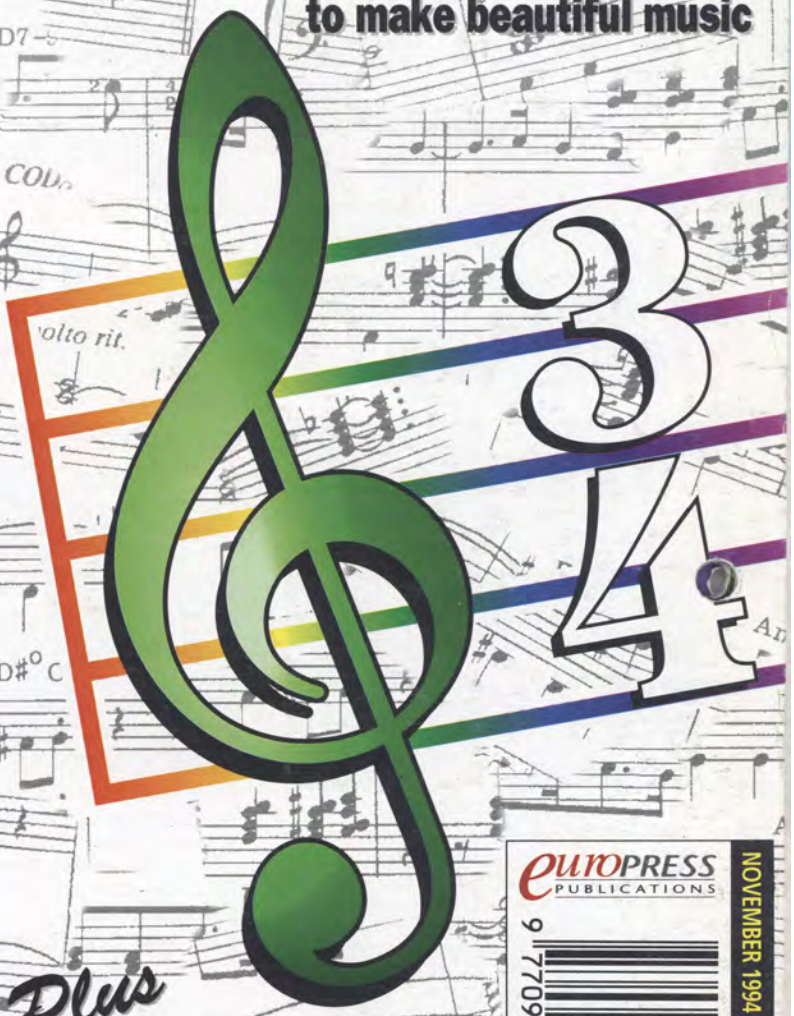
ACORN WORLD SHOW SPECIAL INSIDE

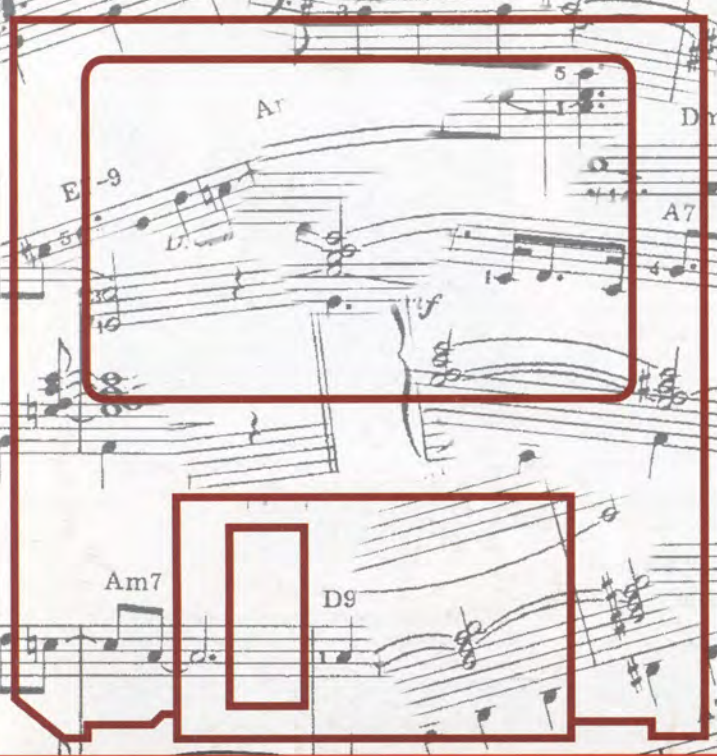
Covering all Acorn machines

Acorn COMPUTING

MUSICOLOGY

Find out what hardware and software you can use to make beautiful music





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- Sex education
- Do it yourself DTP
- Choosing software

europress PUBLICATIONS
NOVEMBER 1994 Vol.12 No.9 £2.95 Hfl 14.50

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SOFTWARE

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STYLE REVIEW:

"Impression Style represents ridiculous value for money..."

ACORN USER

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ACORN COMPUTING

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TURBO REVIEW:

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ACORN COMPUTING

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ARTWORKS REVIEWS:

"It's the best art program ever to hit the Archimedes!.."

"ArtWorks is a great package, full stop."

ARCHIMEDES WORLD

"In short it is amazing..."

ARCHIVE

CLIP-ART CD

CD with over 700 ArtWorks drawings, over 100 24-bit full colour photographs, and a demo version of AudioWorks and sounds.

£19 + VAT (£22.32 inc)

CLIP-ART REVIEW:

"A top notch product that represents true value for money.."

ARCHIIMEDES WORLD

AudioWorks

A general purpose audio sample editing application. Works with a variety of different file formats and can play back through the Archimedes sound system.

£49 + VAT (£57.57 incl.)

AUDIOWORKS REVIEW:

"Taking over as the industry standard for Archimedes sound sampling packages.."

ACORN USER

MacFS

A MAC DISC READ & WRITE UTILITY FOR ACORN RISC COMPUTERS

A utility to read and write to Apple Mac SuperDrive floppies and via a SCSI interface, hard discs, Syquests and optical drives. RISC OS 3.1 required.

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Graphics Loaders

If you need some good 24 bit colour images, this software will allow you to load JPEG compressed files, PhotoCD images, TIFF and Clear files into Impression Style, Publisher and ArtWorks 1.5. Includes sample JPEG images. ***£39.00 + VAT (£45.82 inc)***

Compression

Very fast automatic general purpose file compressing and decompressing utility. Acts like a filing system but can provide up to twice the storage on your floppy or hard discs. Compatible with all applications.

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the Acorn RISC computers

ColourCard GOLD

Graphics accelerator expansion card. Provides much higher resolution, more colours, less flicker (higher refresh rates) and faster graphics drawing. 32,000 colour screen modes and video pass-through for Acorn modes. If your RISC OS desktop is becoming cluttered, how about upgrading to a screen size of 1600 pixels across. Compatible with A300, 400, 540 and A5000 computers.

£249 + £6 p&p + VAT (£299.62 inc).

GOLD REVIEW:

"I don't know how I ever survived all those hours squinting and scrolling..."

ACORN USER

ScanLight 256

The very popular hand-held scanner capable of scanning 256 grey-levels for photographic quality image capture. The best way to get pictures into your computer. Includes internal expansion card. Versions available for all Acorn computers - so please specify model of computer when ordering.

A300/400/5000: £159 + VAT (£186.82 inc)
A30X0/4000:
CC mini podule £169 + VAT (£198.57 inc)
HCCS Ultimate MicroPodule £229.00 + VAT (£269.07 inc)

SCANLIGHT 256 REVIEW:

"Really impressive. A stable, well made product."

ARCHIVE

ScanLight Video

A combination of ScanLight 256 greyscale hand scanner, and real-time 256 greyscale video digitising, on a single card.

£220 + VAT (£258.50 inc)

SCANLIGHT VIDEO REVIEW:

"Excellent quality..."

ARCHIMEDES WORLD

ScanLight Professional

High quality flatbed A4 256 grey-level scanner and ScanLight image processing software. Requires SCSI interface card (available as optional extra).

£499 + £10 p&p + VAT (£598.07 inc)

PROFESSIONAL REVIEW:

"This really is a professional level tool."

ACORN USER

ScanLight Professional Colour

New high quality 24-bit full colour flatbed A4 scanner. Special bundle includes the stunning Spacetech Photodesk retouching program, worth £198. 4Mbyte min. 8Mbytes or more recommended. Requires SCSI interface card (available as optional extra).

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LaserDirect HiRes

Direct drive, higher resolution laser printing for Acorn Risc computers. Quite simply the fastest laser printing solution available. The HiRes8 offers a maximum of 8 pages per minute. The HiRes4, 4 pages per minute. 2Mb RAM minimum, 4Mb RAM recommended.

HiRes8 £1099 + £10 p&p + VAT (£1303.07 inc)
HiRes4 £799 + £10 p&p + VAT (£950.57 inc)

Canon Colour Printers

360dpi printing (40% higher than HP printers), vivid colour and unlike some colour printers, absolutely no problem mixing black and colours together. Separately replaceable colour ink cartridges. Includes RISC OS 3 TurboDrivers and cable.

BJC-600 A4 printer: £389 + £10 p&p + VAT (£468.82 inc). BJC-800 A4 printer: £1499 + £10 p&p + VAT (£1773.07 inc)

BJC-600 REVIEW:

"A very impressive package, worthy of our Best Buy rating."

ARCHIMEDES WORLD

Canon Mono Printers

Fast, 360 dpi, inkjet printer. Includes TurboDriver software to provide the fastest inkjet printing of any printer in its class. Printer has built-in sheet feeder and power-supply. Includes printer cable.

BJ-200 A4 printer £229.00 + £10 p&p + VAT (£280.82 inc)
BJ-230 A3 printer £289.00 + £10 p&p + VAT (£351.32 inc)

BJ-200 REVIEW:

"All in all, this is a splendid piece of kit."

ARCHIMEDES WORLD

Pioneer fast multi-disc CD drives

Holds 6 CDs and includes automatic disc changer. PhotoCD compatible. Includes driver software for all Acorn compatible SCSI interface cards, compatible with AUN networks. Two versions available, the 604X is four times normal speed (600K sec) and the 602X is twice normal speed (300K sec). CDFS 2.2 required.

604X - £999 + £10 p&p + VAT (£1185.57 inc)
602X - £499 + £10 p&p + VAT (£598.07 inc)

EAGLE M2

The ultimate multimedia product. Full video capability - digitises still images and Replay movies, audio sampling and playback, midi capability and much more. 4Mbyte RAM, hard disc and ARM3 min recommended.

Including the Eidos real-time video compression software: *£329 + £6 p&p + VAT (£393.62 inc)*

EAGLE REVIEW:

"In short Eagle comes highly recommended."

ARCHIMEDES WORLD

Lark

16 BIT STEREO/AUDIO SYSTEM FOR ACORN RISC COMPUTERS

16-bit stereo CD quality audio sampler and playback card. Includes links to and from computer sound and external sound source such as CD, with mixer. Includes the acclaimed AudioWorks and AudioControl software. MIDI In, Out and Thru connection.

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E&OE. Prices and descriptions are subject to change without prior notice.

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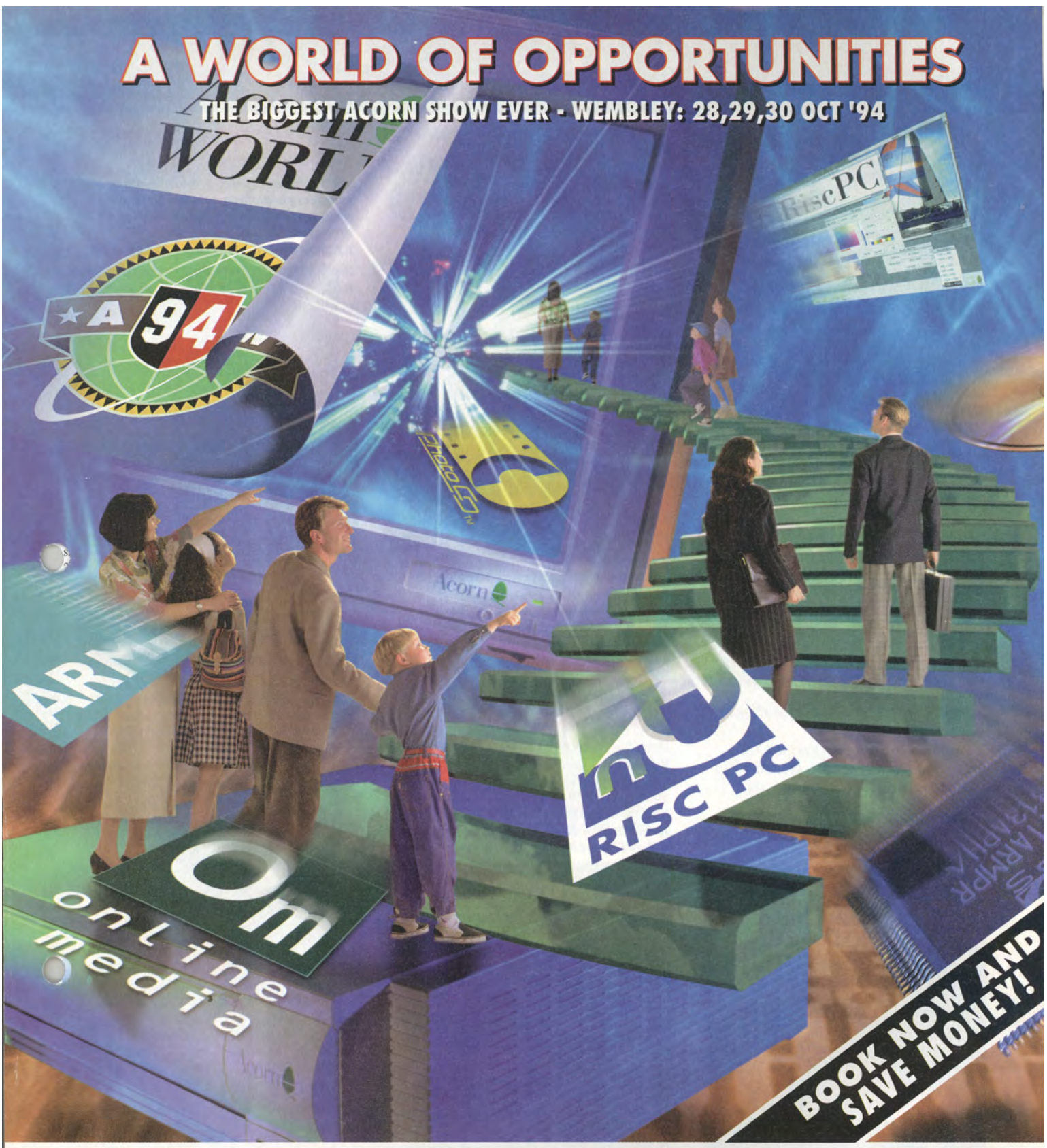

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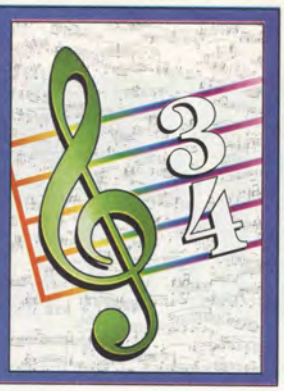
Acorn

Music to the ear

WHILE the Acorn 32-bit machines have excelled graphically for many years it's only now that their power in the field of music is really coming to the fore. Find out what can be achieved starting on Page 37.



REGULARS

Comment 13
Steve Turnbull fears the coming of the Living Dead – does he have good reason to worry?

News 15
All the latest news of products and events taking place in the fast changing world of the Acorn computer.

TechForum 70
Are you an expert programmer? Our hints and tips series is just for you with ideas and algorithms to help you work.

Body Building 73
In the swim? Using ultrasound to detect motion towards and away from the source.

Problem Solved 75
Our technical editor opens his mail and shares the secrets behind some of those tricky hardware problems.

Public Domain 81
Teri Paul is back again with her pick of public domain and shareware programs to enhance your computer.

Mad Hatter 86
Our very own adventure wizard continues to help you explore worlds of fantasy and excitement.

Letters 88
This is your opportunity to voice your news, ideas and views on everything in the Acorn world from viruses to joysticks.

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MegaDisk 6
Check out what's in store for you this month on the best cover disk available for the Acorn 32-bit RISC OS range.

32-bit Subscribers 7
Our special extra subscriber's disk is jam packed full of goodies so find out what's on it this month.

Acorn World Show 19
The eight-page guide that tells you everything you need to know about what's going on at the Acorn World Show 1994.

Write a letter 23
Our DTP specialists explain how you can use the simplest tools to produce the best results.

REVIEWS

Music boxes 38
Expanding your Acorn 32-bit machine for music has never been easier – you can even plug-in PC hardware.

Music shorts 43
Three pages of quick reviews covering many different areas of music from the sublime to the easy.

The Lark card 49
A low-cost option to turn your Acorn 32-bit machine into a powerful music machine that sounds superb.

PC Card 57
We may be waiting for the Risc PC co-processor but you don't have to wait for PC compatibility with these new cards.

Learning Curve 64
We survey the latest in educational software for the Acorn computers:
- Report Writer
- First Words with Smudge

Screenplay 71
The latest game reviews and previews for the 32-bit machines:
- Wolfenstein 3D
- Star Fighter 3000

Music comms 26
Even if you join the comms revolution what's in it for you? We check out the music sources you can access.

Evaluating software 40
Choosing software can be a minefield – we provide a guide to getting through it safely.

Multimedia 52
Three projects into multimedia show how easy it is to develop applications on the Acorn 32-bit platform.

Sex education 61
Part one of our special investigation looks at the official routes through educational software.

BBC Disk 77
Full details on the subscription disk for the 8-bit BBC Micro and how to use it.

THE MEGADISK

Britain's best Acorn cover disk contains hours of fun and a host of useful utilities linked to our editorial features to make the magazine come alive on your desktop.

Full details about the packed Megadisk – see Page 6.

- **Star Fighter 3000**
  A game and a half with furious 3D action
- **Border**
  A fancy border for you to use.
- **Game cheats**
  Diggers, James Pond 2 Plus, Warlocks – plus many more
- **TechForum**
  Fixing the bugs and the problems with RISC OS.
- **Reviews index**
  Easy reference to the 32-bit reviews since 1987.

Subscribe now! – See page 68

SUBSCRIBE to Acorn Computing and you'll get an amazing value-for-money deal that beats all our rivals: Not only do you get a whole years-worth of issues for LESS than any other Acorn magazine, 32-bit owners get TWO disks every month.
See Page 68 for details of this unbelievable offer.

GET YOUR NEWSAGENT TO RESERVE YOUR COPY NOW – SEE PAGE 48
AVAILABLE AT W.H. SMITH AND ALL GOOD NEWSAGENTS

– TWO MEGADISKS –

From the next issue, for three issues, Acorn Computing will have two packed Megadisks for you to sample – don't miss out.

Most of the editorial and adverts in this magazine were produced with ArtWorks and Impression from Computer Concepts.

The MegaDisk

What's on this month's disk?

- STARFIGHTER 3000
- Game cheats
- Programs from the magazine
- PD protection

Programs from the magazine

- DTP – Border for your own letterheads
- TechForum – On-the-fly fix utility for DragASprite
- Sprite left-hand wastage remover

Next month

FOLLOWING the success of our two disk promotion last year, we are repeating this for the next three issues: December, Special and January. The cover price of the magazine will be increased to £3.95 for these issues and then return to £2.95. Subscribers will receive the magazine and two disks as usual at no extra cost.

Starfighter 3000: Battle on the airwaves

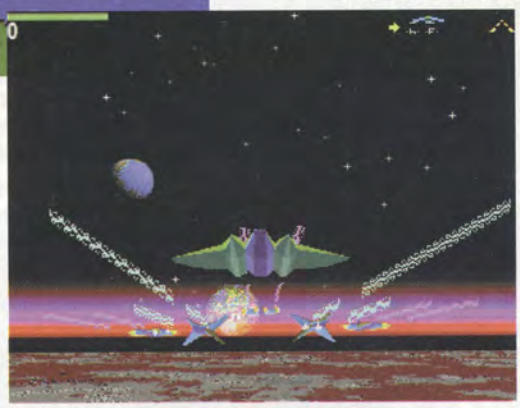
THE year is 3037 and peak-time TV has acquired its most successful audience participation show ever – Star Fighter 3000. Lucky viewers are selected from thousands to take part in the Star Fighter UEP (Ultimate Expansion Programme) where, faced with an enormous military attack force around progressively difficult strategic locations, they take part in the ensuing battle.

The full version of StarFighter 3000 has 108 missions set in detailed texture mapped landscapes with fast three dimensional graphics. This version is exclusive to *Acorn Computing* courtesy of Fednet (0332 840487) and you can buy the full game for £29.95 for the first time at the Smart DTP stand at Acorn World '94.

The missions are divided into three pyramids: Easy, medium and hard. The mission on this month's MegaDisk is a special one which is ranked medium to hard. There is a short guide to the map and ship display information in text format on the cover disk which we'd recommend you read before you take off. At the start of the mission, three friendly craft are patrolling the area over the port at very high altitude and in crocodile formation. A close fly-by of the leader will signal a request to join the attack force and the formation will join you. It is good defensive practice to allow the formation to settle before moving into dangerous areas. When in difficulty – send in the troops.

Running under the radar...

...or into the stars.



Pressing A will send your formation – providing you have one – into battle with the nearest airborne targets. They attack on a one-to-one basis, if there are two enemy craft nearby, two of your formation will take them on while the rest stay with you as defence. Pressing A again will send in more.

If things get too rough, R will regroup your formation. However, be careful not to force your wingmen into retreat if it puts them in a vulnerable position as they leave the battle scene. If fired upon, they will return.

When an enemy target is destroyed, friendly craft will either select new targets or rejoin a defensive formation.

Do well – the TV rating depends on it, and you wouldn't want to get *cancelled*.

Controls:

Ship Control

Z	Roll Left
X	Roll Right
"	Climb
/	Dive
Return	Fire Selected Weapon
Space	Thrust

Game Control

S	Go shopping
M	View map
P	Pause game
R	Regroup your formation
A	Break formation for attack
Q	Quit game

Weapon Select

F1	Lasers
F2	Air to ground missiles
F3	Air to air missiles
F4	Cycle super weapons

Camera select

F5	Reset normal view
F6	Tracking camera

Aircraft view

F9	Reset view to player
F10	Cycle through view types

a) Player
b) Friendly spacecraft
c) Enemy spacecraft

Player weapons

F11 View next spacecraft/missile of selected type

Camera Control

Up arrow	Forwards view
(+ Right Control for Camera Up)	
Down arrow	Rear view
(+ Right Control for Camera Down)	
Left arrow	Camera left
Right arrow	Camera right
Page up	Zoom in
Page down	Zoom out

Getting started with the MegaDisk

THE programs on this disk are stored in a highly compressed format which sometimes enables as much as 1.6Mb of programs and data to be stored on an 800k floppy disk

The procedure for running the programs is very straightforward and does not require learning any special methods or techniques. Switch on your Acorn micro, put the disk in the drive and click the drive icon.

Now double-click !ACmenu – there's a short pause while it scans the archive then it displays a window of the contents. You can treat this new window like any other one for viewing disk contents, and run programs and open directories by double-clicking them.

Large programs must be unpacked by dragging them on to a separate disk before being run. Some may have an !Install program that will do it for you.

We recommend that you always read the !ReadMe files or access the help information via the Help button.

FAULTY DISK?

If your cover disk or 32-bit subscription disk has a physical fault – doughnut won't rotate in the sleeve, disk errors and so on – please return it for replacement to:

PC Wise Ltd
Dowlais Top
Business Park
Dowlais
Merthyr Tydfil
Mid Glamorgan
CF48 2YY

If there seems to be a fault with one of the programs please contact the magazine by post describing your machine set- up and exactly what happens when you run the program.

The 32-Bit Subscription Disk

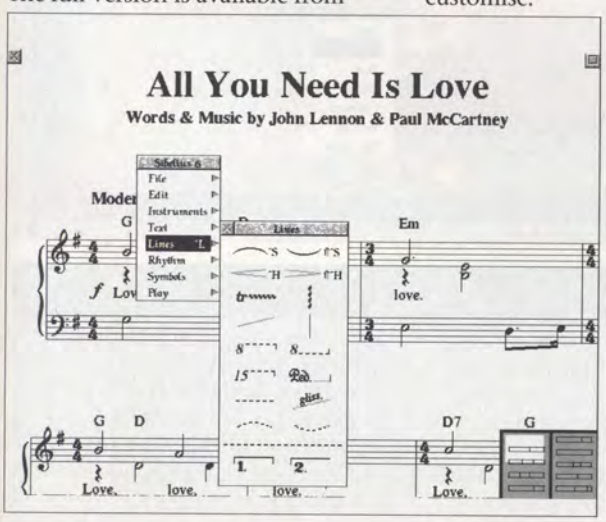
Sibelius 6 demo – compose and play

Sibelius 6 is a program for inputting music using a Midi keyboard or mouse, editing it as music notation and then playing it back through the computer's speaker or Midi, or printing it out – reviewed in the December '94 issue of **Acorn Computing**. Sibelius 6 is a complete tool for composing or arranging music straight on to the computer and is based on the Sibelius 7 Expert System which is now used by some of the world's best-known composers and the Royal Academy of Music.

This demo version 2.06 is complete except that the following features have been disabled: Printing, saving, exporting Draw files and the on-line Help system. The full version is available from Sibelius Software (0223 302765). Sibelius 6 makes a lot of use of the function keys for speed and a function key strip is included as a draw file.

The readme files on the subscription disk contain a manual and information about Sibelius 6 and 7. There is also a file called **Fun Things**. This is a list of things to try exploring features of Sibelius 6 such as when each stave has an independent stereo position, or changing the spacing – if you drag far enough, you can push bars of music off the page to produce a domino effect right the way through the score.

In addition, there is a selection of music files for you to play or customise.



Put your stamp on some classics

What to do

Sibelius 6 edits a single score at a time, so once you've loaded a score you should close it before loading another – or your computer will start another copy of Sibelius 6 to load the score into. Instead of having scroll bars, Sibelius 6 uses the **radar** at the bottom right-hand corner of the editing window.

You can click on the toggle size icon at the top right of the screen. This makes the editing window small and reveals an **overview** window for zooming in and out. Click Select on it to zoom in and Adjust to zoom out

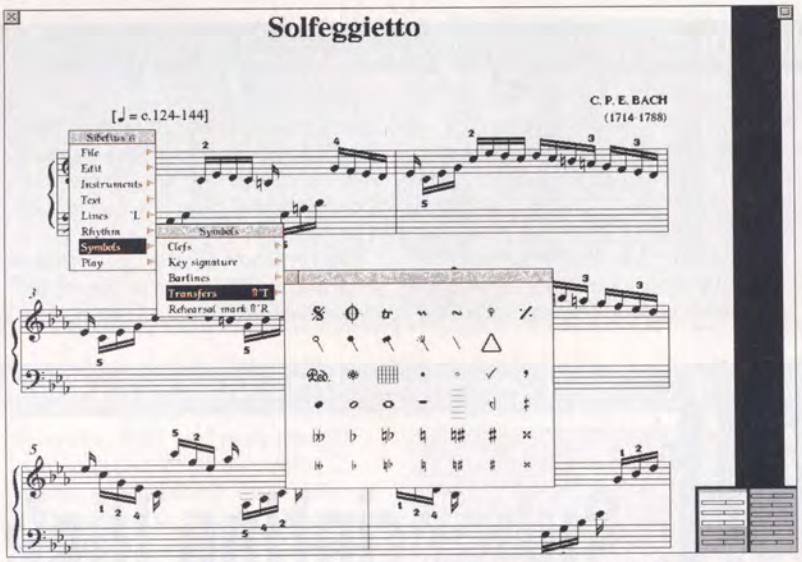
You can select notes (by clicking on the note head itself), rests, staves, bar lines, text and so on using the left mouse button (Select) as normal. The basic editing operations are shown at the top of the Edit menu.

The most important operation is clicking the Adjust button to copy an object, such as a note or a stave. Most objects can also be dragged with Select. You can create notes with the mouse by selecting a rest and then pressing one of the note-value keys – F5 to F9. Clicking Adjust on a note allows you to change the pitch as you drag the note head up and down.

Copying notes is simple, just Select a note and click Adjust on where you want to to go. Keep clicking Adjust in different places to get more notes with the same length

What's on this month?

