output. This complements the RISC OS 2 version, *PrinterDJ*, which has been available for some time. All printer drivers cost £18.80 inc. VAT and p&p, and are available from Ace Computing, 27 Victoria Road, Cambridge CB4 3BW, tel. (0223) 322559, fax (0223) 69180.

## GOODBYE 400, HELLO 5000

Acorn has announced that it will not be building further products in the A400/1 range. It said that "the demand for the A400/1 series has declined because the successfully launched A5000 offers greater overall customer benefits at a comparable price". Of course, spares and support will continue to be available for the earlier products from normal service and support providers.

## ACORN ROADSHOW BOUNCES BACK

The Acorn Roadshow will be travelling the country once again in May. The show will start on 11th May at Northern College, Aberdeen, and will continue as follows: 12th May, Hillpark Education Centre, Benview, Bannockburn; 13th May, Cleveland ECC, Marton Sixth Form College, Middlesborough; 14th May, Education Development Centre, Sandwell; and 15th May, ILEC Centre, London. For further information contact Acorn at the address given above.

## ACORN USER SHOW DATES

BBC Acorn User has announced the dates of its 1992 show, which will again be held at the Wembley Exhibition Centre. The show will be open to the public from 16th to 18th October 1992.



# Wimp Function/Procedure Library Part 1

by Mark Moxon

Welcome to the first instalment in this new series. In this we hope to provide a universal library of Basic functions and procedures for use when writing Wimp applications. Anyone who has tried to write their own Wimp application in Basic will appreciate the effort required to put even a simple window on the screen, and we intend the Wimp library to grow and prove an invaluable Wimp programming tool.

However, the library will not do *everything* for you - you will still need to understand the fundamentals of Wimp programming (as described in the series *Mastering the Wimp* that started in Volume 2 Issue 9). The library will simply provide routines that perform standard jobs that most Wimp programmers have to do (like placing icons on the icon bar) so that a Wimp application can be written more quickly. On the other hand, the library will provide routines to enable you to use the Wimp more easily than via complicated SWI calls, so it will also prove a valuable system for novice Wimp writers and will help readers learn by example from the routines that we publish.

Each month the Wimp library article will consist mainly of two parts: the library listing and explanatory text. There may also be an example program if there is room (as there is this month). The text will try to be consistent in its presentation, and will give the name of the routine, a description of what it does and the parameters it takes. The library listing will contain the new routines for that month, and should be added to all the previous listings, thus creating a program that will grow every month: this is the "library" program.

The concept of a library of functions should be familiar to C programmers, and

libraries can be used in Basic V using the LIBRARY command. What this allows us to do is to put routines in a separate Basic program (the library program) and use them in any program we want to without having actually to put them in that program. To use the library, we must put the command:

```
LIBRARY *filename"
```

at the start of the *!RunImage* program in an application, and then the routines in the library can be accessed by that program via normal function and procedure calls. The *filename* parameter given must be the filename of the library program; we recommend that you call the library *WimpLib* and that you save it inside the application directory of the application using the library, but that is a matter of choice. One could just as easily store the library anywhere, as long as *filename* gives the correct pathname.

This month an example application is also listed to demonstrate some of the routines in the library - it simply puts a window on the Desktop, but as already noted, that is normally no trivial matter! To create the example application, you must do the following:

1. Create a directory called *!WimpLib*, and open it up by double-clicking on it while holding down Shift.
2. Create an Obey file containing the following lines:  

```
WimpSlot -min 32K -max 32K  
Set WimpLib$Dir <Obey$Dir>  
Run <WimpLib$Dir>.!RunImage %*0
```

and save it as *!Run* inside the application directory.
3. Now type in listing 1 (the library program) and save it in the same directory under the name *WimpLib*.
4. Next type in listing 2 and save it as *!RunImage* in the same directory.



5. Finally use Paint to create a mode 12 sprite called *!wimplib* with height 17 and width 34, and save it in the directory under the name *!Sprites*.

This will complete the example application and double-clicking on *!WimpLib* will run it. You may find it instructive to examine the additional code in this example program to see how the library routines can be used to create an application.

What follows is a description of the routines in this month's library program. Don't worry if you don't understand all the routines - the idea of library routines is that you don't have to understand them to use them. Experimenting with them and examining the example programs will certainly pay dividends; above all, don't be afraid to make mistakes and learn from them. This month's selection provides a number of routines for displaying windows; next month we will look at icons.

### PART 1: WINDOWS

A number of parameters have a description of an action next to them, such as "Error box has an OK button". This means this will be true if that parameter has value 1, and not true if it has value 0. Note this does not mean you can use TRUE and FALSE - only 0 or 1 can be used, otherwise the result is undefined. The reason for this is that the parameters are simply bits in a flag word, so they must be 0 or 1 to keep the procedures to a reasonable length. Of course, you could define variables *\_TRUE=1* and *\_FALSE=0* and use them if it makes things clearer.

#### Routine 1: FNwimperror

Displays a standard error box. Returns 1 if OK selected, 2 if Cancel selected.

<i>block%</i>	Block for SWI call
<i>errno%</i>	Error number
<i>err\$</i>	Error message
<i>task\$</i>	Name of task reporting error

<i>ok%</i>	Error box has an OK button
<i>cancel%</i>	Error box has a Cancel button

#### Routine 2: FNpoll\_flags

Returns value of Wimp Poll mask flag. If a parameter has value 1, then that reason code will not be returned.

<i>null%</i>	Null_Reason_Code
<i>redraw%</i>	Redraw_Window_Request
<i>leave%</i>	Pointer_Leaving_Window
<i>enter%</i>	Pointer_Entering_Window
<i>click%</i>	Mouse_Click
<i>key%</i>	Key_Pressed
<i>lose%</i>	Lose_Caret
<i>gain%</i>	Gain_Caret
<i>user%</i>	User_Message
<i>userrec%</i>	User_Message_Recorded
<i>userack%</i>	User_Message_Acknowledge

#### Routine 3: FNst\_create\_window

Creates a standard window definition. This is defined as a movable window with all the window icons, and a text title which goes cream when the window receives the input focus. The origin for co-ordinates (0,0) is at the bottom left of the screen, and all of the co-ordinates, widths, heights and offsets given as parameters should be positive (i.e. parameters 2 to 9 are all positive). Returns window handle.

<i>block%</i>	Block for SWI call
<i>x%</i>	X co-ordinate of top left corner of window
<i>y%</i>	Y co-ordinate of top left corner of window
<i>w%</i>	Width of window
<i>h%</i>	Height of window
<i>ww%</i>	Width of work area
<i>wh%</i>	Height of work area
<i>sx%</i>	X offset of window into work area
<i>sy%</i>	Y offset of window into work area
<i>title\$</i>	Window title
<i>ind%</i>	If 0, then title is taken not to be indirected (i.e. <i>title\$</i> is 12 characters or less). If non-zero, then <i>ind%</i> points to a buffer in which the title is placed as an indirected text icon (i.e. it can be longer than 12 characters).



### Routine 4: FNst\_create\_window2

Creates a standard window as above, but with the option of not changing colour on input focus and having different window flags (e.g. different window icons). Returns window handle.

First 11 parameters as for Routine 3.

*input%* Title bar background changes colour to cream when it gains input focus

*wflag%* Window flags (see Routine 7)

### Routine 5: FNcreate\_window

Creates a totally user customisable window. Returns window handle.

First 13 parameters as for Routine 4, except *input%* is now the colour that the title bar goes when the input focus is gained, rather than a flag.

*mw%* Minimum window width (0 to use title width)

*mh%* Minimum window height

*behind%* Handle to open window behind (-1 means open on top, -2 bottom)

*tflag%* Title flags (see Routine 6)

*tfore%* Title foreground colour

*tback%* Title background colour

*wfore%* Window foreground colour

*wback%* Window background colour

*sout%* Scroll bar outer colour

*sin%* Scroll bar inner colour

*button%* Work area button type

*icon1%* Title icon data word 1

*icon2%* Title icon data word 2

*icon3%* Title icon data word 3

### Routine 6: FNtitle\_flags

Returns value of title flags word.

*text%* Title is text

*sp%* Title is sprite

*chor%* Title is centred horizontally

*cover%* Title is centred vertically

*anti%* Title is in an anti-aliased font

*ind%* Title data is indirected

*rjust%* Title is right justified

*half%* Title is displayed at half size (if a sprite)

*font%* Font handle for anti-aliased text (if *anti%=1*)

### Routine 7: FNwindow\_flags

Returns value of window flags word.

*back%* Window has Back icon

*close%* Window has Close icon

*title%* Window has a title

*toggle%* Window has Toggle Size icon

*vscr%* Window has Vertical Scroll

*hscr%* Window has Horizontal Scroll

*adj%* Window has Adjust Size icon

*move%* Window is movable (i.e. can be dragged around)

*wredraw%* Window can be redrawn entirely by the Wimp (i.e. no redraw requests returned)

*pane%* Window is a pane

*bound%* Window is not bounded by the screen

*scr%* Return Scroll\_Request when scroll arrow/outer scroll bar clicked

*rscr%* As *scr%* but with auto-repeat on arrow icons

*gcol%* Treat window colours as GCOL numbers rather than Wimp colours

*below%* Don't allow any windows to be opened below this one

*hotkey%* Generate events for Hot Keys passed back through Wimp\_ProcessKey if window open

### Listing 1

```
10 REM >Wimplib - Wimp Library
20 :
30 DEF FNwimperror(block%,errno%,err$
,task$,ok%,cancel%)
40 LOCAL flag%,response%
50 !block%=errno%
60 $(block%+4)=err$+CHR$(0)
70 flag%=ok%+(cancel%<<1)
80 SYS "wimp_ReportError",block%,flag
%,task$ TO ,response%
90 =response%
100 :
110 DEF FNpoll_flags(null%,redraw%,lea
ve%,enter%,click%,key%,lose%,gain%,user%
,userrec%,userack%)
120 LOCAL flag%
```

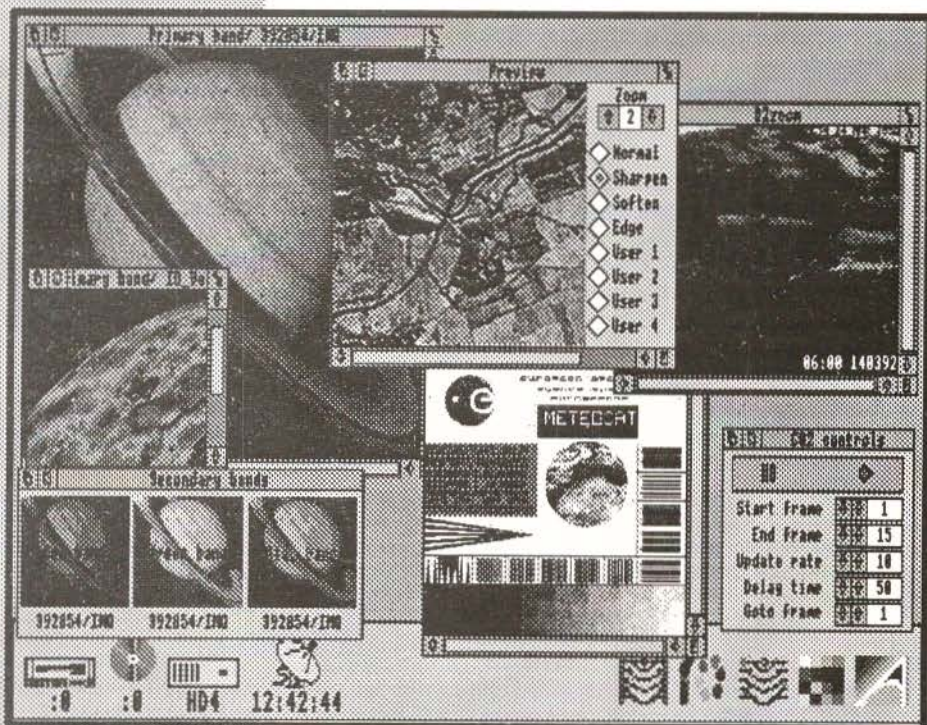


## Wimp Function/Procedure Library

```
130 flag%=null%+(redraw%<<1)+(leave%<<
4)+(enter%<<5)+(click%<<6)+(key%<<8)+(lo
se%<<11)+(gain%<<12)+(user%<<17)+(userre
c%<<18)+(userack%<<19)
140 =flag%
150 :
160 DEF FNst_create_window(block%,x%,y
%,w%,h%,ww%,wh%,sx%,sy%,title$,ind%)
170 LOCAL iflag%,i2%,i3%,tflag%,wflag%
180 IF ind%=0 THEN iflag%=0:i2%=0:i3%=
0 ELSE iflag%=1:i2%=-1:i3%=LEN(title$)
190 tflag%=FNtitle_flags(1,0,1,1,0,ifl
ag%,0,0,0)
200 wflag%=FNwindow_flags(1,1,1,1,1,1,
1,1,0,0,0,0,0,0,0,0)
210 =FNcreate_window(block%,x%,y%,w%,h
%,ww%,wh%,sx%,sy%,title$,12,wflag%,0,0,-
1,tflag%,7,2,7,0,3,1,0,ind%,i2%,i3%)
220 :
230 DEF FNst_create_window2(block%,x%,
y%,w%,h%,ww%,wh%,sx%,sy%,title$,ind%,inp
ut%,wflag%)
240 LOCAL iflag%,i2%,i3%,selcol%,tflag
%
250 IF ind%=0 THEN iflag%=0:i2%=0:i3%=
0 ELSE iflag%=1:i2%=-1:i3%=LEN(title$)
260 IF input%=0 THEN selcol%=2 ELSE se
lcol%=12
270 tflag%=FNtitle_flags(1,0,1,1,0,ifl
ag%,0,0,0)
280 =FNcreate_window(block%,x%,y%,w%,h
%,ww%,wh%,sx%,sy%,title$,selcol%,wflag%,
0,0,-1,tflag%,7,2,7,0,3,1,0,ind%,i2%,i3%
)
290 :
300 DEF FNcreate_window(block%,x%,y%,w
%,h%,ww%,wh%,sx%,sy%,title$,input%,wflag
%,mw%,mh%,behind%,tflag%,tfore%,tback%,w
fore%,wback%,sout%,sin%,button%,icon1%,i
con2%,icon3%)
310 LOCAL handle%,ist%
320 !block%=x%:block%!4=y%-h%
330 block%!8=x%+w%:block%!12=y%
340 block%!16=sx%:block%!20=-sy%
350 block%!24=behind%:block%!28=wflag%
360 block%?32=tfore%:block%?33=tback%
370 block%?34=wfore%:block%?35=wback%
380 block%?36=sout%:block%?37=sin%
390 block%?38=input%:block%?39=0
400 block%!40=0:block%!44=-wh%
410 block%!48=ww%:block%!52=0
420 block%!56=tflag%:block%!60=button%
<<12
430 block%!64=1
440 block%?68=mw%MOD256:block%?69=mw%D
IV256
450 block%?70=mh%MOD256:block%?71=mh%D
IV256
460 ist%=(tflag%>>6)AND4)+(tflag%AND3
)
470 CASE ist% OF
480 WHEN 1,2,3:$(block%!72)=title$
490 WHEN 5,6,7:block%!72=icon1%:block
%!76=icon2%:block%!80=icon3%:$icon1%=tit
le$
500 ENDCASE
510 block%!84=0
520 SYS "Wimp_CreateWindow",,block% TO
handle%
530 =handle%
540 :
550 DEF FNtitle_flags(text%,sp%,chor%,
cver%,anti%,ind%,rjust%,half%,font%)
560 LOCAL flag%
570 flag%=text%+(sp%<<1)+(chor%<<3)+(c
ver%<<4)+(anti%<<6)+(ind%<<8)+(rjust%<<9
)+(half%<<11)
580 IF anti%<>0 THEN flag%+=(font%<<24
)
590 =flag%
600 :
610 DEF FNwindow_flags(back%,close%,ti
tle%,toggle%,vscr%,hscr%,adj%,move%,wred
raw%,pane%,bound%,scr%,rscr%,gcol%,below
%,hotkey%)
620 LOCAL flag%
630 flag%=(move%<<1)+(wredraw%<<4)+(pa
ne%<<5)+(bound%<<6)+(scr%<<8)+(rscr%<<9)
+(gcol%<<10)+(below%<<11)+(hotkey%<<12)+
(back%<<24)+(close%<<25)+(title%<<26)+(t
oggle%<<27)+(vscr%<<28)+(adj%<<29)+(hscr
%<<30)+(1<<31)
640 =flag%
```



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# Archimedes Gets the Fax — Straight

Alan Wrigley reviews Computer Concepts' fax card for the Arc.

Readers with long memories may remember advertisements for the FaxPack fax card way back in 1988, as part of Computer Concepts' commitment to an electronic office based around the Archimedes. Other components of the system have appeared in the meantime, such as Impression, Scan-Light and LaserDirect, and now at last FaxPack itself has materialised.

incoming faxes are stored as files allowing them to be read on screen or printed via a conventional printer.

## ADVANTAGES AND DISADVANTAGES

FaxPack has a number of advantages over the conventional method of transmitting and receiving faxes, and some disadvantages too. It is worth considering both sides of the coin in some detail, since they are likely to influence heavily the decision on whether to purchase FaxPack or go for the traditional route.

Chief among the advantages is the one already mentioned: if most of your faxes result from documents prepared on your Arc, it is silly to have to print them out just to re-convert them to electronic form by feeding them through the scanner in a fax machine. Not only does this save money and paper, it saves a great deal of space too, since FaxPack sits entirely inside the computer and requires no additional office space at all. Furthermore, the image quality of the fax received at the other end will be substantially higher.

When receiving faxes, it is often sufficient just to read the document without needing to have it printed on expensive thermal paper (often with poor paper feeding); if you *do* need to keep a hardcopy of a fax, virtually all users who need a fax machine would also have a conventional printer attached to the computer.

Further advantages arise from the fact that you have the intelligence of the computer at your disposal. A conventional fax machine can normally store a selection of numbers which can be dialled at the touch of a button, but there is a limit to how many the machine will recognise, and the

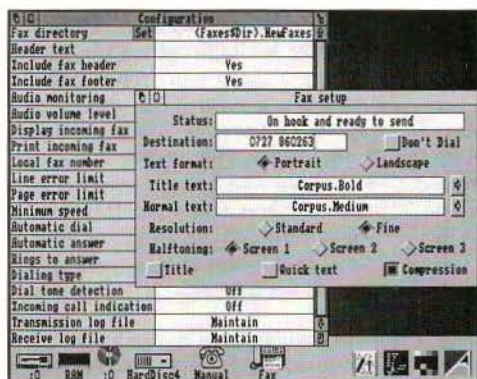


Figure 1. FaxMngr's Configuration window, and PrinterFP's status window

## WHAT IS FAXPACK?

FaxPack consists of an expansion card, available for all Archimedes, A3000 and A5000 models, containing essentially a 9600 baud modem. This connects to a telephone socket and enables faxes to be sent directly from the computer to a remote Group 3 fax machine, and similarly to be received directly from such a machine. Because all the necessary electronics are contained in the card, there is no need for a scanner, a sheet-feeding mechanism and a thermal printer, all of which are required by a conventional fax machine. Any file can be sent as a fax in just the same way as it would be printed via a printer driver, and

information will be lost if the batteries which maintain the memory are allowed to run down. FaxPack, on the other hand, comes with an address book utility, in which you can not only store long lists of names, addresses and phone numbers (which can be dialled by double-clicking), but other information too, and none of this is lost when the Arc is switched off.

Yet another advantage of the system is that, since the facilities available are controlled largely by software, it should be possible for future developments in fax technology to be catered for by upgrading the software. Conventional machines are unlikely to offer an upgrade path. One particularly exciting upgrade planned by CC is to allow FaxPack to act as an answering machine - more of this later.

The disadvantages are less numerous but not insignificant. I have mentioned the fact that an expensive scanner is no longer required. But what if you need to fax an existing document or a hand-drawn diagram to someone? With FaxPack you simply cannot do it, unless you also have a separate scanner. This sounds like a huge drawback, since everyone will at some time or another want to do just that, but in fact the cost of FaxPack plus a monochrome scanner is still less than a good many fax machines on the market. What is more, the resolution and image quality of a stand-alone scanner is often considerably better than one built into a fax machine, and once you have it there are many other uses for it.

A minor disadvantage is that you must, of course, leave your Arc switched on all the time that you are likely to be receiving faxes (though not the monitor). This does not use a great deal of power, however, and does no harm to the Arc, and you would in any case need to leave a conventional fax machine on under the same circumstances. The Arc tends to make rather more noise though, so if your office is next to the bedroom this may be inconvenient.

### THE PACKAGE

The board is well made and simple to install in the usual way. There are no connectors at the back - just a flying lead terminated by a standard BT plug. This plugs into a telephone socket and enables FaxPack to be used exactly as a conventional machine, either on a dedicated fax line or in tandem with a phone on a shared audio/fax line. The software supplied with the package consists of five applications: *FaxMgr*, *PrinterFP*, *Address*, *Faxes* and *LQEmulate*. A smart and well-written manual, an audio connection lead and a 2-way telephone adaptor complete the package.

*FaxMgr* controls the use of the fax card generally, while faxes are transmitted by sending a document from a file or an application to *PrinterFP* in exactly the same way as you would use a conventional printer driver. The functions are split over two applications because you only need the printer driver when sending faxes, and having it installed all the time would (under RISC OS 2) prevent you from using any other printer driver.

*LQEmulate* was designed for use with LaserDirect, to provide Epson compatibility for the benefit of older applications which do not use the RISC OS printer drivers. However, it works equally well with *PrinterFP* and enables you to send faxes directly from 1st Word Plus or from Basic, for example. *Faxes* handles the storage and display of received faxes, while *Address* is the address book utility mentioned earlier.

### USING FAXPACK

To set up FaxPack for your own use, a comprehensive set of 20 configuration options is provided, including automatic dial and/or answer, automatic display or printing of received faxes, and the ability to define your own fax header text. These options can be saved as defaults. The header is printed at the top of the fax in a smart bold typeface (see figure 2).



### To RISC Developments Ltd from Rheingold Enterprises.



### To RISC Developments Ltd from Rheingold Enterprises



Figure 2. The same fax sent from FaxPack (left) and a conventional fax machine (right).  
The difference in quality can be seen clearly.

Once you have set the configurations to suit yourself, using FaxPack is very straightforward. Any document can be sent as a fax by simply treating PrinterFP as a standard RISC OS printer driver. This means you can send faxes directly from Ovation, Impression, Draw, and indeed any application which addresses the RISC OS drivers (or by using LQEmulate you can send faxes from certain other applications, as mentioned earlier). This means that outline fonts, drawings etc. appear at the other end of the line exactly as they appear on your screen. For pure text files you can select any of the fonts normally available in your Arc. The number to be dialled can be typed directly into the driver's dialogue box, or alternatively you can double-click on the number on an address book page, or even include the number in the correct format within the document itself.

Once the file has been sent to PrinterFP, which is a fairly quick process, the actual sending of the fax is multi-tasking. Provided auto-dial has been set, the number will be dialled automatically, the fax connection established, and the file sent as a fax to the remote fax machine. A status window keeps you informed of what is happening, and if you have fitted FaxPack's audio connection lead inside your Archimedes, you can monitor the audible signals on the telephone line as well, just as you can with many conventional fax machines.

Unless you are transmitting to another FaxPack (which I will describe in more detail shortly), there is no speed advantage over conventional machines, since the amount of data and the baud rate of the modem are exactly the same as normal. The quality of the fax received at the other end, however, is outstanding. Because the image is generated in the computer rather than by a low-resolution scanning head, it is a much more accurate representation of the document, and results in crisp, clear text and pictures. Figure 2 shows a fax sent by FaxPack compared with one sent by a conventional machine - the difference has to be seen to be believed.

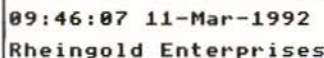
Receiving a fax is just as simple as sending one. For this you need only to have FaxMgr installed. It can be configured to answer automatically after a user-defined number of rings, or you can answer manually and then click on FaxMgr's menu option to activate fax reception. The process is fully multi-tasking under most normal circumstances, and will even continue to work outside the Desktop provided that no other application inhibits the operating system's call-back routines (it will even work while playing some games). The manual gives clear guidance on which activities may prevent faxes being received.

You can configure FaxPack automatically to display incoming faxes on screen or print them to an on-line printer (with LaserDirect

## Archimedes Gets The Fax Straight

this can be done in the background while you get on with something else). Whether you choose these options or not, faxes are stored in a specified directory, and can be viewed, scaled, flipped, printed or filed as sprites using the Faxes application. These operations can be performed on the whole page or a selected area. I found the fax viewer a little fiddly to use, especially with multi-page documents, and would probably want to print out any faxes which required more than just a cursory glance. At least this can be done on scrap paper rather than the expensive thermal kind, though with a dot matrix printer it will take some time since it is always a bit-image document you are printing, not a text file.

A useful option is the maintenance of log files, for transmission, reception or both. A



09:46:07 11-Mar-1992  
Rheingold Enterprises

Figure 3. The FaxPack header

text file holds the details of all calls made or received, including the length of the call and any errors. This file is then updated with each subsequent call.

### DIRECT FILE TRANSFER

One of the most powerful features of FaxPack, which sets it aside from any conventional fax machine, is the capacity for direct file transfer between two computers equipped with FaxPack cards. This was not implemented on the review copy I received, but will be included very shortly and will be made available as a free upgrade to all existing users. Provided that the machine on the other end of the line is also a FaxPack, then instead of sending the document as a bit-image page to be printed by a remote fax machine, the file is sent as ASCII data, with full error correction and data compression. This will usually be very much faster, since a text or document file is normally only a fraction of the size of the corresponding bit-image output.

The potential for this facility is enormous. Journalists could write articles

and send them via FaxPack to be edited, all without any paper being required. Office workers could work from home, receiving and transmitting their work in the same way. Of course, this has all been possible for some time by using a conventional modem, but never has it been so easy as with FaxPack.

### FAXPACK HAS THE ANSWER

I mentioned earlier that CC is working on an upgrade which will effectively turn FaxPack into an answering machine. The idea is that the software will detect whether an incoming call is from a fax machine. If not, a stored sound sample containing the user's message will be played down the line, and the incoming message will be sampled and stored on disc. You will probably get around 2 minutes or more of messages per megabyte of disc space, so for the average user with a few megabytes to spare this is a perfectly practical proposition. Arc owners could soon find that answering machines are redundant along with fax machines.

### CONCLUSIONS

£300 might seem a lot for just a modem, particularly when you consider that a fax machine with a scanner, sheet feeder and thermal printer as well might only be a couple of hundred more. However, CC does not have Amstrad's mass market to aim at, and given that the facilities offered by FaxPack are so comprehensive, I feel that it is good value for money. Products such as this might just push the Arc into the business market. An A540 with FaxPack and a direct laser, plus Aleph One's 386 card, would make a pretty formidable foundation for a business system. Even though I already have a fax machine, I will probably invest in a FaxPack myself, and I doubt if I can give it a higher recommendation than that.

Product	FaxPack
Supplier	Computer Concepts Gaddesden Place, Hemel Hempstead, Herts HP2 6EX. Tel. (0442) 63933 Fax (0442) 231632
Price	£351.32 inc. VAT

RU



# Using Acorn's New PC Emulator (Part 1)

Kevin Bracey advises on how to make the most of Acorn's multi-tasking PC emulator.

## INTRODUCTION

The most recent, multi-tasking version of Acorn's PC Emulator (version 1.60 or 1.70) is a technically stunning piece of software, but unfortunately needs some adjustment to get the best possible performance out of it. These articles should help you to use it more effectively. In this article I shall assume that you understand how the Configuration window on the PC emulator works and that you have got the Emulator up and running as described in the manual.

## UPGRADING

Firstly, if you are still using an old single-tasking version of the PC Emulator (earlier than 1.60) you should consider upgrading. The upgrade routes for version 1.60 and version 1.70 were on offer from Acorn Direct until 27th March this year.

A new version 1.80, including full optional BIOS VGA support (primarily for use with MS-DOS CD-ROM extensions) will be available for outright purchase from early April through dealers, but as an upgrade only from 1st June 1992 (and again from Acorn Direct). Full details relating to version 1.80 are in this month's News pages. Any queries on PC Emulator upgrades should, in the first instance, be addressed to Acorn Direct, 13 Dennington Road, Wellingborough, Northants NN8 2RL.

## RUNNING PCEmS ON A 1Mb MACHINE

If you own just a basic 1Mb machine, then you should upgrade if possible to 2Mb (or more). One megabyte upgrades can be found from £35 for a 410/1 series machine, £50 for an A3000 and £150 for an A310

(excluding VAT), and will provide you with a much more usable system, as well as allowing you to run the multi-tasking PC emulator.

If you don't want to do this, then the only option open to you is to use PCEmS, which provides only CGA graphics. However, it does have a few enhancements above previous versions of the emulator. The most obvious one is that you can switch between

the PC and RISC OS without loss of data. But if you are on a 1Mb machine you have little enough PC memory available without having 200K or more of memory being taken up by RISC OS. Therefore it is advised that you use the *Erase RISC OS* option on the Configuration dialogue box. Apart from this, the emulated

PC appears to be marginally faster and includes 8087 emulation.

## RUNNING PCEm ON A 2Mb MACHINE

If you do have a 2Mb machine, there are still several problems to overcome, as the multi-tasking version of the PC emulator uses a colossal amount of memory compared to normal applications. So although the multi-tasking version of the PC Emulator is advertised as being suitable for use on 2Mb machines, it can leave you with very little or no memory spare to run other applications. I shall therefore devote some time to discussing how best to configure the PC Emulator.

My first tip is not to use the *All* option in the PC RAM dialogue box if you don't need the full 640K of PC memory. This means you

PCEmS CGA	896K
MDA	1344K
CGA	1344K
EGA 64K	1424K) CD
EGA 128K	1488K) or
EGA 256K	1648K) ECD
EGA+	1648K

Table 1. Minimum memory required for a 640K PC

will have more memory spare for RISC OS. The amounts of RISC OS memory required by the PC Emulator for 640K of PC memory are listed in table 1. If you reduce the PC RAM setting, then the RISC OS memory requirement decreases correspondingly.

### CHOOSING A GRAPHICS ADAPTER

The obvious tip here is not to select a more advanced graphics adapter than your application will use. For instance, I regularly run a PC computer bridge program (Oxford Bridge 3) which uses CGA text mode and requires 384K of RAM. If I were to use the PC Emulator's default settings I would be using 400K more memory than was needed.

If you have a piece of PC software that uses EGA graphics, then you should try it with different amounts of graphics memory to find the minimum requirement. For example, Battle Chess will run with an EGA CD 128K adapter, but needs an EGA CD 256K adapter to run at an acceptable speed.

On a 2Mb machine you should have no problem running the MDA, CGA or EGA adapters. At first you may well agree with the PC Emulator manual that you cannot use EGA+ on a 2Mb machine, but I have found that it is just possible to find 1648K of free memory, as follows.

Firstly, reset your machine and, if you have a boot sequence, do not boot up as normal. Call up the Task Manager and reduce the font cache, system sprites and RAM disc all to 0K. Also, reduce the system heap to the minimum possible. On my system, which has a few ROM modules, such as the Font Manager, unplugged, this leaves me with 1728K free memory in mode 20. If you now run the PC Emulator, selecting EGA+ mode, you will have just have the 1648K required after loading the various support modules.

As a general tip, unplug the ROM version of the Font Manager built into the RISC OS 2 ROMs. If it is not unplugged it uses up precious memory, and the PC

emulator will refuse to run until you load the new Outline Font Manager (2.44), which will then consume another 30K or so of memory. To unplug your FontManager module, reset your machine and type:

```
*Unplug FontManager
```

The Outline Font Manager is only in fact required by the PC emulator when running in MDA mode, so do not load it unless you have memory to spare or are running MDA software.

### USING A STANDARD RESOLUTION MONITOR

If you do not have a multisync or VGA monitor, then you will find that using the EGA ECD or EGA+ graphics adapter doubles the height of the PC screen, as your monitor is incapable of displaying the necessary vertical resolution (400+ lines).

There is one possible way around this, via a module that is supplied on this month's magazine disc. This module simulates modes 18 to 21 on a standard monitor using interlacing. The problem with this is that the display flickers quite badly and its width is halved. However, if you can put up with this you will be able to run the emulator in mode 20 and see the whole display. Mode 66 (part of Computer Concepts' !NewModes module supplied with Impression) also helps when using the PC Emulator in a window.

It is just possible that if you have a standard resolution monitor the PC Emulator will not function in its Single Tasking mode. This is because it uses a non-standard 200 line screen mode. I have experienced no problems with my Acorn monitor, but if you have this problem, then load the !Run file from the !PCem or !PCemS, and insert a vertical bar (|) in front of the two adjacent lines beginning:

```
RMEnsure ModesCGA 1.00 ...
```

### GREATER SPEED

The PC emulator running on an ARM2 machine is, let's face it, appallingly slow by



## Using Acorn's New PC Emulator

modern PC standards, as it barely reaches the speed of a 4.77MHz 8088 machine. There are two things that can be done about this. The cheaper of the two choices is to go out and buy an ARM3 upgrade. These are available for all machines for prices ranging from £200-£250 (excluding VAT). An ARM3 upgrade will typically increase the performance of the PC emulator by a factor of two or three.

Back in 1987, Acorn said that to complement the software PC emulator, a "hardware solution" would also be available, offering much increased performance. Sadly, this project never saw the light of day. However, by the time this goes to press, Aleph One's PC Card should be available. This is a single width expansion card that fits in any Archimedes and has on board a 20MHz 386SX processor and 1 or 4Mb of RAM. It also has its own printer and serial ports, to solve compatibility problems with "dongled" software, and a socket for a 387SX floating

point coprocessor (see last month's preview of this product for more information).

The PC podule runs in conjunction with the multi-tasking PC emulator (in a window), and will enable the PC emulator to run DOS software at speeds equal to or greater than equivalent Archimedes (non DOS) software running on an ARM2 machine. Aleph One is also working on a VGA graphics driver, and the option to use the ARM as a graphics coprocessor, handling the complex graphics work while the 386 executes the software. Prices range from £595 to £750.

Next month I will look at how to set up your PC hard disc partition, using MultiFS, the advantages of RISC OS 3, and give some help to those who are new to PCs.

**RU**

*We hope to feature further articles relating to the PC emulator more frequently in the future. Any submissions on this subject will be most welcome.*

## !Transfer

**Transfer**, the **NEW** utility that lets you copy text from any icon in any RiscOS application and transfer it to any other.

The copied text can be **inserted** into other text, or it can **replace** it. You will find many uses for **Transfer** as it makes the contents of practically all field or writable icons, 'drag-able' between applications. It also lets you drop the text into **documents** as well as icons. An obvious use would be to grab a name and address from a database and deposit it into a word processor, (or even another database).

**Transfer** is itself, a RiscOS application and sits on the icon bar. A simple menu gives you complete control of its actions.

It is simplicity itself to use. All transfers are carried out by mouse clicks. Point and click at the text you want, then point and click again to deposit it. It is invisible to applications and does not interfere in any way with their operation. **Transfer** will work on any Archimedes series computer.

**Transfer** is only available from Apricote Studios, 2 Purls Bridge Farm, Manea, Cambs, PE15 0ND ☎ (035 478) 432



**£8.95**  
inc. VAT & p&p



# Computer Concepts' ArtWorks

*Mike Williams takes a first look at this forthcoming release from Computer Concepts.*

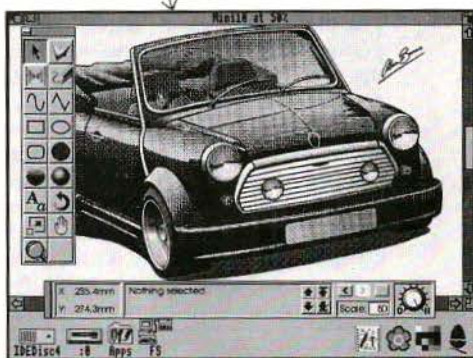
Computer Concepts has been demonstrating its next major software release, *ArtWorks*, since the summer of last year. With the official release now expected around the middle of 1992, we felt it was time to take a first look at what *ArtWorks* is and what it has to offer.

Let me make it quite clear that what follows is based on experience with a pre-release version of the software, which is incomplete and still has to undergo final testing. The only documentation at this stage consists of some 24 pages of rough notes. It says much for CC's faith in *ArtWorks* that they were so willing to make a copy available in this way. The final product will be accompanied by a full manual and no doubt packaged to the same high standard as *Impression*.

Let's start by saying what *ArtWorks* is (and is not). It is primarily a professional graphic design tool; it is not a pixel-oriented painting package as the name might first imply. It complements any DTP package like CC's own *Impression* by offering much greater and more flexible control over the graphics environment. CC's stated aim is to provide on the Archimedes software which is functionally similar to and of the same calibre as Adobe *Illustrator* and Aldus *Freehand* on the Apple Macintosh. Whether this has been achieved we must wait and see, but the initial promise of the software is high indeed.

Like *Draw*, *ArtWorks* is an object-oriented program. It is also highly modular in design, and CC says that it will be publishing the specification so that others can construct additional modules which will fit seamlessly into the *ArtWorks* structure. All objects are stored with full 24-bit colour

representation (16 million colours) and displayed using sophisticated colour dithering to give a full spectrum of colours even in 16 colour modes. And *Artworks* will produce spot colour or full colour separations as required.



*Artworks screen display showing tools at left*

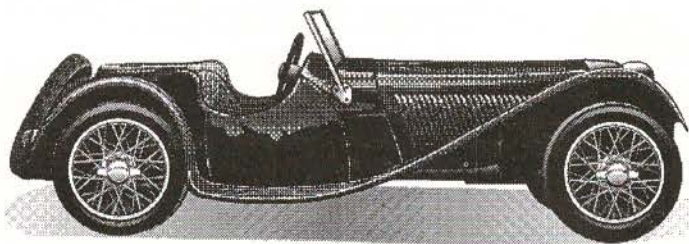
Text can be incorporated into any *ArtWorks* display. Within *ArtWorks*, text can be manipulated by any object-related tool or process, yet also remains editable as text at all times. A sophisticated undo and redo system is included which stores a complete history of the development of a drawing, if required, along with the drawing itself. *ArtWorks* will also import files from Adobe *Illustrator*, Aldus *Freehand* and CorelDRAW (the latter from the PC world), and will export in *Illustrator* format (which is recognised by all three of these established packages). It will also import and export RISC OS Draw files as well as using its own internal format.

Like *Draw*, *Artworks* uses a panel of tools, though rather more than in *Draw*. These can be selected and arranged as required by the user, and can 'stick' to the current window, or sit independently on the



screen. This tool bar can also grow or shrink as new facilities are added, or to suit the needs of users. In addition, there is an *info bar* running across the foot of the screen. This shows the x,y position of the mouse pointer, information which is tool related, and scale and fidelity controls. Fidelity refers to the drawing - greater fidelity implies greater accuracy (and slower refresh speeds). Maximum fidelity results in the whole drawing being anti-aliased.

Drawing lines and curves is much as with Draw. However, ArtWorks makes it much easier to change tool while drawing a path of several segments, and also makes the creation of closed paths (*shapes*) much easier too - adjacent end points simply snap onto each other.



Artwork from Artworks

As screen and printer colours are not normally the same, ArtWorks provides additional palettes so that the display conforms better to the Cyan-Magenta-Yellow-Black (CMYK) system used for printing. Tints can also be expressed as percentage values, so that changing a base colour will automatically change all tints of that base colour. ArtWorks will also work with the RGB system, or with HSV (Hue, Saturation, Value) more familiar to TV engineers.

As well as colour fills, ArtWorks provides graduated shading allowing users control of direction and range. Radial fills give a more three-dimensional aspect to shapes.

Applying tools to text can achieve many of the effects produced by software such as 4mation's Poster and RISC Developments' TypeStudio. Text can be shaped by means of envelopes using Bezier curves to control the degree of distortion. The perspective tool gives correctly calculated perspective views of a selected object (or text). As mentioned before, whatever transformations are applied, text can still be edited as text, a powerful feature.

The pre-release version of ArtWorks is dangled (like Impression), and it seems likely that the final release will also use a dangle for security. CC says it is considering a combined Impression/ArtWorks dangle for greater convenience. The final price on ArtWorks has yet to be determined, but should be about £150.