- **SIBELIUS 6 demo with playback**
- Graffiti art package
- FontManager 2
- BBC Micro subscription disk
- PD: Menu-driven Filer access
- PD: Disk recovery
- PD: Tree of Knowledge
- PD: Undelete for files



and the same articulation marks – staccato, tenuto and so on.

Sharps, flats and so on can be added via the function keys. For instance, Shift+Control+F3 **respells** accidentals C# as Db. The same system is used for creating articulation marks, while rests are added by Selecting a note and pressing F11. You can't delete a note as the bar wouldn't add up, so you must turn the note into a rest.

To type a crotchet rest, for instance, select a note or rest, type F7 (crotchet) and then F11 (to turn it into a crotchet rest).

Chords are created with a note for one of the pitches – point to another pitch on the same note and click Adjust to copy it.

Sibelius 6 implements Midi step-time input, which means you use a Midi keyboard to indicate the pitches and the function keys to specify the rhythm.

You will need to have a Midi interface and any Midi keyboard. Simply Select a note or rest and play note on the keyboard. They will go in as crotchets on that stave.

For instance, if you press the quaver function key, the selected note and all those you play thereafter will be quavers – only press a function key when the note-length changes. To play any of the same scores, press Control+P and you can play just part of a score by double-clicking on the stave on the first bar of the passage and Shift-Select on the last bar.

To stop playing, press Escape and the music stops at the end of a bar.

You can control speed and temp, and when a stave is selected – by clicking on a blank part of it – change various parameters affecting music on that stave: Balance, pan, Midi channels and voice numbers and program numbers. Full details are given on the disk-based manual.

Create your own music

Click Select on the Sibelius 6 icon on the iconbar. Choose one from within Woodwind, Brass and so on in the Instruments menu and click Adjust on the paper. You can choose several instruments at once and add a second stave to an instrument.

To start typing in your notes Select a bar rest and press one of the function keys – F5 to F9 – to get a note, and drag it to the pitch you want.

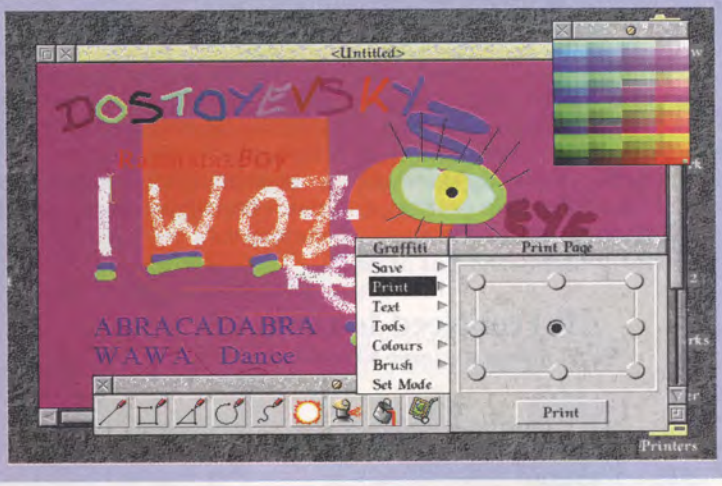
Clicking Adjust will copy it to create further notes. The function keys will let you change rhythm, accidentals and so on.

Graffiti – PD painting

THIS application is **freeware** which means you can use and distribute it free of charge.

Graffiti is a small painting application for beginners, or just users who find Paint a little daunting. The best results are from a 256 colour mode – Mode 13, 15, 28.

The tools are responsive, fast and easily accessed from the main menu as with the colours dialogue box. Printing is supported via the standard RISC OS drivers so you can output your image to all those supported by the drivers.



Font Manager 2 – Font access

This shareware utility is designed to replace Fonts, and therefore should sit in your root directory with only one copy residing on your hard disk at once. Font Manager 2 allows you to manipulate, move, import and export fonts within groups. These groups can then be turned on and off and hence fonts can be *hidden*.

RISC OS restrictions mean that you can only have 24 groups of fonts, which is equivalent to more than 1500 font families under ADFS and is hopefully more than anybody could ever want. Remember, as this is shareware, if you find you like the utility register it – it only costs £2 and you'll be kept up to date with new versions and support.

easy *to understand*

easy *to access*

easy *to use*

difficult *to ignore*

MAGPIE

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1ST PAGE

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The Living Dead

I DON'T like horror stories. I have a nervous disposition so I avoid them, but there's one horror image that has been keeping my mind exercised ever since ARM Ltd became really successful.

Let's make no mistake that by the criteria of a long and bright future, ARM Ltd is probably the most successful *R*educed *I*nstruction *S*et *C*omputer manufacturer in the world today. It may be true that DEC have sold more and it may be the case that the Power PC chip set is selling by the truckload.

But they only sell into the computer market and given a sudden (admittedly dramatic, traumatic and, at present, unknown) shift in trends they could become obsolete or unwanted overnight. The companies that make these chips is suffering – if that's the right word – a tidal wave of money, but after the wave has passed what then?

ARM Ltd, on the other hand, sells its designs to anybody and everybody – the computer market provides the merest fraction of their income. You get ARM processor cores in video recorders, cars, kettles, washing machines and heaven knows what else. Anywhere that a manufacturer wants low energy consumption, high performance and easily debugged micro-processing power, ARM is the preferred choice.

Not only that but ARM promises to be the first company to produce a really low cost *super-scalar* processor (wheep wheep buzzword alert). Quick digression: Processors have clocks and there's a relationship between the number of instructions they process for each clock tick – this is usually less than one. When it reaches and goes beyond one pre tick it's called *super-scalar*. End of digression. Lots of potential kudos for ARM Ltd in that.

In addition, as the range of manufactured items with them increases so does their reputation and their income. A recent press release from ARM revealed that an army of 300 engineers are developing support software for the ARM, as well as hundreds among their registered developers.

ARM is really big and its potential is even bigger.

Now this is good news because Acorn own a big chunk of ARM (as they should since ARM Ltd was originally a part of Acorn). So if ARM Ltd is doing really well, Acorn get a chunk of the cash too.

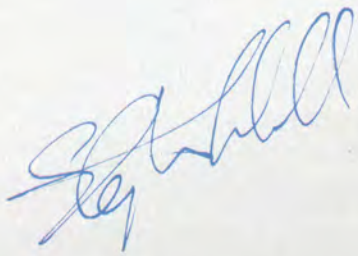
This is where the horror story begins. Suppose Acorn continue to just *almost make it*? I have terrible visions of a zombie company that stalks the corridors looking for the door that leads to success, unable to lie down and die because of a company it owns that continues to keep it alive, providing it with life when it's years past its sell-by date.

Until now, Acorn has staggered along with the life support of the education market, without which it would certainly have been six foot under years ago. With injections from ARM it can keep going for years more but, without real expansion of the consumer market, is there any point?

The mood at Acorn now is genuinely good, in fact it's probably better than it's been in years. With a number of coups over so-called industry standard machines there is room for optimism. But Acorn must take fast and effective action to build on their successes and keep hitting hard into new markets.

It's a choice between that or being consigned to wander the corridors like an undying zombie. And that's a thought I prefer not to contemplate.

Steve Turnbull presents a frightening view of Acorn's future



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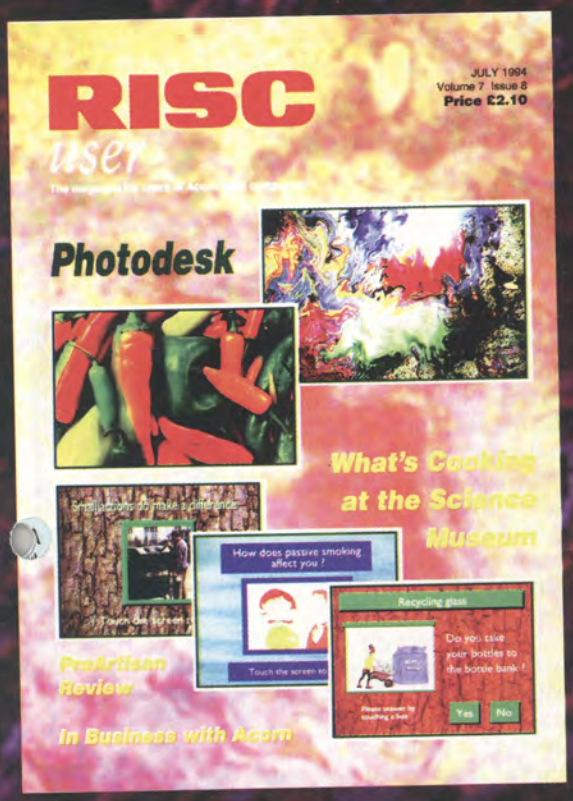

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Wimp Topics	*a series of programming articles aimed at the serious programmer*
What's Cooking	*behind the scenes at companies such as Computer Concepts, Minerva and Eidos*
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Selection panel

ACORN has compiled all its education support information into one package – Acorn Selector. This provides a guide to the IT resources and training courses available for schools through Acorn in Education Centres (AECs). The handbook lists information alphabetically, regionally and under curriculum subject area to provide comprehensive cross-referencing.

Kill or be killed

MG Research (0252 621004) has developed a virus killer called SmartKill to deal with both known and unknown viruses through a unique load, dissect and zap routine. SmartKill costs £15 and scans for suspicious files – such as Basic files hidden as sprites – and inoculates entire disks against viruses.

In addition, SmartKill has a * command preventer among its features to disable viruses using these commands. Support is provided free of charge to all registered users.

Pinpoint winner

THE National Association for Coordinators and Teachers of IT (ACITT) awarded the Best Generic Software Package Award to Longman Logotron for its data-handling package, PinPoint. The award was judged on one simple criterion: *which product was the best package.*

Romping to the winning post past Claris Works and Microsoft Excel, PinPoint provides a complete environment for collection and handling data as well as sorting land selecting information performing statistical analysis and generating graphs and charts.

On the move

HYBRID and Music Information Technology has moved to: 1 Winship Road, Milton, Cambridge CB4 6BQ. Tel: 01223 425666.

Royal Academy dumps IBM PCs

AFTER a demonstration from Sibelius Software (0223 302765), the Royal Academy of Music has abandoned their current IBM PC software, Score, in favour of Sibelius 7. Paul Patterson, Professor of Composition at the Royal Academy remarked, "When we saw Sibelius 7, it was clear that it was in a totally different league from anything else."

Sibelius 7 is now an official part of the Royal Academy's composition course. It is used for producing scores and for playing music using Sibelius 7's increasingly sophisticated Midi facilities. The Royal Academy is buying a number of Risc PCs to replace their previously used IBM PCs.

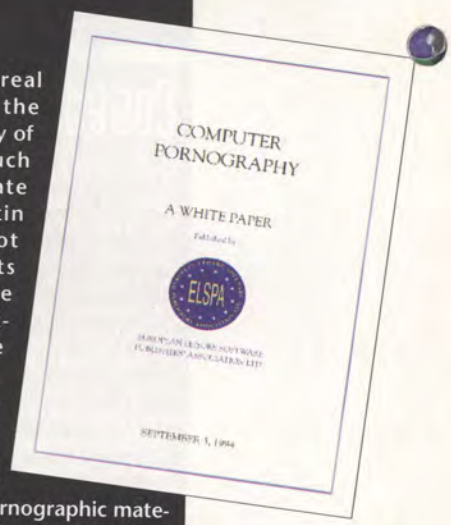
A full review of Sibelius 6 and Sibelius 7 software will appear in the Special issue of Acorn Computing.

ELSPA versus porn

IN its white paper into computer pronography the European Leisure Software Publishers Association (ELSPA) has called on the government to provide greater police resources and increase police training in a bid to curb computer pornography.

The white paper looks at the methods of distribution, the legal situation and other measures in place to control computer pornography. ELSPA stresses the need to differentiate between commercial software producers, and non-commercial and often illegal sources.

General secretary of ELSPA, Roger Bennett, commented: "Members of ELSPA, representing the majority of commercial leisure software publishers, put in place a system of self-regulation in February, which includes the control of erotic and pornographic images beyond that required by the law. The real problem is with the black market supply of software from such sources as pirate computer bulletin boards, car boot sales and markets where even the Obscene Publications Act may be transgressed."



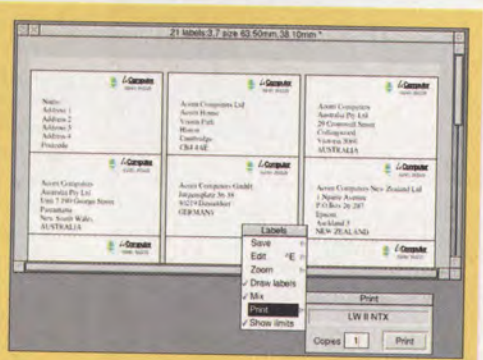
ELSPA has a dedicated Crime Unit to track pirated software but has often discovered pornographic material too which has been referred to police forces around the country. ELSPA's call for government action comes from the belief that too few police forces have computer literate officers in their obscene publications units.

Increasing access

THE professional DTP market demands flexibility and accessibility across platforms. Following close on the heels of Computer Concepts' MacFS, comes Oregan (021-353 6044) with AppleFS.

This allows file transfers between Acorn and Macintosh machines using standard Acorn floppy disks and supports both low and high density formats. The price is £59.95.

Label it



A NEW labelling program has been launched by Le Computer (0245 362225). Called Ultilabel it allows you to produce business cards, disk labels and name badges as well as address labels. You can use Draw and CSV files to produce you own custom formats and produce your work on laser, inkjet and dot matrix printers.

The standard Avery label layouts are supported and it costs £58.69 including postage and VAT.

Apple foul confirmed

THE Advertising Standards Authority has upheld Acorn's complaint against Apple Computer and their misleading remarks about its Power PC chips.

Sales and Marketing Director at Acorn, Mike O'Riordan commented: "Although Apple agreed to review the claims when we initially made a complaint in March 1994, this decision reinforces our objection and Acorn's belief that the Power PC information was misleading. The material was inaccurate and the decision will ensure that UK purchasers are aware that Acorn's position on this matter was correct."

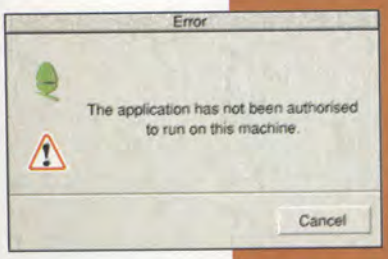
Apple claimed that *Until now, personal computers have used the CISC (complex instruction set computing) microprocessor architecture, while RISC-based microprocessors have been used for high performance systems such as workstations and servers. Apple is the first company to ship personal computers with RISC-based microprocessors.*

Acorn have been successfully supplying RISC-based computers since 1987 and Apple has now amended the materials to acknowledge Acorn's concerns and the company's position in the UK and overseas.

Coded in stone

A TRANSPARENT application protection utility has been launched by The Really Good Software Company (0582 761395) called Softcrete. This program allows you to protect your software against theft or prying eyes.

For £24.95, you can opt for automatic or semi-automatic encryption and decryption of an application and gives you a flexibility to protect against several possibilities: If you have a recent Acorn machine with an identification chip you can tether it so that it will only run on that machine; a password can be inserted into the CMOS ram which lets a program run on a number of machines, proving that they have been set up with the correct CMOS password or a non-resident password can be used to encrypt the application.



What makes Softcrete special is its transparency. With the first two methods, once you have protected your programs no-one will be able to tell that it has been protected until they try to run it on an unauthorised machine. With the third method you can allow free access to a protected program for a certain length of time after the password has been entered.

If the application is stolen the *pirates* will not have the decryption code to hack into it. RGSC have found this to be useful at exhibitions by making applications accessible while keeping software secure from theft.

Clever disk

THE ARM Club (0171 624 9918) has released a commercial version of Ian Giblin's freeware Smart CD application. The enhanced version is called Smart CD+ and costs £10 and provides extra facilities, including the ability to produce cassette inlays and sequence tracks.

Audio CDs can be controlled and played using your RISC OS machine and CDs can be automatically identified as they are inserted with the title and list of tracks being displayed. You can select the tracks to be played among other facilities usually only available on expensive CD players.

Video diary

ANGLIA TV (0603 615151) has announced that it will be adding MPEG video into their CD-Rom range of educational software. This is the result of a collaboration between Anglia, Computer Concepts and Acorn. Computer Concepts will be marketing the MPEG card called Movie Magic for the Risc PC providing full screen, full motion video.

If you do not have the appropriate MPEG hardware you'll see the video as a Replay movie, as the software intelligently deduces what your machine can access and provides it.

In a separate announcement, Anglia also stated that in future its CD-Roms will be able to be run on Acorn, Macintosh and IBM and compatible computers – the same disk on any of the three computer formats. The move is the result of Anglia's push into the North American market which has the greater emphasis on Macintosh and PC machines.

All for one...

ACORN's integrated package, Advance, has been revamped to The Musketeer Pack. Priced at £249 this includes Impression Style, Schema 2 and DataPower – if you bought these three packages separately the price would be £385.

At present there is no shell containing these packages as with Advance, but one is in the pipeline. Neither is there a separate graphing package as Schema 2 now includes this facility in the standard package. For those cognisent of Alexander Dumas, I am reliably informed that the four musketeers are: Computer Concepts, Iota, Clares and CRM.

Printer cuts

COMPUTER Concepts (0442 63933) has cut the cost of its BJC-600 colour inkjet printer and the ScanLight 256 handheld scanner from 1 October. The BJC-600 now retails at £389 – a fall of £80 while increased competition in the Far East means that the price of the ScanLight 256 is reduced from £189 to £159, with the A3000 version costing from £199 to £169.

Do it yourself

SOFT Teach (01985 840331) has released a design and technology package called MakeIT aimed at Key Stage 2 pupils. Using MakeIT you can incorporate pictures from a variety of sources into cards, envelopes and stamps easily and simply. The cost is £35 including site licence.

Tesco results

OVER 10,000 UK schools have benefited with new computer equipment through the Tesco Computers for Schools '94 scheme. In total over 22,000 items of equipment and books have been provided, which breaks down to 10,500 Acorn computers and peripherals plus over 4,000 items aimed at children with special educational needs.

The ten week scheme saw the greatest number of computers going to Essex schools. This was the third year of the Tesco scheme and through this over a third of all schools in the UK have now gained a total of almost 15,000 Acorn computers.

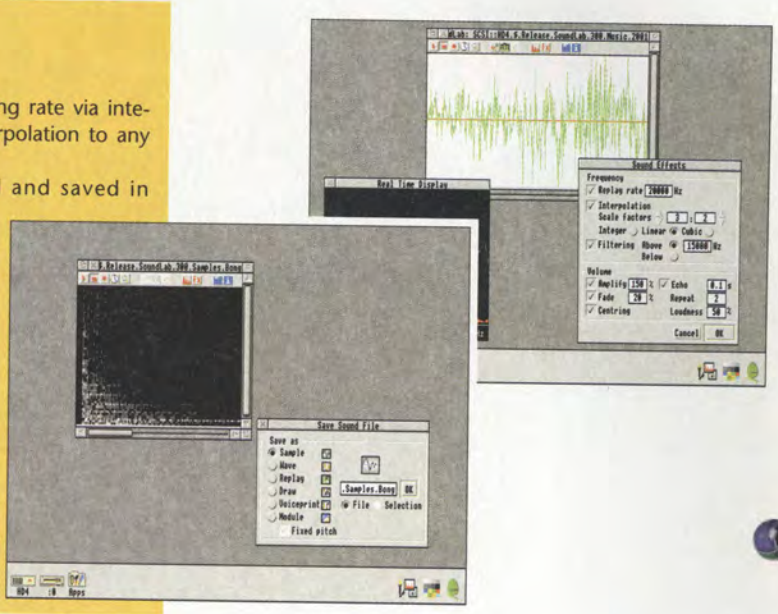
Virtual recordings

SOLENT Computer Products (0954 789701) has radically updated Oak Recorder. The new system works with the A3010, A3020, A4000, A4, A5000 and Risc PC. By taking advantage of the bi-directional parallel port it can achieve a standard recording rate of 20kHz, with higher sampling rates up to 32kHz on the more power-ful machines – with Oak Recorder 2 the maximum recording rate was 10.5kHz.

The SoundLab software has also been rewritten with a new friendly interface and a range of functions available from a button bar including amplifying, fading, and echoing sections or a sample. You can also have high or low pass filtering to eliminate high frequency noise and can change the base sampling rate via integer, linear or cubic interpolation to any value.

Files can be loaded and saved in Armadeus or PC compatible WAV format. The software can also output Acorn Replay sound track and create voice modules used in Basic programs, while you can export a waveform or voice print to Draw and Paint.

Oak Recorder is still available for the older machines and the price of Oak Recorder 3 is £44.95.



Better graphics

ENHANCED versions of games for the Risc PC have been released over the last few months and now 4Mation (0271 25353) are taking advantage of the high resolution screen modes with special versions of Betsi, A Mouse in Holland and Explore with Flossy the Frog.

The enhanced version works on all machines capable of displaying high resolution graphics: Risc PCs and A3020/A4000/A4 and A5000s with 2Mb of ram, a multiscan VGA, SVGA or LCD monitor and a 1.6Mb disk drive.

You can specify the enhanced version when ordering or upgrade from Mode 15 to Mode 28 screens by returning the original disks and a cheque for £4.99.

Networking at speed

Asynchronous Transfer Mode (ATM) is fast becoming the standard for high speed networking for commercial reasons and to meet the need for increased bandwidth. ATM has the ability to combine voice, data and video services and is the basis of broadband ISDN.

SJ Research (01223 416715) has been providing schools with their ATM network, Nexus for the past 18 months, with around 6,000 computers running on the system. This experience has put SJ Research at the forefront of ATM research and development.

Commenting on the development, was Kim Spence-Jones of SJ Research: "We believe we have the largest installed based of ATM networks in the UK and probably Europe. ATM technology is being used as the backbone of the *information superhighway* as it is easier to connect to local and wide area networks. It is also the only network that can support the requirements of multimedia at an affordable price."

What's on

IT Coordinator Show
5 October
Queen Elizabeth Hall, Oldham
Contact: NW Semerc (061-627 4469)

Micros for Special Needs Exhibition
6-7 October
Queen Elizabeth Hall, Oldham
Contact: NW Semerc (061-627 4469)

Acorn World '94
28-30 October
Wembley Exhibition Centre, London
Contact: Vector Services (0933 441448)

Computer and Technology Show
14-15 October
Rougemont Hotel (opp Central train station), Exeter
Fri 10am til 7pm – Seminars during day include CAD on Risc PC, Multimedia and Links with Photography
Sat 10am til 4pm
Contact: Minerva (0392 437756)

European Technology in Learning '94
16-18 November
NEC, Birmingham
Contact: BIC (0254 663922)

ARM Club Open Day
19 November
St Mary's Activity Centre, Sedgley, Wolverhampton
Contact: ARM Club (0785 714535)

Dealer Open Day
20 November
Kegworth Hotel, Kegworth
Contact: Selective Computer Services (0332 690691)

Computer Shopper Show
1-4 December
Olympia, London
Contact: Computer Shopper (081-742 2828)

Acorn Computing Open Day
4 December
Portland Hotel, Manchester
Contact: Acorn Computing (0625 878888)

BETT '95 Technology in Education
11-14 January
National Hall, Olympia, London
Contact: EMAP (081-984 7711)

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Acorn WORLD '94

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Acorn WORLD '94

THE RISC PC is a powerful and flexible computer and this year it will be the central theme on the Acorn stands, stressing its expandability. Using production systems and some technology straight from the labs Acorn will be demonstrating some of the developments we can expect to see in the coming months and years.

The Rocketship Risc PC will hold pride of place – a seven-slice Risc PC configured with a whole host of fascinating add-ons and expansions that show the power and flexibility of the system. You can also see a five processor adapter card for the Risc PC which will allow up to five ARM processors to be fitted in addition to a standard second processor card.

Also on show will be the long-awaited Risc PC cards developed by Acorn, Atomwide and Future Technology Devices. Some of these cards will be configured with DX2 chips, with the DX4 chips available for preview. These cards will let you see how RISC OS runs alongside Dos, Windows and OS/2 systems and software.

In addition, you'll be able to see a variety of different applications and operating systems, from OS/2 on the new PC cards to UNIX native on the Risc PC and TAOS – pronounced *dowse* – which is a multi-processor operating system. A lot for you to read between the lines here.

Networking is another key area, with new versions of Access being previewed with CD-Rom support. You can also see Microsoft and Novell-based servers.

Internet surfers should look out for an early version of a RISC OS World Wide Web browser and Acorn promises work-in-progress glimpses of other projects, including new authentication procedures to allow work group-style computing. You can also see the effect of the new high speed ATM networking links, along with the Online Media set-top boxes.

While the clever money is on the PC card and Movie Magic MPEG cards to steal the show, don't miss the new 16-bit low-cost sound card, SCSI II, Network Interface and Digitising cards. Plus an adapter for Risc PCs to allow PC ISA cards to be inserted, delivering low cost PC devices to the Acorn market.

Enthusiastic club

This is also a good time to find out what the Acorn Enthusiasts Scheme offers you, with opportunities to win an ARM 700 processor card or be one of the first to own a 486 card for a Risc PC in a competition of multiple choice questions and a tie-breaker, with extra prizes of a range of Risc PC processors and multiprocessor adapter boards. Full details from the Acorn stand.

While Acorn are showing you the future, how about the present? The Acorn world of software and hardware developers will be demonstrating their wares and projects. Space restrictions mean that we cannot cover everything in these pages, so we've decided to concentrate on three main areas of interest: Desktop publishing, art and image processing plus games and leisure.

There is much much more to the show – educational products alone would take up all of these pages – so don't miss our show report issue available in November which will feature the stars of Acorn World '94.

New releases, advance information

Discover the future

The Acorn World 1994 Show – Wembley Exhibition Centre
28-30 October 1994
Advance tickets: Adults £5, Children £4 and Family £16
Ticket Hotline: 0933 441448

Desktop publishing

Alternative Publishing (041-248 2322) – if you are involved with professional DTP, at some time you will need to access graphics from other computers – Macintosh, PC or UNIX – and convert them into sprites. Enter ImageFS. This utility is deceptively simple as all you have to do is drag and drop the foreign file into the application which will load sprites and ImageFS will do the rest. For instance, just drag a Tiff file directly into Paint or Draw. ImageFS is totally transparent and can be used even on 1Mb machines.

ImageFS will work on any RISC OS 3 machine and converts Windows BMP and Apple PICT files up to 24-bit depth, as well as Tiff, BMP, PICT, PCX, Clearfiles, Targa, PBM, MacPaint, Atari/Gem, Gif, ColoRIX and, for professional users, 32-bit CMYK Tiff files. All for £34.95.

Calligraph (0223 566642) – will be demonstrating their A4 1200 and TQ-1200 direct drive laser printers with enhanced software smoothing techniques and more versatile document handling. A great deal of work has gone into perfecting the smoothing algorithms for the SuperRes mode which now gives a precise line and curve definition on your printed page.

The A3 and A4 format 8ppm direct drive printers give up to 1200dpi and incorporate the new SuperRes mode and TrueTone greytones. A draft mode is supported and the printers can output to paper, matt film – for camera ready artwork – or direct to plate for offset printing.

Direct drive means that typical rendering times are between 15 and 45 seconds per page when running with a Risc PC. However, the Calligraph 1200dpi printers will operate from any RISC OS computer with a standard podule slot and an ARM3 or faster. You will need at least 4Mb of ram for A4 printing while the TQ-1200's A3 pages needs 8Mb of memory.

Colton Software (0223 311881) – at this year's show you'll be able to see FireworkzPro, containing Wordz, Resultz and Recordz in one. Colton will be demonstrating how you can direct transfer files between the Windows and RISC OS versions of the software.

The release version is waiting for the final touches to be added to Recordz (£149) but you'll be able to upgrade from Fireworkz to FireworkzPro as well as take a look at the classroom resource, ClassCardz, for Wordz and Resultz. Pipedream 4 will also be in evidence as will Colton's training arm and user group, Abacus.

Computer Concepts (0442 63933) – sharing the stand with Wild Vision, Computer Concepts will be selling the latest member of the Impression family – Impression Publisher Plus. This is a supplement for Publisher users who need more pre-press facilities as well as more advanced colour control.

Publisher Plus supports EPS and DCS files and when imported, EPS files can be treated like any other graphic file. In addition, OPI is also supported, allowing low resolution versions of an image to be incorporated into a document during editing which are then automatically replaced at the typesetting stage by high resolution versions of the same image.