On a relatively brief exposure to ArtWorks it is clearly impossible to do more than scratch the surface. Like all good applications, the results depend as much on the skills and imagination of the user as on the sophistication of the

software. ArtWorks appears to have particular strengths with regard to colour rendition and manipulation for professional quality results; it extends and improves upon Draw's object-oriented capabilities, and it caters very comprehensively for the needs of creative typographers in its handling of text. All in all, ArtWorks looks sure to be a success, and furthermore will significantly enhance the potential of the Archimedes as a platform for professional graphic designers.

Product	ArtWorks
Supplier	Computer Concepts Gaddesden Place, Hemel Hempstead, Herts HP2 6EX Tel.(0442) 63933 Fax (0442) 231632
Price	£160 approximately

# ... a new version of **DeskEdit** (V 1.20)

has now been released

## Acorn User

...offers much to the user... a good deal of thought has evidently gone into its development...  
... a worthwhile upgrade from Edit

## Archimedes World

...replete with well thought out and flexible features... very attractive... remarkably inexpensive for what it offers... should prove very popular.

## Archive

...a wonderful piece of software... deserves to be on everyone's icon bar... Acorn would do well to provide it free with every machine it sells... so much (is provided) that you wonder how you managed before.

...macros are... a boon and of great value when writing a program... a truly marvellous set of page and printer control options are included... Everything I wanted was there with clear instructions for use. DeskEdit is a must.

with even more features for text editing and word processing tasks, Basic and C source editing.



## A new single key

**save-and-run feature in Basic mode**, permits virtually instantaneous testing of programs and applications as you edit them. To make Basic editing even easier, an automatic LISTO 1 is applied when numbered programs are loaded (and the spaces are automatically removed on saving).

The **improved procedure and function browser** now lets you browse procedure and function definitions in both directions (Ctrl-D takes you to the next definition, while Ctrl-Sh-D takes you to the one above etc).

In text mode, **wordwrap control** has been improved, while in C mode **syntax checking** has been extended, and a special Search option lets you search for function definitions.

Other **new features** are: • dynamic date insertion, • Left and Right Justify, • bracket matching, • Align Columns and the Char Info option (Ctrl-7 puts up a box giving the ASCII code of the character at the caret in hex and decimal, and any special function it may have - e.g. Bold On etc.).

# DeskEdit

Is the ultimate all-purpose editor for the Archimedes, with special features for use with plain text, Basic and C source.

Edit your Basic programs on the desktop and test them interactively with a single key press.

## DeskEdit features

- Three special Find and Replace modes - from Simple to Power Search
- Additional Quick-Search mode for rapid retrieval
- Text macros to insert user strings in both text and source code
- Special Undelete buffer for moving text around, in addition to Edit-style Undo/Redo
- Dedicated markers and position finders for finding your way around large files
- Clipboard, providing an alternative way to move text around
- On screen Help - full documentation in a scrollable window
- Instant file info feature, and current directory setter
- Caret flash controller for DeskEdit and other applications
- Customised user commands to open directories, run other applications and launch Obey files
- Numerous keyboard shortcuts
- Fast text printout including style codes for bold, underline, italics, page breaks etc
- Special text printing options with headers, footers, page numbering and style codes.
- Preview mode
- Statistics option - a brief summary of aspects of the text to be printed, including character, word, line and page count.

## Language specific features:

### Plain text

- DeskEdit will format word-wrapped text as you type

### Basic

- Drag a Basic file to the icon, and it will automatically be detokenised and loaded into DeskEdit ready for editing. Press F3 to retokenise and save it after editing.
- Optional line number stripping.
- Auto indent, automatic line number insertion, and checking for matched brackets and quotes - as you type.
- **Special Basic browser:**
  - Ctrl R steps through all REM lines
  - Ctrl D steps through all procedure and function definitions
  - Ctrl P steps through all procedure references
  - Ctrl F steps through all function references

### C language

- A simple syntax checker which operates as you type.
- Auto indent facility combined with automatic generation of opening braces streamlines source code entry.
- **C Function browser**
  - Ctrl-F steps through function definitions.

DeskEdit is supplied with a 48 page manual and a function keystrip.  
Members' Price **£19.95** inc. VAT. + p&p Stock Code **PEDTb**  
Existing users may upgrade to V. 1.20 by sending their original disc, together with £2.00 and SAE marked **DeskEdit Upgrade 1.2**.

**RISC Developments Ltd.**

117 Hatfield Road, St Albans, Herts. AL1 4JS.  
Tel. 0727 40303 Fax 0727 860263



# Boot Applications Revisited

by Bill Hine

Alan Wrigley's article in Volume 4 Issue 5 showed you how to create a boot application to install your favourite software every time you switch on your Archimedes. In this article I want to explain how to auto-boot any disc.

Alan Wrigley showed how to initialise your machine in just the way you want at switch-on. However, if you have 2 Mb or 4 Mb of RAM but only a single floppy disc drive, one disc may not be enough to contain all the applications (especially large ones like Ovation or Pipedream) which you may want loaded. Fortunately, a similar approach can be adopted to start up any disc in the manner you want, whenever you insert it in a drive and click on the drive's icon.

Normally, clicking on the drive's icon appears only to open the disc's main directory viewer. But you might want, for example, to open one of the sub-directories instead, start up one or more applications on the disc, or copy a directory to RAM. The method outlined below can do all of this and more.

The Boot Application discussed by Alan Wrigley works because at switch-on RISC OS automatically tests whether the configuration setting 'Boot' is on. If so, it then looks for a file (or application) called *!Boot* in the root directory of the configured drive and, provided Opt 4 is set to 2, runs it. The technique proposed here makes use of another of the operating system's automatic processes which is less widely known. This is that whenever a directory of any disc is seen (i.e. when the viewer is opened on screen), each application in the viewer which has not been seen before is examined

to test whether it contains an obey file entitled *!Boot*. If so, this file is run.

You may have noticed, in this context, that it seems to take quite a long time to open the root directory of some discs after you have clicked on the disc drive icon, with much whirring of the drive (e.g. the Application discs supplied with the computer). The reason may well be that there are a large number of applications on the disc which are new to the computer and therefore with *!Boot* files to be found, read and run.

The *!Boot* file of an application usually contains the instruction:

```
IconSprites <Obey$Dir>!Sprites
```

This merges the application's identifying icon (contained in the file *!Sprites*) into the Wimp sprite area, although according to the PRM the instruction is not essential provided the sprite file is called *!Sprites*. The boot file may also contain other instructions to set up new filetypes and file runtypes. You can read more about application boot files in RISC User Volume 4 Issue 3 p.71 and in the PRM pp. 1716 and 1304-5.

But how do we make use of the automatic running of the boot file contained in an application to achieve what we want? Begin by creating a new application directory in the root directory of any disc you want to boot. Its name must be unique - i.e. it must not have been seen by the system before - otherwise it will be ignored. The name must begin with "!" to identify it to RISC OS as an application, and I suggest that, for the sake of identification, you give it a name which ends in "boot". For example, the boot application on my Ovation disc is called *!OvBoot*. You could help further to identify it as a boot

## Boot Applications Revisited

application by borrowing the !Sprites file from Alan Wrigley's Boot application on the April 1991 RISC User disc and copying it into your own application. Alternatively, you could design your own sprite using Paint. In any case, make sure that the sprite itself has the same name as the application but with all lower case letters (e.g. !ovboot).

Now use Edit to create an Obey file which you will call !Boot when you save it to your new application (a boot file, and in a boot application to boot! - I couldn't resist it either, Alan). This need contain only two lines:

```
IconSprites <Obey$Dir>!Sprites
Desktop -File <Obey$Dir>.DeskBoot
```

Next use Edit again to create a text file: call it *DeskBoot* and when complete, save it too into your application. DeskBoot should contain the instructions needed to accomplish whatever actions you require for this disc. In the case of my Ovation disc, I want it to run Ovation, copy a directory called Stylesheet to RAM disc, and open it up ready for use. So my DeskBoot file looks like this:

```
Run adfs::OvProgB.$!Ovation
Copy adfs::OvProgB.$.Stylesheet RAM:$
* ~CR~V
Filer_CloseDir adfs::OvProgB.$
Filer_OpenDir RAM:$.Stylesheet
```

The Copy instruction assumes of course that I have a large enough RAM disc already configured. The parameters to *Copy* ensure that each of the files in directory *Stylesheet* are copied (R for recursive) without prompting for confirmation (~C) and without printing information on each file copied (~V, not verbose). Note that the *Filer\_CloseDir* instruction closes the root directory of my Ovation program disc before opening the Stylesheet directory, now in the RAM disc. In effect, the root directory viewer for the disc will simply fail to open in the way you would normally expect it to do after clicking on its drive icon. I don't

usually want to access any of the files contained in the Ovation disc root directory, so I don't need to see it.

You will, of course, include in your DeskBoot file whatever commands you want carried out for your particular disc. You may notice the resemblance between DeskBoot and the file of the same name in Alan Wrigley's application; indeed, they can perform a similar set of functions. Note too that the same constraints apply: to run an application, use the word Run and give the full pathname (see RISC User Volume 4 Issue 6 p.65).

Now, all I have to do to run Ovation, transfer my stylesheets to RAM and display them on screen, is to insert the disc in drive 0 of my A3000 and click over the disc drive icon. If I subsequently decide I do, after all, want to look at the root directory of the Ovation program disc, clicking on the drive icon again will open it. This is because, as explained above, RISC OS behaves differently when asked to display a directory, depending on whether or not it has "seen" the applications in it before: the first time an application is seen, its boot file will be run, but subsequently the boot file will be ignored. In the absence of the filer instruction to close the viewer, normal service will be resumed!

As well as containing a boot file in place of a run file there is one further difference between an application used to start up your computer (as described by Alan Wrigley) and one used to start a disc subsequently inserted into a disc drive (as described here). In the first case, Opt 4 must be set to 2, but in the latter, Opt 4 must be set to 0. To do this, insert your disc in drive 0, press F12 and enter:

```
Mount :0
```

Then type:

```
OPT 4 0
```

and press Return to get back to the Desktop.

**RU**



# Lingenuity's Presenter GTi —

*Rob Cumming investigates the competition for Graphbox Professional, which he reviewed in RISC User Volume 5 Issue 3.*

Lingenuity's new graph drawing package *Presenter GTi* sounds more like a sporty hatchback than a graph drawing program! Perhaps, I thought, in keeping with its name, it outputs the graphs in a handy Filofax-sized format ready for direct insertion into the diary. But no, none of these things. It is, however, a very nifty graph drawing package indeed.

*Presenter GTi* comes on one disc with a 60 page manual. When loaded, it occupies 416K of memory but the package will grab more memory as data is fed in. Once installed, clicking Menu over the icon will reveal, in addition to the usual Info and Quit, an options menu. The options allow a choice of the way in which CSV files are imported - either as a vertical column of data (the default) or as a horizontal one.

## LOADING IN DATA

Data can be loaded into *Presenter GTi* in a number of ways. Dragging a CSV file onto the GTi icon is the easiest way of getting started. The CSV file can be created from most spreadsheets, or through a Basic program, or in Edit. The data can include labels for the graphs. Dragging more than one file in succession onto the GTi icon results in the production of a new datasheet for each data set. This is of no use if you want all the data to be on one graph. However, it is easy to load multiple data sets into memory by using the second method of loading data, via the GTi data sheet.

Thus after loading the first set of data, the GTi data sheet appears on the screen, and by moving the cursor to the desired column for the new data set to be received, multiple column sets can be built up. I tested this facility by loading 6 files of about 200 paired X and Y values, originally

formed on a PC which was logging a scientific instrument.

## SELECTING THE TYPE OF GRAPH

Once the data is loaded, clicking the Menu button produces a menu for all other operations. From this menu you can edit the data sheet (as mentioned), plot the graphs and save the data. Choosing the *Graph* option gives another menu with the four types of graph: *Line*, *Scatter*, *Pie*, and *Bar and Area*. With the paired X-Y data, only the Scatter option is suitable. Selecting this produces a pictorial menu which allows the remaining selections to be made: principally the choice between linear, semi log or double log scales.

Selecting in this case linear scales results in a graph being drawn with the default options. These can be changed but not saved as the GTi *Save file* option saves the data along with the settings, and cannot be used to generate graphs of the same format. So I had to select the correct font every time I used the package (the default is Trinity). Once the graph has been drawn, a very comprehensive set of style changes can be made. Thus you can choose:

1. The data symbol: 11 point types are possible, including the usual filled and unfilled triangles, squares and circles.
2. Whether to plot the symbols or join the points, or both. Thus with 200 points per data set, it is necessary to turn off the option for displaying the points and just use the *Join point* option. An annoying feature here is that it appears to be possible to change only one data line at a time.
3. Line thickness and type (5 varieties of dotted line are possible, an important criterion for when monochrome graphs are required).

4. Colour of line or points.
5. A line of best-fit to be plotted through any or all of the data sets. There is a facility to access the statistics associated with the degree of fit.

Effect of lysis time on viscosity  
Shear stress versus shear rate

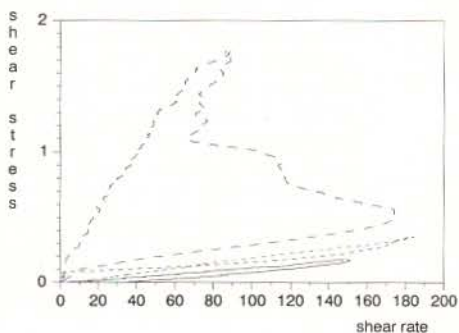


Figure 1. Example of a Scattergraph produced from 6 data files of paired X and Y values. All colours were changed to black and white

Most of the other desirable parameters can be changed from the axes menus or options. Thus it is possible to have a box format in addition to the usual X axis and Y axis (see figure 1). An excellent feature of GTi is the facility to select a grid with lines on intermediate positions between labels. One can thus produce a graph as though it was on, say, millimetre graph paper. This is a boon to those of us in the field of education where it is often required to give students a graph from which accurate values can be read, and even gradients taken.

Other features worth noting are:

1. The ability to have the axes labelled in fixed point or exponential format (but this is not as neat as in GraphBox Pro, which uses just one multiplier for the whole axis rather than attaching a power of 10 with each label).
2. Axes colour and thickness.
3. Titles, a major and minor one (see figure 1).
4. Position of origin when negative numbers are used.
5. Inclusion of legends in either a horizontal or vertical position. A very useful facility is that the legend can be dragged to any position within the graph (for instance within the box of the graph itself). This could also be done in Draw, I guess, but it is a nice touch.
6. Linear or logarithmic scales.

### OTHER TYPES OF GRAPH

As would be expected, GTi produces bar charts in various forms. Thus vertical, horizontal and stacked histograms are rapidly constructed. From the options menu, 3D and shadow rendering of the histograms are possible, a lovely feature, and almost standard nowadays. An excellent detail is the ability to control the position of the label on the X axis for each bar. It can start in the middle of the bar or at the furthest point to the left. The former often gives a much better appearance, if the label is short enough (see figure 2).

The range of pie charts which can be produced is also fairly standard, but with easy selection from the picture menus of GTi. Thus you have control over whether to explode sections or not, or whether to include percentage labels. They can be rendered with shadows too.

### LINE GRAPHS

GTi recognises whether the data set is continuous or not by the presence of a text label in the first column (this provokes the package to space the data out on the X axis in equal divisions). On selecting the *Line graph* option, a picture-style menu appears from which it is possible to select linear or logarithmic scales with or without the points shown. It was very easy to produce good looking graphs and to change from one style to another. I was disappointed



here with the logarithmic scaling routine in that although the program does the hard work of scaling the data and drawing the graph correctly, it refused to print the numbers on the logarithmic axis if the numbers are less than 1. Excellent labelling and presentation was obtained if the numbers were always greater than 1.

### OTHER FEATURES

GTi comes with a tutorial written into the manual with accompanying graphs on disc. However, I was not able to test these, since they seem to require the Homerton font, which I do not have. This reinforces my earlier point of GTi's lack of control over the default values, particularly fonts. Most of the menu items are obtainable from key shortcuts, to speed things up, although the program is very quick and easy to use anyway. There is also a conversion utility to allow old Presenter files to be used with GTi. A *Hotlink* facility is provided for linkage to spreadsheets supporting the same.

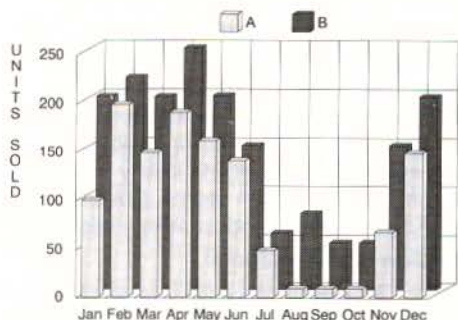


Figure 2. Example of a bar chart. Note positioning of labels on X axis, giving a neat appearance. The 3D option has been chosen, together with a full grid.

### THE COMPETITION

Of the two packages I have been able to test (GTi, Graphbox Pro), I would choose Graphbox Pro for scientific graphs. It scores because it has a number of facilities that others do not have. For example, you can label axes in mixed fonts combined with the use of superscripts (essential for

units like "m<sup>3</sup>"), which cannot easily be done when the graph is imported into Draw. Similarly, Graphbox Pro's ability to write the Y axis label vertically, with correct 90° rotation of letters, gives very professional (and more readable) results. Also, Graphbox Pro can add real error bars to the data points (e.g. 95% confidence points). Other advantages are that Graphbox Pro can convert the screen to monochrome instantly, and has a built-in function plotter.

GTi does have a few advantages over Graphbox Pro, however. The ability to have the axes in a box form and to draw a grid to give ruled paper are very useful points. In addition, GTi is much easier to use as everything is controllable from menus rather than SID files.

GTi gives very good bar charts, pie charts and line graphs, with excellent control over the finished results. Graphbox Pro can produce much more of course, and again would be the choice for the serious user who needs the sheer variety available with Graphbox Pro or needs a particular type of graph not available on the other two packages.

Neither of the packages can produce X-Y plots with two different Y scales, nor produce true scaled 3D X-Y-Z graphs. Both these features are available with PC software.

### CONCLUSION

GTi is a powerful package and is very easy to use. It could be an alternative to the more expensive (but still reasonable) Graphbox Pro. Check its specification for your needs; you may not need Graphbox Pro. If you have simpler applications in mind, check whether or not RISC Developments' own *Chartwell* won't do the job just as well.

Product	Presenter GTi
Supplier	Lingenuity Wood Farm, Linstead Magna, Halesworth, Suffolk IP19 0DU. Tel.(0986) 85477 Fax (0986) 85460
Price:	£82.19 inc. VAT

RU

# Archimedes Software

## Banish Those Jaggy Blues !



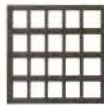
### Disc 35 Trace

- Trace converts Sprites into Draw files.
  - Sprite format clip art is cheap and plentiful. Draw clip art is expensive and usually has to be painstakingly drawn by hand.
  - Sprites take up lots of disc space. Draw files are smaller.
  - Scaled sprites have jagged edges. Draw files scale perfectly.
  - Unlike some programs, Trace will handle full colour sprites. Trace works automatically with no user help.
  - You can now use the powerful tools in Draw for manipulating Sprites.
- Comes with D2Font program for making outline fonts from Draw files. So you can scan your own fonts. Examples of Trace and D2Font included.



### Disc 7 - Chess Program for The Archimedes.

A Chess program that takes full advantage of RISC OS, installing itself on the icon bar and running on the desktop in a window. You can work with other programs whilst you play Chess. Many features, computer play, hint, save games, edit etc. Risc User July 1991 said: "*Chess is an absolute bargain. .playing at a comparable level it always beat Micro Power's offering. ....this has to be the one to go for*".



### Disc 8 - CrossStar 2.XX Crossword puzzle solver

Fully RISC OS compliant desktop Crossword puzzle solver. 200,000 word dictionary. Solves interlocking clues. Editable/user definable dictionaries. Saves grids as Draw files. Browse through dictionary. Check grid for new words.



### Disc 32 - Charm. High level language and environment.

Charm, is a high level language similar to Pascal and C. This implementation, includes a compiler, linker and assembler, with an editor, and a desktop environment to use them. The Charm system is both fast and ideally suited to being used on 1Mbyte and floppy machines. Demos with source, Chinese checkers and an arcade style game. An easy way to produce ARM code programs.



### Disc 33 - Panorama. Your window on the World!

180,000 coordinates outlining the lakes, rivers, continents, state boundaries etc. of the World and a program that can produce Draw files from them. You can make maps of any part of the world and then use them in DTP etc. programs. Includes the positions of nearly 1000 cities. Does simple, cylinder, Mercator and perspective projections. Can be used from a single floppy disc and requires no setting up.