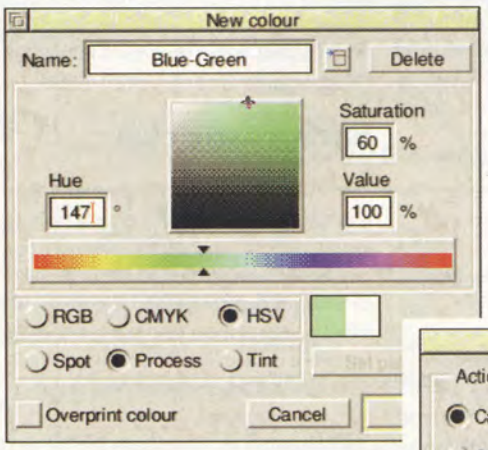
Publisher's colour support is improved by the ability of Plus to introduce named colours defined by users like styles – these can be edited as you want. This includes the ability to import ArtWorks named colours. Spot colours can be defined and separated, with tints supported as well. These are defined as a percentage of any other colour, including named or spot colours. You can purchase the upgrade for £130 which includes eight disks and a new user guide, and is suitable for all RISC OS machines with 2Mb of ram.

When it comes to printing your pages, Computer Concepts has released version 4 of TurboDrivers which not only support the Risc PC range but offer enhanced compatibility with other new software developments. This version takes advantage of the Risc PC's unlimited printer buffer allocation and in initial tests against standard Acorn drivers, Computer Concepts reports that the TurboDrivers are running twice as fast for simple text and ten times faster for more complicated documents.

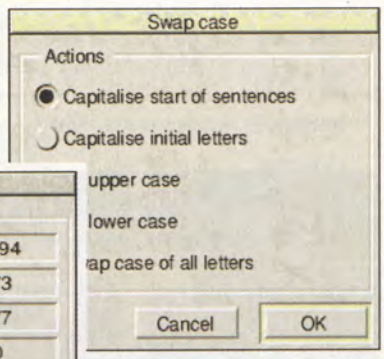
There is also a new TurboDriver for the Epson Stylus Colour and a network spooler version of both the TurboDriver and LaserDirect software. The spooler allows network access to a common inkjet or LaserDirect printer and makes many of the advantages of the TurboDriver software available to all machines on a network and is compatible with any AUN network including Econet.

Creating equations and formulae in DTP documents can cause problems but Formulix aims to make life easier. This application has been designed to run with a broad range of word processing and DTP programs and is fully compatible with Equasor. It comes with OLE support so that it integrates directly with Style and Publisher.

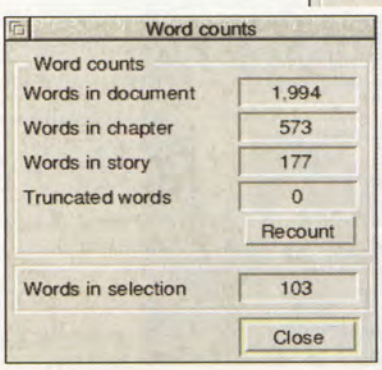
Equations can be exported as draw files or in a native Formulix format. There is an unlimited undo and redo function as well as



◆ *Publisher Plus now includes named colours...*



◆ *...block case swapping...*



◆ *...and selective word count facilities*

◆ *Formulix gives you even more DTP flexibility*

context-sensitive help, and drag and drop editing. A large selection of operators and structures are supported, as are matrices of any size and many maths characters. Functions are recognised as they are typed in and converted to the appropriate Roman typeface.

Formulix is supplied with EFF mathematical fonts for £69, though Equasor owners can buy Formulix for just £49. However, you will need 2Mb of ram.

One of the more visual developments to be viewed at this year's Show is the new Movie Magic MPEG card. Computer Concepts and Wild Vision have developed this for Online Media's set-top boxes. MPEG offers a high degree of compression for quality audio and video, so enabling complete movies to be stored on two conventional CD-Roms. Movie Magic gives Acorn users the ability to play back full screen, full motion MPEG videos at better than VHS quality and with CD quality stereo sound tracks.

This is a first, and suitable material includes an expanding range of movies and music video titles available in Video CD format. Not to be left out is the education software with Anglia TV's range of multimedia CDs, soon to include MPEG video clips.

The Movie Magic card is compatible with the Acorn Replay system so that packages such as S-Base 2, Genesis and Magpie will be able to include MPEG movies without modification. The software offers full video-type control of the movie with facilities such as pause, rewind and fast forward. You can also capture any frame directly into the computer as a 24-bit colour sprite.

Movie Magic will come in two forms: Available at Acorn World will be a version including a Scart socket suitable for connection to any RGB monitor capable of 50Hz PAL modes. Later in the year, Computer Concepts plans to release a version which will let any high-end multisync monitor display video in a window on the desktop. The Movie Magic card is only available for the Risc PC.

The release in September of the new ArtPad A6 graphics tablet from Wacom was the cue for Computer Concepts to launch their own Wacom drivers for Acorn machines, and this is the first opportunity most people will be able to see these in operation.

The Wacom tablets can be plugged into the serial port of any RISC OS machine which means they can be used alongside a mouse or as a replacement. The tablets are more natural to use and give a faster, smoother and higher resolution response.

The ArtPad exceeds 2000dpi, 200 samples per second and 256 levels of pressure and comes with a cordless pen. The tablets are pressure sensitive so can produce realistic effects such as variable width or density with different packages. Computer Concepts' drivers will be compatible with software which can use the pressure information such as PhotoDesk, the Eesox ArtWorks Pressure Tool, DA Picture and Studio 24.

Dec_Data (0392 221702) – will be demonstrating its range of clip art, including the latest edition to the range, The Normans. This is a two-disk pack which includes images from the Bayeux Tapestry as well as individual knights in colour and as outline images, all in draw format. In addition, Dec_Data has added the PES (Primary Educational Services) clip-art to their portfolio of DTP resources.

Also planned is a new version of the multimedia package ClearView and the DTP utility Draw_Changer. Special show prices are promised on their entire range.

Desktop Projects (061-474 0778) – although an Acorn dealer Desktop Projects also produces a range of programs and utilities for the DTPer. The Quick Series consisting of Quick Tile, a poster printing utility, Quick Sound for manipulating sounds and Quick Show, a budget slideshow package, will be in evidence, as will the full range of TopicArt clip-art covering everything from dinosaurs to cars.

The latest edition, Food and Drink, is in preparation and Desktop Projects also has plans to produce a collection of all the TopicArt on one multi-format CD-Rom.

EFF (0344 891 355) – when it comes to adding fonts to your system, EFF must have the most wide and comprehensive set of world fonts available. As well as display and standard fonts, a joined up writing font for schools has been added. However, when it comes to non-English fonts EFF are without equal.

There are over 800 fonts in its range, with five sets of standard latin Fonts for Western Europe, Central Europe, Mediterranean Europe, Eastern Europe (Latvia, Lithuania and Estonia) and Turkey respectively. Eff has also added over 40 cyrillic, slavonic and non-slavonic fonts to the range of ancient Greek and Indian fonts – Bengali, Sanskrit, Tamil, Hindu and so on.

The creation of an Urdu font family is also being worked on. However, due to the way of writing Urdu there is no word processor on any platform which can produce acceptable documents. As well as writing from right to left and slightly downwards, the use of ligatures are very common and any number of letters can be joined together.

EFF has access to a family of 95 different fonts and is looking into the possibility of the Risc PC having the power to access this number of fonts at one time – in Urdu it is likely that every other letter is in a different font.

Modern Hebrew fonts are in existence but when it comes to Ancient Hebrew the problem of being able to access multiple fonts in one word occurs again. Ancient Hebrew usually uses only four fonts at once, and EFF is working on a word processor to handle Ancient Hebrew, which should be available in 1995.

◆ *Risc PC printer drivers*

Available at the show will be a range of Publisher Fonts which are aimed at documents printed via a bureau. Typesetting in a bureau can lead to problems of font compatibility. The Publisher Fonts come in pairs, with one font being the standard RISC OS font to enable you to access on screen or print your document in the usual way. Its partner is an identical PostScript font suitable for the PS driver on the RISC OS machines and for your typesetting bureau.

A typical family of four fonts costs £28 for RISC OS 2, £42 for RISC OS 3 and £70 for the Publisher Fonts.

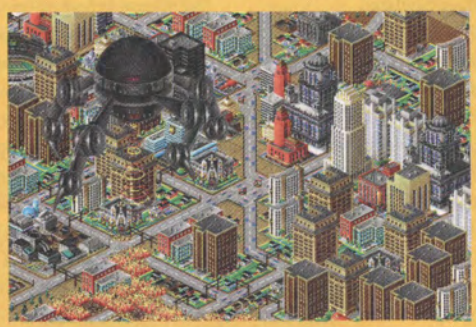
Fabis Computing (0283 552761) – will be selling the latest release of EasyFont. Version three of this font management program has three main enhancements on earlier versions:

FOR PEOPLE WHO DON'T WISH EVERY CITY WAS LIKE MILTON KEYNES

A park...

a bridge...

a marina...



an alien...

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15-17 ✓ 18+ ✓
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RISC PC – £39.99

OH NO! If you thought you could escape those pesky Lemmings by upgrading to the new Risc PC – think again! The all time classic Acorn game, Lemmings and Oh No! More Lemmings are now available for the Risc PC at £29.99. Both games run simultaneously with other programs, or, for the ultimate Lemmings challenge, with each other!

We hope to release Sim City 2000, Cannon Fodder and the Lemmings at the forthcoming Acorn World show at Wembley, but please check before making a special journey.

HOW TO ORDER

LETTER /FAX
SIMPLY SEND A LETTER GIVING DETAILS OF THE GAME(S) YOU WOULD LIKE, YOUR NAME AND ADDRESS, AND PAYMENT BY CHEQUE, POSTAL ORDER, OR BY GIVING YOUR ACCESS OR VISA CARD DETAILS INCLUDING THE EXPIRY DATE

IMMEDIATE DESPATCH
ALL ORDERS ARE DESPATCHED BY FIRST CLASS POST IMMEDIATELY. CARRIAGE IS PAID BY US IN THE UK. (ORDERS FROM OVERSEAS ADD £3 PER PRODUCT)

FULLY GUARANTEED
IF FOR ANY REASON DISKS SUPPLIED BY US BECOME FAULTY WE WILL REPLACE THEM STRAIGHT AWAY. SIMPLY RETURN THEM TO US ENCLOSING YOUR NAME AND ADDRESS.

0709 372290
ACCESS & VISA ACCEPTED

Krisalis Software Ltd. Teque House, Masons Yard, Downs Row, Moorgate, Rotherham, S60 2HD, Tel: 0709 372290 Fax: 0709 368403

◆ *Movie Magic – MPEG card for the Risc PC*

The main window displays the window in the style of your chosen font, EasyFont now has its own filing system which can save up to 40 per cent of disk space and finally, there is a new grouping feature so that you can collect your fonts into serif, sans serif or ArtWork fonts, or have an overlap. The price is £35 (inc VAT) though you can upgrade for £10 after the show.

Icon Technology (0533 546225) – if you require a word processor for yourself or your children, Icon Technology has one to offer. EasiWriter offers standard word processing to the highest level while TechWriter gives the ability to do equations in the word processor document without resorting to a second or third package – ideal for technical report writing or academic papers.

Integrex (0283 551551) – as well as showing its range of printers, you can also see printers from Canon and Hewlett Packard. These will be mainly inkjet as well as medium and low-end laser printers aimed at the home, small business and education markets.

Iota Software (0223 566 789) – this will be your chance to see a new low-cost 24-bit scanner based on the MicroTek Engine. The price has been set at £499 which includes the scanning software and one year's on-site maintenance.

Irlam (0895 811401) – additions to the Irlam range this year feature the Canon IX-4015 A4 flat-bed colour scanner. This has a very small footprint with 400dpi optical resolution, but Irlam also plans to have the very latest 600dpi Epson flat-bed as well – digitising images to 10bits.

For hand scanners there is new software which allows images to be stored direct-to-disk while scanning, real-time screen update during scanning and with support for 16 and 32-bit true-colour sprites. There are also red, green and blue component maps for brightness, contrast and colour balance.

On the multimedia front is 24i16. This is a combined 24-bit video and 16-bit audio digitiser. Image size, capture rate and audio sampling frequency can be controlled from the desktop, with incoming video displayed in real-time. As well as capturing a full 24-bit TV frame in real-time, 24i16 can sample stereo 16-bit sound direct-to-disk with video, allow moving images to be captured to your specified size and use 16-bit audio output for improved quality playback of existing Replay movies.

For more specific applications is a new general purpose signal processor and data acquisition card – ADdsp. This is an expandable system with plug-in input modules, the first of which has eight channels, 12-bit Analogue to Digital Conversion and can capture data direct to disk at up to 400KHz rates. It also includes desktop oscilloscope software.

Minerva (0392 437756) – the show will see the launch of PrimeMover as well as Minerva's Ordnance Survey data package, Map Importer. This is also a chance to see an early version of Ancestry. This genealogy package was one of the first products available for the Archimedes. The new enhanced version will run on any RISC OS machine and will be available in the New Year – but you can order your copy at a special price at the show.

The new and improved Ancestry has comprehensive multiple reports and an easy to use DTP front-end. You can design your own reports, design variable length fields, drop in draw files and store any type of information from Impression to sprite files and Euclid films. They are also looking at the possibility of incorporating Replay files.

Neurotron Software (0227 700516) – the latest version of Optical, Neurotron's powerful and intelligent optical character recognition package will be available at a very special show price. Also being demonstrated will be the Multibase database which is under development, as is a new desktop filing utility.

Smart DTP (0332 842803) – a new DTP resource pack called PublishArt will be available. This is a collection of Draw and ArtWorks files for use with Ovation, Impression and the like. £29.95 including VAT will give you access to A4 backdrops, patterns, textures and page layout tools, borders, margins, headers and footers.

Quantum Software (0506 411162) – Keystroke 3.06 will be very much in evidence, allowing to you create keyboard shortcuts for just about any package. Furthermore, the normal price of £29.95 has been slashed for the show to £19.95. If you are an existing user you can bring your original disk to the show for a free upgrade.

New to the show will be Blinds which is a professional alternative desktop where windows act as blinds. An extension of the Pinboard concept, documents can be attached to a DTP package blind for instance. Furthermore you can create windows/blinds to any size.

◆ *Graphic tablet support*

Art and image processing

◆ *ProArtisan 24 lets your creativity take control...*

Archangel (0392 422759) – in addition to a range of Public Domain and shareware disks of 24-bit, Risc PC-specific painting programs, there will be a general Graphics Pack consisting of eight disks for £10 containing a range of utilities and programs such as 3D rendering.

Clares Micro Supplies (0606 48511) – ProArtisan 24 will be making its official launch and Clares has a special show price for you too. ProArtisan 24 exploits the artistic potential offered by allowing the use of 16.7 million colours for image creation and display. The computerised tools, such as chalk, water colour, pastels and charcoal can mimic their natural counterparts and brushes can be made to follow the most basic, or most intricate, of draw paths, resulting in Draw images rendered in any brush type. ProArt 24 is also able to load and manipulate full or selected areas of Kodak Photo CD images in 24-bit colour.

You'll also be able to see the current state of Compo, an image composition package which is under development by Clares. This is a design tool which allows the combination of 24-bit pixel-based images from any source, treating each image as an individual object to which a wide variety of effects can be applied such as drop shadow, tints or transparencies. Scaling and movement of objects is also supported and the effects applied to each object also move or scale with it.

Digital Arts (081-679 7307) – for image processing take a look at DA's Picture which lets you take a digitised, original or scanned picture and alter its qualities. You could lighten the image, or increase the contrast for instance or adjust the false colour from a satellite image. What interests most people are the special effects and interesting editing which can be done to photographs which makes a fallacy of the phrase the camera can't lie.

There will be two new modules for Picture available at the show: Texturisation and Text. You can also look at the work in progress on a new addition which promises to put DA's Picture in the realms of Quantel Paintbox.

They will also be showing a new piece of prepress software called DA's PhotoScreening and incorporates: Colour separation, colour correction and a sophisticated image screening known as frequency modulation. Other vendors such as Linotype and Agfa have systems based on this screening methods but cost in excess of £10,000 – Digital Arts have already produced versions of this software for the Apple Macintosh, Atari and PC.

The benefits of the software mean that you no longer have to scan pictures with 2000dpi to get a Vogue-quality picture. PhotoScreening uses a different and an almost random way of placing image picture dots on paper, thus eliminating common picture problems such as moire patterns. They have also added colour correction supporting the usual grey component removal, under colour removal with additional suppression methods such as achromatic and chromatic separations.

Digital Arts and Epson UK have become partners in offering the complete range of Epson scanners: GT-6500, GT-8000 and the latest GT-900 which are the only scanners with an optional transparency adaptor. Special bundles will be available at the show.

◆ *...whatever your painting style*

Longman Logotron (0223 425558) – this will be the first sighting of Revelation Image Pro 24-bit. This enhanced image processing package promises 24-bit graphics, new levels of sophistication when it comes to transforms, blending and shifting, with 100 levels of transparency for any colour. There are also 200 positions of saturation with colour processing such as: Lens simulation, subtle colour shifting, separation and enhancement. This new addition to the Revelation family is compatible with earlier versions and is priced at £149 – upgrade prices for registered users are available.

Longman also has a new version of Logo for RISC OS 3. Called Acorn WinLogo it costs £69 and as well as working in a windows environment and supporting the Risc PC, enhancements have been included such as improved printing. Finally, you'll be able to see the new version of Longman's spreadsheet program, Eureka 3.

Millipede Electronic Graphics (0284 850594) – will be exhibiting products aimed at professional video and image processing markets and launching a low-cost AlphaLock Genlock overlay board for the RISC PC circa £600. This enables the Risc PC image to be output at high quality to a PAL or NTSC video system (composite or S-Video Y/C) and to be accurately combined with other video signals. The relative low cost of the AlphaLock should enable the amateur video enthusiast to obtain professional quality video output and mixing facilities from their Risc PC.

The Risc PC image can be combined with an external video source using a linear key circuit built into the AlphaLock. This provides fading and cross fading while a linear keyline also allows the computer image to be combined with the video signal with variable transparency, controllable on each pixel by the value of the Risc PC Alpha channel.

This means that anti-aliased objects – such as text – can be combined with video to

professional standards. Alternatively, a linear key output is provided for controlling an external vision mixer with software programmable delay.

Software control is provided for most video parameters, including horizontal phasing and colour sub-carrier phasing. Digital signal processing techniques are employed to provide stable and accurate line and sub-carrier genlocking without the need for calibration.

Oregan Software (021-353 6044) – virtual memory has now been incorporated into PhotoTouch as has a complete cloning tool, but the price of this package remains at £79.95. PhotoTouch does include some morphing facilities, but for greater morphing control take a look at Morpheus which is now in a new version.

Oregan reports that the new Morpheus software is almost twice as fast as the previous version and handles all industry standard formats as well as deep sprites. 24bpp animation can be saved and Morpheus now supports 16bpp Replay and MPEG files. In addition, this version uses three-stage morphs, with the results previewed at any stage using the thumbnail viewer.

Pineapple Software (081-599 1476) – Killer, the virus protection scheme, will be on show in its latest edition, but the main feature of the stand will be Pineapple's latest release, Studio24. Well-known computer artist, Walter Briggs, will be demonstrating to show-goers how to paint on a computer using Studio 24 and Eesox's pressure sensitive graphics tablet. Studio 24's programmers will also be in evidence to talk to people about future developments and what you would like to see in the next edition.

◆ *Compo – creating interesting effects*

Away from the artistic front, plans are underway to demonstrate a new schools administration program for secondary schools. Developed by Tudor Grange School, this simple package has been enhanced by Pineapple and records data, prints reports and timetables.

Spacetech (0305 822753) – there will be a special 10 per cent discount on PhotoDesk at the show which will have scanner and direct printer support added, among other enhancements. You can update your version of PhotoDesk by sending the original disks back to Spacetech with an SAE for the new program and documentation.

Plans are in hand to have a dye sublimation printer, as well as a Canon BJC600 printer, on the stand so images can be printed out to the highest quality. Spacetech will be showing how to input an image via a scanner, process this in PhotoDesk and then output the finished graphic to a truly professional standard.

Also on display will be Spacetech's range of space and weather packages including !Orrery.

Games and leisure

4th Dimension (0742 700661) – "The lowest ever prices for our very latest range" is what Rick Adams of 4D says they will have available at this year's show. 4th Dimension will also be releasing Gordon Key's latest game – E-Type II: The Pink Lady. Designed to complement the abilities of the Risc PC, it should become a classic with two-player split screen action, computer players, six tracks, track designer and enhancements such as pursuit mode. Your Jaguar is also equipped with lasers to make life somewhat more difficult for the opposition.

◆ *E-type II: The Pink Lady*

E-Type II requires 2Mb of ram but will work on all RISC OS machines – however, on older machines it will run more slowly. The release of E-Type II coincides with 4D's fifth birthday and though this retails at £34.95, look out for a very special show price.

If your prefer more cautious driving, then 4D's sister company 10/10 Educational Software will be launching Driving Test at the show. This tests your knowledge of the road and the Highway Code, whether you are a learner or consider yourself an experienced driver. You'll also be able to see the new range of 10/10 products including: Maths Geometry, Essential Maths, German and Essential Science.

ArchAngel (0392 422759) – on the game front ArchAngel will selling a 200 Public Domain Game Pack for £20. For the more cerebral there will also be a draw file Puzzle Collection for £5 which consists of over 100 puzzles.

Gamesware (0703 457333) – ready for the Christmas games boom will be the latest Tom Cooper release, Wavelength. This is a space age shoot-'em-up featuring rendered graphics and a variety of different landscapes to negotiate on a seek and destroy mission. To be expected are enemies of alien shape and hue, it's lucky you have a good arsenal at your disposal.

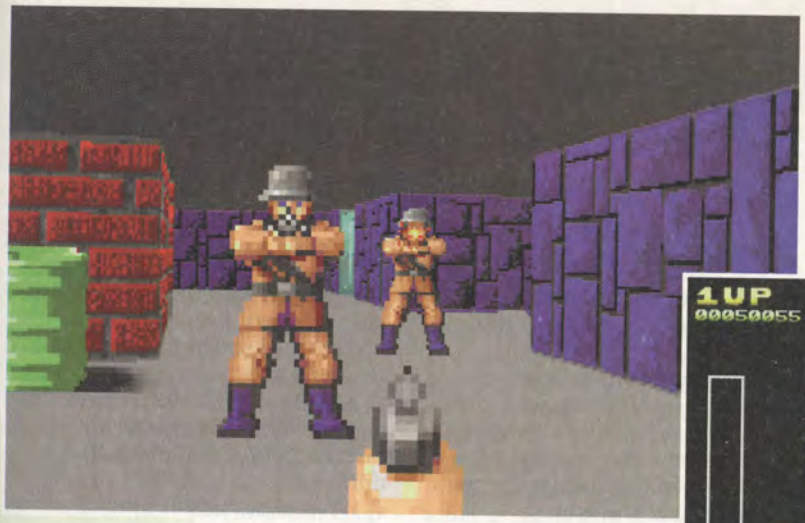
You'll also be able to see the pre-production versions of Striker – an isometric football game for release in December for £25.99, as well as Rome AD, a game of strategy due for release at the end of November for £29.99. Starting as a slave, you must try to avoid the fate of Spartacus and become Caesar by hard work and through the people you meet and impress. Progress is gauged by the clothes you wear – after all, only the Emperor can wear purple.

Krisalis (0709 372290) – this is your chance to see the latest releases of Cannon Fodder and the Risc PC versions of Lemmings and Oh No More Lemmings. So whether you want to battle your way through combat zones or play with multitasking Lemmings, this is a stand not to be missed.

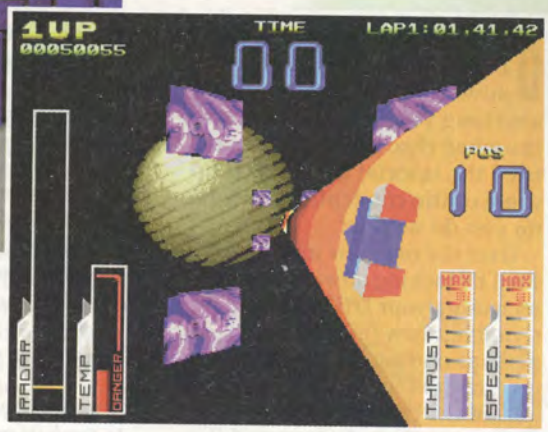
Krisalis is also working all out on the RISC OS version of SimCity 2000. This is the latest addition to the Maxis family which saw SimCity on Electron, BBC and RISC OS machines. But SimCity 2000 requires a powerful and fast machine, so will only work on the Risc PC.

Your task is to build and develop your very own city state. As you progress, you must handle the power and the expectations of the inhabitants, all this with wonderfully detailed graphics and sound effects. SimCity 2000 gives you many more options than SimCity. For instance the terrain is not flat, and you can develop underground as well as on the surface, with sewers and subterranean transport.

Perhaps the economy could benefit from military bases and in times of economic strain you can create and edit taxes, changing the education budget or perhaps legalise gambling. You can also run anti-drug campaigns. For power you can choose between wind



◆ *Life is straightforward in Wolfenstein 3D, kill or be killed*



◆ *Formula Two Thousand – TBA's flagship autumn release*

generators, thermal, hydroelectric, solar, coal or nuclear energy. You decide on the city you want to run and live in

But remember, to work a city must be a cohesive whole. Water lines must connect to filters and the terrain and climate could dictate the type of bridge you want more than your aesthetic sense. Have you got what it takes?

Oregan Software (021-353 6044) – maintaining its diversification into the leisure market, Oregan will be selling Sally & Wally, Burn 'Out and Arcturus at the Show. Also promised is a games competition on the stand. Each day the highest scorers will receive their own software bundle, courtesy of Oregan.

Powerslave (0462 438548) – Wolfenstein 3D will be available for the first time at the show. This game is a conversion from the PC and takes you back to 1930's Europe. Your mission is simple: Escape from the Nazis and save the world. The ARM3 lets Wolfenstein run Archimedes around 35 frames a second over 60 levels of fun but you can also play this on a 1Mb ARM2 machine.

TBA (0970 626785) – having been quiet for most of 1994 concentrating on research and development, TBA has changed location and is exploding back on to the scene with 17 new products on show. Formula Two Thousand (£24.99) is the flagship autumn release with formula racing in space on a cylindrical track. 15 circuits of 3D mayhem as you fight to keep on the track, while also fighting for a place in the championship. Hear all the news from the Seven Sports Studio with hosts Bob and Ted.

Due for release at the same time is Acceptable Rate of Loss (£24.99), another 3D extravaganza filled with ballistic missiles, fighter aircraft and a lot of explosions over 20 levels as you fly-by-wire a stealth aircraft to tackle the defences hounding your assault on the four refusion motors that power the planets defences. It's your planet, so save it from the tyrannical rule of Jehosaphat.

Next comes Cyber Ape (£19.99) where an ape is taken from the jungle and sent to a research lab for experimentation into gaining greater intelligence and dexterity – but he escapes. Your mission is to help him find his way home as he crosses four worlds and 40 levels. There are perils galore in this cute platform game which must be overcome by this friendly creature whose most violent act is throwing the odd banana.

In the Galaxy of Andoni you'll find the Warp Riders (£19.99). Stretching between the Planets of Santanium and Nocratious, there lies a network of energy warps. These ex-training devices were once used for fighter training but are now a source of entertainment. Races now take place across the warps, and guess who's just spent every last penny on entering this year's championship? Cruise the tunnels in this speedy, vector graphic, flight of fancy.

The Deep is due for release in November at £19.99 and has you trapped deep inside an ageing prison planet. You want to escape but the prison and warders have other plans. There are plenty of puzzles to solve and traps to avoid. A moody graphic adventure.