### Disc 16 - Spark RISC OS Archive program

Spark, allows you to store files and directories in archives in a compressed form. e.g. sprites often take up only 10% of normal space. Files in archives, can be accessed just like files on disc. Reads all these formats, zoo, zip, lzh, UNIX and Archie Tar, Compress. Reads and writes PKarc, SEA/PC arc, uucode, atob, fcet.

*Discs are £5.99 each, all inclusive. Buy four claim an extra one free!*

**David Pilling, P.O. Box 22, Thornton Cleveleys, Blackpool. FY5 1LR.**

Free Air Mail delivery on overseas orders. Extensive range of other Archimedes software available (programmers tools, games, utilities, clip art), please send for free list.



# Assembler Workshop

## Square Root and Sort Routines

### Integer Square Root

by Mark Moxon

A calculation that is much used (for example in 3D graphics programming) is the square root function. There are various methods for calculating the square root of a number, but the one presented here is quick and small, and calculates the integer square root - i.e. the integral part of the square root, so the integer square root of 11 is 3 - which is usually all one needs in assembler as registers can only hold integers.

To use the program, simply type it in and run it. It includes example code to call the routine, which is done simply by placing the number to be rooted in A%, and then calling the routine by **USRisqrt**, which will return the answer, for example:

```
A%=1234
```

```
R%=USRisqrt
```

will return 35, the integer square root of 1234, in R%.

### HOW IT WORKS

To describe the algorithm, it is necessary to introduce an operator ++ which "tacks" bits on to the least significant end of a binary number, thus:

```
1010 ++ 1 = 10101
```

```
1101 ++ 10 = 110110
```

Let 'b' be the number to be rooted, and 'a' be the answer from the algorithm. Then the algorithm is as follows (using temporary variables s, t and u):

1. Put  $s=0$  and  $a=0$ . If b contains an odd number of bits then put  $b=0++b$ .
2. Put the two most significant bits of b into t.
3. Put  $s=s++t$  and  $u=a++01$ .
4. If  $s>=u$  then put  $s=s-u$  and  $a=a++1$ , otherwise put  $a=a++0$ .
5. Go back to step 2, getting the next two most significant bits of b until we have used all of b.

As an example, let's take the number %10111 (23 in decimal). The method goes as

follows (all numbers are in binary and the left hand numbers represent the step number being executed):

1.  $s=0$  and  $a=0$  and  $b=010111$
2.  $t=01$
3.  $s=0++01=1$  and  $u=0++01=1$
4.  $s>=u$  so  $s=1-1=0$  and  $a=0++1=1$
2.  $t=01$
3.  $s=0++01=1$  and  $u=1++01=101$
4.  $s<u$  so  $a=1++0=10$
2.  $t=11$
3.  $s=1++11=111$  and  $u=10++01=1001$
4.  $s<u$  so  $a=10++0=100$
5. All done

So the answer is 100 (4 decimal).

```
10 REM >ISqrt
20 REM Program Integer Square Root
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 DIM code% 256
100 FOR pass%=0 TO 2 STEP 2
110 P%=code%
120 [OPT pass%
130 .isqrt
140 MOV R2,#%11
150 MOV R3,#30
160 MOV R0,#0
170 MOV R7,#0
180 MOV R8,#1
190 .isqrt1
200 MOV R0,R0,LSL#1
210 AND R6,R2,R1,LSR R3
220 ORR R7,R6,R7,LSL#2
230 ADD R5,R8,R0,LSL#1
240 CMP R7,R5
250 SUBGE R7,R7,R5
260 ADDGE R0,R0,#1
270 SUBS R3,R3,#2
280 BPL isqrt1
290 MOV PC,R14
300 ]
310 NEXT pass%
320 :
```

```
330 REPEAT
340 INPUT "Number",B%
350 PRINT "Root is ";USRisqrt
360 UNTIL FALSE
370 END
```

### ArmSort

by David Beaumont

Sorting numbers into order is a vital part of many applications - databases need a fast sorting algorithm, for example. The importance of sorting is shown by the inclusion of a heap sort routine in RISC OS - the *SWI OS\_HeapSort* (see *A Desktop File Sorter* in Volume 4 Issue 10).

The assembly listing provided here implements a sort that outperforms *OS\_HeapSort* when sorting large arrays of integers. It assembles a routine in the DIMed area *sort*. To use the routine, set A% to be the number of the first element in the array (usually 0), set B% to be the number of the last element in the array (here it's *max\_n%-1* because numbering starts from 0), and set C% to point to the array (here stored at *arry*). Then calling the routine by **CALL sort** will sort the array. The listing given performs a sort of an array with a user-defined number of elements, and compares the times taken by *ArmSort* and *OS\_HeapSort*.

#### HOW IT WORKS

The sorting method itself is not an obvious one like Bubble Sort or Insertion Sort, but for those of you who are interested in the workings of the program, the algorithm is listed below. It uses the so-called "divide and conquer" method, in which a problem is broken down recursively into smaller steps, which are then solved and recombined to solve the whole problem. Assuming we are sorting an array *arry[]* of *n* elements, the algorithm goes as follows:

1. Put  $a'=0$  and  $b'=n-1$ . These two variables point to the start and end of the array to be sorted.
2. Set  $a=a'$ ,  $b=b'$  and  $m=(a+b)/2$ . Put  $m0=arry[m]$ .
3. Put  $a0=arry[a]$ . If  $a0>m0$  then put  $a=a+1$  and repeat this step.

4. Put  $b0=arry[b]$ . If  $m0>b0$  then put  $b=b-1$  and repeat this step.
5. If  $a<=b$  then put  $arry[a]=b0$ ,  $arry[b]=a0$ ,  $a=a+1$ ,  $b=b-1$ . If  $a<=b$  then go to 3.
6. If  $a'<b$  then sort array recursively with  $b'=b$  (i.e. go to 2 with  $b'=b$  and when sort is complete, carry on from here).
7. If  $a<b'$  then sort array recursively with  $a'=a$  (i.e. go to 2 with  $a'=a$  and when sort is complete, carry on from here).
8. End - sort is complete.

```
10 REM >ArmSort
20 REM Program Assembler Sort
30 REM Version A1.0
40 REM Author David Beaumont
50 REM RISC User May 1992
60 REM Program Subject to Copyright
70 REM Not Public Domain
80 :
90 MODE 0
100 INPUT "Number of elements in array
*,max_n%"
110 DIM sort 144
120 DIM arry 4*(max_n%)
130 DIM arry2 4*(max_n%)
140 base=11:count=12
150 FOR pass%=0 TO 2 STEP 2
160 P%=sort
170 [OPT pass%
180 MOV base,R2
190 .srt
200 STMPD R13!,(R14)
210 MOV R2,R0:MOV R3,R1
220 ADD count,R0,R1
230 MOV count,count,LSR#1
240 LDR R4,[base,count,LSL#2]
250 .lab1
260 LDR R5,[base,R2,LSL#2]
270 CMP R5,R4
280 ADDGT R2,R2,#1:BGT lab1
290 .lab2
300 LDR R6,[base,R3,LSL#2]
310 CMP R4,R6
320 SUBGT R3,R3,#1:BGT lab2
330 CMP R2,R3:BGT lab3
340 STR R6,[base,R2,LSL#2]
350 STR R5,[base,R3,LSL#2]
360 ADD R2,R2,#1:SUB R3,R3,#1
370 .lab3
```



```

380 CMP R2,R3:BLE lab1
390 CMP R0,R3:BGE lab4
400 STMPD R13!,{R1}:MOV R1,R3
410 BL srt:LDMFD R13!,{R1}
420 .lab4
430 CMP R2,R1:BGE lab5
440 STMPD R13!,{R0}:MOV R0,R2
450 BL srt:LDMFD R13!,{R0}
460 .lab5
470 LDMFD R13!,{PC}
480 ]
490 NEXT
500 :
510 PRINT "Generating Random Numbers..
"
520 FOR i%=0 TO max_n%-1
530 number%=RND(10000)-5000
540 array!(i%*4)=number%
550 array2!(i%*4)=number%
560 NEXT
570 PRINT "ArmSorting.."
580 start_time=TIME
590 A%=0:B%=max_n%-1:C%=array
600 CALL sort
610 time_taken=TIME-start_time

620 PRINT "Checking.."
630 dta1%=!array
640 FOR i%=1 TO max_n%-1
650 dta2%=array!(i%*4)
660 IF dta2%>dta1% THEN PRINT "Failed!
":END
670 dta1%=dta2%
680 NEXT
690 PRINT"ArmSort took ";time_taken/10
0;" seconds"
700 PRINT "HeapSorting.."
710 start_time=TIME
720 SYS "OS_HeapSort",max_n%,array2,1
730 time_taken=TIME-start_time
740 PRINT "Checking.."
750 dta1%=!array2
760 FOR i%=1 TO max_n%-1
770 dta2%=array2!(i%*4)
780 IF dta2%<dta1% THEN PRINT "Failed!
":END
790 dta1%=dta2%
800 NEXT
810 PRINT"HeapSort took ";time_taken/1
00;" seconds"
820 END

```

RU

## A5000

Acorn's new machine, offering RISC OS 3, multisync monitor, ARM3, and 40Mb hard disc. A5000 computers are normally shipped with 2Mb of RAM, but **currently an extra 2Mb (4Mb total) is supplied free of charge with the systems below;**

A5000 with 4Mb RAM £1499  
A5000 Learning curve (4Mb RAM) £1531

## A5000 memory

Upgrades your 2Mb A5000 to a total of 4Mb. Fast RAM and a high quality 4-layer circuit board (as recommended by Acorn). Easy to fit, plug-in construction. No soldering needed. Money-back guarantee.

**2Mb upgrade (4Mb total) £99**  
(Special offer - this board is supplied free of charge with the A5000 systems above).

**Educational and quantity discounts are available.**

Prices exclude VAT. Further information and free price list from;



IFEL, 36 Upland Drive, Derriford, Plymouth PL6 6BD. (0752) 847286. Fax 840029



## A310 memory

**2Mb - £99    4Mb - £163**

The 2Mb card may be upgraded later to the full 4Mb. Compatible with ARM3s, backplanes, hard discs etc. Larger OS ROM option. Low power consumption. High quality four-layer circuitry and a no-quibble money-back guarantee. *A neat and long lasting upgrade. Acorn User. We have had a lot of very positive feedback about the IFEL memory upgrades. Archive.*

We have been upgrading A310 computers for over two years. In that time, not a single upgrade which we have fitted has developed a fault and needed repair.

**Write or phone for our detailed data sheet on this upgrade. Educational discounts available.**

## A3000 memory corner

Upgrade to 2Mb £55  
Upgrade to 4Mb £140  
Bare board £25.50

These upgrades are very easy to fit, and use just 8 chips to minimise power consumption. The bare board has high quality turned pin sockets for the RAM chips. Gold plated connectors ensure long term reliability. Money-back guarantee.

# Notate

## Music Composition from Longman Logotron

Reviewed by Richard Hallas

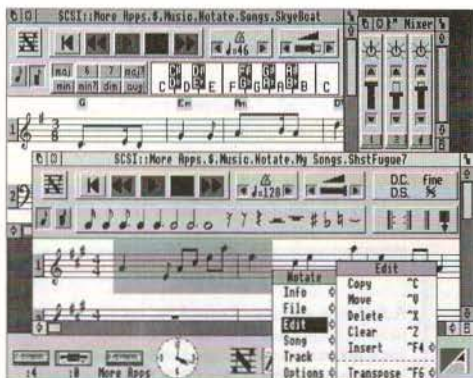
Longman Logotron's Notate is a music composition application, targeted primarily at the educational market. At first sight it looks somewhat like Maestro and Rhapsody, but the facilities it offers, and the way in which they are presented, are quite different.

### THE PACKAGE

Notate comes on two discs in a very attractive sturdy box which also contains a manual, a reference sheet and a registration card with a tear-off function key strip. The large A4 manual is exceptionally well produced, and contains a substantial section on using Notate in the classroom, with numerous well-conceived ideas for teachers to use. The quality of presentation and the content are absolutely first rate.

Of the two discs, the first contains the main Notate application, numerous example files and a few voice modules, whilst the second is devoted entirely to extra instrument sounds. The example files are in a very wide range of styles, from Bach to Blues via Teddy Bears' Picnic! Many of the examples have been composed specially to demonstrate different kinds of music; all are of a very high quality. In addition to the complete examples there are also a number of unfinished pieces and simple ideas. These are referred to directly in the teachers' section of the manual, and are designed to be completion or composition exercises for pupils. A number of rhythmic patterns and templates are also provided, giving a very comprehensive selection all round. Obviously, a lot of time has gone into producing a sensibly balanced selection of example files and exercises.

The seventy voice modules provided are of a similarly high quality, with some particularly realistic sounding instrumental samples, such as the vibraphone. In addition to the normal single-instrument modules, there are a number of kits, including drum kits, where each different note produces a different instrumental sound. These are helpfully summarised on the reference card.



Editing a score within Notate

### IN USE

Notate can be configured to load up a selection of voices automatically, which it will remove again when quit. If you load a file which uses a voice that is not currently installed, Notate will try to find the voice on the disc, and if it cannot, it will search through a series of floppies or use a substitute voice. The way in which voices are handled is very comprehensive.

Notate can handle up to four pieces at once, and data can be copied between them quite freely. Each window has a colourful set of tape recorder-style controls above the top of the score, and this area contains the



## Notate: Music Composition from Longman Logotron

other elements used to create the pieces, including notes, rests and accidentals. The longest note value available is a semibreve (this is reasonable) whilst the shortest is a semiquaver, which is, I feel, rather restricting. Since Notate is intended for use in education, it can be customised to a certain extent and simplified for less advanced pupils. It has three levels of difficulty, and the first is very simple, providing only quaver, crotchet and minim notes and rests. The second level adds dotted notes, semibreves, a comprehensive set of repeat marks, sharps and flats, whilst the third also gives access to semiquavers, naturals and ties. Various other options are available, such as viewing the score in two sizes.



Previewing a composition

Notate provides up to eight lines of music. Each line can only hold one musical part, but the extra clarity gained is quite sufficient justification for this, especially as it is a learning tool. There is also provision to control MIDI instruments, and to import and export MIDI files. A small mixer window can be called up to modify the relative volumes and stereo positions of the voices, and you can listen to one voice alone via the solo buttons in this window.

One of the most publicised features of Notate is its word processor-like cut and paste facility. You simply drag across a line of music to highlight it as you would a line

of text, and then use the same standard keyboard shortcuts or menu options for cut, copy and paste as you would in a word processor. Notate will not allow you to enter too many beats into a bar, and of course vertical alignment is performed automatically. Dragging a note with Select will edit its position, whilst clicking on any musical symbol with Adjust will take a copy of it, which can then be dragged to any other bar or staff. Another excellent feature is the Transpose edit option, which can be used to transpose the whole piece, a single track or, very usefully, a marked section. All this adds up to the best musical entry system I have encountered in this kind of program.

In addition to the single-part lines, chords can be used by clicking on the chord symbol in the top area of the window. The *note palette* changes into a keyboard and a set of eight chord buttons. Chords can then be dragged to the music area. However, four voices must be sacrificed to use the chords, and you can only have one harmony per bar.

Files can be saved in Notate, Maestro or MIDI format, but because of the chord facility, Maestro files are only saved with the first four parts.

The printout facilities are quite comprehensive and work via the normal RISC OS drivers. Music can be printed in three sizes in either portrait or landscape formats, and there are various other options. A useful preview window is also provided. The quality of the printout is reasonable, although it only uses sprites for the musical symbols and the system font for text. Anyway, it should provide a good deal of satisfaction for pupils to see their work printed out.

### CRITICISMS

Notate proved to be a very sturdy and reliable program. Some small points could be improved upon (for example, it would be nice to be able to drag the volume sliders

rather than having to use the arrows, and the pointer has to be positioned quite precisely when copying symbols), but my main criticism is that the most advanced difficulty level does not provide enough facilities for older pupils. Notate does not currently allow changes of key or time signature, and each part can only have one instrumental sound. In a future version, I hope Longman will consider adding at least one more difficulty level, which should give access to demisemiquavers and changes of key and time signature. A further level might also allow changes of instrumentation, tempo and dynamics.

The chord facility is a bit limited, too, with only one harmony per bar. This could be improved, and I can see no good reason why Maestro files are only saved with the top four parts intact. Also, the chord facility is the same for all difficulty levels: I think it should be removed from level one, and simplified for level two. A split window facility is provided, though this is less useful than it might have been because you cannot move the split windows sideways separately, so it is not possible to view a score at two points simultaneously. Such a facility would have improved the cut and paste features.

Notate is less than perfect with multisync modes, as there are some small problems with the horizontal alignment of staff lines. As many schools will be buying A5000s with multisync monitors, display aspects such as this should be tightened up. At the moment Notate also allows you to leave bars partially empty, which it then treats as rests. This should really be discouraged in a school, as children must not learn sloppy notation, just as they should not learn sloppy English grammar.

### CONCLUSIONS

As an educational product, Notate is a top class piece of software. Its editing facilities are very good indeed, and it is a

delight to use. School children will find it great fun, and very rewarding: I can think of few better ways of teaching music to children initially than through a stimulating medium such as this. Music can and should be treated as a game for young children, and playing with Notate will prove to be quite compelling and educationally valuable. Of course, Notate is equally well suited for learning music at home. The manual is absolutely excellent, but the program is so easy to use that the tutorial section, at least, is hardly needed.



Notate's information window

At the moment Notate's facilities are quite limited, and nowhere near as extensive as those provided by Rhapsody, although given the targeted market this is as it should be. I do hope that Longman will add at least one more difficulty level in future, as Notate is currently much better suited to those new to music, and older pupils may find it quite restricting. However, as it stands, Notate is a valuable educational product, and is highly recommended.

Product	Notate
Supplier	Longman Logotron, 124 Cambridge Science Park, Milton Road, Cambridge CB4 4ZS. Tel. (0223) 425558, Fax (0223) 425349
Price	£59.00 inc. VAT

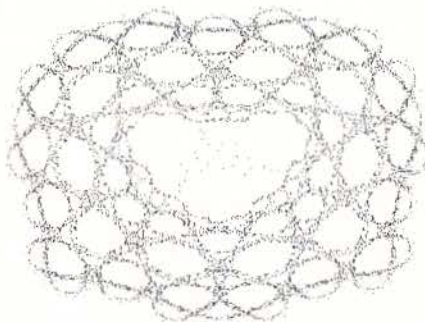
RU



# Dynamic Systems Visual

by L.G.Kirby

The program given here creates a beautiful display based on dynamic systems. It isn't a Desktop application, so it's extremely short, and the effect is well worth the effort of typing it in. A picture is constructed pixel by pixel, changing colours as it does so; this is repeated until the user gets fed up. Although intended as a screen saver (i.e. an application that prevents "burn-out" on your monitor by constantly changing the display), it produces attractive patterns and can be rather satisfying to watch.



The program works as follows. The parameters  $a$ ,  $b$  and  $c$  are chosen at random using the function *FNrand*; the numbers returned are partially determined by a limit  $H\%$ , also chosen at random. Within a loop, the position of the next pixel ( $x,y$ ) to be coloured is determined by operating on the old values of  $x$  and  $y$  to obtain new values of  $x$  and  $y$  as follows (using  $z$  as a temporary variable):

$$\begin{aligned}z &= y - \text{SGN}(x) * \text{SQR}(\text{ABS}(b * x - c)) \\ y &= a - x \\ x &= z\end{aligned}$$

Another loop changes the colour of the pixel being plotted (held in  $C\%$ ). When the colour has changed a given number of times, as given by  $L\%$  (set to 10 in the example program), the current pattern terminates and the next one is generated with new random numbers. The technique was described in *Scientific American*, November 1986.

The user can interact with the program in one of three ways. Pressing Escape

terminates the program as may be expected; pressing Space terminates the current pattern and starts the next; and pressing "." means that the current pattern will not automatically terminate, but will continue forever or until the user presses Space or Escape; the character "." is displayed at the top left-hand corner to indicate this.

```
10 REM >Dynamic
20 REM Program Dynamic Visual
30 REM Version A1.0
40 REM Author L.G.Kirby
50 REM RISC User May 1992
60 REM Program Subject to Copyright
70 REM Not Public Domain
80 :
90 ON ERROR PROCerror
100 s%=ASC" ".d%=ASC".".
110 REPEAT
120 L%=10:x=RND(-TIME):next%=FALSE
130 REPEAT
140 H%=RND(20)
150 a=FNrand;b=FNrand;c=FNrand
160 fac=150/(ABSa+ABSb+ABSd)
170 MODE 12:OFF:ORIGIN 640,512
180 x=0:y=0:C%=RND(7):J%=0
190 REPEAT
200 J%+=1:C%=(C%+1)MOD7+1:GCOL C%
210 FOR I%=0 TO 2000
220 z=y-SGNx*SQRABS(b*x-c)
230 y=a-x:x=z
240 POINT fac*(y+x-a),fac*(y-x)
250 A%=INKEY(0)
260 IF A%=s% I%=2000:next%=TRUE
270 IF A%=d% J%=L%+1:PRINTTAB(0,0) ".
280 NEXT
290 UNTIL J%=L% OR next%
300 UNTIL next%
310 UNTIL FALSE
320 END
330 :
340 DEF FNrand=RND(1)*RND(H%)*SGN(RND(
1)-0.5)
350 :
360 DEF PROCerror
370 ON ERROR OFF
380 ON
390 PRINT REPORTS;" at line ";ERL:END
400 ENDPROC
```





## C Notebook: C Source Code for Template Files

This C source will scan a loaded template file and replace all relevant carriage return characters with null characters. This makes sure that text strings in template files are all null-terminated which makes it easier to extract the strings in C.

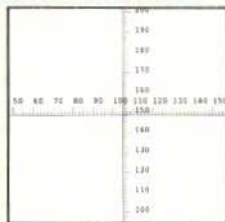
## Multisync Mode Extender Module



The mode extender module enables normal non-multisync monitors to display modes 18 to 21 (albeit rather flickery), which can normally only be used on multisync monitors. This can be handy when using the PC Emulator, as described in this issue.

## Printer Calibration Sheet Generator

This application prints horizontal and vertical rulers on your printer which extending across the full page width and height. The rulers are calibrated so that they begin at the left hand side of the page and at the bottom of the page respectively. This permits accurate setting up of page sizes in printer drivers, as discussed in *Into the Arc* this month.



## BONUS ITEMS

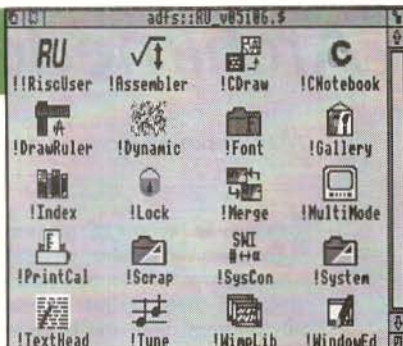
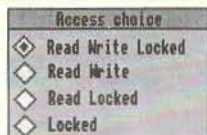


### Draw Ruler

A Draw file which contains two rulers, graduated in centimetres, which can be used to measure objects in Draw files (see last month's imperial equivalent).

## File Access Changer

This application allows the access rights of directories and files to be changed. The type of access is set through an easy to use dialogue box, and files can be locked and unlocked recursively throughout a directory structure.



## DeskEdit Text Header Displayer



The TextHead application is designed to assist file management by rapidly extracting a non-printing heading, inserted at the start of a DeskEdit file, for easy file identification.

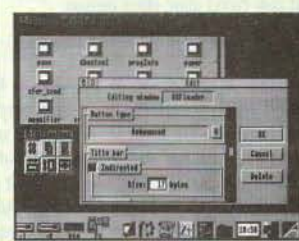
## Example Notate File in Maestro Format

This musical piece was prepared in Notate and exported as a Maestro file. The music is the Fugue in A major, Op.87 No.7 by Dmitri Shostakovich. Our multi-tasking Maestro file player (to enable the tune to be played in the Desktop) is also included.



## WindowEd Demonstration Version

A demonstration version of the comprehensive



WindowEd template editor, reviewed in last month's RISC User. This version is complete, except that template files cannot be saved after editing.

**ArcScan Data** ArcScan indexes for this issue of RISC User and BEEBUG Vol.10 No.10.

# Archimedes Disc Rescue

Martyn Lovell looks at this potentially life-saving package from LOOKsystems.

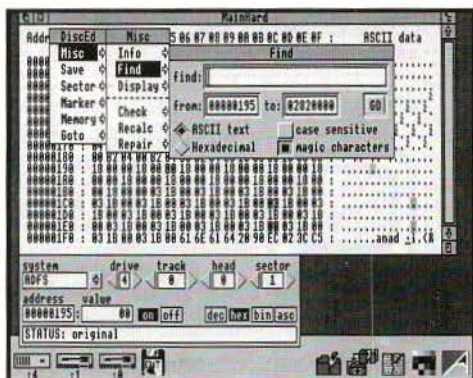
It's easy to become complacent about discs. They seem so reliable, especially as one can now throw a 3.5" floppy at the wall with no visible ill effect. It's just so easy to come to rely on hard discs and become blasé about backing up. I discovered this to my cost a couple of years ago when I lost two weeks' programming as a result of my A440's hard drive dying irretrievably.

Making regular backups is one insurance against data loss, though it's not made any easier by Acorn's failure to provide a built-in means of hard disc backup, even in RISC OS 3; there are, however, already commercial products (such as Risc Developments' Hard Disc Companion) that come to the rescue here. Another safeguard is to ensure one has tools that will help one pluck data from the jaws of a corrupted disc. LOOKsystems' *Archimedes Disc Rescue* is one such package, designed to enable the repair of discs and recovery of data.

The package consists of four RISC OS based applications: *DiscEd*, *FixMap*, *Recover* and *RepairDir*. The version I received came with a pre-release copy of the printed manual: documentation is currently also supplied on the disc. The master discs are not copy-protected, so installation was simple: I just dragged the applications to my hard disc. I also put copies on my emergency system disc that contains repair software that may be useful if my hard disc dies again.

## DiscEd

The main application is DiscEd, a tool for inspection and modification of floppy and hard discs. When its icon is clicked it opens a window containing data from the default drive. This contains the disc's first sector represented in both hexadecimal and ASCII. A pane (similar in behaviour to Draw's toolbox) hangs from the bottom of this window, and allows one to use the mouse or keyboard to move to any part of the disc. It is also possible to alter any byte or word.



The Disc Editor application

A menu allows one to move around the disc, find data, check or repair disc control structures and mark blocks, but infuriatingly blocks cannot be marked with the mouse. A set of key shortcuts are also available, but these are fairly annoying, for example Ctrl-Shift-S followed by Ctrl-Shift-I sets a marker. If you accidentally release one of the Shift keys, the disc will be edited instead. Once a block is marked, it can be saved as a file, providing a simple means of data recovery.

A key concept for DiscEd is the disc record. This is a file which contains data describing the format of a hard or floppy disc. The program comes with disc record files for many popular formats. These files can be used to tell DiscEd what format a disc should have when that disc has become so corrupted that DiscEd can no longer work out what type it is. In a couple of cases during my tests, I corrupted a disc so much that DiscEd would crash when I tried to edit it, and the only way I could fix such discs was to load the disc record file for that format.

When I first got Archimedes Disc Rescue it incorrectly recognised my D format hard disc as an E format one. LOOKsystems were very helpful, and dispatched a new version to me



quickly. While I was waiting, I was able to use a disc record file to convince the software to ignore its instincts and treat my hard disc as D format.

I also found that DiscEd operated too slowly. Its redrawing was sluggish when I moved to a new sector, and editing of individual disc bytes also seemed poor. Fortunately, the all-important search functions seemed to work at a respectable speed.

### THE OTHER APPLICATIONS

The FixMap application is intended to repair disc maps that the ADFS command \*CheckMap reports as corrupt. On D format discs this is achieved by looking through the directory structure and finding out where all the files are. The fixes performed on E format discs are necessarily much less satisfactory: the program can either 'correct' the map's checksum or swap copies of the map. Neither of these actually ensures the map is now correct, but they will, at least, let you access a corrupted disc.

RepairDir can be used to add, edit and delete directory entries, which can allow access to a directory that reports itself as broken. The user interface for this program is not very helpful: instead of presenting all the directory entries in a Filer-style window, they are presented one at a time in a dialogue box, and must be moved through using arrow icons.

Recover is a similar tool for files. You can drag a file with a corrupt section to the Recover icon and then have it copied (with holes for its corrupt portions) to another disc. Alternatively, if you have found some deleted data using DiscEd you can enter its position on disc into the recover dialogue box and write that section of disc to another.

### THE PACKAGE IN USE

During the course of this review, I tried various tests, corrupting discs and files in a number of ways. Most of the time the applications performed satisfactorily, and I was able to recover my data. However, some seriously corrupted discs made the applications crash, in which cases I had to use

a disc record to load them into DiscEd, and then repair them partially by hand before I could use the other tools on them. It would be useful if one could use a disc record with all the tools, not just DiscEd.

Luckily (or rather unluckily) I also accidentally deleted a real file. I was able to use DiscEd to search for a string I knew to be in the C source code contained in the file. I then used Recover to retrieve the file. It was fortunate that the file was in text format as it would not have been so easy to find a more complex file format. Documents that are stored as directories (from Impression, for example) would have been even harder still.

The pre-release documentation supplied with the program was well presented but patchy in content. There were very good background sections on how data is stored on disc, and the control structures used by RISC OS to track files. However, the sections describing the applications are cursory and badly organised. For example, the Recover program, which can be used to grab deleted files from the disc, is described before DiscEd, which must be used to find those files. The text would benefit from being rewritten with the novice in mind. There are also mistakes: for example, the 'grandfather, father, son' backup method is incorrectly described as having two backup discs and a work disc, when in fact this method involves use of three backup discs and an original.

Despite its user-interface failings, Archimedes Disc Rescue is clearly able to do the job it was designed for. It dramatically reduced the time for me to retrieve lost files from disc, and was able to cope with a range of dead discs. At only thirty five pounds, most users would be wise to keep this in their armoury for when their data comes under attack.

Product	Archimedes Disc Rescue
Supplier	LOOKsystems 47 Goodhale Road, Bowthorpe, Norwich NR5 9AY. Tel. (0603) 764114
Price	£35 inc. VAT and p&p

**RU**

# SWI Name/Number Converter for Basic Programs

by Alan Wrigley

Most programmers will be aware that SWI calls, which are accessed from Basic by using the SYS command, can be specified either by name or by number. For example, the following call:

```
SYS "Wimp_OpenWindow",,block%
```

is exactly the same as:

```
SYS &400C5,,block%
```

There are advantages and disadvantages of each method. Generally speaking, you should always use names, since programs are then much easier to debug. When you are hunting down a problem, it is inconvenient to have to look up every SWI call in the manual because you cannot remember what &400D4 or &57 stands for. If you are writing programs for publication in RISC User or other magazines, it is imperative to use names, since the purpose of the various sections of the program should be crystal clear to the reader.

Using numbers, however, has two advantages. Firstly, they can save space, particularly with long SWI names, though this is not usually too much of a problem on the Arc since a few bytes makes little difference on a machine with 1 Mb or more. But there is also a speed advantage -SYS calls referred to by number may often be executed 10-20 times faster than by name.

It would be useful, therefore, to be able to replace all the SWI names with numbers once a program is fully debugged, but with the facility to convert them all back again if you want to work on the program at a later date. You may also find that you sometimes want to inspect other programmers' work, and they may have opted for speed rather than readability.

The program listed here, *SysCon*, allows you to convert all the SYS calls in a Basic program from names to numbers and vice versa. It is intended to be added to the RISC User Icon Bar Shell (the "savebox" version published in Volume 5 Issue 2, *not* the original in Volume 4 Issue 7). Menu options allow you to choose the direction of change (i.e. whether to convert to names or numbers), and dragging a Basic program to *SysCon*'s icon will alter all the SYS calls in the direction chosen (ignoring any which are already in the required format) and put up a save box for you to save the modified program.

Listing 1 can be added directly to the program published in Volume 5 Issue 2. Note that line 720 is to be deleted, and some other lines are replacements for existing lines. You will probably want to create a new application for the purpose. This should consist of an application directory called *!SysCon*, inside which there should be a *!Sprites* file containing a 34x17 pixel sprite called *!syscon*; a *!RunImage* file which will be the *!RunImage* file from the Icon Bar Shell plus the modifications listed here; and a *!Run* file as follows:

```
WimpSlot -min 32k -max 32k
```

```
Run <Obey$Dir>.!RunImage
```

You will also need to alter line 80 of *!RunImage* to:

```
Application$=*SysCon*
```

and line 150 to:

```
Spritename$=*!syscon*
```

As a postscript to the subject, it is worth knowing that you *can* get the best of both worlds. If you specify the SYS call as a variable, the speed of execution is virtually as fast as using the SWI number itself. So you could declare a number of variables



## SWI Name/Number Converter for Basic Programs

with meaningful names and use these instead of numbers, as in the following example:

```
wimp_openwindow%=&400C5:os_byte%&=6
.....
.....
SYS wimp_openwindow%,,block%
SYS os_byte%,202,0,255 TO ,status%
.....
```

and so on. SysCon will not convert to or from variables, however, so you will have to do this manually.

```
240 DIM block% &300,menu% 99,iblock% &
200
250 exit%=FALSE:namenum%=0
450 menuchars%=11
480 menu%128=0:menu%132=-1
482 menu%136=&7009031
484 $(menu%+40)="Number>name"
486 menu%152=0:menu%156=-1
488 menu%160=&7009031
490 $(menu%+64)="Name>number"
492 menu%176=128:menu%180=-1
494 menu%184=&7009031
500 $(menu%+88)="Quit"
640 WHEN 9:IF !block%=2 exit%=TRUE ELS
E namenum%=!block%
710 WHEN 2:menu%128=1-namenum%:menu%15
2=namenum%
712 SYS"Wimp_CreateMenu",,menu%,block%
!0-68,228
890 DEF PROCaction(click%,dir%,appl%,f
iletype%,pathname%)
900 IF type%=&FFB THEN
910 $sbs%="file_ffb":REM sprite
920 ftype%=&FFB :REM ftype
930 $sbttext%=pathname$
940 start%=HMEM:size%=start%&8000
950 SYS "OS_File",17,pathname$ TO ,,,
,length%
960 SYS "Wimp_SlotSize",size%+length%
+1024,-1 TO new%
970 IF size%=new% THEN
980 PROCreport("Not enough memory")
990 ELSE
1000 SYS "Hourglass_On"
1010 PROCprocess
1020 SYS "Hourglass_Off"
```

```
1030 SYS "Wimp_GetPointerInfo",,block
%
1040 SYS "Wimp_CreateMenu",,savebox%,
!block%-64,320
1050 SYS "Wimp_SetCaretPosition",save
box%,sbttexticon%,,-1,LEN($sbttext%)
1060 ENDIF
1070 ELSE
1080 PROCreport("Not a Basic program")
1090 ENDIF
1100 ENDPROC
1110 :
1120 DEFPROCprocess
1130 SYS "OS_File",255,pathname$,start%
,0
1140 line%=start%:flag%=0
1150 nomem%=0:errflag%=0
1160 REPEAT count%=line%?3:ptr%=line%:R
EPEAT ptr%+=1
1170 IF ?ptr%=200 AND ptr%?1=153 THEN
1180 ptr%+=1:REPEAT ptr%+=1
1190 UNTIL ?ptr%<>32:CASE TRUE OF
1200 WHEN ?ptr%=34 AND namenum%=1:PRO
Cmakenumber
1210 WHEN (?ptr%>47 AND ?ptr%<58 OR ?
ptr%=38) AND namenum%=0:PROCmakename
1220 ENDCASE
1230 ENDIF
1240 UNTIL?ptr%=13 OR ?ptr%=255 OR nome
m%
1250 line%?3=count%:line%+=count%
1260 UNTIL ?ptr%=255 OR nomem%
1270 IF errflag% PROCreport("Program co
ntains unknown SWI names")
1280 ENDPROC
1290 :
1300 DEFPROCmakenumber
1310 name$="":temp%=ptr%+1:WHILE ?temp%
<>34
1320 name$+=CHR$(temp%:temp%+=1
1330 ENDWHILE
1340 SYS "XOS_SWINumberFromString",,nam
e$:TO num%:v%
1350 IF v% AND 1 THEN
1360 errflag%=TRUE
1370 ELSE
1380 num%="&"+STR$num%
1390 PROCalter(num$,LENname$+2,LENnum$
)
```

## SWI Name/Number Converter for Basic Programs

```
1400 ENDIF
1410 ENDPROC
1420 :
1430 DEFPROCmakename
1440 num$="":temp%=ptr%:a%=?temp%
1450 WHILE FNnum(?temp%)
1460 num$+=CHR$(?temp%:temp%+=1
1470 ENDWHILE
1480 SYS "OS_SWINumberToString",EVAL(nu
m$),block%,256 TO ,,end%
1490 block%?(end%-1)=13
1500 name$="****+$block%-****"
1510 PROCalter(name$,LENnum$,LENname$)
1520 ENDPROC
1530 :
1540 DEFPROCalter(a$,x%,y%)
1550 flag%=1:IF length%-y%-x%>new%-size
% THEN
1560 old%=new%
1570 SYS "Wimp_SlotSize",old%+8192,-1
TO new%
1580 IF old%=new% THEN
1590 PROCreport("Not enough memory")
1600 flag%=0:nomem%=1
1610 ENDIF
1620 ENDIF
1630 IF flag% THEN
1640 FOR i%=ptr% TO start%+length%-x%
1650 ?i%=i%:x%:NEXT:length%-x%
1660 FOR i%=start%+length%+y% TO ptr%+
y% STEP -1
1670 ?i%=i%?-y%:NEXT:length%+y%
1680 FOR i%=1 TO LENa$
1690 ptr%?(i%-1)=ASCID$(a$,i%,1)
1700 NEXT
1710 count%+=y%-x%
1720 ENDIF
1730 ENDPROC
1740 :
1750 DEFENnum(x%)
1760 =x%>47 AND x%<58 OR x%=38 OR x%>64
AND x%<71
1770 :
1780 DEFPROCreport(a$)
1790 |block%=1:$ (block%+4)=a$-CHR$(0
1800 SYS "Wimp_ReportError",block%,1,Ap
plication$
1810 ENDPROC
```

RU

## Desktop Publishing on Acorn Systems

- What are the component parts of a DTP system?
- How can I do DTP using Acorn computer systems?
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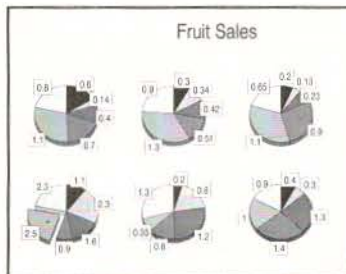


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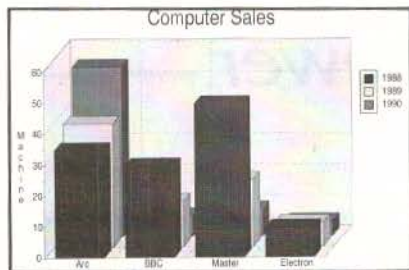
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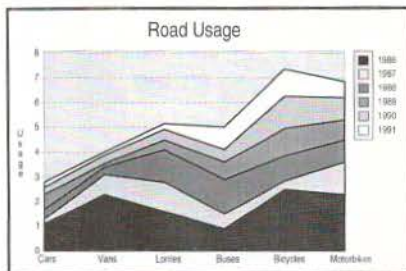
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## Acorn User

*...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.

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## 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.



# Into the Arc

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## Using RISC OS 3 Printer Drivers

by Mike Williams

In two previous articles under the *Into the Arc* heading I have looked at what I have termed *Shared Resources*, namely !System, !Scrap, outline fonts and printer drivers. Apart from the latter there are few differences between their use under RISC OS 2, and the latest RISC OS 3 (currently only available with the A5000). Users of this system are growing rapidly in numbers, and already make up a significant proportion of our readership. It therefore seems appropriate to devote similar attention this month to RISC OS 3 printer drivers, where there are major differences compared with RISC OS 2. It will also be relevant to all users upgrading to RISC OS 3 in the near future.