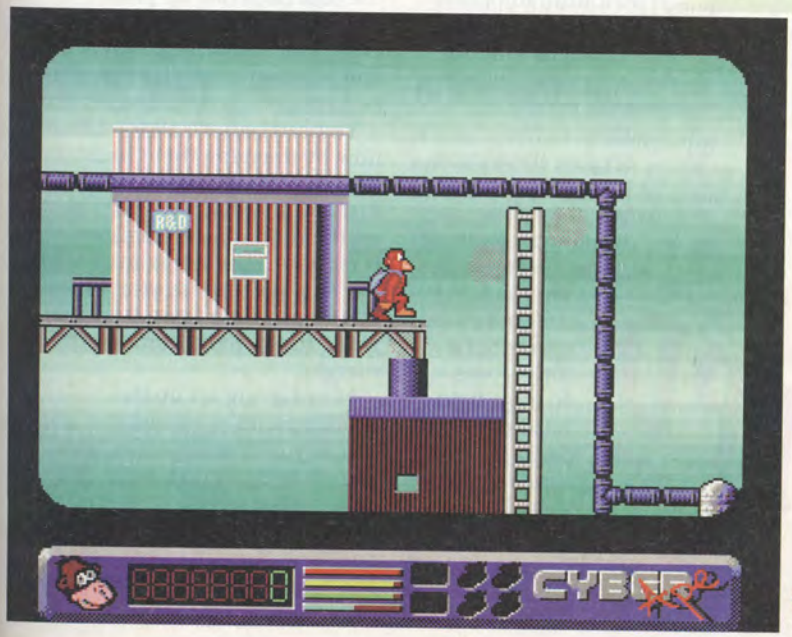
On the control side TBA is bringing out a range of joysticks: The SpeedPad is an eight button, full autofire, pad controller at £14.99; The ProPad has eight buttons, full autofire and a pad controller with index finger buttons for £19.99; for £24.99 there is the LogiPad also with eight buttons and full autofire, a pad controller with index finger buttons and all the breakers are micro-switched; and finally the Phantom is an eight button, full autofire, table-top arcade-quality base controller, with dialable autofire. Both joystick and breakers are fully micro-switched at £29.99. All comply to Acorn requirements and come with driver software.

You'll also be able to see the work-in-progress on a selection of the 1995 releases: Who is Demon South?, The Cobalt Seed, Psychic Yoyo, Psycho Squad and Burning Planet.

Acorn Computing at World '94

As well as the usual special offers and free technical advice, this year's stand will give you a chance to experience the past 12 years of Mike Cook's Body Building projects. We have taken some of the best loved and fun projects and recreated them for you to try out for yourself. It's time for hands on Mike Cook!

Do you remember the Pulse Rate Monitor which takes an infrared reflection from your finger, or the Nine Pins reed switch game from 1988? Then journey back in time in the Body Building Tunnel where you can use light dependent resistors to generate every changing artwork, play at being a sneak thief getting treasure past an infrared beam, view stereoscopic 3D images, sort coins by size and value or explore Chaos theory in a dripping tap.



◆ *Platform cuteness with CyberApe*

DTP in

OKAY, so you've got this great DTP software that all the adverts tell you will do anything you want. You've thumbed through the manual, tried the tutorial and picked up some of the concepts. Now what do you do with it?

Over the next few months we shall be looking at ways of increasing your DTP power, trying out new projects and perhaps putting different angles on familiar themes. Many – but not all – of the examples will use Impression Style, but most of the ideas can be transferred to any DTP package.

By way of introduction, in this first article we shall tackle an everyday item: Headed notepaper. You can use a letterhead to brighten up a page or make it more formal.

You can have it conveniently printed at the top of every letter you prepare on your Archimedes or you can make someone a nice Christmas present by printing out one fair copy and having it printed up by the hundred on good-quality writing paper.

A letterhead is more than purely functional, it makes some kind of statement about the writer – even if the message is merely one of elegant simplicity. First, let's look at the most straightforward kind of letterhead – the plain facts.

Just the facts, ma'am

It might seem a simple matter just to type in your address and telephone number at the top of a page, and if that's as much as you want to do, fair enough. But in reality, even with plain typography, as with all aspects of design where you actually want to create an impression, there are choices to make.

For this form of letterheading they come down to:

- typeface,
- type size, and
- layout.

Let's try to simplify the choices. As in any document, the overriding principle is: *Keep the number of typefaces down*. In this instance it's probably safest to use either the same face as for the rest of the letter, or a variant of it.

Choosing typefaces to match or contrast is a big subject and not to be covered in a few sentences, but here are a few thoughts. At present – at least until my tastes change – I use Oxford, a nice sans serif font, for my letters and Oxford Oblique for the heading.

Because the weights of the two are the same, I make the heading a couple of points larger than the letter text so it stands out a bit. If I was to use a bold heading it could be the same size – or, if very bold, it could even be smaller.

If you feel adventurous you could try, say, a bold sans serif heading with a normal serifed text face – but not, I suggest, the other way round. Or you could use two different serifed faces. You can always quietly discard any combinations that don't work.

What about positioning? You've plenty of choice, though basically the address can go at the left, in the centre or at the right. For these you need only use the Left align, Centre or Right align commands – in Impression you can just press F5, F6 or F7 respectively.

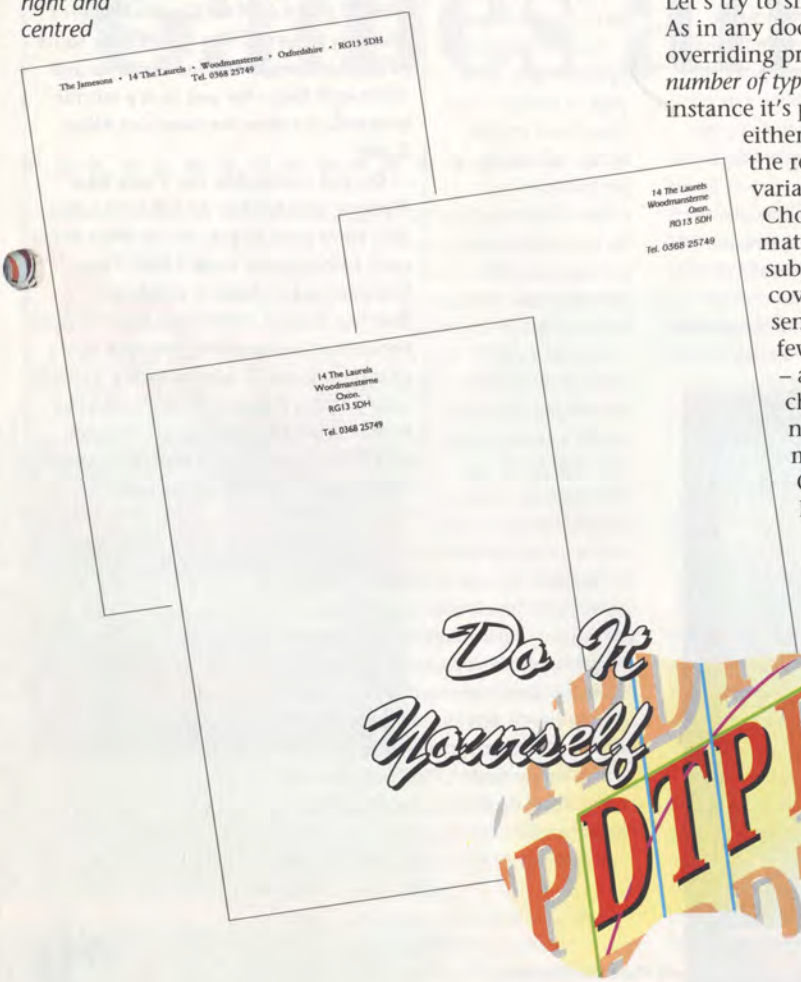
There are also *stepped* formations, where the address lines are successively indented. Even if you don't want this particular layout, it's worth practising because it involves setting up a style containing a ruler.

Open a new document window by clicking on the Impression icon and ensure that the ruler bar is visible – if it isn't, click on *Show ruler bar* in the View=>Tool bars sub-menu. Now, before typing anything, use the *Text font* and *Text size* menu icons in the text bar to set up your heading typeface and size, then click on the lower *text effect/Tabs* radio button to display the margins and tabs.

You can remove all the tabs for now by dragging them back into the tab well, then drag the left and first line margins to 12cm – click on the units icon if necessary until it reads *cm*. Then drag in as many left tabs as there are lines in your address, spacing them 0.5 cm apart going to the right from the left margin.

Now having set up the heading ruler as you want it and before you type anything, you can convert it into a style. Just click on the Define icon, make sure that *Take styles* is ticked and *Define new style* is selected, and type the style name Address

● *A few straightforward designs: All in a line, justified right and centred*



in the space provided. Then click OK.

You can now type in the address, putting one tab at the start of line 2, two tabs at the start of line 3, and so on. This gives the staggered effect. Your telephone number goes underneath after a blank line – how you indent it is up to you.

The advantage of using a style rather than a set of effects is that now, if you want to change the font, size or positioning you can use the Edit Style option and be sure that all – and only – the heading lines will be affected. So even if you're only centring the address it's worth setting up a style.

Lastly we need to prepare for the date so that whenever you load your letterhead all you need do is press Shift+Control+D and launch into the letter. Turn off the Address style and position the cursor where you want the date to go – this will depend on what looks best with your address.

Unless we insert a *placeholder* character here the Address style will reassert itself. Typing Control+R will do. All you now need to do is check that the Normal style is right for your letter text and save the document as LetterHead.

With added illustrations

Plain letterheadings can look very effective, but you may want to add a motif to express your personality, your hobby, your business activities or just to look decorative. You can choose from any sort of graphic – clip art, your own custom-designed Draw file, even a scanned sprite showing a distinctive architectural feature of your house – just put it in a frame of its own.

Depending on your printer, half-tones at small sizes can be hard to see, and a Draw file is often better. You may find it better to make one from a sprite by using line-tracing software.

As for positioning, you can place it at the opposite edge from your address, or spread across the foot of the page, or if the graphic is pale enough you can even superimpose the address. Remember that unless you only (ever) write one-page letters the graphic goes on the first page, not on the master page.

Ornamental

A really fancy letterhead is one that goes all the way round, and this month's disk contains a sample border for you to use – courtesy of Midnight Graphics. You'll need to set up your text frame inside the graphic border frame, and if you want to have the border on all pages you need to put it on the master page.

The typeface I use with this Art Nouveau-style border is elegant enough for both the heading and the text. This may be slightly over the top, of course – it does have a sledgehammer effect – but it can impress people, especially if printed on good-quality paper.

Address frames

If you get tired of addressing envelopes by hand or printing out labels specially, you could consider using window envelopes. All you have to do is measure the position of the window on the envelope and make a frame on page 1 of your letter in the right place at the bottom of the page – or the top, heading permitting – allowing for folding.

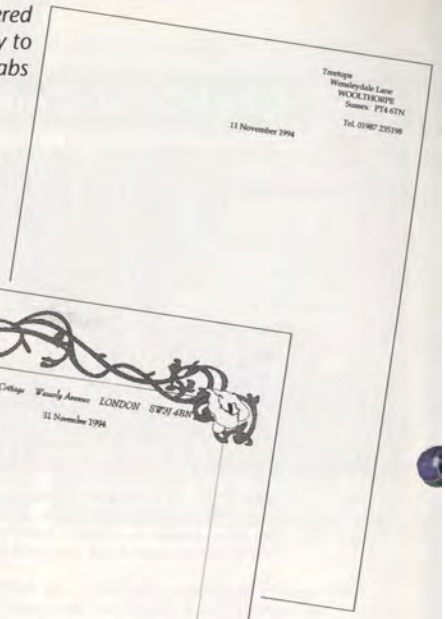
You may need a little trial and error and patience, and an address frame at the bottom will require another full-width frame to repel the text from that part of the page altogether. But it's invaluable for one-off letters, and you can keep a directory of address files in Edit format, ready for dropping into the frame.

For larger mailouts you'll find mailmerge very useful – and we'll come back to that another time.

action

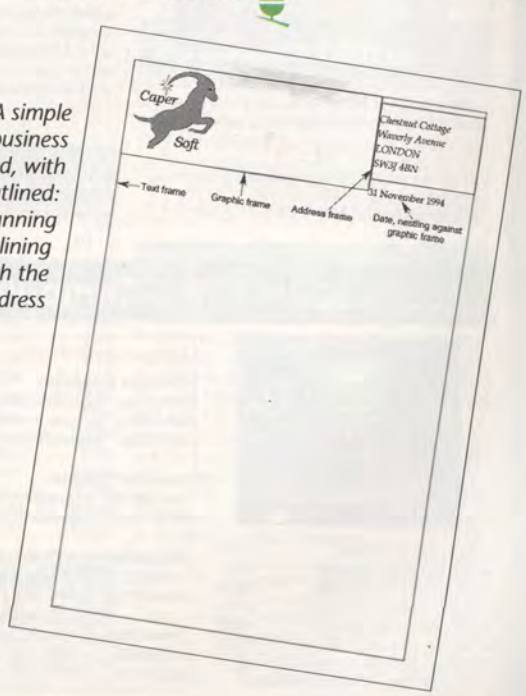
Bruce Goatly starts a new series by looking at letterheads

● *A staggered effect that's easy to achieve with tabs*



● *Somewhat over the top, with period typeface – not for the fainthearted*

● *A simple business letterhead, with frames outlined: note the cunning method of lining the date with the address*



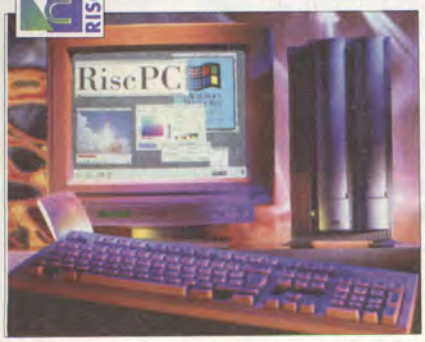
Watford Electronics

Jessa Group of Companies – Established 1972

Mail Order & Showroom: Jessa House, 1 Finway, Dallow Road, Luton LU1 1TR
Tel: 0582 487777 Fax: 0582 488588

Showroom Only: Jessa House, 250 Lower High Street, Watford WD1 2AN
Tel: 0923 237774 Fax: 0923 233642

RiscPC 600 Computer Systems



The RiscPC from Acorn offers all the traditional strengths of RISC processing, and a great deal more, at a remarkably affordable price. Based on a 30MHz ARM610 processor, the RiscPC simply leaves the competition standing.

It is the world's most cost-effective 32-bit RISC computer. The graphics on the RiscPC are astounding - 24-bit colour (2Mb VRAM required) at resolutions up to 1600 x 1200 pixels. The memory capacity starts at 2Mb and can be expanded to a massive 256Mb. A special slot for a 2nd processor is provided, allowing you to add an additional ARM processor or any other processor, so allowing easy low cost access to DOS and Windows based applications.

The standard sound system offers 8 channel stereo sound, which can be upgraded with the optional 16-bit sound card. Networking options include Econet and industry standard Ethernet. There is also a choice of either 14" or 17" monitors.

Specification:
- ARM610CPU running at 30MHz
- 2Mb, 4Mb or 8Mb RAM expandable to 256Mb
- 210Mb or 420Mb IDE Hard Disc Drive
- up to 2Mb VRAM for high resolution graphics
- 8 channel stereo sound
- up to 1600 x 1200 dpi resolution
- 24-bit colour graphics
- 2nd processor slot
- RISC OS 3.5 operating system in ROM
- 2 or 4 32-bit expansion slots (expandable to 8 slots)
- 3.5" 1.6Mb high density floppy disc drive
- 5.25" drive bay for floppy drive or CD ROM drive
- 14" EPA compliant SVGA monitor (AKF60)
- 12 months On-site warranty

RiscPC Upgrade Options

Memory Upgrade Options

ARA0340/U	upgrade from 2Mb to 4Mb RAM	£59.00
ARA0350/U	upgrade from 4Mb to 8Mb RAM	£149.00
ARA0370/U	upgrade from 8Mb to 16Mb RAM	£279.00
ARA0400/U	upgrade from 0Mb to 1Mb VRAM	£109.00
ARA0410/U	upgrade from 1Mb to 2Mb VRAM	£79.00

Hard Disk Upgrade Options

ADA1520/U	upgrade from 210Mb to 420Mb IDE hard drive	£119.00
ADA1530/U	upgrade from 210Mb to 540Mb IDE hard drive	£179.00

Monitor Options

MKA1640/U	upgrade from 14" to 15" Aries 5000 monitor	£99.00
MKA1620/U	upgrade from 14" to 17" Aries 7560 monitor	£299.00
MKA1670/U	upgrade from 14" to 17" Acorn AKF85 monitor	£379.00

Miscellaneous Options

AEA1650/U	upgrade to 486SX33 PC Card	£99.00
APA0250/U	upgrade to dual speed CD ROM drive	£189.00

RiscPC 2M HD210

- 2Mb RAM expandable to 256Mb
- 210Mb IDE Hard Disk Drive
- 2 expansion slots
- 14" EPA compliant SVGA monitor

£1249

RiscPC 5M HD210

- 4Mb RAM expandable to 256Mb
- 210Mb IDE Hard Disk Drive
- 1Mb VRAM for enhanced graphics
- 2 expansion slots
- 14" EPA compliant SVGA monitor

£1399

RiscPC 9M HD420

- 8Mb RAM expandable to 256Mb
- 420Mb IDE Hard Disk Drive
- 1Mb VRAM for enhanced graphics
- 4 expansion slots
- 14" EPA compliant SVGA monitor

£1699

RiscPC 600 CDi Systems

Enter the world of multimedia with the RiscPC CDi system. Gain access to massive amounts of data on CD ROM – study the masses of text, pictures and sound all interacting with each other.

Specification:
- Dual speed CD ROM drive and IDE interface
- Hutchinson Encyclopaedia CD
- Sherlock Holmes CD
- Aries Stereo Speakers
- Acorn Video Collection CD
- Really Useful CDv2

RiscPC 5M CDi System

- 5Mb RAM expandable to 256Mb
- 210Mb IDE Hard Disk Drive
- 14" EPA compliant SVGA monitor
- Dual speed CD ROM drive
- CD bundle as described below

£1599

RiscPC 9M CDi System

- 9Mb RAM expandable to 256Mb
- 420Mb IDE Hard Disk Drive
- 14" EPA compliant SVGA monitor
- Dual speed CD ROM drive
- CD bundle as described below

£1899

RiscPC 600 Publishing Systems

One of the main uses for the Acorn RiscPC is DTP work. Utilising its immense processing power and high quality graphics capabilities, you can produce professional quality documents for a fraction of the cost.

Specification:
- 5M HD210 or 9M HD420 system
- Impression Publisher DTP software
- 14" EPA compliant SVGA monitor (AKF60)
- Artworks image manipulation software

5M Publishing System

- 5Mb RAM expandable to 256Mb
- 210Mb IDE Hard Disk Drive
- Impression Publisher
- Artworks

£1499

9M Publishing System

- 9Mb RAM expandable to 256Mb
- 420Mb IDE Hard Disk Drive
- Impression Publisher
- Artworks

£1799

Acorn 32-bit RISC Computer Systems

- A3010 Action Pack £319
- A3010 Learning Curve £599
- A3020 2M FD System £659
- A3020 2M HD System £799
- A4000 2M HD System £829
- A4 4M HD Notebook £1599

FREE Shoulder Bag with every A3010 or A3020 computer

Upgrade Options

Memory Upgrades

ARA0220	upgrade to 2Mb RAM - A3010	£49.00
ARA0260	upgrade to 4Mb RAM - A3010	£135.00
ARA0230	upgrade to 4Mb RAM - A3020/A4000	£79.00

Monitor Options

MKA0170/U	upgrade to AKF52 monitor	£40.00
MKA1020/U	upgrade to AKF50 monitor	£120.00

Miscellaneous Options

AAA0600	Learning Curve software pack	£39.00
AAA0610	Home Office software pack	£79.00

Hard Disk Upgrade Options

ADA0730	120Mb IDE hard drive - A3010	£199.00
ADA1070	250Mb IDE hard drive - A3010	£249.00

Acorn Pocket Book

The truly personal computer. With built-in word processor, spreadsheet, database, spell checker and scientific calculator, it provides all the basic tools for recording ideas, notes and data.

- Pocket Book 256K Computer £165
- Pocket Book 256K Class Pack £1650

Pocket Book II with 256K £225
Pocket Book II with 512K £275

Pocket Book Accessories

A-Link	£40.00	Plotter Class Pk	£250.00
Parallel Link	£25.00	128K RAM Disc	£49.00
PC Link	£59.00	256K Flash Disc	£59.00
Mac Link	£65.00	512K Flash Disc	£85.00
Schedule	£16.00	OPL Editor	£59.00
Schedule Class Pk	£160.00	Mains Adaptor	£12.00
Plotter	£25.00		

0% Finance

available on all basic RiscPC systems, A4000 systems and A4 Notebooks. Call 0582 745555 for more details.

TO ORDER CALL OUR SALES HOTLINE or FAX YOUR ORDER on 0582 488588

0582 745555

Access VISA AMERICAN EXPRESS

CD-ROM and Multimedia

CD-ROM Software

Artworks	£129
Artworks Clip Art CD	£18
British Birds	£150
Castles	£40
Changing Times	£125
Countries of the World	£40
CD – 4 Disc Set	£149
CD Francais	£120
Creepy Crawlies	£90
Daily Telegraph	£125
Dictionary of Living World	£175
Directions 2000 – French	£140
En Marcha – Spanish	£140
Elements – Science series	£130
Frontier 2000CD	£125
Grooves	£90
Hutchinson Encyclopaedia	£49
Illustrated Holy Bible	£23
Illustrated Shakespeare	£23
Image Warehouse	£53
ITN European Atlas	£149
Interactive French Tutor	£149
Interactive Periodic Table	£99
Inventors & inventions	£150
Materials – Science series	£130
Number Games	£79
Pro Artisan v2	£129
Revelation II	£99
Really Useful CD v2	£47
Sherlock Holmes	£23
Sherston Naughty Stories	£79
Space Encyclopaedia	£57
Times & Sunday Times	£195
Times Newspaper Sampler	£40
Tekkie CD	£99
Understanding the Body	£40

CUMANA

Oscar CD-ROM Drive

Dual speed CD-ROM drive – connects to parallel port on A3010, A3020, A4 and A5000 computers.

- Oscar CD-ROM drive – parallel **£229**

Bravo CD-ROM Drive

Dual speed CD-ROM drive – connects to parallel port or with SLCD interface.

- Bravo CD-ROM drive – parallel **£299**
- Bravo CD-ROM drive – A3000 **£299**
- Bravo CD-ROM drive – A5000 **£299**

Victor CD-ROM Drive

Dual speed SCSI CD-ROM drive, available as a single drive, or dual and quad speed versions with a SCD autochanger. Interface not included.

- Victor 402A CD-ROM drive **£299**
- Victor 632A CD-ROM drive **£399**
- Victor 602 - dual speed 6CD A/C **£499**
- Victor 604 - quad speed 6CD A/C **£969**

Indigo CD-ROM Drive

The ideal CD-ROM drive for the RiscPC. A dual speed unit that connects to the IDE interface (300i series). SCSI version also available.

- Indigo 300i CD-ROM drive–IDE **£199**
- Indigo 300iA CD-ROM drive–IDE **£249**
- Indigo 401 CD-ROM drive–SCSI **£199**
- Indigo 631 CD-ROM drive–SCSI **£299**

Accessories

- 8-bit SCSI Interface – A3000 **£119**
- 16-bit SCSI Interface – A5000 **£119**
- SCSI-2 Interface–A5000/RiscPC **£199**
- SCSI Interface cable **£15**
- SCSI-2 Interface cable **£20**

25MHz ARM3 Turbo Card

Using the latest surface mount technology on a high quality 4 layer PCB, the ARM3 Turbo Card will increase the speed of your A300, A400 or A3000 computer by up to 6 times.

The upgrade can be fitted by the user in A300 and A400 machines, but for owners of the A3000 we can collect, fit and deliver your computer back for an additional £34.

Owners of A300 and old A440 models will require a MEMC1A upgrade to use the ARM3.

Buy ARM3 Turbo Card and RISC OS 3.1 upgrade for £159

Special Offer Price

£89

Hard Disc Drive Upgrades

A3000/A3010 Internal IDE Hard Drives

• ADA0730	120Mb	19ms	£199
• ADA2360	170Mb	11ms	£219
• ADA1070	250Mb	11ms	£249
• ADA2080	340Mb	11ms	£309
• ADA2200	540Mb	10ms	£489

A300/A400 Internal IDE Hard Drives

Complete with interface, drive, cables and mountng brackets

• ADA2010	250Mb	13ms	£199
• ADA0580	340Mb	13ms	£229
• ADA2030	420Mb	12ms	£269
• ADA2210	540Mb	11ms	£329
• ADA2340	1.0Gb	10ms	£649

A5000 Internal IDE Hard Drives

To replace existing hard drive, if required to be additional drive, 2nd drive kit will be needed.

• ADA2050	250Mb	13ms	£159
• ADA0880	340Mb	13ms	£189
• ADA2000	420Mb	12ms	£219
• ADA2220	540Mb	11ms	£279

A300/A400 IDE Hard Drives

• ADA0680	120Mb	19ms	£209
• ADA1090	250Mb	11ms	£259
• ADA2000	340Mb	11ms	£319
• ADA2230	540Mb	10ms	£499

A300/A400 SCSI Hard Drives

Complete with 16-bit interface, drive, cables and mountng brackets

• ADA2300	365Mb	12ms	£340
• ADA2310	540Mb	11ms	£429
• ADA2320	1.0Gb	9ms	£579
• ADA2330	2.0Gb	10ms	£1069

Cables & Accessories

- A5000 2nd Drive Kit **£10**
- 16-bit IDE Interface - A300/A400 **£39**
- 8-bit IDE Interface - A3000 **£49**
- SCSI Interface - A300/A400 **£119**
- SCSI-2 Interface - A300/A400 **£199**
- 25w - 50w SCSI Cable **£10**
- 50w - 50w SCSI Cable **£16**
- 50w - 50w SCSI-2 Cable **£20**

Aries Multiscan Monitors

For the ultimate in high definition, flicker-free monitors displaying the sharpest text and graphics look no further than the new Aries range of monitors.

They're safe, easy to use and set up and excellent value for money. All models are low radiation and conform to the Swedish MPR II standard.

The 15" and 17" models are also EPA compliant, ideal for use with RiscPC which supports this type of monitor.

All monitors are supplied with connection cable with 15pin VGA connector. If they are to be used with an older Archimedes, a SVGA VIDC Enhancer and 9pin to 15pin adaptor will be required.

14" A-Scan Pro LR

- 14" non glare tube, 0.20mm dot pitch
- 1024 x 768 resolution @ 60Hz
- 29KHz to 70KHz horizontal frequency
- Microprocessor controls
- Low radiation MPR II standard

£199

15" EnergyPro 6000i

- 15" FST tube 0.20mm dot pitch
- 1280 x 1024 resolution @ 60Hz
- 29KHz to 70KHz horizontal frequency
- Digital controls with LCD display
- Low radiation MPR II standard

£259

17" EnergyPro 7560i

- 15" FST tube 0.20mm dot pitch
- 1280 x 1024 resolution @ 60Hz
- 29KHz to 70KHz horizontal frequency
- Digital controls with LCD display
- Low radiation MPR II standard

£499

Scan256 Scanner

Scan256 gives you up to 256 grey levels at a maximum resolution of 400dpi and is supplied with state-of-the-art software. This makes it the only sensible scanning and image processing solution for Acorn 32-bit machines.

The highly advanced software supplied with the scanner offers you many different image processing options, such as dithering, image enhancement, edge detection, brightness and contrast controls, plus many more.

Features include:

- Multiple copies of an image in memory at once
- Advanced image processing tools
- Convolution digital filtering with over 100 filters
- Adjustable scale & size during scan
- Save images in industry standard formats
- True brightness, contrast and gamma controls
- 105mm scanning width
- Ability to rotate and shear the image

- Scan256 for A300/A400/A5000 **£129**
- Scan256 for A3000 external **£139**

Archi A4 Scanner

The 216mm scanning width can cope with both desktop scanning of single sheets, photographs, etc, with its detachable sheet feeder, or used as an A4 wide hand scanner. 64 grey levels are produced from the scanner at resolutions up to 400dpi.

- A4 Scanner for A300/A400 **£199**
- A4 Scanner for A3000 **£229**
- Sheet Feeder for A4 Scanner **£69**

Upgrade to Archi A4 Scanner

For existing users of the Archi MK2 hand scanner we can offer you an upgrade to the A4 Scanner for only **£129**

Fax/Modem Bundle

Now you can use your Archimedes computer as a fax machine. Prepare a fax, send it using the ArcFax software. Receiving a fax is simple - display on the screen or print out on any RISC OS printer.

- Fax/Modem with ArcFax software **£149**

Memory Upgrades

- A3000 to 2Mb RAM upgrade **£49**
- A3000 to 4Mb RAM upgrade **£119**
- A3000 to 8Mb RAM upgrade** **£259**
- A3010 to 2Mb RAM upgrade **£59**
- A3010 to 4Mb RAM upgrade **£139**
- A3020/A4000 to 4Mb RAM upgrade **£89**
- A410/1 to 2Mb RAM upgrade **£35**
- A410/1 to 4Mb RAM upgrade **£70**
- A420/1 to 4Mb RAM upgrade **£105**
- A540 additional 4Mb RAM upgrade **£249**
- A5000 to 4Mb RAM upgrade **£79**
- A5000 4Mb to 8Mb RAM upgrade **£259**
- RiscPC additional 2Mb RAM **£85**
- RiscPC additional 4Mb RAM **£139**
- RiscPC additional 8Mb RAM **£279**
- RiscPC additional 16Mb RAM **£499**
- RiscPC additional 32Mb RAM **£999**

** Dealer fit only

RISC OS Upgrades

- RISC OS 3.1 Single User upgrade **£73**
- RISC OS 3.1 Bulk Software upgrade **£319**
- RISC OS 3.1 Hardware upgrade **£21**

Graphics Cards

- Colour Card Gold **£239**
- Chroma 500 Genlock card **£419**
- Chroma 150 PAL Encoder **£169**
- Chroma Genlock card **£209**
- Hawk V9 MKII Digitiser **£189**
- Eagle M2 Multimedia card **£319**
- Vision Colour Digitiser **£99**
- HiVision Colour Digitiser **£149**
- Scanlight Video 256 **£199**
- Vision24 Colour Video Digitiser **£99**
- Multiscan VIDC Enhancer **£15**
- SuperVGA VIDC Enhancer **£29**

We stock a full range of add-ons and expansion cards from HCCS, Computer Concepts, Wild Vision, Cumana, Aleph One, IFEL, Lingenuity and Acorn. If there is a product you can't see here, it doesn't mean we don't stock it.

Call 01582 745555 for price and availability

ArcScan Flatbed Scanners

The ArcScan range of professional flatbed scanners for the Acorn 32-bit RISC machines and the RiscPC, are incredible value for money. Whatever your budget, there is a model for you. There are 3 models in the range, from a 256 grey scale scanner through to a 24bit high speed scanner.

All models use the new industry standard SCSI-2 interface*, which allows you to scan a full A4 page in just 15 seconds (mono) and in a few minutes (24-bit colour).

The scanners are ideal for anyone in the publishing field, requiring to import scanned images easily into their documents.

The scanners are amazingly fast. Using the industry standard TWAIN drivers and state of the art SCSI-2 interface technology, the ArcScan is probably the most powerful, yet easy to use scanner available.

All scanners are supplied complete with ImageMaster scanning software and Sleuth OCR software. An optional SCSI-2 interface is available to give the best performance. Also available are a 50-sheet auto document feeder and a transparency adaptor.

Special prices available to Schools, Colleges and other Educational establishments.

Aries

Accessories

- SCSI-2 Interface & Cable £166
- 50 sheet Document Feeder £259
- Transparency Adaptor £295

FREE Software

All models come complete with two software packages –

ImageMaster
Image capture and graphics enhancement software.

Sleuth OCR
Software for turning scanned text into an editable format.

(4Mb RAM required to use scanner)

ArcScan 3420

- 256 grey scale scanner
- 300 x 600 dpi optical resolution
- 1200 x 1200 dpi max resolution
- 216 x 356 mm scanning area
- single pass scanning process

£499

ArcScan 3520

- 24-bit colour scanner
- 300 x 600 dpi optical resolution
- 1200 x 1200 dpi max resolution
- 216 x 356 mm scanning area
- single pass scanning process

£549

ArcScan 2412

- 24-bit colour scanner
- 300 x 600 dpi optical resolution
- 2400 x 2400 dpi max resolution
- 216 x 356 mm scanning area
- single pass scanning process

£699

Modems

PACE MODEMS
- Microlin FX Fax Modem £112
- Microlin FX32 Fax Modem £169
- Linnet Quad FX Fax Modem £117
- Ultralink 32+ V32bis Modem £349

DATAFLEX MODEMS
- GEM Fax Modem £75
- SuperGEM Fax Modem £149
- Rapier Plus Fax Modem £379

US ROBOTICS MODEMS
- Sportster 14.4 Fax Modem £119
- Worldport 14.4 Fax Modem £174

- ArcFax 1.10 fax software £35
- Archimedes serial cable – 300/400 £9
- A5000/RiscPC serial cable £7

BBC Products

- AMX Super Art (ROM/Disc) £10
- AMX Stop Press (ROM/Disc) £10
- AMX Page Fonts for Stop Press £5
- AMX Mouse & FREE mouse mat £15
- Quest Paint software (ROM/Disc) £15
- ConQuest ROM £12
- Quest Fonts Disc £5
- Quest Integrex 132 printer driver £5
- Quest Tracerball - BBC B/M128 £20
- Quest Mouse Mat £3
- InterWord ROM £36
- InterSheet ROM £36
- InterChart ROM £25
- Logotron Logo ROM £40
- Mega3 ROM - Word/Sheet/Chart £69
- Numerator ROM £39
- Pendown ROM £32
- SpellMaster ROM £40
- Wapping Editor £29
- Wapping Art Disc £10
- Wapping Font Disc 1 £10
- Wapping Font Disc 2 £10
- View Printer Driver ROM £15
- View 3.0 ROM £45
- ViewSheet ROM £36
- ViewStore ROM £36
- ViewSpell ROM £28
- Master 512 Co-processor £49
- Master 65C 102 Co-processor £39
- 32K ROM/RAM Card - BBC B £29
- 64K ROM/RAM Card - BBC B £39
- 128K ROM/RAM Card - BBC B £59
- 32K Shadow RAM Card - BBC B £29
- 16K Static RAM for ROM/RAM Card £8
- 16K DRAM upgrade for ROM/RAM £7
- Battery backup for ROM/RAM Card £3
- Sideways RAM Utilities Disc £5
- Twin ROM Cartridge for Master 128 £6
- Quad ROM Cartridge for Master 128 £12
- Data Duck £10
- Power Duck £5
- Acorn 1772 DFS Kit - BBC B £47
- Acorn ADFS ROM Upgrade £25
- Watford 1772 DDFS Kit - BBC B £29
- BBC BASIC 2 ROM £15

Monitors

ACORN MONITORS
- AKF30 14" RGB Colour Monitor £179
- AKF40 14" RGB Colour Monitor £179
- AKF52 14" Multiscan Monitor £249
- AKF50 14" Hi Res Multiscan Monitor £299
- AKF60 14" ES SVGA Monitor £319
- AKF85 17" PS SVGA Monitor £969

TAXAN MONITORS
- Taxan EV400LR - 14" SVGA Monitor £208
- Taxan 787LR - 14" SVGA Monitor £209
- Taxan 580LR - 15" SVGA Monitor £339
- Taxan 885LR - 17" SVGA Monitor £719
- Taxan 865LR - 17" SVGA Monitor £599

PANASONIC MONITORS
- Panasync T1537 - 15" SVGA Monitor £359
- Panasync 1732 - 17" SVGA Monitor £589

CONNECTING CABLES
- Arc to AKF30/AKF40 Monitor lead £7
- Arc to VGA Monitor Adaptor £9
- 15-pin - 15-pin VGA Lead £12
- 15-pin VGA Extension Lead £12

Add-On Cards

I/O EXPANSION CARDS
- A3000 User Port/MIDI card (AKA12) £44
- A3000 User/Analogue/IIC card £35
- I/O Podule - Analogue/User/1MHz £79
- Archimedes Analogue/User I/O card £49

ULTIMATE EXPANSION SYSTEM
- Ultimate Expansion Interface £39
- Ultimate Expansion with IDE Interface £99
- Ultimate SCSI uPodule £69
- Ultimate Vision Digitiser uPodule £69
- Ultimate MIDI uPodule £49
- Ultimate Analogue uPodule £29
- Ultimate ScanLight 256 uPodule £229

DISC CONTROLLER CARDS
- ST506 Hard Disc Interface £59
- 16-bit IDE Interface - A300/A400 £39
- 8-bit IDE Interface - A3000/A3010 £49
- 16-bit SCSI Interface £119
- SCSI-2 Interface £189
- External Floppy Disc Interface £10

MISCELLANEOUS ADD-ONS
- 4-way Backplane - A300 series £22
- Fan for Backplane £8
- A3000 Serial Port Upgrade (AKA18) £19
- Arc to BBC Serial Transfer Link £15
- MEMC1A upgrade £29
- Floating Point Accelerator - A5000 £99
- MIDI Expansion Card (AKA16) £65
- Laser Direct Hi-Res 4ppm Printer £799
- ArcLaser A4-1200 Printer £985
- Scanlight 256 - A3000 internal £199

UNIVERSAL 2010 CONCEPT KEYBOARD
- 2010 A3 Concept Keyboard £107
- BBC User Port Cable £12
- Archimedes Serial Port Cable £12

Networking

ACORN ECONET PRODUCTS
- Econet Interface - all models £49
- Ethernet Interface III - A5000 £149
- Ethernet Interface - RiscPC £99

Acorn Access Peer to Peer Networking
- Acorn Access - A3000 £145
- Acorn Access - A3020 £145
- Acorn Access - A5000 £145
- Acorn Access - RiscPC £119

I-CUBED ETHERNET PRODUCTS
- Accord P/P Networking - A3000 £145
- Accord P/P Networking - A3020 £149
- Accord P/P Networking - A5000 £145
- EtherLAN Card - A3000 (BNC) £131
- EtherLAN Card - A3020 (BNC) £143
- EtherLAN Card - A5000 (BNC) £131
- EtherLAN Card - A3000 (B/TP) £131
- EtherLAN Card - A3020 (B/TP) £148
- EtherLAN Card - A5000 (B/TP) £131
- EtherLAN Card - RiscPC (B/TP) £113

ETHERNET HUBS
- 8 port UTP Ethernet Hub £179
- 12 port UTP Ethernet Hub £259
- 16 port UTP Ethernet Hub £329

ETHERNET CABLING

Cable length	*Thin*	*UTP*
3m	£5	£3
5m	£6	£5
10m	£9	£8
15m	£12	£10
20m	£17	£14

NETWORKING SOFTWARE
- AUN/Level 4 Fileserver Rel.3 £359
- TCP/IP Protocol Suite - s/user £99
- TCP/IP Protocol Suite - site licence £399

Archi Spares

- Archimedes keyboard (cased) £99
- A4000 Keyboard (cased) £79
- Replacement keyboard - A3000/A3010 £29
- Keyboard Controller PCB - MK2 Kbd £49
- A300/A400 Power Supply Unit £59
- A3000 Power Supply Unit £35
- A4000 Power Supply Unit £59
- A5000 Power Supply Unit £69
- 3.5" FDD for A3000/A4000 £39
- 3.5" FDD for A3010/A4000/A5000 £39
- VIDC Video Controller (VL86C310) £39
- IOC I/O Controller (VL86C410) £39
- MEMC1A (VL86C110) £25
- ARM2 8MHz CPU (VL86C010) £29
- 256K x 4 120ns ZIP DRAM £6
- Replacement Keyboard Cable £17
- Replacement Mouse Cable (state type) £12
- Replacement Mouse Ball £5
- 1.2v NiCad Battery - A3000/A5000 £4
- AA Batteries - A300/A400 (pair) £2
- Fan Filter £2
- Eject Button - A3010/A3020 FDD £3
- Loudspeaker £2

BBC Spares

BBC B SPARES
- BBC B Power Supply £49
- BBC Keyboard £35
- Keyswitches £1
- Functon Keystrip Holder £3
- Serial/Video ULAs £10
- 6502A CPU £5
- 6512A VIA £5
- 6845 CRTC £10
- 6850 ACIA £8

MASTER 128 SPARES
- Master 128 Keyboard £62
- Master 128 Battery Pack £4
- Master 128 Power Supply £69
- Master ULAs £15
- 1772 Disc Controller £10
- 6818 Real Time Clock £12
- Loudspeaker £3
- 65SC12 CPU £12

Accessories

DUSTCOVERS & CARRY CASES
- A3000 Keyboard Dustcover £5
- A3000 Micro & Monitor Dustcover £9
- A300/A400 Dustcover £9
- A5000 Combined Dustcover £9
- 14" Monitor Dustcover £6
- A3000 Shoulder Bag £10
- A4 Notebook Carry Case £35

MICE & JOYSTICKS
- Mk4 Archimedes Mouse £24
- Acorn Logitech Mouse £29
- Voltmace DeltaCat Joystick £25
- Quest Tracerball £20

MISCELLANEOUS ACCESSORIES
- Battery Pack for A4 Notebook £49
- A3000 Monitor Stand £15
- A3000 External Podule Case £10
- Archimedes Keyboard Extension Lead £5
- Archimedes Mouse Port Splitter £5

PC Cards

Transform your Archimedes so you can run standard PC MS-DOS software and even Windows 3.1. Available as a bare card with either 486SLC25 or 486SLC2-50 (no memory) or with 4Mb RAM fitted. Prices do not include DOS or Windows, which we can supply for an extra £99, at time of purchase only.

- 486 25MHz 0Mb RAM £369
- 486 25MHz 4Mb RAM £529
- 486 50MHz 0Mb RAM £449
- 486 50MHz 4mb RAM £609
- 4Mb SIMM RAM Module £149
- 8Mb SIMM RAM Module £299
- 16Mb SIMM RAM Module £499
- 486SX33 Card for RiscPC £199
- MS DOS 6.2/Windows 3.1 £99

Printers & Accessories

Laser Printers

All Laser printers (excluding Hewlett Packard) include 12 Months On-Site maintenance

• Brother HL630	6ppm	£422
• Brother HL-6V	6ppm	£456
• Canon LBP 4i	4ppm	£477
• Canon LBP-8 IV	8ppm	£920
• Canon LBP-8 IIIR	8ppm	£1559
• Epson EPL-3000	4ppm	£422
• Epson EPL-5200	6ppm	£476
• Epson EPL-5600	6ppm	£660
• Epson EPL-7500 PS	6ppm	£1135
• Fujitsu VM600	6ppm	£529
• Fujitsu VM4	4ppm	£499
• HP Laserjet 4L	4ppm	£459
• HP Laserjet 4 ML	4ppm	£739
• HP Laserjet 4P	4ppm	£595
• HP Laserjet 4MP	4ppm	£856
• HP Laserjet 4+	12ppm	£946
• HP Laserjet 4M+	12ppm	£1268
• HP Laserjet 4Si	16ppm	£2099
• HP Laserjet 4Si MX	16ppm	£2999
• NEC SuperScript 610	6ppm	£275
• OKI OL-400ex	4ppm	£316
• OKI OL-410ex	4ppm	£449
• OKI OL- 850 PS	8ppm	£770
• Panasonic KX-P4400P	4ppm	£335
• Panasonic KX-P4401P	4ppm	£369
• Panasonic KX-P4410*	5ppm	£329
• Panasonic KX-P4430*	5ppm	£485
• Panasonic KX-P4440*	10ppm	£768
• Panasonic KX-P5400	4ppm	£599
• Star LS-5 TT	5ppm	£528
• Star WinType 4000	4ppm	£299

*2 years on-site warranty

Laser RAM Upgrades

Type	1M	2M	4M	8M
• Canon LBP-4+	£139	–	–	–
• Canon LBP-4i	£109	–	£279	–
• Canon LBP-8 IV	£119	–	£299	–
• EPL-4100/4300	£70	£110	£205	–
• EPL-5200/5800	£58	£115	£215	–
• Fujitsu VM600/VM4	£57	£85	£149	£299
• Fujitsu VM800	£115	–	–	–
• HP III/IIIP/IIID	£75	£115	£135	–
• HP II/IID	£75	£115	£135	–
• HP IIISi	£57	£85	£158	£299
• HP 4/4M/4P/4MP	£85	£85	£149	£299
• HP 4L/4ML	£75	–	–	–
• KX-P4410/4430	£129	£199	–	–
• KX-P4420/4450i	£75	£115	£135	–
• KX-P4400/5400	£89	£139	£229	–
• OKI OL400e	£99	£118	–	–
• Star LP-8	£138	£225	–	–
• Star LS-5	£75	–	–	–

Laser Consumables

Type	Toner	Drum	Dev
• Canon/Star 4s	£48	–	–
• Canon LBP-8 IV	£70	–	–
• Canon LBP-8 III	£52	–	–
• EPL-4100/4300	£75	£89	–
• EPL-5200	£85	–	–
• EPL-7100/7500/8100	£117	–	–
• Fujitsu VM600	£85	–	–
• Fujitsu VM800	£115	–	–
• Fujitsu VM4	£29	£149	£89
• HP II/III/IIID	£52	–	–
• HP IIP/IIIP	£46	–	–
• HP IIISi/4Si	£85	–	–
• HP 4/4M/4P/4MP	£72	–	–
• HP 4L/4ML	£49	–	–
• NEC 610	£85	–	–
• NEC S80/S62P	£105	–	–
• OKI OL-400/800	£19	£189	–
• OKI OL-400e	£17	£129	–
• KX-P4410/30	£29	£80	£90
• KX-P4440	£32	£108	£115
• KX-P4420	£24	£60	£55
• KX-P4450/50I/51/55	£18	£75	£60
• KX-P4400/5400	£32	£69	–
• Qume Crystalprint	£99	£189	–
• Star LS-5	£83	–	–

Laser Accessories

• JetPage Postscript Cartridge - IIP/IIIP	£225
• Postscript Upgrade for LaserJet 4	£270
• LaserJet 4 Lower Paper Cassette	£205
• LaserJet 4 JetDirect Ethernet Card	£339
• LaserJet IIIP Lower Paper Cassette	£115
• Ozone filter for KX-P4420	£9
• Ozone filter for KX-P4450/4455	£20
• LaserJet 4Si Duplex Unit	£475
• Envelope Feeder for LaserJet 4	£199
• LaserJet Font Cartridges	from £45
• LaserJet III FX/IBM Emulation Cart.	£79
• Lower Paper Tray for Canon LBP-4	£98
• A5 Paper Feeder for LaserJet 4P	£85
• Postscript Upgrade for LaserJet 4P	£225

9pin Matrix Printers

• Citizen Swift 90	80col	£114
• Citizen Swift 90C	80col	£121
• Citizen 1200+ Parallel	80col	£90
• Citizen 120D+ Serial	80col	£102
• Epson LX100	80col	£109
• Epson LX300	80col	£90
• Epson LX400	80col	£89
• Epson LX1050	132col	£172
• Epson FX870	80col	£222
• Epson FX1170	132col	£282
• Epson DFX5000C	132col	£1095
• Pansonic KX-P1150	80col	£89
• Panasonic KX-P1695	132col	£270
• Star LC15	132col	£177
• Star LC100C	80col	£89
• Star ZA200	80col	£255
• Star ZA250	132col	£315

24pin Matrix Printers

• Citizen ABC Mono	80col	£109
• Citizen ABC Colour	80col	£126
• Citizen Swift 200 Mono	80col	£138
• Citizen Swift 200 Colour	80col	£146
• Citizen Swift 240 Mono	80col	£160
• Citizen Swift 240 Colour	80col	£178
• Citizen Swift 24X	132col	£235
• Epson LQ100	80col	£98
• Epson LQ150 Colour	80col	£154
• Epson LQ570+	80col	£185
• Epson LQ870	80col	£353
• Epson LQ1070	132col	£283
• Epson LQ1170+	132col	£402
• Epson LQ2550+	132col	£678
• Epson DLQ3000		£672
• NEC P20	80col	£110
• NEC P30	132col	£236
• NEC P32Q	132col	£238
• NEC P62Q	80col	£315
• NEC P72	132col	£377
• NEC P90	132col	£549
• Panasonic KX-P2023	80col	£109
• Panasonic KX-P2123C	80col	£152
• Panasonic KX-P2124	80col	£206
• Panasonic KX-P1624	132col	£210
• Panasonic KX-P2624	132col	£253
• Panasonic KX-P2135	80col	£122
• Star LC24-20 II	80col	£113
• Star LC24-15 II	132col	£235
• Star LC24-30C	80col	£148
• Star LC24-100	80col	£95
• Star LC24-300C	80col	£178
• Star XB24-200C	80col	£315
• Star XB24-250C	132col	£385

Ribbons/Ink Cartridges

(Manufacturers Original Ribbons Only)

Type	Black	Colour
• Canon BJ10ex/BJ10sx	£14	–
• Canon BJ200/BJ230	£16	–
• Canon BJ300/BJ330	£11	–
• Canon BJC600	£6	£7
• Canon BJC800	£16	£22
• Citizen 120D+	£4	–
• Citizen Swift 200/240	£4	£13
• Citizen Swift 24X	£8	£18
• Epson LX400/LX850/FX870	£4	–
• Epson LX100	£4	–
• Epson LX1050/FX1170	£5	–
• Epson LQ100	£4	–
• Epson LQ150	£4	£12
• Epson LQ570/870	£5	–
• Epson LQ1070/1170	£8	–
• Epson LQ2550	£8	£16
• Epson SQ870/SQ1170	£21	–
• Epson Stylus Colour	£–	£29
• Epson Stylus 300	£12	–
• Epson Stylus 800/1000	£10	–
• Fujitsu DL1150/DL1250	£5	£7
• Fujitsu DL3600	£6	£12
• Fujitsu B100/B200	£14	–
• HP DeskJet Std Capacity	£–	£21
• HP DeskJet High Capacity	£20	–
• HP DeskJet 310	£15	£21
• HP DeskJet 1200	£20	£21
• HP PaintJet	£16	£18
• HP PaintJet XL300	£16	£18
• Kaga/Taxan KP810/815	£5	–
• NEC P88Q/P32Q	£8	–
• NEC P82/72/90	£8	£14
• Panasonic 1150/1170/1180	£7	–
• Panasonic 2180/2123/2124	£7	£15
• Panasonic 1824/2824	£8	–
• Star LC10/LC20/LC100	£5	£9
• Star LC100/200	£5	£11
• Star LC24-20/24-100/24-200	£5	£12
• Star LC24-30	£8	£12
• Star XB24/ZA200/ZA250	£5	£12
• Star SJ48	£15	–
• Star SJ144 Thermal	£18	£18

Inkjet Printers

• Canon BJ10sx	80col	£137
• Canon BJ200	80col	£178
• Canon BJ230	132col	£237
• Canon BJ300	80col	£319
• Canon BJ330	132col	£368
• Canon BJC600	80col	£330
• Canon BJC800	132col	£1069
• Canon BJC820 (Mac)	132col	£1228
• Canon BJ4000C		£POA
• Citizen ProJet II	80col	£299
• Epson Stylus 300	80col	£138
• Epson Stylus 400	80col	£133
• Epson Stylus 800+	80col	£172
• Epson Stylus 1000	132col	£339
• Epson Stylus Colour	80col	£399
• Epson SQ870	80col	£415
• Epson SQ1170	132col	£580
• Fujitsu B100	80col	£145
• HP DeskJet 520	80col	£199
• HP DeskJet 500C	80col	£215
• HP DeskJet 560C	80col	£339
• HP DeskJet 310	80col	£165
• HP DeskJet 310 & CSF	80col	£204
• HP DeskJet 1200C	80col	£949
• HP DeskJet 1200C PS	80col	£1299
• HP PaintJet XL300+	132col	£1616
• HP PaintJet XL300 PS	132col	£2575
• HP DeskWriter 520 (Mac)	80col	£189
• HP DeskWriter 500C (Mac)	80col	£260
• HP DeskWriter 580C (Mac)	80col	£375
• Star SJ48	80col	£182
• Star SJ144	80col	£285

Sheet Feeders

• Canon BJ10ex/BJ10sx	£40
• Canon BJ300	£88
• Canon BJ330	£92
• Citizen Swift 24/200/240	£75
• Epson LX400	£69
• Epson LQ570/LQ870	£47
• Epson LQ1070/LQ1170	£89
• HP DeskJet 310	£48
• NEC P20/P220	£59
• NEC P3Q/P32Q	£85
• Panasonic 1170/1180/1123	£59
• Panasonic 1124/1124i/2124	£79
• Panasonic 1824/2824	£128
• Star LC100	£69
• Star LC24-20	£69
• Star LC200/LC24-200	£69

INKJET REFILL PACKS

• Canon BJ10ex/BJ10sx - 2 pack	£12
• Canon BJ10ex/BJ10sx - 5 pack	£24
• Canon BJ10ex - Cart/3 Refills	£29
• Canon BJ200 - Cart/3 Refills	£34
• HP DeskJet Std Capacity - 2 pack	£8
• HP DeskJet Hi-Capacity - 2 pack	£24
• HP DeskJet Std Capacity - 5 pack	£14
• HP DeskJet Hi-Capacity - 5 pack	£35
• HP DeskJet Colour - Cart/4 Refills	£49

Accessories

• Citizen Swift 200/240/ABC Colour Kit	£32
• Citizen Projet II Cartridge	£3
• Canon BJ10sx Battery Pack	£32
• Epson 0K Serial Interface	£29
• Epson 8K Serial Interface	£75
• Epson 32K Serial Interface	£95
• Epson LQ100 Tractor Unit	£29
• HP DeskJet FX Emulation Cartridge	£49
• HP DeskJet IBM Emulation Cartridge	£57
• HP DeskJet 256K RAM Cartridge	£45
• HP Deskjet 310 Black Cartridge	£14
• HP DeskJet 310 Battery Pack	£33
• HP DeskJet Carry Case	£49
• HP DeskJet 310 Colour Kit	£28
• HP DeskJet 1200 Postscript Upgrade	£499
• HP DeskJet Prestige Elite Fonts	£55
• HP DeskJet Letter Gothic Fonts	£56
• HP DeskJet 310 Parallel Cable	£12
• Panasonic Serial Interface	£49
• Panasonic 32K Buffer	£16
• Panasonic 2180/2123 Colour Kit	£30
• Star 8K Serial Interface - LC range	£52
• Star 8K Serial Interface - XB range	£39
• Star 32K Buffer - LC24/XB24	£52
• Dustcovers for 80col printers	£6
• Dustcovers for 132col printers	£9
• 51636G - 50 x DJ500 Transparencies	£35
• 51838J - 50 x DJ500 Glossy A4 Paper	£35
• 51630Z - 50 x DJ500 A4 Paper	£15
• Appletalk Printer Cable - 2m	£12
• Appletalk Interface for DeskJet 1200	£129
• Appletalk Interface for LaserJet III	£189

HP On-site Warranty

• Mono DeskJets & Deskwriters	£40
• Colour DeskJets & Deskwriters	£85
• 4ppm LaserJets & DeskJet 1200C	£100
• 8ppm LaserJets	£185

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• 3 to 1	£11	£12
• 4 to 1	£15	£16
• 5 to 1	£27	£28

Professional Sharers

Connects	Serial	Parallel
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• 3 to 1	£15	£17
• 4 to 1	£24	£26
• 5 to 1	–	£38

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Connects	Serial	Parallel
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Connects	Serial	Parallel
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• 4 to 1	£44	£45
• 8 to 1	£62	£75

Bi-Directional

Connects	Serial	Parallel
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256K RAM module for above £59

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Parallel Auto sharers with 256K RAM

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• Serial/Parallel Converter – 256K Buffer	£40
• IEEE-488/Centronics Converter	£49

Buffers

	256K	1Mb	2Mb
Flash Buffer	£65	£98	£119
Fast Flash Buffer	£85	£125	£158
Plotter Buffer	£155	£184	£330

Printer Leads

	2m	5m	10m
• PC Parallel	£4	£8	£13
• 25 'D' Male/Male	£4	£8	£13
• 25 'D' Male/Female	£5	£9	£14
• Centronics D/Ended	£8	£10	£15
• BBC Parallel	£6	–	–

Other standard cables available on request

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• 500sht A4 80g Laser/Copier paper	£2.50
• 500sht A4 80g Coloured paper	£3.50
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• 1000sht 9.5" x 11" Fanfold paper	£5.50
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• 1000 102mm x 36mm Twin Row	£4.70
• 2400 70mm x 37mm Laser Labels	£15.25

Miscellaneous

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• 132 column Professional printer stand	£27
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Impression Publisher

Impression Publisher £122
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Impression Publisher £122
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ACCESS VISA AMERICAN EXPRESS

Notes on the superhighway

Rob Miller wears the comms hat this month, with a musical tilt

ONE of the biggest growing areas in the computer world is communications or comms, for short. The information superhighway is, supposedly, upon us now, and access to all facts and figures is but a phone call away. Well, that's how the theory goes anyway.