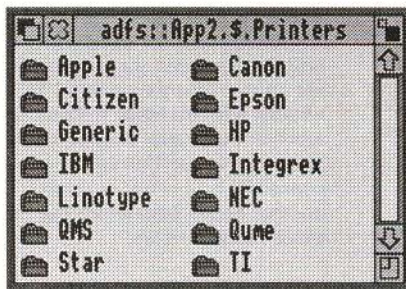


Figure 1. Choice of RISC OS 3 printer drivers

Under RISC OS 3 there is a greater separation between the printer manager (in the form of an application called !Printers), and the printer drivers themselves. The one printer manager application handles all printing, mapping output correctly to your printer by using a printer definition file appropriate to your printer (this is the *printer driver*). Printer drivers for a range of different printers are located in a directory, also *Printers*, on Applications disc 2. This is organised by manufacturer's name and printer type (see figure 1).

It is worth noting that each of the printer family directories contains a *Read\_Me* file

containing information about the printer drivers in that group. However, this is fairly technical in nature, so I suggest you ignore it initially, and refer to it only if you subsequently encounter problems.

Of course, it's always possible that you will find yourself using a printer for which there doesn't appear to be a suitable driver. If you are buying a printer to use under RISC OS 3 then again it's a good idea to seek the help of a good dealer, who should be able to advise you. Even if a particular model of printer is not listed in the printer drivers, it will often be sufficiently close in operation to one which is.

Many dot-matrix printers adopt the Epson standard, originally the Epson FX80 (9-pin), more recently the LQ850 (24-pin). The Hewlett-Packard LaserJet is another standard adopted by many inkjet printer manufacturers. Some printers offer a choice of emulation modes, so that if you don't have a suitable driver for the printer's *native* mode of operation, it may have an emulation mode (emulating another printer) for which there is. As new printers appear on the market, then third party software houses often step in to provide suitable printer drivers, at a (small) price. Many dealers selling printers will bundle in a suitable driver if necessary. Lastly, there is always the possibility of creating your own printer driver, by editing one which already exists. Although this may sound daunting, particularly for newcomers to the Archimedes, patience and perseverance may well be rewarded.

### CUSTOMISING THE PRINTER MANAGER

Assuming a suitable printer driver is available, you need to set up the print manager so that it 'knows' which printer driver to use. Install the printer manager (which should be located on your hard disc - there is also a copy on Applications disc 1) on

the icon bar by double clicking on the *!Printers* icon (the icon bar icon will initially be grey, showing that no specific driver has been selected). Click on this in turn to display the *Printer control* window.

You select a printer driver simply by dragging it from its directory on Applications disc 2 to the *Printer control* window, whereupon it will appear as an entry (and the printer icon on the icon bar will change to cream, and possibly in shape to reflect the type of printer chosen). You can, if you wish, set up more than one printer type by dragging more printer drivers to the *Printer control* window. For example, you could configure the printer manager to provide a choice between a draft (cheap) local printer and a high quality PostScript (expensive) network printer. See later for other uses of multiple printer drivers.

You still need to configure the printer driver for the exact type of printer which you are using, and the mode of operation (for example, manual or automatic paper feed). To do this you need to open the *configuration* dialogue box, either by double-clicking on the printer entry in the *Printer control* window, or by selecting the printer entry and using the *Menu* button to display a menu from which you should choose the *Configure* option.

### TEXT PRINTING

Printer configuration varies slightly depending upon the type of printer you are using (dot-matrix or bubblejet, Laserjet, or PostScript). The parameters you need to consider are quite well detailed in the RISC OS 3 User Guide. In general these cover graphics printing and text printing. Remember that text printing refers to the use of *Edit* or similar using the system font. Text is sent to the printer with each character represented by a single code. The only style options available are those provided by the printer itself (though these can be quite comprehensive). Using such features is referred to as *fancy text* printing in the User Guide.

### GRAPHICS PRINTING

If you are using outline fonts, usually as part of a DTP application or similar, then all output is obtained using graphics printing.

Although a page of such a document may consist largely of text, it is treated as a pattern of black dots and it is these patterns which are effectively sent to the printer (PostScript printers are a little different). All images (like Draw files, sprites etc.) are printed in this way. You need to study your User Guide carefully, though the default options will frequently give quite acceptable results. It can help to have a simple, short text file, and maybe a Draw and/or sprite file handy so that you can test out the effects of changing various options. Again, the advice of a good dealer can be invaluable.

Whenever you change the configuration of a printer driver, you will need to click on the 'OK' icon to confirm the new settings. Simply closing the configuration window will leave the configuration unchanged.

### DIRECTING PRINTOUT

Most printers are connected to the computer by the (parallel) printer port, and this is the assumed default within RISC OS 3. If you happen to be using a serial printer, you will need to open the *connections* window to set appropriate parameters. This is done by clicking with the *Menu* button over the printer entry in the *Printer control* window. You will also need to use this option if your A5000 is connected to a network printer. There is also another option here which can be useful, and this is output to a file.

If this is option is selected (and you need to specify a pathname for where the file will be located), then any subsequent printout will be in the correct format for the selected printer, but will be sent to a file (on disc) rather than to a printer proper. One use for this concerns PostScript printing. PostScript printers tend to give the best results (but are expensive), and indeed high resolution photo typesetters can take PostScript files as input.

Even if you don't have a PostScript printer yourself, you can create a PostScript file on disc, which you could then take to another system with a PostScript printer. Indeed, using the A5000, you could transfer the PostScript file to a PC format disc and print out your file using a PC with a PostScript printer. We have



used a similar approach quite successfully ourselves, at RISC Developments, to produce high quality photo-typeset output for advertising from PostScript files created in-house with Ovation.

### PAGE SIZE SETTINGS

The configuration window allows you to select a paper size, though the default setting is often the most useful. If you click with the Menu button over the printer driver icon (printer manager) on the icon bar the *Paper size* option leads to a much more comprehensive window allowing all aspects of paper size including margins to be specified. Again, much can be achieved without recourse to this option whatsoever, but it does enable you to fine tune the driver to the printer.



Figure 2. Draft and NLQ versions of printer driver installed

Most printers, for example, cannot print over the whole area of an A4 size sheet of paper. The optimum setting is achieved when the print margins specified within the printer driver coincide with the physical limits on the printer's print area. An incorrect setting can be the reason why printout is unexpectedly cropped. One way to check this out is to set the print margins to zero, and then perform a test print. A program to do this was included in Volume 4 Issue 10, and is repeated for convenience on this month's magazine disc. This prints a graduated scale across the page both vertically and horizontally.

When you have finished configuring your driver you will need to save your choices so that they are automatically invoked the next time you select the printer manager. This is done by clicking with the Menu button over the printer driver icon on the icon bar and selecting *Save choices*.

### EXAMPLE

I use a Canon Bubblejet at home, originating my text with DeskEdit. This gives reasonable quality print at moderate speed, and still permits proportional spacing, bold, underlining etc.

This can also illustrate the merits of using multiple printer drivers, even if you have only one printer connected to your A5000. For example, drag two copies of a printer driver (like the Canon Bubblejet) to the Printer control window. Configure the first of these with the name *Draft* and set *Text quality* to 'Draft'. Click on 'OK'. Now open the configuration window for the second copy, and configure this with the name 'NLQ' and set *Text quality* to 'NLQ'.

When you click with the Menu button over the Print control window there are two further options, *Active* and *Inactive*. Select the second copy of the driver (the one named 'NLQ') which should show *inactive* and set this to *active*. The icon bar should show two copies of your printer driver, one labelled 'Draft' and one labelled 'NLQ', the latter greyed out (see figure 2). By clicking on one or other of the two printer icons you can select which one is currently active (shown in cream). This is the one which will be used for any printing. This arrangement works very well in practice, and is a significant improvement over what is possible within RISC OS 2.

There is much, much more that could be said on this subject. I have tried to give sufficient general advice that with the help of the User Guide you should be able to get a printer driver successfully configured for your system. However, printing and the use of printers often cause problems. Any specific points can often be covered in our occasional series *The 80 Column*. Another source of help is to use our new readers' pages to appeal for help from other users. One way or another we will do our best to assist.

RU

# Desktop Publishing on the Archimedes - DTP for All

Keith Powell reviews Bruce Goatly's new book.

This book, called *Desktop Publishing on the Archimedes - DTP for all*, is ideal for people who are contemplating desktop publishing (DTP), but it will also prove extremely useful to those who are already users. It initially assumes that you know nothing about the topic and the early chapters guide you towards suitable Archimedes hardware and applications.

If you are already using an Archimedes computer for DTP, the opening chapters will be of less interest to you, but the remainder of the book should prove a source of much useful information on all aspects of the subject. It has an index, but it is a book to be read (although not necessarily from cover to cover) rather than being a reference book. In fact, it is a particularly readable book and is difficult to put down. The author's humour occasionally surfaces to lighten a work that covers a topic about which he knows a great deal, has researched well and has much to say.

If you are well into DTP you will be quite interested to read how the three principal DTP packages on the Arc compare. The book claims not to be biased towards any one of these. Presumably in an endeavour to ensure this, one chapter is devoted to practical examples of using all three. After explaining in detail how to prepare the same letter template with each of them in turn, there are worked examples showing the preparation of a business form with Acorn DTP, a school newspaper with Ovation, and a newsletter with Impression. However, a marginal bias in some chapters was probably unavoidable - an appendix explains how the book was prepared using Impression. The book is itself an excellent example of desktop publishing with the Archimedes.

You will certainly not read this 280 page book quickly. The font size is relatively small (10pt) and the side margins are narrow, resulting in a wide single column. The line spacing is not excessive (20% leading) so the pages are filled with long, wide paragraphs.

These are separated by generous spaces and there are copious illustrations. Despite the vast amount of information contained in the book the effort of reading it is well rewarded, though space does not permit more than a fraction of the book's topics to be reviewed here.

The early chapters progress from typewriters used with scissors and paste via word processors to the three major desktop publishing packages for the Arc. Although written for new users, more experienced users will find in these chapters much practical information ranging from memory and font management to solutions to some of the problems encountered when extra fonts are added.

The strengths and drawbacks within a DTP context of 1st Word Plus, Pipedream 3, EasiWriter, Archimedes PenDown and Desktop Folio are listed before similar lists are presented for the major Archimedes DTP packages - Acorn DTP, Impression (both the prime and junior variants), and Ovation. The graphics capabilities of 1st Word Plus, Pipedream 3 and EasiWriter are examined in detail in a separate chapter, and yet another chapter covers in turn the capabilities of Archimedes Pendown and Desktop Folio for DTP work.

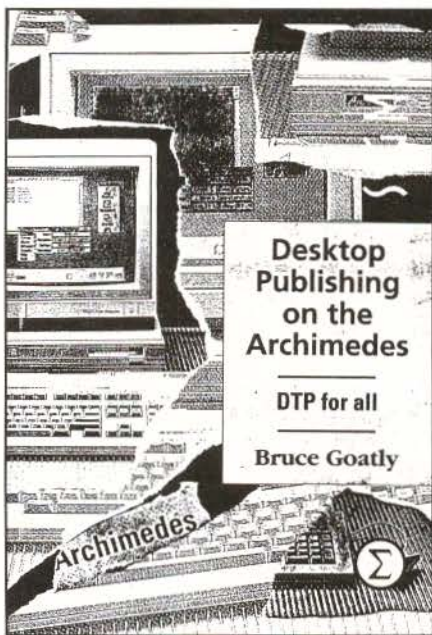
A very useful chapter is provided for those who wish to try DTP using only Edit and Draw, which are supplied with every Archimedes. It illustrates how to use Edit to prepare text with embedded codes which is imported into Draw. The text appears in columns which are then resized and suitably positioned around sprites and drawings. The technique to be used for subsequent text editing is explained, as is the way to avoid text clipping.

If you have dabbled with DTP or already have a DTP package then the chapter headed *Essentials of DTP*, which commences a third of the way through the book, marks the point from which the book will be of greatest



## Desktop Publishing on the Archimedes - DTP for All

interest. With detailed references to Ovation and Impression II, and occasional references to Acorn DTP and Impression Junior, it first covers DTP structures, frames, and master pages. The different approaches of the principal packages are then compared - the modal operation of Acorn DTP, the toolkit of Ovation and the context-sensitive operation of Impression which lacks drawing tools. The chapter contains a detailed example showing how text can be made to flow around an illustration with an irregular outline.



The preparation of text for import is described, a process which is essential for Acorn DTP, and which still has value with Ovation and Impression. The spelling-checkers of Impression and Ovation are covered as is Impression's abbreviation expansion dictionary.

Kerning and tracking are well illustrated as are some of the special effects which can be obtained with ancillary applications. Manual methods of preparing contents lists and indexes are presented, and the automated techniques of Impression are described.

There are frequent hints and tips. A particularly interesting one explains how to amend the !Chars and !CharSel applications so that the less-used Ctrl key rather than Shift causes the character under the pointer to be inserted into the text.

One piece of advice given concerning graphics effects is that you should keep your enthusiasm in check within the pages of DTP! Scanners and digitisers are also covered and there are descriptions of dithering and sampling.

Probably the most important part of the book is entitled *Rudiments of Design*. Excellent advice is given that a document's design should be eye-catching but not obtrusive and should never impose between author and reader. Starting from the pencil and paper stage, practical points are offered concerning the design decisions you must make when considering a new document. Cover design leads into single and double page formats and includes an amusing example of what not to do.

Advice on typographical design ranges from typographical chaos (using a multitude of fonts) to choosing fonts which work together. Recommendations are made on filling a headline rectangle the right and wrong way. The reduction of 'rivers of white' with hyphenation is interestingly illustrated, and techniques are presented for effective copy filling which will allow you to avoid 'widows and orphans'.

The book concludes with descriptions of printer types, duplication and finishing. Techniques are detailed which will allow you to prepare PostScript files for a printing bureau and separations for colour printing which incorporate registration marks. Lists are given of the advantages and disadvantages of photocopying, stencils, and offset litho.

If you have any interest at all in DTP but cannot afford to purchase this excellent book, avoid browsing through it in a bookshop or you will surely overstay your welcome.

*Desktop Publishing on the Archimedes - DTP for all* by Bruce Goatly (ISBN 1-85058-248-3), published by Sigma Press at £14.95. Available from computer dealers and bookshops.

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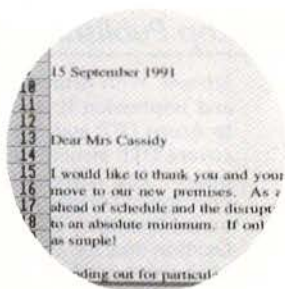
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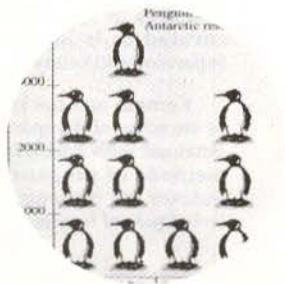
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	Grid x	Grid y	Metro	Area	Chap	Pa
77m	2265	7264	48	SH	13	12
29m	2134	8345	45	WH	11	13
99m	2970	7732	46	CG	7	17
0m	2266	7263	44	SH	13	1
7m	2418	7875	43	CH	14	*
1	2212	7663	47	CH	8	8
	2144	8263	42	WH	10	10
	2470	7746	41	CH	*	*





# Creating Draw Files in Basic (Part 2)

by Gordon Gilmore

This month we expand the *CDraw* library to include functions to deal with line objects. The listing given should be added to the listing from last month - note that the two programs should merge together to give a listing with line numbers in increments of 10.

Curved figures using Bezier curves are complicated to implement (see RISC User Volume 4 Issues 3 and 4), so of these only the circle is implemented in an easy to use fashion. Curved lines are still supported, but we will not describe them in detail. The Draw module allows many subtle effects such as different style of join and capping, but these have been omitted to avoid making the library too complicated.

Straight line drawings are also complicated, but the method employed here is reasonably easy to grasp. Each drawing consists of a series of steps similar to the steps which you might use in Basic to plot a drawing on the screen, for example:

```
MOVE x,y : DRAW a,b
```

The *CDraw* procedures have been written in such a way as to allow this type of input to be used.

A path object can be created by using *PROCCDraw\_pathobject*. The parameters are as follows:

*fill%* is the colour with which the object should be filled. If you don't want it filled, set *fill%* to the value *CDraw\_nofill%*, (which is globally defined as -1).

*col%* is the colour of the line to be plotted.

*thick%* is the thickness of the line to be plotted in millimetres. Zero is equivalent to the Draw 'Thin' option.

*dash%* selects a dash pattern. 0 gives a continuous line, and 1 to 4 emulate the normal Draw dash pattern options.

*path\$* is a list of commands telling *CDraw* how to draw the path. Look at the example program to see how multiple commands can be used, but each command can be one of the following:

```
MOVE x y to start the path at x,y  
DRAW x y to draw a line to x,y  
GAP x y leaves a gap to x,y  
CLOSE closes the figure with a line  
CGAP closes the figure with a gap
```

**Bold SwissB**

*Italic Paladin*

Paladin

System Font



Output from the complete program

Note that *CLOSE* and *CGAP* have no parameters. There is one final command about which I shall say very little: *CURVE*. This should be followed by six parameters - *x* and *y* co-ordinates for two control points and the point itself - and the result should be a Bezier curve. I have steered clear of curves for obvious reasons - they are complicated to set up and even more complicated to explain. *CDraw* does, however, contain one curve procedure *PROCCDraw\_circle* where *X* and *Y* are the co-ordinates of the centre of the circle and *R* is the radius, all in screen co-ordinates. The other parameters are as described above.

There are a number of other procedures in the library that are not accessed directly by the user, but are used by the main procedures. These include *PROC\_putword*

## Creating Draw Files in Basic

and PROC\_putwords, which have similar names so do beware when typing the listing in.

The use of these commands is best appreciated by looking at the test program. In practice, anything but a simple figure will need a path\$ which would exceed the legal length for a Basic string so procedures are provided to split the process up into manageable lumps. Instead of using PROCDDraw\_pathobject, you can initialise (or "open") a path using PROCDDraw\_openpath, then repeatedly call PROCDDraw\_extendpath to fill in the parts of the path in small steps, and finally signal the end of the path using PROCDDraw\_closepath.

The test program shows clearly how to use the procedures. Two boxes are plotted, one using PROCDDraw\_pathobject and the other using the alternative method of PROCDDraw\_pathextend. It should be easy, using these basic procedures, to create equivalents for the Basic LINE and RECTANGLE commands. If anyone has the stomach to try ELLIPSE perhaps they would like to write in to RISC User and share their success.

```
190 PROCDDraw_textobject(0,"Line",6.4,
12.8,150,100,7,0)
200 PROCDDraw_pathobject(CDraw_nofill%
,7,4,0,"MOVE 100 90 DRAW 270 90")
230 PROCDDraw_textobject(1,"Rectangle"
,18,24,200,200,10,7)
240 PROCDDraw_openpath(CDraw_nofill%,7
,0.25,1)
250 PROCDDraw_extendpath("MOVE 150 190
DRAW 450 190")
260 PROCDDraw_extendpath("DRAW 450 250
DRAW 150 250 CLOSE")
270 PROCDDraw_closepath
330 PROCDDraw_openpath(11,7,0.25,0)
340 PROCDDraw_extendpath("MOVE 390 390
DRAW 980 390")
350 PROCDDraw_extendpath("DRAW 980 460
DRAW 390 460 CLOSE")
360 PROCDDraw_closepath
400 PROCDDraw_circle(600,200,100,3 ,14
,1,0)
1800 :
1810 DEFPROCDDraw_circle(X, Y, R, fill%
, col%, thick%, dash%)
1820 LOCAL A,B,C
1830 A=R/SQR2
```

```
1840 B=A+R/2.544
1850 C=A-R/2.544
1860 PROCDDraw_openpath(fill%, col%, th
ick%, dash%)
1870 PROCDDraw_extendpath("MOVE "+STR$(
X+A)+" "+STR$(Y-A))
1880 PROC_putword(6)
1890 PROC_putwords(X+C,Y-B)
1900 PROC_putwords(X-C,Y-B)
1910 PROC_putwords(X-A,Y-A)
1920 PROC_putword(6)
1930 PROC_putwords(X-B,Y-C)
1940 PROC_putwords(X-B,Y-C)
1950 PROC_putwords(X-A,Y+A)
1960 PROC_putword(6)
1970 PROC_putwords(X-C,Y+B)
1980 PROC_putwords(X+C,Y+B)
1990 PROC_putwords(X+A,Y-A)
2000 PROC_putword(6)
2010 PROC_putwords(X+B,Y+C)
2020 PROC_putwords(X+B,Y-C)
2030 PROC_putwords(X+A,Y-A)
2040 PROCDDraw_extendpath("CLOSE")
2050 PROCDDraw_closepath
2060 ENDPROC
2070 :
2080 DEFPROCDDraw_pathobject(fill%, col
%, thick%, dash%, path$)
2090 PROCDDraw_openpath(fill%, col%, th
ick%, dash%)
2100 PROCDDraw_extendpath(path$)
2110 PROCDDraw_closepath
2120 ENDPROC
2130 :
2140 DEFPROCDDraw_openpath(fill%, col%,
thick%, dash%)
2150 IF CDraw% THEN
2160 LOCAL pattern$,I%
2170 _start%=_ptr%
2180 PROC_putword(2)
2190 _ptr%+=20
2200 PROC_putcoords(_start%+8,1<<30,1<<
30,0,0)
2210 PROC_putword(FN_colour(fill%))
2220 PROC_putword(FN_colour(col%))
2230 PROC_putword(thick%<<8)
2240 PROC_putword(_flags% OR &80*-(dash
%<<0))
2250 IF dash%>0 THEN
2260 pattern$=_dash$(dash%)
2270 PROC_putword(0)
2280 PROC_putword(LENpattern$/4)
2290 FOR I%=1 TO LENpattern$
2300 ?_ptr%=ASCMIIDS(pattern$,I%,1)
```



```
2310 _ptr%+=1
2320 NEXT I%
2330 ENDIF
2340 ENDIF
2350 ENDPROC
2360 :
2370 DEFPROCDraw_extendpath(path$)
2380 LOCAL _pathtype%,I%
2390 WHILE path$<>"
2400 CASE FN_nextchunk(path$) OF
2410 WHEN "MOVE" :_pathtype%=2
2420 WHEN "CGAP" :_pathtype%=4
2430 WHEN "CLOSE":_pathtype%=5
2440 WHEN "CURVE":_pathtype%=6
2450 WHEN "GAP" :_pathtype%=7
2460 WHEN "DRAW" :_pathtype%=8
2470 ENDCASE
2480 IF _pathtype%<>0 THEN
2490 PROC_putword(_pathtype%)
2500 CASE _pathtype% OF
2510 WHEN 2,3,7,8:
2520 PROC_putpair(path$)
2530 WHEN 6:
2540 FOR I%=1 TO 3
2550 PROC_putpair(path$)
2560 NEXT I%
2570 ENDCASE
2580 ENDIF
2590 ENDWHILE
2600 ENDPROC
2610 :
2620 DEFPROCDraw_closepath
2630 PROC_putword(0)
2640 _start%!=4-_ptr%-_start%
2650 PROC_checkspace(_start%!=8, _start%
!12, _start%!=16, _start%!=20)
2660 ENDPROC
2670 :
2680 DEFFN_nextchunk(RETURN path$)
2690 LOCAL P%,chunk$
2700 P%=INSTR(path$+" ", " ")
2710 chunk$=LEFT$(path$, INSTR(path$+" ",
" ")-1)
2720 path$=MID$(path$,P%+1)
2730 =chunk$
2740 :
2750 DEFPROC_putpair(RETURN path$)
2760 LOCAL X%,Y%
2770 X%=VALFN_nextchunk(path$)
2780 Y%=VALFN_nextchunk(path$)
2790 PROC_putwords(X%,Y%)
2800 ENDPROC
```

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# WP/DTP Hints

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Many thanks to David Pilling and Charles Moir of Computer Concepts for supplying these hints on Ovation and Impression.

## Ovation Hints

### IMPORTING TEXT

Sometimes when importing a text file from a conventional editor like DeskEdit or Twin, it is convenient to strip the new lines or carriage returns at the end of each line, and convert the double new lines at the end of each paragraph to a single new line. Ovation has a facility for doing this, obtained by holding down Ctrl when you drop the text file into the main document.

### DEFAULTS

It is possible to save a style sheet called *!Ovation.Default*. By doing this, you can control many of the parameters Ovation will start up with, for example the page size of documents, and which spell check dictionaries are loaded.

### LAYOUTS

If you fill up the Principal Text Frame with other frames, then the caret will be pushed over onto the next page (because the Principal Text Frames between pages are linked), so if you want to create a one page document covered in frames, then you may end up with an extra page that you can't delete. Therefore, when creating any kind of layout it is often best to make the Principal Text Frame on the page very small, and push it out of the way. Then create your work inside a large picture box: in general picture boxes are good for just holding other objects, as they won't show an overflow arrow when filled up. Once you have everything in a picture box, it can be cut and copied and moved around as one item, whereas the Principal Text Frame couldn't be cut as it is part of a linked sequence.

### MARKED TEXT

If an area of text is marked, then typing anything will delete the marked text. This is a useful shortcut. For example, if you want

to replace a word, double-click to mark it, then just type the new text; this also works with Paste. Don't worry, if a lot of text is to be deleted, a warning will be given first.

### DITHERING

If you have RISC OS 3.00 then by uncommenting the Ovation\$Dither line in the *!Ovation.!Run* file you can turn on the enhanced rendering of colour sprites in RISC OS 3.

### CASE

Ctrl-Shift-P will swap the case of the character at the caret.

### CONSTRAINTS

Holding down Shift while moving a frame or a picture in a frame will constrain movement to be either horizontal or vertical. Holding down Shift while resizing a frame will constrain it to be square. Holding down Ctrl while resizing will constrain the frame to have a constant aspect ratio.

### GO FASTER

Although Ovation will work with C Library version 3.50, the machine coded memory movement functions in later C Libraries will give much better performance. So if you've only got CLib 3.50 in your System folder, it is worth getting hold of a copy of 3.66 or 3.75 (via our magazine disc, for example).

### DRAWING LINES

The Ovation manual describes clearly that if a line is started from within a frame, it cannot be extended beyond the frame border - you must start the line *outside* the frame and extend it inwards. But what do you do if you want to draw a line from within one frame to within another? Simply draw a line from outside the first frame to the inside, and then drag the start point of the line into the second frame. The line will be in front of both frames.



### Impression Hints

#### MY SPRITE FILES WILL NOT ROTATE

Although you can rotate Draw files just by click-dragging with the Adjust button, before you can rotate sprites it is necessary to switch on the Enhanced Graphics option in the Preference dialogue box. This can be especially confusing if your graphic is a Draw file that contains sprites since some bits will rotate while other bits will not. But if you make sure the Enhanced Graphics is on, then everything rotates correctly. This also allows greyscale dithering of both Draw files and sprites.

Since RISC OS 3 has the ability to rotate sprites itself it is not necessary to switch on Enhanced Graphics when running on this OS.

#### RISC OS 3

Impression release 2.16 is now available as a free upgrade. This is the first version that takes advantage of RISC OS 3. For example it supports the new greylevel sprite format, and also rotated text within Draw files. It also responds to the new RISC OS 3 boot message so you can now easily have Impression installed on your icon bar on start up.

Version 2.16 (and on) will be compatible with all Archimedes machines and versions of operating system. Computer Concepts now recommends that all existing owners upgrade to this version. To do this just send back the Impression One disc and it will be replaced (at no charge) with the latest version.

#### GUIDE FRAMES DISAPPEARING

This is an often asked question. Guide frames are always placed below all other frames on the page, so if you put a guideframe in the centre of another frame, and then click away to select the other frame, the guideframe seems to disappear. All that has happened is that it has gone behind the other frames - it is still there and will act as a guide frame. Holding down the Alt key and clicking will allow you to select other frames under the current one.

#### ALT + KEY DOES NOT WORK

Unfortunately some games software unplugs software modules that they think are not needed. If the International module is unplugged this stops the Alt key from working correctly. Try using the \*Unplug command to check which modules are unplugged. If the International module is in this list then just type:

\*RMReInit International

#### LOADING TEXT FILES

While you can drop text files onto a blank page or frame and Impression will load them, it is often easier to simply drop them on the Impression icon. In this case Impression starts a new document and loads the text file into the default page.

#### SAVING A TEXT FILE

A little known key short cut, Ctrl-Shift-T displays a 'Text save' dialogue box, which saves the current text story as a text file. Impression remembers the name of the text file and so once you've entered the name and dragged the icon to the desired directory viewer, all you have to do to re-save or update the file is press Ctrl-Shift-T and press Return. This is in fact exactly the equivalent of the Save Text Story menu, and offers you the choice of saving the text file with linefeeds or carriage returns or with style information included.

#### A QUICK WORD COUNT

Some people forget that the word count in Impression is shown in the Info dialogue box. The quickest way, therefore, to check the current word count of a text story is simply to press Ctrl-F1, which displays the document Info box.

#### CLEARING EDITABLE FIELDS

Not exactly an Impression hint, more a RISC OS hint. One of the most frustrating drawbacks of the Archimedes Wimp interface is the lack of double-clicking in editable fields, or writable icons as Acorn calls them. PC and Mac users are used to simply double-clicking on a number and typing a replacement. While this does not work, it is possible to press Ctrl-U in an editable field which clears the whole field, then just type the replacement. **RU**

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# Using ANSI C

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## Part 10: Memory Allocation

by Lee Calcraft

For the next couple of issues, I want to take a look at the allocation of memory in RISC OS applications compiled with Acorn's ANSI C compiler, and in particular the use of the *malloc* and *flex* suites of functions. We will begin with a brief overview.

Figure 1 gives an idea of the way in which memory is allocated to a C application which does not use *flex* (*flex* will be discussed next month).

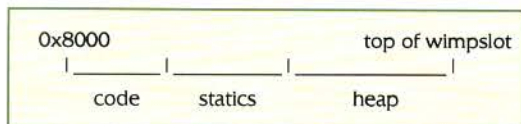


Figure 1. Memory allocation in a C application

The application loads at 0x8000. Above the code area is the region set aside for static variables - that is to say, all variables declared in the white space outside function definitions, together with any others specifically declared to be of type *static*. Between this and the top of the wimp slot the heap is located. This is used by *malloc* (see later), and by the all-important stack. The latter is used to hold the addresses of functions and the values of parameters passed to them, as well as all dynamic variables; and is itself created using *malloc*.

Whenever you define a new non-*static* variable within a particular function definition of a program, that variable is placed on the stack. When the function within which it is defined terminates, the variable is destroyed, and the stack contracted. If the stack needs more space than is currently allocated to it, it simply requests more from the heap. If ever the heap becomes full, then what happens depends on which version of the compiler you are using. If you linked with version 3.1b or later, then *malloc* will attempt to extend the program's wimp slot (for a caveat

to this, see next month's discussion of *flex*). On earlier versions of the compiler, *malloc* is not extendable, and you will get an error message.

All the above processes are automatic, and require no special activity on the part of the programmer. If your program needs a block of memory for any purpose, you can simply declare an appropriate array. For example:

```
char block[1024];
```

But what about the allocation of memory in cases where the amount required is not known at compile time? Suppose for example that you are writing a small database management program. Because the number of records is not known at compile time, you cannot declare an array of structures to hold the data, without imposing some arbitrary upper limit on its size.

The way around the problem is to use *malloc* or *flex* to allocate memory on the fly. Another advantage of such an approach is that memory allocated in this way can be freed for other use as soon as it is not required - though (by contrast with *flex*) when using version 4's extendable *malloc*, there is no way to shrink the wimp slot to return memory to the Wimp pool.

For the remainder of this article, we will take a look at practical uses of *malloc*. The ANSI standard provides for four related functions for the dynamic allocation of memory: *malloc()*, *free()*, *calloc()* and *realloc()*. Any program which uses these functions should make sure to *#include* the header file *stdlib.h*. The first two functions allocate and free memory respectively, while *calloc()* essentially provides an alternative to *malloc()* in which the allocated memory is initialised by filling with zeros. The fourth function *realloc()* provides a way to change the size of a block of memory allocated with *malloc()* or *calloc()*.

### USING malloc()

The *malloc()* function has the following prototype:

```
void *malloc(size_t size);
```

Thus you pass the function the number of bytes which you wish to claim, and the function returns a pointer to void. If this is null then the allocation was not possible; otherwise it points to the first byte of allocated memory.

The following example allocates 500 bytes of memory:

```
char *ptr;  
ptr=malloc(500);
```

Note that because pointers to void can be assigned to any kind of pointer, we do not get an *unequal pointers* error from our use of *ptr* here.

Whenever *malloc()* is used it is essential to check for a null response before attempting to use the allocated memory, so you might use something like:

```
char *chptr;  
if ((chptr=malloc(500))==NULL)  
{  
    werr(FALSE, "Can't allocate memory");  
    return;  
}
```

In this example we have used a constant size of 500 bytes for the size of memory to be allocated, but in a real situation a variable could equally well be used to convey the size.

Allocating an array of chars is probably the simplest case of the use of *malloc()*. If you are allocating memory for other types of variable, it is wise to use the *sizeof()* function. Thus for example to allocate memory for *n* integers, we could use:

```
int *intptr;  
intptr=malloc(n*sizeof(int));
```

### ACCESSING THE MEMORY

Since *malloc()* returns a pointer to the allocated memory block you can use this like any other pointer to a one-dimensional array of objects - since this is what it is. Thus in the first example we can use *chptr* as if it had been declared with:

```
char chptr[500];
```

Thus *chptr[0]* addresses the first char in the array, *chptr[1]* the second, and so on. The same is true of the integer example: *intptr[0]* is the value of the first integer in the array, etc.

### realloc()

This function, which has the prototype:

```
void *realloc(void *ptr, size_t size);
```

changes the size of a previously allocated block of memory pointed to by *ptr* to the new size *size*. If there is no room to extend the memory, a null pointer is returned, otherwise the function returns a pointer to the new block. This function changes the base address of the memory block, if for example an increase in size is required, and it is not possible to extend the present block. In such cases the data in the original block will be copied to the new location. But clearly any program using this function must take care to update all its pointers into the block after any call to *realloc()*.

The following few lines of code give an example of usage:

```
char *pt, *new_pt;  
if ((pt=malloc(100))==NULL) return 0;  
/* now extend it */  
if ((new_pt=realloc(pt,200))==NULL)  
    printf("Error - can't extend");  
else printf("Buffer now 200 bytes");
```

### FREEDING MEMORY

When you have finished with a *malloc* block, you should free it using the *free()* function, which has the following prototype:

```
void free(void *ptr);
```

where *ptr* is the *malloc* pointer to the allocated block. If you call *free()* with an invalid pointer your program will probably crash. Incidentally, it is not essential to free up the heap when your program exits, since the whole area from 0x8000 to the top of the wimplot is automatically returned to the Wimp.

### USING calloc()

For completeness, we will finish with a brief description of *calloc()*. This has the following prototype:

```
void *calloc(size_t num, size_t size);
```

This function will allocate enough space for *num* objects of size *size*. Like *malloc()* it returns a void pointer to the base address of the allocated block, or null if allocation was not possible. As mentioned earlier, the whole of the allocated area is initialised with bytes of value 0x00.

More on all this next month.

**RU**



# C Notebook

Compiled and Linked by Lee Calcraft

## NULL TERMINATING TEMPLATE STRINGS

Dave Appleby

When accessing text strings in a loaded template, it is essential to remember that they are not null-terminated - a CR is used instead.

If you access these strings frequently it is sometimes worth scanning a loaded template, and replacing all the relevant '\r's with '\0's.

Dave has supplied a short routine for doing just this, and we have put the source on this month's disc.

## THE enum ALTERNATIVE TO #define

Tony Shew

When defining names to use in switch statements it is usual to #define them. An alternative is to define them using an enumeration of the form:

```
enum {
    icon_menu_info=1,
    icon_menu_print,
    icon_menu_quit,
};
```

The great advantage of this approach is that new items can be inserted without the need to renumber the remainder.

You can take this further and declare an enumeration tag, thus enabling you to define variables of the enumeration type. For example:

```
enum icon_menu_response {
    icon_menu_info=1,
    icon_menu_print,
    icon_menu_quit,
};
enum icon_menu_response response;
```

For further details see K & R page 39.

## var args FOR debug()

Denis James

The RISC User Wimp debugger *debug* (Volume 4 Issue 3 with extensions in Volume 4 Issue 7 - and also on the Wimp Programmer's Toolkit) is very useful for debugging C programs from the Desktop. The following function gives it greater flexibility by allowing it to be called using a variable argument list similar to that used with *printf()*.

Just include this function along with the function *debug()* (which it calls) in any

program under development, and use it to display the values of variables etc. by using calls along the lines of:

```
dprintf(1, "Index=%d fname=%s", i, fname);

void dprintf(int no, char *fmt, ...)
{
    char dres[80];
    va_list arg_ptr;
    va_start(arg_ptr, fmt);
    vsprintf(dres, fmt, arg_ptr);
    va_end(arg_ptr);
    debug(no, dres);
}
```

## USING BIT FIELDS

David Pilling

Bitfields provide a convenient way to represent certain types of data. For example, if a variable can only take two values, then if there are 1000 cases of it, using a word or byte is wasteful. The good news is that C lets you represent variables as a number of bits:

```
typedef struct fixedbit {
    unsigned int flag: 1;
    unsigned int selected: 2;
    unsigned int parity: 4;
} fixedbit;
```

In this example the bit fields are 1, 2 and 4 bits wide. The bad news however, is that Acorn's compiler always rounds the structure size up to a whole number of words. The above structure is thus 4 bytes in size. The fields are accessed as with any other *struct* using the . and -> operators. Thus you might write:

```
fixedbit modem_bits;
modem_bits.selected=0x3;
```

## USING setlocale()

David Pilling


The following gem, when inserted early in your source, will ensure that languages other than English can be handled intelligently by your program:

```
setlocale(LC_ALL, "ISO8859-1");
```

More precisely, it means that functions like *toupper()* and *islower()* will work correctly on top-bit-set characters in the Latin 1 alphabet. The default locale, by the way, is "C".

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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.

## ALPHABETS AND RISC OS 3

Alan Wrigley

There is a bug in RISC OS 3.00 in that when OS\_Byte 25 is used to reset character definitions, or OS\_Byte 71 is used to alter the alphabet, characters 140-159 are not redefined. Because the Cyrillic alphabet on the A5000 uses some of these characters, if you set Cyrillic and then revert to a Latin alphabet, the Cyrillic characters between 140 and 159 will remain in force. This includes the arrow characters which are sometimes used in icons.

If you are writing programs which alter the alphabet, you should adopt the following procedure for RISC OS 3. First check the operating system version number by calling INKEY (-256). If this returns 163, it is RISC OS 3.00. Then use OS\_Word 10 to read the character definitions for 140-159 and store them in memory. When you restore the alphabet to its original setting, use VDU23 for each ASCII code in this range to reset the stored characters:

```
VDU 23,ASCIIcode,n1,n2,n3,n4,n5,n6,n7,n8
```

If you wish to use arrows or other symbols in icons, you should always use sprite icons, whether you are using RISC OS 2 or RISC OS 3.

## SMARTER IMPRESSION QUOTES

Nick Edgar and Chris Parker

Hints and Tips Volume 5 Issue 3 carried information on how to use smart quotes in Impression by saving ASCII text. There are at least three alternatives to using smart quotes directly:

1. By using Acorn's Chars application
2. By holding down the Alt key and typing in the character code for the correct quote at the keypad
3. By using one of the following key combinations:

Ctrl-]	open single quote	code 144
Ctrl-\	close single quote	code 145
Ctrl-Shift-]	open double quotes	code 149
Ctrl-Shift-\	close double quotes	code 149

Other key presses of interest to Impression users include:

Ctrl-Hyphen	Soft hyphen
Ctrl-Shift-Hyphen	En-Dash
Ctrl-Shift-H	Bullet

## CORRECT ALTERNATIVE KEYS

Nick Edgar

The list of Alt key shortcuts printed in Volume 5 Issue 3 was garbled by the gremlins, so we reprint it here, with some additions courtesy of Nick Edgar. Note that the number keys must not be those on the numeric keypad.