Access is not just for those interested in comms for comms sake, not just for those with a tekkie leaning. If you are first and foremost a musician, or a computer bod with a musical bent, get on-line and connect to the largest database of resources there has ever been.

Logging on

Once you've got all the necessary hardware and software, you can start to log on. There are quite a large number of Bulletin Boards dedicated to users of Acorn machines, but perhaps the two most popular are Arcade, based in London, and World of Cryton run by The Serial Port's Hugo Feinnes – who, incidentally, wrote ArcTerm7.

Arcade contains all sorts of interesting features such as mail upload/download as well as a huge area of files and programs that can be downloaded. Music and music-related subjects are very popular and there are special areas on Arcade dedicated to things such as Tracker and Maestro files. The discussion areas often contain musical subjects such as record reviews, as well as more computer-specific items like Midi.

Sound Tracker files are very popular and plentiful because they are a common format used on different computers such as Atari STs and Commodore Amigas. Native Archimedes format files such as Digital Symphony and Maestro are also common and there are plenty to choose from as long as you've got the disk space to store them – as well as the money to spend on the phone bill.

The World of Cryton has a similar collection of mail and discussion areas, as well as large numbers of downloadable files related to music. Because message files are *shared* between different bulletin boards, you'll quite often come across similar messages on different systems. It's worth, therefore, checking on Bulletin Boards on an alternate basis, rather than at the same time.

There are plenty more Bulletin boards dedicated to Acorn machines, but some of the other non-Acorn boards are often worth a look. Finally, there are a few music-only Bulletin boards that cater for professional musicians and home enthusiasts. They contain all sorts of information on virtually any musical subject you can imagine, from help with starting up a Midi set-up to reviews of software packages. They are also a quick way of getting your hands on some excellent Midi files, although some of the more up-to-date songs will be charged for.

Profile Midi Music (0602 641176) is run by enthusiasts for enthusiasts and is aimed more towards those interested in music technology. As its name suggests, there is a strong bias towards Midi. Hands On Midi (0705 783400) is another music bulletin board specialising in computers and music making.

The Net

Whereas a bulletin board is just a single computer, the Internet is a world-wide network of inter-linked computers and the services available on it contain information about virtually any subject you could care to mention. There are many areas dedicated to music, with subjects ranging from A Cappella to Zappa (Frank). When you get to the Internet *ip* prompt (through Demon, Cix or whatever) you can access Gopher – type *gopher*.

If, for example, you're interested in bagpipes, just use the following *gopher* – Name: Dartmouth College, Address: cs.dartmouth.edu, Choose: Bagpipe Archives – and you'll find all you ever wanted to know about, well, bagpipes actually.

Some people make it their life's goal to document every band's discography they can lay their hands on and you can access the details of the Beatles, Pink Floyd, the Grateful Dead and many others via the Wiretap gopher. Name: Internet Wiretap, Address: wiretap.spies.com, Choose: Wiretap Online Library | Music | Discographies.

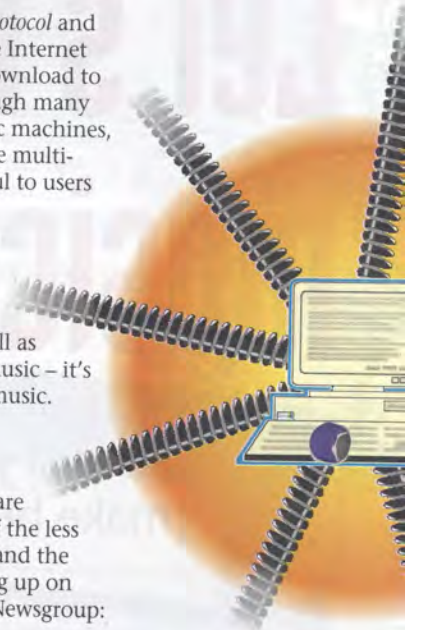
There are many newsgroups on Usenet where users can find out about all the latest developments and gossip on a particular subject. Being an *online* system, everything is bang up-to-date and you'll often find stories that even the big magazines like Rolling Stone haven't caught up with yet – as well as unsubstantiated rumours

One particular area to take a look at is the MTV (Music Television) gopher on – Name: MTV, Address: mtv.com, Choose: kenscolumn. This is a weekly column of general chat and gossip and includes all the sorts of bands and music that you're likely to see on MTV – Guns & Roses, Aerosmith and, probably, some Nirvana.

Ftp or bust

FTP stands for *file transfer protocol* and is used to access sites on the Internet which have files you can download to your own computer. Although many files are dedicated to specific machines, there are quite a few that are multi-platform (Midi), so are useful to users of Acorn machines.

One particular site worth investigating contains all sorts of useful information such as music databases on many different artists, as well as Midi files of some of their music – it's at: ftp.uwp.edu, Path:/pub/music.



Use it or lose it

More specialist newsgroups are on hand to cater for some of the less mainstream tastes in music and the following are worth checking up on Usenet if you're interested. Newsgroup: alt.punk, Newsgroup: alt.rap, Newsgroup: alt.rave, Newsgroup: rec.music.reggae and finally Newsgroup: rec.music.newage.

Usenet (called Newsnet on Cix) groups are available in varying degrees from different bulletin boards. Usenet is a major service available on the Internet. Universities or companies – such as Compulink – have a computer that stores all the *news* articles. This is looked after by a News Administrator at each site and periodically the machines contact another site and request new articles. Thus, slowly, information is transmitted world-wide.

When you've logged on to a site or newsgroup, you're bound to find details of other places to look and then it's up to you.

Let's make music

Rob Miller compares three desktop music systems to allow you and your Acorn to make beautiful music

APART from providing access to literally thousands of applications, Aleph One's range of PC cards also allows specialised hardware peripherals that make use of the cards' serial and parallel ports to be used on suitably upgraded Acorn machines.

Three such *add-ons* are the all-in-one desktop music systems produced by Korg, Roland and Yamaha. These low-end units are all designed as a first step into the world of electronic music making and are based around similar hardware used in the much more expensive keyboards and workstations produced by these companies.

The units are not really designed for the Archimedes market, but they can all be connected and run on suitable Acorn RISC computers. I thought it would be interesting to see what was available for other computer systems and show how and why they could be an alternative choice to what is already available.

The Archimedes has not, until recently, been supported particularly well by third party manufacturers in the area of music making. There are, of course, companies like Electromusic Research who specialise in music-related items, but their products are aimed at someone who already owns a number of keyboards and the like.

ESP is another company whose main area is music making, and its recently launched SSES 1600 is the only currently-available product that can compare with those from Korg, Roland and Yamaha. Vertical Twist also have a sound card under development.

The systems

All three systems are supplied with the necessary cables and software to get you started. All you need is an Aleph One PC card – this review was carried out with a new series 50MHz 486PC card but any of the cards should work – and an installed copy of Windows 3.1 (or later).

All the sound modules have outputs suitable for an external amplifier or a pair of headphones, so you will also need something along that line. Yamaha produce their own speakers for this purpose, although any *active* speaker system will do. I tried all the systems through a mid-range pair of Sony headphones which gave perfectly good results.

Korg – Audio Gallery

The main part of the Korg Audio Gallery system is the AG-10 module. This small, beige-coloured box, measuring about 218mm x 235mm x 45mm is designed to sit on any flat space – or upright with the clip-on feet provided.

There are only two controls on the front of the box, on/off and volume. All the inputs (the AG-10 can be used as a simple mixer) and outputs are positioned on the back.

Although the AG-10 module is a Midi-based device, it has been designed so that it can be connected to the computer via the serial port. Three Midi sockets on the back of the unit support the standard In, Out and Thru Midi connections. These sockets can in turn be used to connect other Midi equipment to the AG-10 module, therefore removing the need for a separate Midi card.

The AG-10, like the other modules, connects to Archimedes via the serial port on the Aleph One PC card. This, therefore, does away with the need for an additional Midi card in the Archimedes while also providing Midi In, Out and Thru connections.

Installing the software

If you are familiar with the Windows operating system you should have no problems in installing the software on your machine. A separate setup guide provides all the necessary information to get the system up and running and takes you through each step with easy-to-follow instructions. Even a relatively inexperienced Windows user such as myself had no problems with the task.

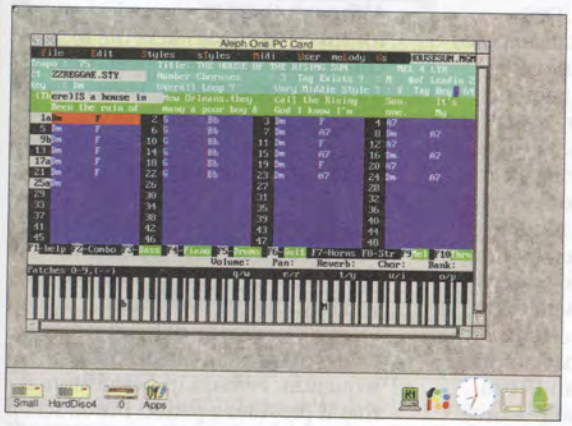
A hard disk is essential – it's extremely unlikely that you'll have a PC card and no hard disk – and a PC disk partition of at least 20Mb is recommended. The software supplied with the AG-10 does not take up too much room, but you'll also need space for MS-DOS and Windows which can be hungry in terms of disk space.

Two main programs are supplied with the AG-10: Trax, a simple Midi sequencing program, and Passport Midi Player (for playing back Midi files). A number of demonstration files are provided to show off the AG-10's capabilities and a small utility program is included that allows you to convert older Midi files to a format suitable for the AG-10 – from Type 0 to Type 1.

There's not really the space here to go into a full depth review of the software. I can comfortably say though that it compares well against anything available for the RISC OS platform. Perhaps the only real drawback is that the programs are designed to run under Windows, which can be a temperamental operating system at the best of times.

Trax provides all the features expected in a sequencer and allows you to input and edit music in two

● *Ballade is a powerful package despite its simple appearance*



● *Band in a Box is fun to use*

different ways. You can either use what's called a *piano roll* editor which is similar to the method used by Clares' Serenade sequencer, or the more traditional notation system used by Clares' Rhapsody program.

A separate Midi keyboard can be used to record music, and this is by far the best means of getting notes into the computer. I used an ageing Casio HT-700 for recording music, but any keyboard will do as long it can be connected to the AG-10 via a Midi cable. You can get away without using a keyboard although it's virtually impossible to get any *feel* to your music with just the mouse.

The Passport Midi Player is designed as a kind of software-jukebox and allows individual Midi files to be played back in any order. A set of mixing tools are provided to fade separate tracks up and down as well as adding various effects such as reverb and Stereo Panning.

The set of instruments used in a song are stored as part of a Midi file. The Passport Midi Player allows one or more of these instruments to be changed, even when a song is being played back, so you could, for example, change a simple piano piece into a great mass of swirling synths.

As it is a General Midi device, the AG-10 provides 128 standard instruments – or programs – as well as four drum kits, which should be more than enough for the average musician.

Sounding off

Probably the most important aspect of the Audio Gallery system, apart from the software, is the quality of the sounds produced by the hardware. Well, when connected up to a suitable amplifier – I used an Arcam Alpha – the sounds the AG-10 produced were absolutely superb. It's difficult to imagine that what you're hearing is coming from such a small box.

Korg is well known for the *warm* sound of its keyboards and sound modules and the AG-10 certainly lives up to expectations. The *natural* instruments were particularly clear, with just the right amount of depth to make distinguishing it from the real thing very difficult indeed.

Guitars are quite hard to synthesise, mostly because of the complex harmonics involved, but the AG-10 takes them in its stride. A couple of the demo Midi files are based around acoustic guitars and the results are completely believable.

Hello Music

The aptly named Hello Music system from Yamaha is designed as an all-in-one hardware and software music package. The standard setup consists of the sound module – the CBX-T3 – plus software and all the necessary cables for connecting up the system.

The package is aimed at the first-time musician and additional software can be bought separately to help teach the basics of music creation and keyboard playing. A ➤

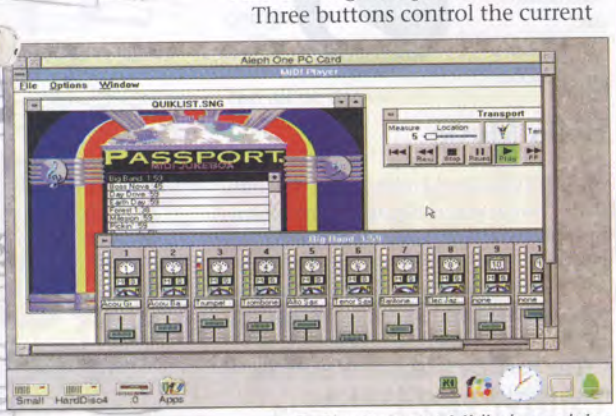
low-cost Midi keyboard can be added to form a complete keyboard teaching package.

The CBX-T3

This comes in a similar shaped case to that of the Korg AG-10 with the major difference being the number of lights on the front of unit, plus the rather stylish vertical mount system it uses. A line of 16 separate LEDs is used to represent the Midi channels, and when the module is in use they light up to signify that data is using that particular channel.

Three buttons control the current mode of the CBX-T3 which can be GM-L1 (General Midi), Disk Orchestra (Yamaha's *standard* used on their range of Clavinova keyboards) and C/M – another *standard* used mainly by other desktop music systems. The buttons are of the LED type giving a clear indication of which mode is selected.

The Yamaha sound module is similar to that produced by Korg in that it can be connected directly to the computer via the serial port. The same three Midi connections are also provided on the back of the unit, namely In, Out and Thru. Mixing an external audio source with the CBX-T3 is easy with the inclusion of a separate Audio In socket and volume control.



● *The Passport Midi player doing its Wurlitzer impersonation*

The software

Like the Korg AG-10, the Yamaha CBX-T3 comes with a sequencer program – Cubase Light – and a Midi file player called Music Box. A selection of Midi files is also included in the package with which to demonstrate the sounds. Installing the software is simple and a guide provides easy step-by-step instructions.

If you're at all interested in making music with computers you'll probably have come across the sequencing package Cubase. Although there is no version (as yet) for the Archimedes, it is the most commonly used sequencer on STs, Macs and PCs. Cubase Lite is the baby brother to Cubase and contains more than enough features for the amateur musician.

Cubase Lite, as you would expect, performs well. It's certainly not just a bit of software thrown in for free – it costs around £100 if you buy it on its own – and incorporates many of the functions expected on a fully-fledged sequencer. Perhaps its best feature is that it provides a perfect introduction to its big brother, without having to fork out almost £400 for the privilege.

Music Box is a straightforward Midi File player that allows simple mixing while a track is being played. Slider controls allow the volume of individual tracks to be increased or decreased and effects such as reverb can be applied. Instruments can also be changed while songs are playing, much in the same way as in Korg's Passport Midi Player.

Sound quality

The Yamaha CBX-T3 unit employs similar technology to that used in Yamaha's professional range of

What if you don't have a PC card?

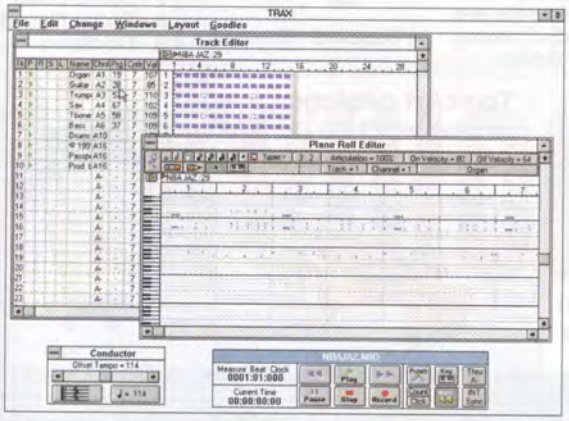
All three modules can be connected to a computer via Midi. This still means that you may have to fit additional hardware to your computer in the form of a Midi expansion card. All Acorn RISC computers can be so upgraded and this normally means the addition of a small plug-in expansion card.

This table gives a list of the various boards available.

Product	Company	Description	Prices
MidiMax	Computer Concepts	The board is a single width podule and contains buffering to eliminate data loss. The standard Midi In, Out and Thru connections are provided plus a second Thru connector to simplify the interfacing of multiple devices	£69 + £6 carriage + VAT (£88.07 inc.)
Eagle M2	Computer Concepts	As well as Midi, the single width expansion card has video digitising and sound sampling capabilities. See the full review in August issue of *Acorn Computing* for full details	£329 + £6 carriage + VAT (£386.57 inc.)
Lark	Computer Concepts	This card is primarily designed to provide the Archimedes with 16-bit sound recording and playback facilities. It also includes a full Midi implementation with In, Out and Thru ports. See the full review elsewhere in this issue of *Acorn Computing* for full details	£199 + £6 carriage + VAT (£233.82 inc.)
Midi uPodule	HCCS	This is a mini podule designed specially for HCCS' Ultimate Expansion system	£49 + VAT (£57.58 inc.)
Midi/Sampler interface	Vertical Twist	This is a small card that fits into the Econet socket on all computers except the RISC PC or A3010 which doesn't have an Econet socket	£69.95 + £2 carriage + VAT (£81.08 inc.)

In addition to a separate Midi card you'll also need some kind of Midi software in order to control the modules. Many suitable products have been covered in past issues of *Acorn Computing* but I would particularly advise having a look at Clares' Serenade sequencing package.

The recent announcement that Acorn is moving into the world of multimedia – as reported in the August '94 issue of *Acorn Computing* – should mean that music and in particular Midi music, could well make a long awaited mark on the Acorn market place. As they say, watch this space.



● *The Trax sequencer for the Korg AG-10*

synthesisers and sound modules and the sounds are understandably of a similar high quality. Until you actually get to hear one of these units playing in front of you, it's difficult to imagine how good they can sound.

As the CBX-T3 is a General Midi module, it has a similar list of instruments to that of the Korg AG-10. In addition, it also has a further 64 instruments available through its Disk Orchestra and C/M modes. The different banks of sounds can be selected either from the front panel of the CBX-T3 or by issuing special software commands via Midi.

The Roland SC-7 Desktop Music System

Like the Korg AG-10 and Yamaha CBX-T3, the Roland SC-7 module is designed to sit on top or alongside your computer system. The box is quite a bit smaller than the other two units – it's only 168mm x 203mm x 35mm – and fits in well alongside other peripherals. It is designed to either sit flat on a surface or stand on its side like the other units.

A single LED on the front of the box shows when power is connected (the light level is constant) and when incoming data is detected the LED flashes. A volume knob on the front controls the output level while a separate knob on the back handles input volume for one of two inputs. These inputs are designed to give users a simple mixing facility where multiple sound sources can be combined into one.

Like the Korg AG-10 and Yamaha CBX-T3, the Roland SC-7 uses a similar system of connection to the computer via the serial interface. A single Midi In connector fitted to the SC-7 allows a Midi input device such as a keyboard to be used to control the module.

There are no Midi Out or Thru connectors, so it is not possible to use the SC-7 to control other sound modules in the way you can with the AG-10 or CBX-T3.

The soft option

Unlike Korg and Yamaha's offerings, software supplied with the SC-7 does not require the Windows operating system to run. Two applications are supplied with the SC-7, Band-in-a-Box and Ballade, both which run under standard DOS.

Band in a Box is described as a music accompaniment program, and out of all the software tested was by far the most fun to use. Its basic function is to take a given song – a number are supplied with the package – and apply one of over 20 different musical styles to the piece. Imagine a reggae version of House of the Rising Sun or The Entertainer in a Bossa Nova style and you'll get the idea.

This is not really a professional tool, but it can help users to appreciate the way in which different musical style can affect a song and is therefore quite educational.

It's also a lot of fun and less imposing than the more serious sequencers – you can even input your own songs and styles and mix and match them in any way you choose.

The second application supplied with the SC-7 is Ballade, a proper sequencing package. It runs under DOS but employs a kind of WIMP environment with pull-down menus and the like.

The strange front-end takes a bit of getting used to – especially when you're used to RISC OS – but overall, Ballade compares well with the other sequencers on review here. An extensive manual gives detailed instructions on all aspects of the program and should make sense to anyone with little musical knowledge.

The sound quality from the SC-7 is exactly what you would expect from Roland – lush and warm sounding, particularly in the string section.

It's not going to turn you into the next synth sensation, but it will let you get surprisingly close. Just above the Yamaha CBX-T3 and just below the Korg AG-10.

Glossary

Midi	Musical Instrument Digital Interface. A standard setup to allow electronic musical instruments and computers to communicate with each other.
General Midi	An agreed standard for implementing a fixed list of 128 instruments. This means that all Midi files played back on General Midi equipment should sound the same. General Midi instruments also have a minimum capability of being able to play 16 instruments at once (see Multi-timbral) and have at least 24-note polyphony.
Multi-timbral	The ability to play back multiple voices or *timbres* simultaneously.
Panning	The act of moving a sound from one speaker to another in stereo
Polyphony	The number of notes (NOT instruments) that can be played simultaneously.
Reverb	Short for reverberation. An effect that adds *body* and spaciousness to a sound.
Sequencer	The musical equivalent of a word processor that allows music to be input, edited and played back.

Summing up

Out of the three modules reviewed, the AG-10 has to be my favourite. The software is simple and straightforward to use while providing all the functions that you would require from a Midi sequencer.

The hardware side of the Audio Gallery package just pips the others to the post and while the quality of sounds is a difficult thing to put into words, the noises made by the AG-10 just have that something extra.

Sound is also a quite personal thing – Korg, Roland and Yamaha all have their own devotees – so I'd advise trying to hear each of the systems before you buy. Any medium-sized computer shop should be able to give you a demonstration, although you might have to search out one of the more specialised music shops for an audition. It's unlikely that you'll find any of them in your local Acorn dealer, unless of course they deal in PCs as well.

PRODUCT SPOTLIGHT

Product: Hello Music
Price: £299 (inc. VAT)
Supplier: Yamaha-Kemble Music, Sherbourne Drive, Tilbrook, Milton Keynes MK7 8BL.
Tel: 0908 366700

Product: Audio Gallery
Price: £399 (inc. VAT)
Supplier: Korg, 8-9 The Crystal Centre, Elmgrove Road, Harrow, Middlesex HA1 2YR.
Tel: 081-427 5377

Product: SC-7 Desktop Music System
Price: £325 (inc. VAT)
Supplier: Roland UK, Atlantic Close, Swansea Enterprise Park, Swansea, West Glamorgan SA7 9FJ.
Tel: 0792 310247

Showroom open Mon-Sat 10-18.00 hrs (All prices exclude VAT)

CD-ROM

All the following CD-ROM drives are Toshiba units and are PhotoCD compatible (multi-session) and include a driver for CDFS =>2.20

Internal Drives (RiscPC only)

XM-4401B Tray 300ms, 300kb/s	£200
XM-3401B Caddy 200ms, 330kb/s	£250
XM-3501B Caddy 200ms, 600kb/s	£375

The above do not include SCSI interface, see below.

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XM-4401B Tray 300ms, 300kb/s	£275
XM-3401B Caddy 200ms, 330kb/s	£325
XM-3501B Caddy 200ms, 600kb/s	£450

The above do not include SCSI interface, see below.

SCSI cards

Morley uncached SCSI card	£130
Morley cached SCSI card	£175
Cumana SCSI II card	£200

The above cards are suitable for A300, A400, A3000 (Ext), A540, A5000 and RiscPC. For others see MultiPodules.

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A5000/RiscPC 2nd Internal Drive

210Mb IDE 14ms Cache (~1Mb/s)	£159
420Mb IDE 14ms Cache (~1.5Mb/s)	£259
540Mb IDE 12ms Cache (~1.5Mb/s)	£399

The above include all cables, screws and instructions. All the above drives are Connor as used in the RiscPC

A300/A400 Series Internal (IDE)

210Mb 14ms Cache (~1Mb/s)	£239
420Mb 14ms Cache (~1.5Mb/s)	£339
540Mb 12ms Cache (~1.5Mb/s)	£479

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Syquest Drives

IDE 105Mb Internal for A5000/RiscPC	£259
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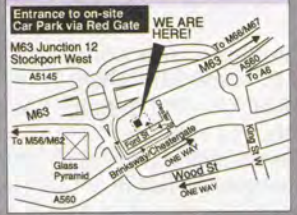

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Noteworthy

James Coates and Rob Miller look at a variety of programs to assist those with a musical ear

HQTracker: Sounding it out

THE Amiga has always been well endowed when it comes to programs to utilise the sound system, what with SoundTracker, ProTracker, OctaMED, and anything-else-Tracker. The Archimedes is getting that way too. First there was Tracker, then along came Coconizer – two that had a pretty similar interface; if you could use one, it was likely you could use the other.

For those of you who have been away on another planet since the 1980's, *Tracker module* is simply a generic term for *tune*. Oregan would have you shot and tell you to call it a Symphony, but for simplicity's sake, we'll stick with Tracker. A Tracker module is simply a collection of samples which are played at different speeds and times by a Player module, resulting in a tune. A Tracker is the program you use to create the Tracker modules.

Vertical Twist released Desktop Tracker, remaining faithful to the original, with embellishments, and ran it in the Wimp. DTT allowed you to compose music easily, and the play routine was superb, although it didn't play Amiga tracks all that well. Digital Symphony was released by Oregan, converted and played tunes from the Amiga with superb accuracy, but was a complete turkey when it came to writing music.

In the meantime, Hugo Fiennes kept on updating his original PlayerModule – the heart of Tracker, and the early clones – which formed the basis of many Tracker offshoots, such as the new HQTracker.

The manual claims that usability is one of HQTracker's marketing strengths – I beg to differ. While better than Symphony's, the user interface leaves a lot to be desired. This is not helped by the fact that you are limited to four tracks.

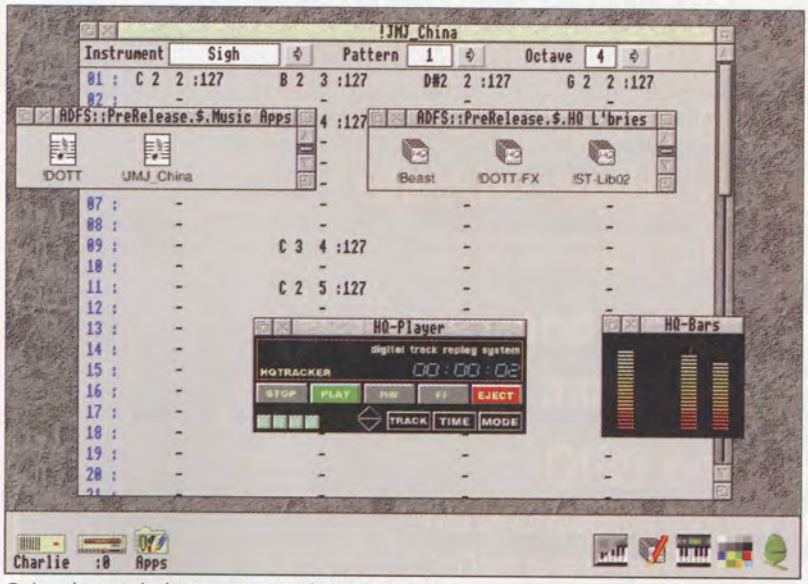
According to the manual, the reason for having only four tracks is apparently because most users are happy with four. This effectively halves HQTracker's usability straight away. The display is limiting, and you cannot see the tune scroll as it plays, which isn't much help when tracking down (pun) a renegade note.

HQTracker uses a system of libraries for sound, which certainly provides an easier way of locating the sounds you want than other Trackers do. After you have dragged the various libraries into HQTracker's window, you are free to choose a sound.

Selecting install will produce a menu with sub-menus such as Orchestral and Percussion. This makes locating the desired sample a doddle, much easier than rooting through floppies.

The only niggle here is that nearly a second elapses from the time when you click Install to the list of samples appearing, and you can't keep this menu open, which means you have to keep on choosing install when you need a new sound.

Sample editing is restricted to being able to alter the loop points of the sample, which is nowhere near as comprehensive as the one in Digital Symphony. DTT's editor is a separate application, which leaves more memory for the main application itself – useful if memory is restricted.



● *Lend your desktop an ear with HQ Tracker*

PRODUCT SPOTLIGHT

Price: £25
Supplier: Mycroft Software, 53 Cottonmill Lane, St Albans, Herts AL1 2ER

Summing up

This package does the job it intends to but is spoiled by niggles like incompatibility with other Trackers, and a limit of four voices which go to create a piece of software that is less than welcoming.

I hope that a new version is in the pipeline as there is a place for a player in this price range, but at present I could not justify buying this in preference to Coconizer on the PD side, or saving my money and opting for Desktop Tracker. Come on Mycroft, prove me wrong.