Alt-1	gives	¹	Alt-S	gives	§
Alt-2	"	²	Alt-	"	÷
Alt-3	"	³	Alt-	"	χ
Alt-9	"	±	Alt-Z	"	«
Alt-0	"	°	Alt-X	"	»
Alt-Y	"	¥	Alt-C	"	¢
Alt-R	"	®	Alt-M	"	μ
Alt-^	"	ˆ	Sh-Alt-C	"	©

Alt-Space gives a Hard Space

## ERROR VARIABLE REPORTING

P.J.M.Radford

While developing Wimp-based programs, you often need to display the values of certain variables. One solution is to use VDU4 type printout (see Hints Volume 5 Issue 2), but this may be partially obscured by a window. Aa alternative method is to exploit the Wimp's error reporting by writing a procedure with a string parameter thus:

```
DEF PROCwimperror(error$)
!block%=ERR
$(block%+4)=error$+CHR$0
SYS *Wimp_ReportError*,block%,3,*<ProgName>* TO ,response%
If response%=2 THEN quit%=TRUE
ENDPROC
```

Then in your main program, place the following code at the appropriate points:

```
@%=<number print format>
error$='x='+STR$@
PROCwimperror(error$)
```

When the error is reported, clicking on OK will allow the program to proceed. Yet another method is to use the Wimp Debug application from Volume 4 Issue 3.



# Hints & Tips. . . Hints & Tips

## EdInsert INSERTS FURTHER

Terry Blunt and John Ferguson

The useful EdInsert application from Volume 5 Issue 2 can be extended to work with both SrcEdit and DeskEdit by altering a couple of lines. Even though DeskEdit has its own control code mode, EdInsert can still be useful. Simply change line 670 (660 for the program on the monthly disc) to:

```
670 If t$="Edit" OR t$="SrcEdit" OR t
$="DeskEdit" THEN
```

and line 1020 (980 on the monthly disc) to:

```
1020 err$="Edit/SrcEdit/DeskEdit does
not own the caret"
```

## TEMPLATE ICON BUTTON TYPES

Chas Davis

When creating template files, it is often convenient to give icons the type *Click/Drag* so it can be positioned easily within the window. However, if this button type is left set for an icon that should not return anything (like the information in an Info box) then a Mouse Click will be returned if the mouse is clicked over that icon. This will not normally cause problems, but if you haven't written your mouse click code correctly (i.e. you don't check window number *and* icon number) then it can cause problems. The solution is to make sure that you check clicks properly in your code, and changing the button types of the relevant icons to Never will prevent unwanted mouse clicks being reported.

## WINDOW HANDLES IN RISC OS 3

Andreas Graham

Window handles in RISC OS 2 are in the range 0-&8000 (except for the icon bar, which has values -1 and -2 for right and left). However, in RISC OS 3 all window handles are a full 32 bits long, and are in fact simply pointers to where the window definitions are stored in memory. This does not mean that you can alter a window's attributes simply by poking values into memory - you should still use the relevant SWI calls.

## PROPORTIONAL SPACING FOR BJ10e PRINTER

Mike Williams

The version of PrinterDM supplied by Beebug for use with the Canon BJ10e printer ensures that all text is printed at 10 cpi (and not proportionally spaced). Using the printer's switches to change this has no effect, as each print task resets the printer to 10 cpi.

To achieve much better looking proportional spacing for text printing you will need to edit the *PrData* file contained within the *PrinterDM* application directory. Load this file into Edit (or similar) and locate the definition for the Canon BJ10e. Within this find the line beginning:

```
job_prologue <8><27>...
```

and replace the <8> with <27>P<1>. The BJ10e can also be put into other printing modes (see manual); to use any of these as the normal print mode, modify the same line in *PrData* accordingly.

## BLANK DESKEDIT HEADERS AND FOOTERS

Jeff Gorman

To create a blank header or footer in DeskEdit in versions up to and including 1.20, insert a Hard Space in the relevant icon of the *Page setup* dialog box. A Hard Space is entered by holding down the Alt key and then pressing the Space Bar. This prevents errors when the set up file is read back in. The printer will shuttle sideways for one space when a blank header or footer is reached.

## PALETTE ERROR ERROR

Ken Cowap

Kell Gatherer's observation of the palette icon error is quite correct - the bottom right pixel colour 6's area is black instead of grey. However, to save the ROM sprites successfully to a file, the second Basic line should read:

```
SYS *OS_SpriteOp*,268,rom%,*ROMSprites*
not SYS "Sprite_Op" as printed.
```

**RU**

# RISC User Public Domain Library

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

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**PD23 Disc** 4 demos, Bounce, Crimbo, GoldDemo and Rotate.

**PD24 Disc** 3 demos, Demo, Gopher and Overscan.

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

**PD26 Disc** 4 demos, Sister, SkullDemo and Whible.

**PD27 Disc** 2 demos, GrannyChow and Windows.

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**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** Artist+ and BigM, both 256 colour art packages, along with Design, a symmetrical pattern designer.

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Bobby, Brill, Burning, Chartmix, Chippene, Demo2.

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

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**PD05 Disc** Soundtracker playroutine plus the following tunes: Fyc, GoodTune, Hello, HowDeepIs, Huba, Humanoid, Hunters, Hymn, Iuba, Igarun, Intob.

**PD06 Disc** Soundtracker playroutine plus these tunes: Jazzid, Jm1\_China, LastNinja2, Like, Magnet4, MegaForced, Minimize, Mod, New\_Biz.

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**PD10 Disc** Soundtracker playroutine plus the following tunes: Demo5rath, FFSound, Five, GSCTheme, HiEnergy, Oxygene2, Piano, PopCorn, PumpUp.

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**PD31 Disc** 17 utilities/applications: Address Book, Address Labeller, DiscSpace Display, Desktop Calendar, Cassette Inlay Printer (Two of these), DFS Disc Reader, Automatic Application Creator, ROM Speed-Up, Arc to Picon 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 hyperXC 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 printer, TEXT to DTPfile converters, plus a letter spooler.

## CLIPART AND PICTURES

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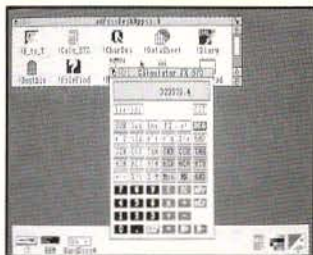
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Scientific Calculator

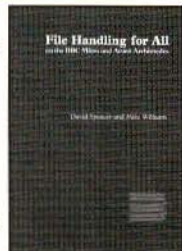
## FILE HANDLING FOR ALL

by David Spencer and Mike Williams

File Handling for All is a comprehensive book which covers all the requirements of data storage and processing by computer, using the popular BBC Basic programming language for the examples. It is aimed at anybody interested in File Handling and Databases, whether beginners or more advanced users, and will appeal to all who want to learn more of this important subject.

The book starts with an introduction to the rudiments of file handling, and in the following chapters develops an in-depth look at the different types of files e.g. serial files, indexed files, direct access files, and searching and sorting. A separate chapter is devoted to hierarchical and relational database design, and the book concludes with practical advice on developing file handling programs.

The associated disc (£4.75) contains complete working programs based on the routines described in the book and a copy of Filter, a full-feature Database program. As a **Special Offer** to RISC User members the File Handling for All book and disc are available together for £11.95.



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# Technical Queries ??

Alan Wrigley answers your queries on transient utilities, inserting tabs in text files, and configuring WimpMode.

Dear Sir

I have a large public domain demo program (500K), but when I try to run it, all that happens is an error message saying "No room to run transient". I have never seen this before - is it caused by a bug in the program?

Hans Elbel

A "transient", or to be more precise a transient utility, is a non-multi-tasking machine code program, usually quite small, which is loaded into the RMA, run once, and then cleared from memory. Its name therefore derives from the transient nature of the program. It has its own filetype "Utility" (&FFC). Usually such programs are run from within an application when some small task needs to be performed. An example of this is the *PCol* utility supplied with RISC User's *BEdit*, which enables a listing to be dumped to a printer from the Basic editor. Another example might be a short routine called from within a boot sequence to set the screen mode (see the query on WimpMode below). Because these programs are small, there is normally sufficient space in the RMA to load them. If not, however, the error message you describe will be generated, and you must increase the RMA slot before you can run the utility.

Occasionally larger programs are written as transient utilities. This is not always a good idea. For example, you say the program you are running is 500K long. On a 1 Mbyte machine it will often be difficult to find half a megabyte of spare memory for the RMA, and so the chances of running the program successfully are slim, unless all spare memory (applications, sprite pool, font cache etc.) is freed first.

Dear Sir

I need to save the output from a Basic program to a text file (type &FFF). Owing to variations in the field width of the variables, the tabulated data in the text file is difficult to read. Is there an easy way to tabulate data using a BPUT function?

Keith Vernon

It is quite simple to introduce tab characters (ASCII 9) into a text file using BPUT. These can be inserted between the strings as follows:

```
BPUT#file%,s1$+CHR9+s2$
```

The problem arises at the other end of the chain, when the file is displayed by an editor or document processor. DTP packages and most word processors, and many printers for that matter, allow the user to set tab stops at a number of places across the page. Each time ASCII 9 is encountered in the file, the text will be tabbed across to the next tab position.

If you load the file into Edit or DeskEdit, the tab characters will be displayed simply as control codes, i.e. in the form "[09]". However, choosing the *Expand tabs* option in either editor will cause the tabs to be replaced by spaces up to the next multiple of 8 characters from the start of the line. This does aid readability, but you still have no control over where the tab stops are placed.

If you want the text to be read in an editor without movable tab stops, then the best solution is probably to introduce artificial tabs into the file itself. This can be done by padding out each string with extra spaces. So for example, if you wanted the second string to start at column 20, you would pad out the first string as follows:

```
BPUT#file%,s1$+STRINGS(20-LENS1$, " ")
+s2$
```

You must be sure, of course, that the first string will not exceed 19 characters, or there will be no space at all between the two strings.



# Technical Queries

Dear Sir

I am writing a comprehensive screen mode selector, with additional features such as reading and writing the configured WimpMode value in the CMOS RAM. The PRM says this is stored at CMOS location 193, but I found it at location 196. Furthermore, the CMOS value is encoded as if from a look-up table, so I had to find out the table values and build them into my program. Is there a RISC OS call which would do this encode/decode for me, and what other CMOS locations are different from those given in the PRM?

I have also created some extra modes, but if I configure WimpMode to an odd-numbered mode above 27, the configured mode is ignored and the Desktop opens in mode 12 instead. Why should this be?

Toby Williams

To take the CMOS RAM first, there is a discrepancy between the PRM and the actual CMOS locations starting somewhere between 187 and 190, and all subsequent data is stored at a location three higher than that given in the PRM. So as you say, the WimpMode setting is actually at 196. It is not found from a look-up table, however, but is calculated from the following formula:

```
mode=(val DIV 16)*32-12-(val DIV 4)*4-  
val MOD 4
```

where val is the value in CMOS location 196, and mode is the resulting screen mode. Don't ask me why!

The operating system has a finite number of modes built into it. RISC OS 2.00 knows about modes 0-28 (except for 22), while RISC OS 2.01 (as provided in the A540) goes up to mode 36, and RISC OS 3.00 to 46. However, it is perfectly possible to define new modes; for example, Impression comes with a module, !NewModes, which provides some additional modes such as 66 and 82.

If you try to set a Wimp mode which is undefined, the result depends on whether

the mode number is odd or even. If it is odd you will get a "Bad Wimp mode" error, while if it is even the Desktop will simply default to mode 0.

When the computer is switched on or reset, the configurations, including the Wimp mode, are read before any boot files are run. So if you have defined new screen modes, you will not have a chance to make RISC OS aware of them until *after* the start-up Wimp mode has been set. If the configured mode number is unknown, then if it is even, the Desktop will start up in mode 0; if it is odd, in mode 12 (the odd-numbered mode would, of course, have had to be resident in the computer at the time of configuring, or the error mentioned above would have occurred).

The best way to set a user-defined mode on start-up is to include a short utility in the boot sequence. The following Basic program will generate such a utility, with the name RunMode:

```
DIM code% 128  
FOR i%=4 TO 7 STEP 3  
P%=0:O%=code%  
[OPT i%  
MOV R0,#mymode  
SWI *XWimp_SetMode*  
MOVVS PC,R14  
MVN R0,#0  
SWI *XWimp_CommandWindow*  
MOV PC,R14  
]NEXT  
SYS "OS_File",10,"RunMode",&FFC,,code  
%,O%
```

where mymode is the mode number you require. Note that there are *two* commas in the last line between &FFC and code%.

The RunMode utility created by the above program should be run *after* you have loaded the module containing your new mode, so your boot sequence might contain a pair of lines such as:

```
RMLoad <Boot$Dir>.!NewModes  
Run <Boot$Dir>.RunMode
```

where Boot\$Dir has previously been set to the directory where the two files reside. **RU**

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

## Compiled by Mike Williams

Welcome to *Write-Back*, our new readers' pages of RISC User. These pages will take over our previous Postbag page, but will also provide much more of an opportunity for readers to paste their own views and comments, ask questions, and seek help (via a Pin Board feature), and will provide the space for answers and information to be published for all to see.

In effect, we would like you to use these pages as a bulletin board, for communication between users, so that all readers can benefit. We will help out with any additional comment if necessary to keep things going.

The success of these pages will depend very much on the readers of the magazine, so let's be hearing from you as soon as possible. It will help if you mark any correspondence *Write-Back*, but don't worry if you forget.

No addresses will be published unless we are specifically asked to (but publishing information in the magazine makes it more widely available anyway).

If you feel that we have contributed a lot ourselves, well this is the first appearance of these pages. It is up to you to change this in the future.

## BlackLet font on Volume 4 Special Disc

Some readers have reported problems with the BlackLet font when used with Computer Concepts' LaserDirect. This has now been fixed with CC's help. If you need to use this font with LaserDirect, please return your original disc to the Publications Department with a suitable SAE and we will send you a replacement. Please make it clear that it is an update of the BlackLet font you are seeking.

## ARM Developments

Malcolm Bird, Technical Director of Acorn, writes that he was very impressed with David Spencer's article on ARM processors in the March issue of RISC User (Volume 5 Issue 4). He also points out a couple of minor corrections: ARM Ltd has equal shareholdings between Apple and Acorn; VLSI is the smaller shareholder. Acorn started research into the ARM processor in 1983, with the first ARM silicon operating in 1985, and the first product incorporating ARM2 being released in 1987.

## Acknowledgement Where Due

Greg Herdman of G.A.Herdman Educational Software has asked us to publicise the fact that the example Draw files which were used on page 41 of RISC User

Volume 4 Issue 8 (a hot-air balloon) and on page 51 of Volume 5 Issue 4 (a jumbo jet) were both samples from the collections of clipart available from G.A.Herdman Educational Software, 43 St Johns Drive, Claborough, Retford DN22 9NN, tel./fax (0777) 700918.

## Trace Elements

David Pilling has written to us regarding the review of his Trace application (for converting sprites to Draw files) which was published in RISC User Volume 5 Issue 4. The current release of Trace allows 256 colour sprites to be converted to 256 colour Draw files, and not just to monochrome as stated. There have also been a number of other improvements including the provision of another program, D2Font, for producing outline fonts from Draw files. I have used Trace myself recently and can certainly vouch for the usefulness of this type of software.

## Is C Faster than Basic?

John Banks has written to us from Brunel regarding the speed comparison given by P.S.Williams in C Notebook in RISC User Volume 5 Issue 4. John writes as follows:



*It is hardly surprising that a compiled language like C can add, subtract, multiply and divide faster than an interpreted one.*



# Write-Back

Neither does it establish that C is a "better" language. In practice no Basic programmer would dream of multiplying 10000 integers: an embedded machine code routine could be written in a few minutes to do that.

Computers spend much of their lives idly waiting for the human to do something. Obviously speed is not a factor here, but the user-friendliness of the language itself. Here Basic wins hands down over C. This applies over the vast domain of Wimp programming, windows, menus, messages, poll routines etc.

Where there is intense CPU activity, we need object code, and if it is purpose written, it is likely to be faster (and smaller) than compiled C code. This mixed approach is very effective.

I realise that it is not done to knock C, but C freaks must play fair too. C's main asset is portability; its main disadvantages are illegibility, strong typing, and obsolete 32-bit reals. Above all a structured Basic program is so readable. The main loop is at the beginning, brackets only occur in mathematical expressions, and they open and close on the same line! Personally I think ENDWHILE is a much preferable terminator to ).

I have had to curtail John's letter somewhat, but I have tried to retain the essentials. What does anyone else think?

# Pin Board

## Mode 7 Screensave Wanted

Ann Wregg has contacted us to see if anyone can help with a screensave routine suitable for mode 7 when running on an Archimedes.

## Re-inking Printer Ribbons

In the course of a conversation on the phone, another reader asked us recently if we knew how to re-ink printer ribbon cartridges so that they don't then jam. Unfortunately, we can't help with this one as we use a networked laser printer for all our in-house printing. Maybe other readers can regale us with their own experiences.

## Canon Bubblejet BJ10e(x)

David Stacey of Bishops Stortford has been having problems trying to use a Canon BJ10ex printer with his new A5000. I also use a BJ10e and find with text printing, that after outputting one document, I can only print a second by switching off the printer and then switching on again. I presume that the printer driver is failing to reset the printer correctly at the end of a job. This is an excellent printer, so any help and advice from other readers on either problem will be appreciated I am sure (let us know if you have other problems with this or other printers).

## Bespoke Software

If you have an idea for a particular application which you would like to see written, then let us know. We are in touch with a number of programmers who are all ready to start coding programs for publication in the magazine or on the magazine disc.

## Historical Adjustments

Jeff Gorman, a previous contributor, writes:



Looking at the calendar program on the January/February disc (Volume 4 Issue 3) I noticed that several historical adjustments appear not to have been accounted for. Year AD 4 was not a leap year; Caesar Augustus apparently ordered that intercalations should not take place until AD 8.

In 1752, Britain and its dominions finally adopted the

calendar reform proposed by Pope Gregory in 1582, so that the 3rd September became the 14th September. Such information can be checked out in *Time in History*, by G.J. Whitrow, Oxford University Press, 1988.

Past experience has shown that calendar programs often generate comments from those seeking historical accuracy. Our own application was intended more for the start of 1992. If anyone wants to provide a more historically accurate version, we could include that on a future magazine disc.

RU

# Personal Ads

**Calling all keen Archimedes programming addicts!** Looking for all persons interested in Archimedes Basic/Assembly programming or any person who would like to swap A3000 PD stuff. Please write to; James Band, 12 Birnam Road, Forest Town, 2193, South Africa.

**WorraCad latest version** £40, Autosketch v2.0 £20, E-Type £10, Arcade Soccer £10, Pipemania £12, Powerband £12, Worra Battle £8, all originals with manuals. Tel. (0730) 812341 extn 5059 eves.

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**WANTED:** Enthar 7 for Archimedes. Tel. (0294) 53648 eves.

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**A3000 Morley 4 Mb memory upgrade** £200 o.n.o. Tel. (0277) 821620 anytime.

**I have a Penman plotter** that has ceased to function, due, I believe to a problem with one of its location devices and its associated diffraction grating. I need someone to repair it for me since the company that made it has ceased to exist. Tel. (0526) 22381.

**If you are interested in** either IBM or Archimedes software and programming (particularly in Basic) or even in swapping ideas for programs. Please write to me at East House, Michaelhouse, Balgowan, 3275, South Africa.

**A3000** with colour monitor as new £625, RICOH daisywheel printer as new £75, A3000 carrying case £15, Parallel printer cable £5, BEEB DOS £20, BEEBPC £20. **WANTED:** A3000 Disc Buffer and/or RAM upgrade. Tel. (0483) 480632.

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£8, Guild of Thieves £10, Zarch £8, Tactic £7, Stranded £15. Tel. (0247) 457655.

**Archimedes A310**, 4 slot backplane & fan, Manchester United game, Interdictor Flight simulator, brand new Acorn DTP and 1st Word Plus packages and approx 3Mb PD software, c/w dust covers, all manuals and starter books, excellent condition £700 o.n.o. Tel. (0903) 690031 after 6.30pm.

**WANTED:** Acorn ADFS book. Tel. (0293) 529129 after 6pm.

**PC Emulator v1.6** £68, Pipedream 4 £120, IPawn £10, ISlide Show £6. Tel. (0926) 421332.

**For sale original games suitable for the Archimedes together with manuals** (offers considered). Chocks Away (MkII) £12, UIM £10, White Magic 1 & 2 £8 each, Hostages £10, Professor Mariarti £8, Nevryon £12, Holed Out £10, Apocalypse £13, Pandora's Box £18, E-Type Jag £18, Inertia £11, Articulate £15, Quazer £8, Enter the Realm £18, Saloon Cars £20. Tel. (0392) 55605.

*Potential purchasers are advised to insist that it is the seller's responsibility to ensure that goods arrive with the purchaser in a fit state as described. In the event of damage in transit, contact the seller before taking further action.*

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