VistaMusic: If music be...

IN essence, Vistamusic is a specialist Midi sequencer for the Archimedes, with particular emphasis on education, and is produced by *The Enabling for Music Project*, a charitably-supported musical project carrying out research, and providing practical help, for the hard of hearing, deaf, physically disabled, and partially sighted.

It is probably already becoming apparent why this program does not comply to the usual RISC OS conventions. Vistamusic is an acronym for VISual and TActile MUSIC – music you can see and feel, as the system was originally developed for use by profoundly deaf people.

You will need a General Midi instrument to get the best out of the program – one is all that is required, but if you have two, one can be used to control the computer, and the other to compose.

PRODUCT SPOTLIGHT

Price: £35
Supplier: Gordon Delgano,
23 Farmstead Rise, Haxby, York
YO3 3LL
Tel: 0904 761594

Once running, the mouse is not used at all with every operation carried out from the computer's keyboard, or a second Midi instrument.

The entire system operates around 16 keys which are utilised in different ways, depending on the mode you're in. There are five modes of operation, each indicated by the colour of the border around the screen. The system is driven from the function keys and the function key strip is printed in different colours, each colour relating to the colour of the border, so you will know what function key does what.

Composing music at first seems slightly unorthodox but once you've worked out how to use the compose mode, it really is quite simple. Instead of capturing notes from your Midi keyboard in real-time, you enter them step by step.

A step can be any note value and if you want to extend the note, you simply hold it down and see how many extra beats are being added to the length. Entering music reminds me very much of the Music program that came on the original BBC Micro Welcome Disk, as you can see which notes you are entering.

Each note has a separate colour assigned to it, and these colours are cleverly assigned to allow harmonisation without any knowledge. For example, the tutorial uses *Twinkle Twinkle Little Star* as an exercise. This shows a simple harmonisation of Twinkle, along with colours under the notes. You will notice that blue and purple are colours which are next to each other hue wise, as are yellow and orange, and turquoise and green.

By using colours as opposed to notes – you get little coloured stickers to stick on your keyboard – people with no musical knowledge can play tunes into Vistamusic by following colours, and then harmonise without having to know blue and purple is a second inversion of the chord of C.

This is where Vistamusic really comes into its own, as it will enable people who otherwise wouldn't have a chance of using a music program to compose music, and enjoy it. The fact that you can see what is happening also adds to the interest.

In the example, Twinkle could be re-harmonised so that the left-hand read Red, Red, Yellow, Purple, Yellow, Blue, Blue, Red. This may not be a major re-working of a popular work, but it proves the theory, although I have moved away from adjacent colours.

The only problem I would have here is that people would not be encouraged to experiment. This proven rule provides an easy way to harmonise, so people may stick to it. If Hindemith, for example, were using Vistamusic, there'd be Cerise, Dayglo Orange and Heliotrope all over the place.

Expression, dynamics and rubato can all be added after you have composed your tune and entered it. As no use of the mouse is made, you don't have to worry about moving a fiddly arrow over a note and clicking on it. Instead, you simply move to the note you want with the cursor keys, and choose the function you require.

One thing I didn't like here is that if you want to enter a velocity of 107, you first have to enter the tens and then the units. So, for 107, you would enter 10, 7. Admittedly, this is made easier by the fact that the function keys will enter numbers from 0 to 12, but I would have preferred to be able to choose to enter numbers normally and use the keypad, or again, the function keys.

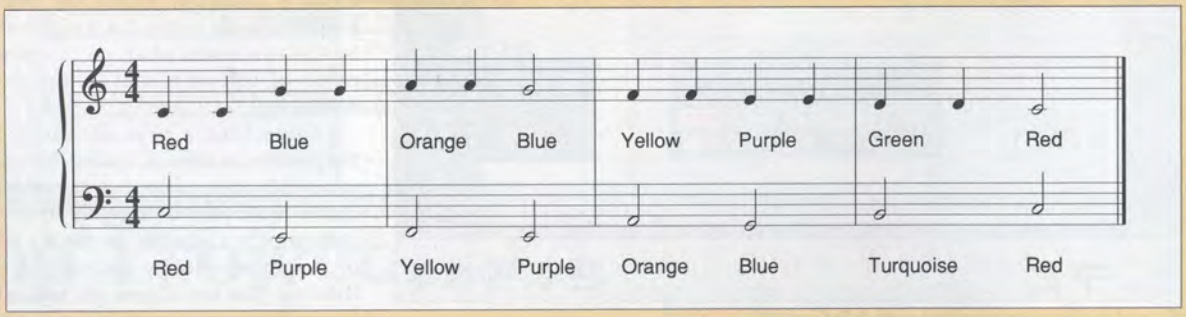
My only other minor gripe is that music cannot be exported into other programs. I'm sure that for children it's exciting to be able to hear their piece, but even more so to be able to see it on paper.

A facility to save a file into Maestro would have been nice. Maestro can print basic scores, although for anything to look good, you would really need access to Rhapsody and ScoreDraw as well.

Summing up

If you need a program that will help people enjoy composing and listening to music, without too much emphasis on the music, then Vistamusic is what you need. I can see it being of use in primary schools, and also units. The move away from tadpoles and telephone wires is good, and will probably help encourage people who would otherwise be frightened off.

I certainly enjoyed the time I spent with the program and the demonstration tunes are superb. You can quite forget yourself just loading tunes and sitting watching and listening to music.



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Desperately seek

Mark Sealey provides more guidelines to help you select good packages

No two teachers or children are alike. Good software should be capable of being used in a variety of teaching and learning styles – with groups, for instance, the whole class and individually – according to teacher taste and school priorities.

This is especially important where it is to be used by staff with different educational values in the same school – something that is *just about* still allowed in the present educational climate. If you know that an adequate trial has taken place and/or there is a teacher's option to alter the way the suite works, this is likely to have been thought through properly in the product's design.

Is there enough flexibility of approach in the way the package has been written to cater for pupils with different speeds of working? An excellent recent example of this is the word processor PrimeWord (Minerva, again), where features can be introduced and removed semi-permanently just when they are needed.

If you are attracted to the software in question because it is visually appealing on screen, remember that this will count even more to young users: A colourful manual and realistic graphics that actually add something purposeful to the program can be quite good indicators of the rest of its content.

Compatibility

Lastly, you can quite easily establish whether the product you intend to buy is a one-off or part of an existing or developing range, for example the Landmarks series (Longman Logotron) or the smArt series (4Mation). If so, are other items in your existing software library compatible?

Choosing a word processor throws up all sorts of questions about helping pupils get used to a particular format with which they may progress right throughout a school or department. Have you a policy on consistency – even if it is one asserting that this is not an issue? This is less important on RISC OS computers, but there are several formats, say for graphics files, and you may experience difficulties.

Although there are good utilities to translate between formats, to expect non-specialists or busy technicians and IT co-ordinators to deal with this is to put an extra obstacle in the way of using maybe an otherwise strong package. Deciding on a slightly inferior product, but one which is more compatible with what staff and pupils already know, isn't perhaps the wiser option.

Is it clear from the information you have received about the package whether it needs peripherals such as a Concept Keyboard or indeed whether these can optionally be used with it? How robust is it on the network, if you use one? There has recently been a splurge of products to facilitate network use (Netmanage and Network Supervisor). Can the product that you are interested in take advantage of these?

Assumptions and -isms

If the content of the software – language and graphics – fails to reflect what progress has been made in equal opportunities (by not reinforcing gender, class and racial stereotypes and so on) in the last 10 years, have you a good reason – assuming you still buy it – not to discuss this aspect of the software with the pupils?

Minerva, again, have made specific provision for their PrimeArt package to run in Mode 22 to facilitate use by partially sighted pupils.

Using the package

Let's assume you are happy about all these points. There are ways of making the suite you buy more or less accessible to the non-specialist user that could themselves determine whether it stays in the box or becomes an established favourite.

For example, is there an Install utility which will make transferring the original program components to working disks easier despite a perhaps unwieldy distribution of files across the disks? They might be packed into an archive that you do not understand or cannot easily unpack.

For use on floppies, is the business of the !System directory and !Fonts application (if applicable) adequately explained in the manual? Computer Concepts software is exemplary in this respect.

Is the route through the software clear? Are menu trees easy to use and understand? Are functions duplicated, certain operations being available both from the iconbar and main menus, say? If so, almost everyone will find the package harder to learn.

Now consider using it on a regular basis. Is the language employed for program instructions suitable for the target age range? Are the prompts

Checklist

- Is there any other way of doing what the package is designed to do?
- Are the aims of the package clearly stated?
- Are its aims met?
- Is it consistent with current learning theories?
- Is it (and the language that it uses) suitable for the intended age?
- Has it a clear menu tree and structure?
- Does the package promote a sense of success and achievement?
- Is it fun to use?
- Does it actively promote purposeful engagement and progression by the pupil?
- Is it easy to learn and use?
- Has it adequate documentation with ample background and classroom-based ideas?
- Does it sponsor work away from the computer?
- Does it relate clearly to the National Curriculum?
- Can the software be easily adapted for all comers?
- Does it acknowledge issues of equal opportunities?
- Can the 'housekeeping' tasks be easily carried out by non-specialists?
- (How) does it fit into your existing software stock?
- Is it desktop compliant?
- Do your dealings with the publishers give you faith in the after sales service you are likely to get?
- Is it good value for money?
- Are the language for prompts and icons to substitute this clear?
- Can it be easily customised?
- Are saving and passwording dealt with smoothly?
- Is installation facilitated by a special utility?
- Does it facilitate pupil assessment?
- Can you live with any copy-protection method employed?
- Does it support/exploit/tolerate peripherals and networks?

ing software

clear? And are all the icons that might be used instead of written prompts completely unambiguous?

Even these days, many otherwise appealing products are still sloppily produced: Maybe the pupil is not given adequate chance to return to reconsider and correct a response in a quiz suite. The pupil's response can be treated as *wrong* not because he or she has failed to understand a point but because of inaccurate spelling where the answer has been required in full. Selecting from a number of alternatives with the mouse should be used instead.

Is there an obvious and elegant way of exiting from the suite? Young children have been known to cut the cabling of the computer in their frustration to end a session. It goes without saying that software should also be as near bug-free as possible.

Is it possible to password protect parts of the suite, if necessary? Can the state of the game be saved at any stage? School days really consist of a number of unconnected sessions, and pupils are rarely able to pursue an interest for the same length of time that they would wish. If the software helps get around this, so much the better.

If they always have to start from scratch, say in an adventure, or if it is difficult or impossible to save work for each class separately, set or pupil frustration will quickly set in.

Look to see whether young users are given warnings when they are about to quit the application with work unsaved or perhaps overwrite superior work on saving it. Sometimes the advertising says that a product is *customisable*. But this can mean digging about in a !Run file or removing colons from statements in a Resources file elsewhere in the directory structure on the distribution disk.

Perhaps staff who are expected to do this are also expected to know (but don't) what to do when they get the message that a file is *locked*. What is your reaction? Will you always be around to help?

Is it obvious from what you know about the package whether it will be easy or even possible to assess pupil progress in its use? The value of this is in planning future work and assisting with difficulties. Sometimes this can be achieved by a facility to spool pupil responses to a separate file for future examination. If so, is all this handled smoothly and consistently?

If, on the other hand, the makers claim that a particular piece of software calculates response times or computes percentages of (in)correct answers, be suspicious. Not only is this likely to be a gimmick to up the price – in all but a very few special cases – but also the busy teacher is unlikely to have time to use such features.

It is helpful to have an estimate of just how much adult intervention is necessary – and when. If the package can be easily learnt and is well supported both by attractive and straightforward documentation as well as supplementary supporting material, workcards for example, then parents and maybe older pupils can be more reasonably enlisted to help and the pupils derive more from a learning environment that may be richer as a result of their assistance and input.

Does the software obey the rules of the excellent user interface that Acorn have provided for their RISC OS computers, the Desktop? The majority of material now released does so, and so it should.

No empirical research is available yet that establishes beyond doubt the educational benefits of requiring pupils to learn the conventions of running software under the Wimp environment (clicking, dragging and consistent key usage – F3 always saves, for instance). But there is a strong belief that this is good practice because pupils need only familiarise themselves with this once in the knowledge that software will then follow the rules. It is also Acorn's policy.

If the software in which you are interested is not RISC OS compliant, there will have to be very good reasons why not.

Backup or be damned

Before committing yourself, make sure that the software is suitable from a practical point of view and that nothing stands in the way of using it.

For example, is it copy protected? If so, is this done in such a way that you or other staff will have to walk around with a *key disk* that has to be inserted before the software will run? If this becomes damaged, what is the publisher's policy on replacing it? Certain producers, Sherston and ESM again for instance, guarantee you a new one at no cost. In other cases a site licence implies an unprotected copy. Others make a nominal charge. Find out how *nominal* this is.

Such an inquiry will also indicate the quality of another sort of backup – the after-sales that you are likely to receive. This includes the presence or absence of a stated policy on upgrades. Compared with the PC world, Acorn users are very fortunate in having to pay modest charges for upgrades; Longman Logotron is a shining example here. But this is not always the case. Ask.

Summing up

Finally, you will have to use your knowledge of the market (and/or consult someone else who knows it) to decide whether, however good the package, it represents value for money. As a rough guide, set probable hours of genuinely profitable use by engaged and motivated pupils against cost, not the length of the manual, the high profile of the advertising or the number of software features.

Although it infuriates some buyers, products which are announced long before they actually become available are not all to be condemned out of hand. Such marketing is rarer now than in the earlier days of the 32-bit series, but still happens. It has been the case with some pretty big names, like Impression and Eureka!

On the other hand, this is an occasion when you should put pupils first: If there is another product that is available by the time you have to cover the ground, there must be a very pressing reason for delaying.

Getting answers to all of these questions could be rather a daunting operation. In the case of some of the extremely reasonably priced software such as that sold by Northwest Semerc or virtually any public domain item, it may not be worth the effort. They are so cheap that you have little to lose.

But for the reasons stated earlier, it is really necessary not just to take pot luck: Many hours of otherwise productive school time and effort with kids at home are likely to be wasted if inappropriate or shoddy software is used.

The checklist given here summarises the most important issues in evaluating software. They have been put into an admittedly subjective order of priority. Some also apply to non-educational packages. You may be left with the feeling that only an alarmingly small proportion of what is currently available meets as many of the requirements in the checklist as this article suggests that it should. But that's another story.

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Up with the Lark

Rob Miller listens in to the latest card addition to the Acorn range

WHEN the original BBC Model B computer was released, way back in 1981, four channels of sound was seen – or more precisely *heard* – as something pretty innovative. Six years later, the Archimedes was launched with double the number of sound channels, as well as the ability to play sounds in full stereo. The sound was still only 8-bit, but with the power of the Archimedes and much improved sound circuitry, it was a major improvement over the BBC B.

The arrival of the VIDC 20 processor – the graphics and sound chip used in the new Risc PC600 – should have meant Acorn's first step into the world of true CD-quality, 16-bit sound.

Unfortunately though, Acorn's somewhat over zealous cost-cutting exercises when designing the Risc PC meant that they left out the all-important circuitry that enables 16-bit sound output.

All is not lost though thanks to those clever people at Computer Concepts and Wild Vision. After months of development the Lark sound card is finally here and offers a complete 16-bit sound specification for all Acorn RISC computers except the A3010, A3020 and A4.

Not only is it capable of recording and playing back sound at up to 48000Hz – the same quality as DAT and higher than normal CDs – the Lark card also contains a full Midi interface with In, Out and Thru connections.

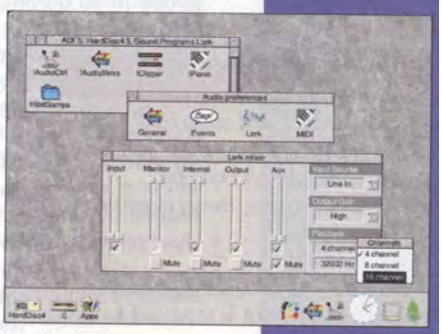
Sound bytes

Installing the card requires no special skills, although there are a couple of cables to weave between the expansion card and main circuit board. If you already have expansion cards fitted in your machine, this can mean a few minutes of hair tearing while you try to decide what goes where. The instructions provided are clear though and you should get there in the end.

A single ribbon cable has to be attached from the expansion card to the computer's main circuit board to enable Lark to communicate with the computer's sound system. A second lead allows you to direct the sound output from the Lark card directly to the computer's speaker. This gives a marked improvement to the computer's sound but still means that you get mono sound. Using the sound-out on the back of the card is by far the best means of hearing the quality of the Lark.

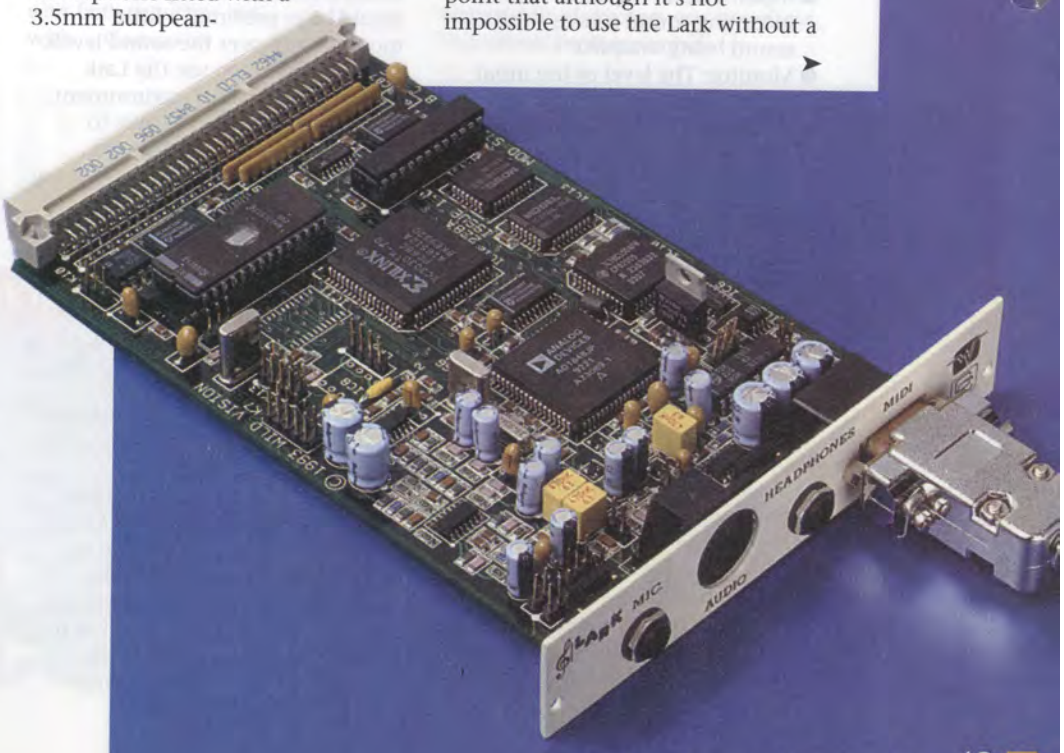
The Lark card can accept many types of input, including CD players, amplifiers and most hi-fi equipment. A five-pin din socket is provided on the back of the Lark card for this purpose. Most audio equipment uses two phono plugs for connection to other items and a five-pin din to four phono socket cable can be obtained for this purpose as an optional extra. This also provides a stereo line out from the Lark card.

A separate socket provides an input connection for any microphone fitted with a 3.5mm European-style jack-plug. Some audio equipment is fitted with Japanese-style plugs and a special adaptor can be obtained from Computer Concepts for no extra cost. Software – part of AudioCtrl – allows you to configure the Mic input to obtain an additional +20dB gain on the signal – useful for mics that require a pre-amp boost.



● *The Lark mixer window*

Software installation is an altogether simpler affair and just requires copying over two applications from floppy to hard disk. I should mention at this point that although it's not impossible to use the Lark without a ➤



TECHNOLOGY ISSUE

hard drive, it would be extremely impractical considering the amount of space required to store sample data. The two applications provided with the Lark are effectively the same as those supplied with the Eagle card, with some minor improvements.

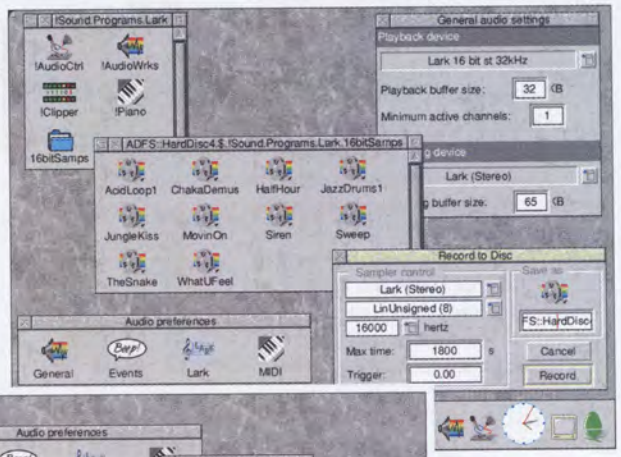
Soft option

AudioCtrl is used to configure the Lark card and to control its various features. There are four sets of preferences, each dealing with a specific area. General and Events are exactly the same as in the first release of AudioCtrl and allow such things as the playback/recording device to be selected as well as the setting up of sound effects for system events – such as a window closing.

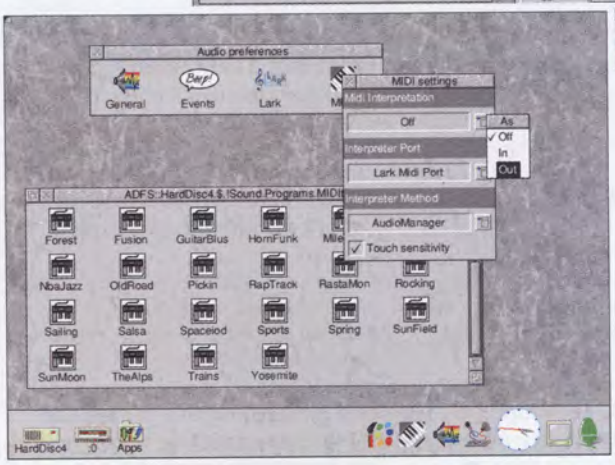
The Lark and Midi options on the other hand are new. The Lark option provides a mixer control, similar to that for the Eagle M2 card, which allows the levels of the sound sources feeding into and out of the Lark card to be adjusted.

The five level settings are:

- Input: The level gain of the incoming sound source – the sound being sampled
- Monitor: The level of the input source mixed with the output
- Internal: The level of the internal sound system – the computer's – mixed with the Lark's sound output
- Output: The level of the Lark's synthesised sounds mixed with the output
- Aux: The sound level of an additional expansion card – if fitted



● *Recording sound directly to hard disk*



● *Setting Lark's Midi options*

While the slider controls on the mixer window are simple to use, I would have preferred a little more control over the sound levels. If you are going to use the Lark card in a *professional* environment, it would be useful to be able to have some kind of auto-fading facility as well as numerical – typing in – control over sound levels. Perhaps an AudioCtrl Pro application could be produced with these features?

Midi is a major part of the Lark card and in addition to its full complement of Midi sockets – In, Out and Thru – it can also be utilised as an actual Midi instrument where sampled sounds are used for the voices.

An example application Piano allows you to play back any Midi file simply by dropping in on to the iconbar. The quality of the sound is rather good considering a certain amount of *stretching* has to be done to make sounds at the extremes of the frequency range sound correct.

There's no explanation of how Piano works but it shows what is possible. With the right software, it would be perfectly feasible to turn the Lark card into a kind of Fairlight-type instrument allowing you to play back any sampled sound as an instrument. Sampled sounds can be saved out as sound modules and used as Midi voices but low frequency notes become stretched and high frequency notes become squashed.

Computer Concepts is keen for third-party software to work with the Lark card and also for third - party developers to write software for the Lark. An optional advanced reference manual has therefore been written that gives all the necessary information. There is, for example, a section specifically dealing with how to write your own version of the Piano application using your own sound samples.

AudioWorks

The main application supplied with the Lark is AudioWorks. This is the same program supplied with the Eagle M2 card and also

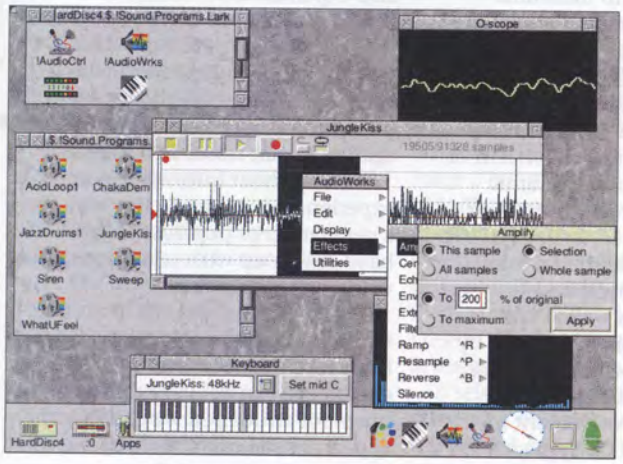
PRODUCT SPOTLIGHT

Product: Lark 16-bit audio card
Price: £239.82 (inc VAT and postage)
Supplier: Computer Concepts, Gaddesden Place, Hemel Hempstead, Herts. HP2 6EX.
Tel: 0442 63933
Requirements: All Acorn RISC computers except A3010, A3020 and A4

Encore

The Lark, as it stands, is quite a leap forward in terms of sound technology. This doesn't mean though that it is the be all and end all. The Lark manual contains a few subtle references to *auxiliary expansion cards* capable of generating sound and the circuit figure printed in the manual has various links for *future use*.

Sound synthesis is one area of sound not covered by the Lark card and it is more than likely that Computer Concepts/Wild Vision have made provisions for adding such technology in the future. ESP were the first company to produce a synthesiser expansion card for Acorn computers and I'm sure they won't be the last.



● *AudioWorks in full CD-quality, 16-bit swing*

The difference between 8-bit and 16-bit sound

DIGITAL sound, like any digital information, is stored as a number of bits. When a sound is sampled – or digitised – it is *chopped* up into small sections of a predetermined length. Put simply, the quality of the sound is determined by the amount of bits used to represent each sound bite – not to be confused with byte.

It's difficult to illustrate the difference between 8-bit and 16-bit sound but a close approximation would be the difference between listening to a radio on medium wave (similar to 8-bit) and on FM (similar to 16-bit). When you see the term *CD sound quality* this usually refers to 16-bit sound playback.

sold separately as a stand-alone package.

A detailed explanation of AudioWorks was given in the July '94 issue of *Acorn Computing*, but to quickly summarise, AudioWorks is an application that allows you to sample sounds and edit them in a number of ways. Special effects such as echo, reverb and panning can be applied and the results saved out in a number of formats including AudioWorks, Armadeus and Microsoft WAVE.

There have been a number of minor changes since its first release, such as ARMovie support and extended Envelope effects. By far the most important enhancement though is direct-to-disk recording.

Sound samples, especially 16-bit sound samples, take up a lot of memory. Even on a 4Mb machine you're going to be hard pressed to fit in anything longer than about 20 seconds of sound. AudioWorks now has a direct-to-disk option that allows you to sample sound directly to a hard disk. This means that you're only limited by the space free on your hard drive.

One of the latest buzz phrases in professional circles is direct-to-disk sound recording and this option gives a rudimentary facility for this. There is no way to edit samples bigger than the memory in your computer at present, but this feature is likely to be added (as an upgrade) if the demand is sufficient.

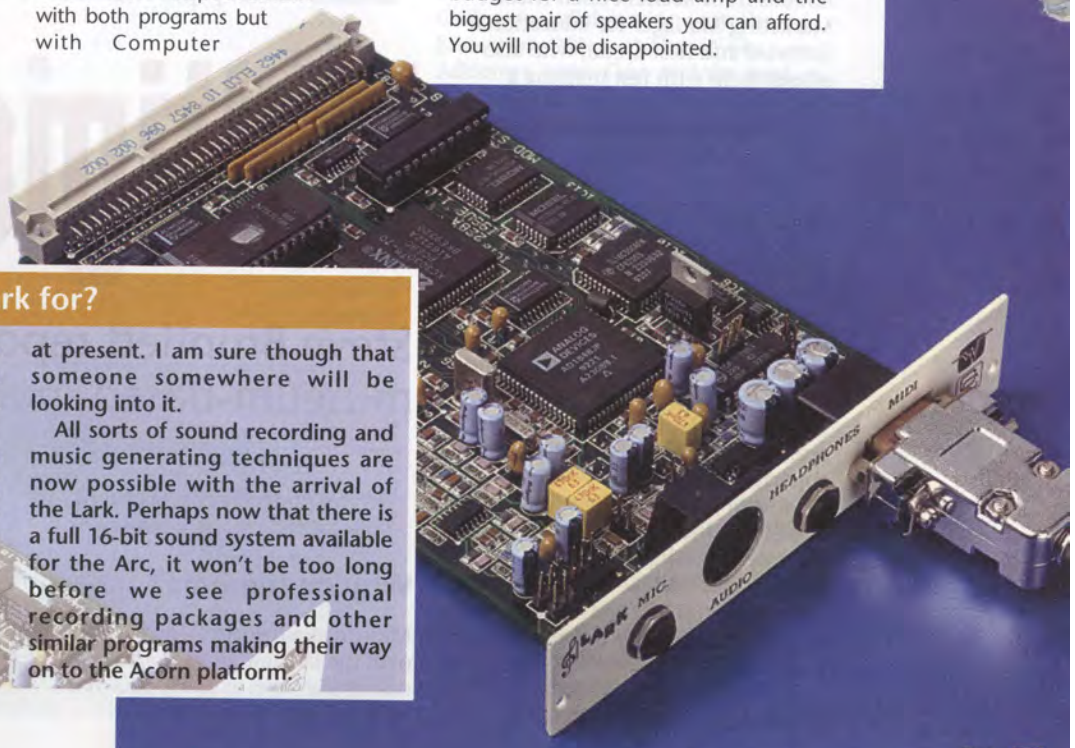
Summing up

There are two main areas by which to judge the Lark card – the software and the hardware. The software (AudioCtrl and AudioWorks) is simple to use while providing plenty of useful and powerful features. There's still room for improvement with both programs but with Computer Concepts' regular upgrade policy, this shouldn't be a problem.

The hardware is as good, if not better than the software. Having been used to 8-bit sound for so long, hearing a Lark card for the first time is rather like going to the cinema after having watched a portable black and white telly for ages.

Whereas sound on a standard Archimedes is only really suitable for the odd jingle in a game or a rather unrealistic sound effect, the possibilities that 16-bit sound opens up are virtually limitless.

You can buy some very nice hardware for £200 which is guaranteed to transform your computer. Although it has its serious uses, the Lark card has to be one of the best fun upgrades for the entire range of Acorn machines. If you're considering buying a Lark card, try and also budget for a nice loud amp and the biggest pair of speakers you can afford. You will not be disappointed.



What can you use the Lark for?

It's all very well being able to record and play back sound but what practical use might a Lark card have?

Sound processing is just as important as image processing and can be used in many areas. Speech recognition has now reached a point where it's quite a realistic method of inputting text into a computer. As far as I am aware, there is no software to do this available for the Archimedes at present. I am sure though that someone somewhere will be looking into it.

All sorts of sound recording and music generating techniques are now possible with the arrival of the Lark. Perhaps now that there is a full 16-bit sound system available for the Arc, it won't be too long before we see professional recording packages and other similar programs making their way on to the Acorn platform.

Multimedia in

Steve Bruntlett reports on recent museum-based multimedia projects

● *Painting of Belgrave Hall by Sue Cole*

IN 1993 Oakham School and Rutland County Museum ran a successful joint multimedia project and negotiations began with staff at the Leicestershire Museums, Arts and Records Service to arrange three more museum-based multimedia projects in 1994.

The project team consisted of myself as Project Coordinator at De Montfort University working with five student-teachers in four schools, the Assistant Director of the LMARS John Mathias, subject mentors and IT co-ordinators in schools and a LMARS Education Officer, Curator and Keeper. Our aim was to gain and give a better appreciation of multimedia in education.

Working with the recommendations from the evaluation report of the Oakham project, we obtained a range of A5000s from Rachel Pullen (Acorn Marketing Manager for Educational Software and Resources), who also offered help with test pressing a final CD-Rom and copies of Genesis Professional provided by Phil Driscoll at Oak Solutions.

Into the breach

Staff in the schools were very enthusiastic, but the staff at the LMARS had several reservations concerning the time needed to work with students, the logistics of access to artefacts in museum collections, the accurate representation of artefacts both visually, verbally and copyright.

Most of these concerns were overcome through meetings and joint negotiation, and the problem of copyright became of secondary concern as none of the projects were to be developed into commercial products.

Some of the preliminary negotiations with LMARS staff involved careful explanation of the role of multimedia in developing access to museums and associated resources and artefacts for schools rather than the potential threat of the use of multimedia applications in replacing museum visits. This is understandably a major concern of museums in difficult economic circumstances in relation to their educational work.

The museum staff had a role in clarifying historical and descriptive text, as well as the correct visual impression given by the applications before anything was put into production. The museum staff's involvement in this aspect was much appreciated on our part as it was one of the factors which prevented the previous multimedia application being widely used by schools.

The benefits of the projects fell into three categories:

- The student-teachers taking part would produce a finished set of curriculum development materials submissible for their final PGCE assignment
- The subject mentors/teachers in schools would be able to realise a viable and visually exciting way of using museum resources in the classroom
- Finally, the museum staff would be able to contribute to the development of resources, enabling schools to make use of the museums in Leicestershire in terms of visits, the loan of artefacts and for pupils to have a greater understanding of the collections and their display.

Why multimedia?

Multimedia has developed rapidly over the last few years to become one of the most exciting education delivery media. Not only are museums using, or looking to use, multimedia to present information and experiences to visitors and resource users, but higher education is also looking to multimedia as a teaching/learning medium which it hopes will help solve the problem of increasing student numbers set against frozen resource budgets.

It can present information and experiences in an attractive way for a generation of pupils/students who have grown up with television if not with computer games.

The use of multimedia also represents a pedagogical move away from teaching to learning. Bodies of experience can be presented in an open but structured way, giving the appearance of free choice to the user but in reality is carefully staged/sequenced learning.

One of the keys to the production of good multimedia is the use of professional art and design skills which aid the use of the application rather than detracting from it, as well as teaching skills which inform the knowledge structure underlying the application.

Text and still or moving images, and possibly sound, can be linked to each other in a variety of exciting ways, but it is the sequence in which experiences and information is triggered by the user which deter0mines whether or not the learning experience is valuable and whether it accomplishes more than conventional media presentation systems such as books, slide/tape packs and so on.

A feeling of open access is necessary, but with the added security of knowing that however far off the beaten track the user strays they will always have had a worthwhile or at least informative experience.

But what are the fundamentals of good multimedia design? These were determined by personal experience

and associated research as:

- Clear and interesting visual appearance of screens, highest possible quality of images and text, good balance of text and images, readable amounts of easy to see on-screen text – paged if necessary
- Clear pathways through the application and development of easy-to-use navigational tools.

The most important aspects addressed early on in the project were the design of the pages, the structure of the application and the development of suitable navigational tools. Navigational structures were produced for each of the three projects and revised as the applications developed.

Lights, camera, action

The three projects took place during a three days a week placement in Community or Sixth Form Colleges in Leicester during the summer term of 1994. Workshops were arranged to train the student-teachers in the use of the computer and software. Practical work was carried out in schools, and visits were made to the museums by student-teachers with and without other staff and groups of pupils. Research work was carried out in relevant libraries and museum resource bases with museums staff.

The Victorian Middle Class Domestic Inheritance Project was based at Belgrave Hall where Jane May is the Keeper. The host school was New Parks Community College where Chris Smith is IT Coordinator and the student-teachers running the project were Graham Beckett and Susan Cole.

The aim of the project was to produce a multimedia representation of the scullery at Belgrave Hall, complete with teaching notes, to augment the Living History Sessions run as workshops for History Key Stage 2 but primarily to be used by LMARS to encourage the use of the museum and its resources by schools especially at secondary level. The titles of these sessions were: Practical Domestic Activities, Learning from Objects and Learning from Room Settings.

A selection of artefacts from the museum collection were historically researched and photographed. The photographs were scanned and converted into a suitable format for inclusion in a multimedia application using ChangeFSI – in this case Mode 28 sprites to give good quality images.

Although images were scanned from colour photos giving generally excellent results, the preferred option, given the funding, would be to have the photos put straight on to PhotoCD. Images could then be dropped into the multimedia application with no extra work and at the resolution or size required. Not many schools have good quality colour scanners, so the PhotoCD is a cost-effective solution.

Key Stage 3 students at the school were also involved in information gathering with small groups of students working at the museum producing on-site drawings which were subsequently scanned and included in the final application. Groups of students at the school worked on CAAD projects in art and design lessons in parallel to the multimedia project using resources developed from visits to the museum.

● *The title screen for the Victorian Art multimedia application*

The Belgrave Hall application was targeted at pupils at Key Stage 3 and 4 working within National Curriculum Art, Technology and History. Opinions were sought from teachers working in these areas as to what materials and information would be beneficial in preparation for a museum visit and as an aid to follow-up work. The objective was to produce an application which was informative, visually stimulating and able to evaluate the responses of teachers and students to using the finished product and in producing relevant visual imagery.

The Victorian Art in National Curriculum Art Project was based on paintings in the Victorian Gallery at the Leicestershire Museums and Art Gallery in collaboration with the Education Officer at New Walk, Adrienne Avery-Gray and the host school, Gateway Sixth Form College. The student-teacher producing the multimedia materials which were aimed at Key Stage 4 Art and Design History was Emma Thorpe.

The project focussed on the production of a multimedia guide to the Victorian Art Collection, New Walk which would encourage pupils, students and teachers to make more use of the museum's resources and at the same time enable aspects of NC Art Attainment Target 2 to be delivered in a visual and cost-effective way.

This application involved a great deal of preliminary research into the historical, cultural and artistic backgrounds of the paintings – Perseus and Pegasus with the Head of the Medusa coming to the rescue of Andromeda by Lord Leighton, The Railway Station by W.P. Frith, A

art design

● *A sample page showing aspects of cleaning*

Whip for Van Tromp: The Admiralty by John Seymour Lucas and The Good Samaritan by W. Small.

The first painting was most productive in its links with Greek mythology and showed how well a single painting could have cross-curricular uses outside art and design. Similarly, the work by Lucas proved to be a key painting in beginning to discuss politics from a historical and propagandist point of view.

Although much of what was presented in the final multimedia application was related to providing historical and biographical details, there was much to do with the personality of the artists and with the stories and cultural underpinnings of the paintings.

The main problem that Emma had was in showing the paintings on screen in enough detail to be able to see the figures clearly. With the new Risc PC and 24-bit imaging this should no longer be a problem, though for a few years perhaps multimedia applications will have to be produced for A3000s as well as for the top-end machines.

The National Curriculum Art Loan Collection Project was based on the National Curriculum Art Loan Collection at the Leicestershire Museums and Art Gallery, New Walk in collaboration with Jenny Dancey, Fine Art Conservator and aimed at Key Stage 3 pupils. One of the host schools was Wyggeston Queen Elizabeth I Sixth Form College where the school subject mentor Mary Bickerstaff worked on the project with student-teachers Lorraine Reilly and Yasmin Butt.

The second host school was Fullhurst Community College where Dave Townsend, IT Coordinator spent many long hours working with the student-teachers demonstrating the best ways of using the computer and related programs.

The National Curriculum Art Loan Collection is currently administered by a text-only catalogue with slides of 600 artefacts available by appointment or a visit to an annual exhibition of artefacts. One of the ways of developing the use of the system would be to use Longman Logotron's PhotoBase so that images could be stored with text descriptors and searched using advanced database techniques.

● *Original illustrations produced for the application*

However, it was decided in this instance to develop the multimedia use of the artefacts in the loan collection with integrated teaching resources rather than becoming involved in time-consuming cataloguing.

Outcome of it all

The museum expects, in the long term, to transfer all the existing slides to PhotoCD. Once that process is complete then visual cataloguing and the development of integrated teaching materials can proceed, perhaps as part of a multimedia project during summer 1995.

The nature of the problem with the original management of the collection was the lack of use by teachers of the Art Loan Collection, the lack of immediate access to view artefacts and the need for a visual-based database.

It was down to the project to catalogue and present the artefacts, thus raising the profile of the Art Loan Collection as primary source material for A level art which at present is underused despite the fact that secondary source material such as books and postcards is widely used as a stimulus for art and design lessons.

The multimedia application contains basic catalogue information – title, artist, medium, content, size and catalogue number – as well as teaching material based on the artefacts which can be printed out for reference and use in the classroom.

A supplementary disk focussing on the work of one artist, Terry Frost, was designed to encourage the use of the original artefacts by teachers through the provision of teaching notes and programmes of study based on selections from the collection.

Worthwhile outcomes can be achieved in a relatively short space of time – 20 school working days – from modest beginnings by student-teachers with relatively little experience of computers. There is a very steep learning curve, as student-teachers have to learn to work with outside agencies with concerns and agendas very different from those of schools.

They also have to learn how to use the computer independently and how to use a text editor, paint system and multimedia development package at the same time as learning how to use a scanner/digitiser or CD-Rom. And all this before they can start to produce the application.

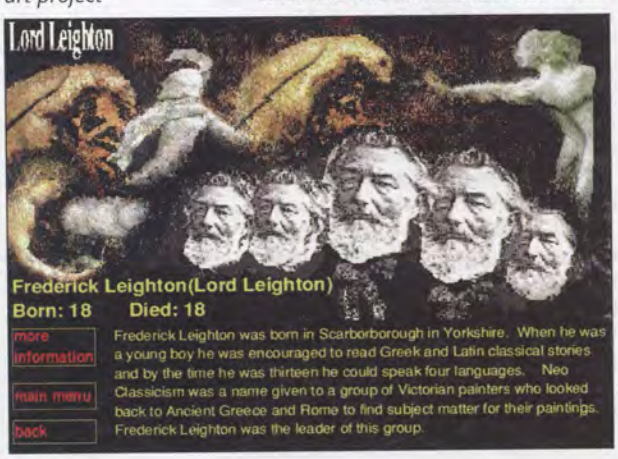
It is hoped that the multimedia applications can be distributed to selected schools on a test CD-Rom to field test the validity of this approach to multimedia based art and design education. In the long term it is anticipated that CD-Rom multimedia applications will be the main method of distributing visual materials which encourage the use of the museums, resources and loan artefacts by schools and colleges.

To put comparative media costs into perspective; to distribute the current unillustrated National Curriculum Art Loan Collection catalogue to all Leicestershire schools would cost about the same as a CD-Rom application containing illustrations of the whole collection, guides to Rutland County Museum, Belgrave Hall and the Victorian Gallery which is an awesome prospect for information delivery.

At a final project evaluation session, the LMARS staff were amazed by what could be achieved in such a short space of time by relative novices considering how long they had spent already developing their professional in-house system.

It is to the credit of Acorn and associated software developers that powerful multimedia educational tools can be used reasonably quickly and easily by people without commercial multimedia training.

● *The Lord Leighton entry from the Victorian art project*



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Countdown

PC Plus

Clem Vogler investigates the Aleph One PC Expansion Card

IN April last year, when I reviewed the Aleph One PC expansion card, I praised it as a vast improvement on Acorn's software PC emulator. It supplied the respectable PC performance necessary to run Windows and thus enabled you to play Minesweeper.

Since then a version of Minesweeper has appeared in RISC OS 3.5 and Windows' sole advantage over RISC OS seems to have been outflanked.

In reality, however, the need continues to grow for users to have access to Windows. As a graphical user interface, I prefer RISC OS, but as a platform for widely available software, Windows cannot be ignored.

Now Aleph One have brought out an improved version of their card.

The relentless downward pressure on PC hardware prices has broadened the software market, with packages brimming with advanced features available in all the main areas at home user prices, spurred on by the need to shift stock before Windows 4.0 (Chicago) arrives early next year – maybe.

In designing dual processor capability into the Risc PC, Acorn has given the clearest indication of its recognition of Window's market dominance. It's becoming harder by the day to keep your home or office a PC-free zone.

The latest expansion card comes with a Cyrix 486SLC microprocessor clocked at either 25MHz or 50MHz, with the memory accesses clocked at 25MHz on both cards. This is standard PC practice, as fast memory chips are expensive and the normal arrangement is to have two banks of 70 nanosecond ram accessed alternatively.

What distinguishes a 486SLC from a top of the range 486DX chip is bus width, reduced hardware cache and absence of floating point co-processing. This last deficiency can be remedied, at a price, since a socket is provided for fitting an optional floating point co-processor.

The rear of the card has standard (bidirectional) parallel and serial connectors, the latter offering a creditable 113.4 Kb data rate. An extra serial port can be had as an option.

The other hardware improvement which the latest card offers over their predecessors is the facility to connect one or two (Dos formatted) IDE drives directly to the card. New Windows driver software (version 1.52) allows SVGA (800 x 600) Windows display to be realised. There is software support for CD-Rom, applicable to any drive which works under RISC OS.

There is optional software support for network connection to Novell Netware, Windows for Workgroups and LAN Manager. There is a configure utility called !PCconfig provided which sets up the Dos partition and arranges whether the PC application wakes up on the icon bar or as a fully running window and sets a few other variables like the preferred boot drive address and an option to share the RISC OS printer stream. Users who have got used to editing the config file directly can ignore !PCconfig if they wish.

The card itself is a neat piece of hardware with a dense array of tracks on a four-layer PCB. Component count is kept low by the use of a VLSI (very large scale integration) Scamp (single chip AT microprocessor peripheral) which concentrates much of the 486 support circuitry in a single package.

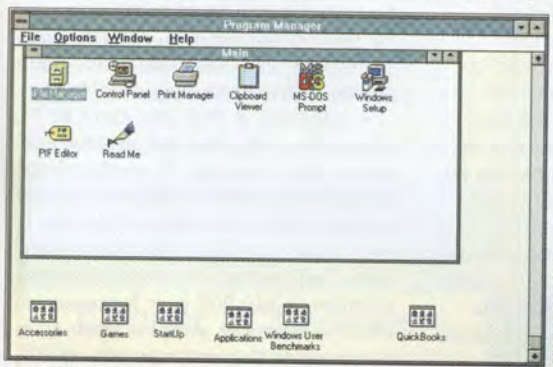
The memory chips are a bank of dram in a 32-bit double-sided SIMM (single inline memory module) This is a bank of dram chips on a board which slides into an angled connector. Upgrading memory is just a matter of swapping SIMMs.

The SIMMs are of similar specification to those in the Risc PC and are interchangeable. It is irksome to have to double up on expensive memory, but the only way that ARM and 486 can share memory is through the Risc PC dual processor open bus.

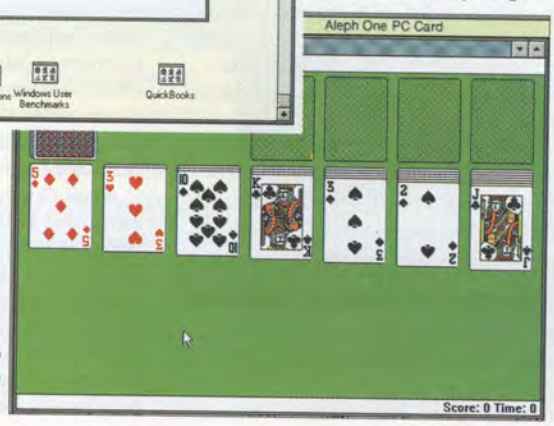
Potential customers will want to know whether the card is reliable, whether it simulates a PC so that software runs correctly and how fast standard software will run. The score is 2½ out of 3.

Good construction, low component count and low power demands make this card, if anything, more reliable than an average PC. Software compatibility is assured. I have run Windows and major Dos packages extensively without a hint of impropriety. The operating speed of software run on the card is only modest.

A limitation in RISC OS allows you to access the PC partition of a RISC OS hard disk only if it is 32Mb or smaller. You can create larger partitions which work perfectly well under Dos and Windows, but won't be able to display their contents



● *A whole new world of Windows...*



● *...to divert you from work*

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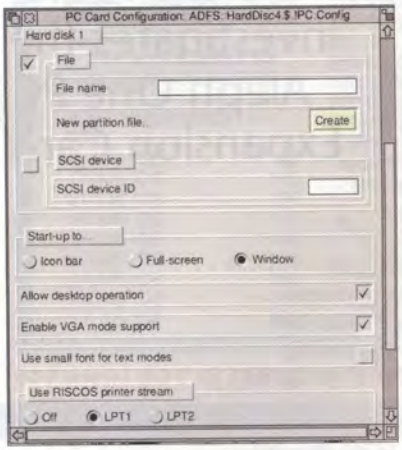
Tel: 0223 811679

under RISC OS, which is handy for a variety of file manipulations. It is good news, therefore, that Acorn are about to release an improved version of DOSFS, which removes the 32Mb limit.

How does it compare?

The new 50MHz cards are an improvement on the Mark 1 25MHz cards, but the benefits are limited because the increase in processor speed cannot be fully exploited due to bottlenecking at the Acorn expansion bus.

Improvements in Windows performance are gained by adding a floating point chip and a dedicated hard drive, but this becomes a costly upgrade. If you take this route you end up with a platform roughly equivalent in performance to a 486SX-25 off the shelf PC clone.



● *New configure utility*

Performance

Comparing PC performance is a complicated business. Formerly, Whetstones and Dhrystones figures were used to compare cpu performance with and without floating point processing, but with cpu speed only one factor in many contributing to the performance of applications running under a graphical user interface, it is now considered better to set the system a buffet of *real* tasks.

One of the best utilities to do this is Windows User Benchmarks, which assesses performance in five areas: Cpu speed, memory access, graphical processing, hard disk accessing and Windows tasking.

● *Multitasking in two environments*

I recorded three sets of benchmarks for the card; as supplied, with a floating point coprocessor attached and then, additionally, with a directly connected hard disk. For comparison, I have provided figures obtained with the earlier mark one 486SX/25MHz card and with a selection of off the shelf 486SX and DX machines. The results are revealing.

The Aleph One card turns in a good processor performance, especially with the floating point chip attached. The other indices are moderate, with the addition of the floating point chip also improving the otherwise feeble graphical processing.

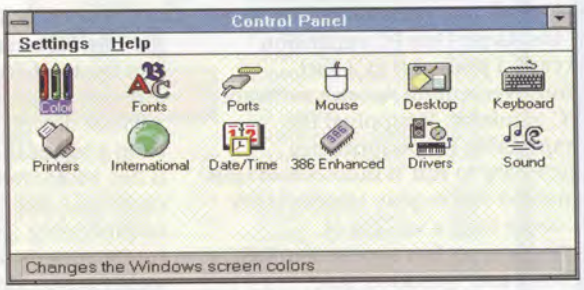
Connecting a hard drive directly to the card resulted in improved disk accessing compared to using the RISC OS hard drive partition, though I also got slower accessing when I used an inferior hard drive.

This suggests that the seek and transfer rates of the drive are more significant than the mode of connection. I spent some time trying to tweak the Windows performance by adjusting the Smartdrive cache and pruning unnecessary device drivers, but without significant improvement.

The general conclusion must be that memory, disk and video are all bottlenecked, and this points to inadequate cacheing and time penalties as RISC OS traps BIOS calls and issues its own instructions over the relatively slow expansion bus – an inherent weakness beyond Aleph One's control.

It would be interesting to know what improvement might result from using a more fully cached processor.

● *Windows control*



Summing up

For those RISC OS users who have a need to run Windows software, the question arises as to whether the PC card offers the best solution. The worst solution would be to struggle on r unning Dos versions of PC software under software emulation. For Windows to perform realistically, hardware implementations are essential. But which?

Risc PC owners will be advised to wait for the end of year release of the Risc PC second processor cards – a basic 486SX from Acorn and a high performance 486 or Pentium version from Aleph One.

These will share memory, I/O and 32-bit bus with the ARM processor and promise optional secondary cacheing, connection to standard PC (ISA bus) expansion cards and, eventually, XGA (1280x1024) graphics, all for the price of the second cpu, ASIC and a few support components.

This is technically a more satisfactory approach than the present one and we shall be previewing its development shortly. For those with A3000, A5000, A540, A300, A400 and derivatives – or A3000 and A4000 machines using Acorn's PC card – the Aleph One card provides a realistic option, notwithstanding the cut throat pricing of mid-range PCs nowadays.

You share monitor, hard disk and peripherals with your ARM host and need only a single box on your desk. You get the benefit of organising your PC partition under RISC OS (so much easier than Windows/Dos) and multitasking both systems if you need to.

A weakness is that you can't fit PC expansion cards. You can achieve adequate, but no better, PC performance. The clinching factor is support. A recent survey by the authoritative Gardner IT Info Group concluded that the average cost of supporting a PC in an office environment is $40,000 over five years. In other words, the amount businesses spend supporting and maintaining their computer systems far exceeds the initial hardware cost.

Aleph One have a well-deserved reputation for efficient customer support, which is a far cry from what you can expect if you buy some PC clones. The continued improvement in price/performance ratios on PCs has weakened, but not eliminated the argument in favour of the PC card, whose price is a significant fraction of a complete PC.

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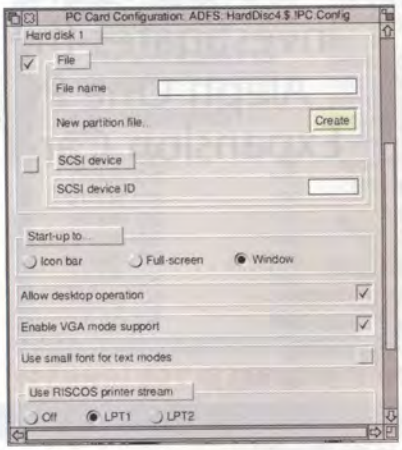

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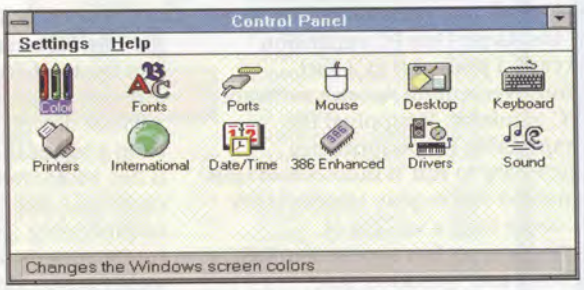

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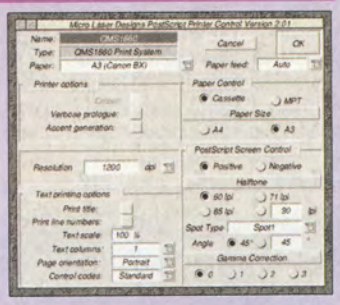

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Body and health

Sex and the (single?) computer, part one – Chris Drage investigates

SEX education is a controversial area within the National Curriculum and one which causes serious concern to parents, teachers and governors. The implications of teaching sex education in schools creates a host of moral questions, no more so than when modern technology is used.

Can computers help or hinder? Does the computer negate parental or teacher responsibility? Where does education stop and pornography start? Do boys or girls have more affinity with a computer-based learning environment?

As far as Acorn 32-bit machines are concerned the situation in schools is fairly clear cut whether computers are used in sex education or not. The school's governors and teaching staff must formulate and publish their agreed policy on the matter and ensure that it becomes included in the general policy revision cycle.

This is a crucial stage, as it is at this point that the resources to be employed are decided upon and decisions made on how they will be used.

Also at this stage the moral issues are sorted out and by general agreement become part of the policy. Not as easy as it sounds, especially in schools having a religious foundation where specific views are upheld, or those having predominantly immigrant populations or with rolls weighted towards one particular ethnic/religious group.

The religious issues can generate a storm of arguments and become a moral minefield.

Once established, the policy will set out how sex education will be taught and should cover issues such as whether boys and girls are taught together or separately and whether parental consent is obtained beforehand, and so on.

At what age?

Sex education in primary schools generally begins about Year 5-6 (10-11 year olds), when children are beginning to mature sexually. In primary schools a variety of media and resources may be used: TV schools broadcasts, books, posters, charts and models loaned from medical institutions. The computer is seen in schools as another resource to be tapped.

Although suitable software is thin on the ground, BodyWise (Sherston Software) and Bodymapper (Tag Developments) are two which stand out. Both treat the whole subject in a purely biological sense and neither wander into the potentially difficult moral ground as to which is right for the target age group.

Bodywise presents a blank human form and eight body systems: Nervous, musculo-skeletal, blood and nymph, respiratory, digestive, excretory, endocrine and reproductive systems – the latter item being password protected for privileged access.

Selecting any of these systems superimposes it on the body form and labels can be called up which provide pathways to information, close-up views, cross-sectional views and animations.

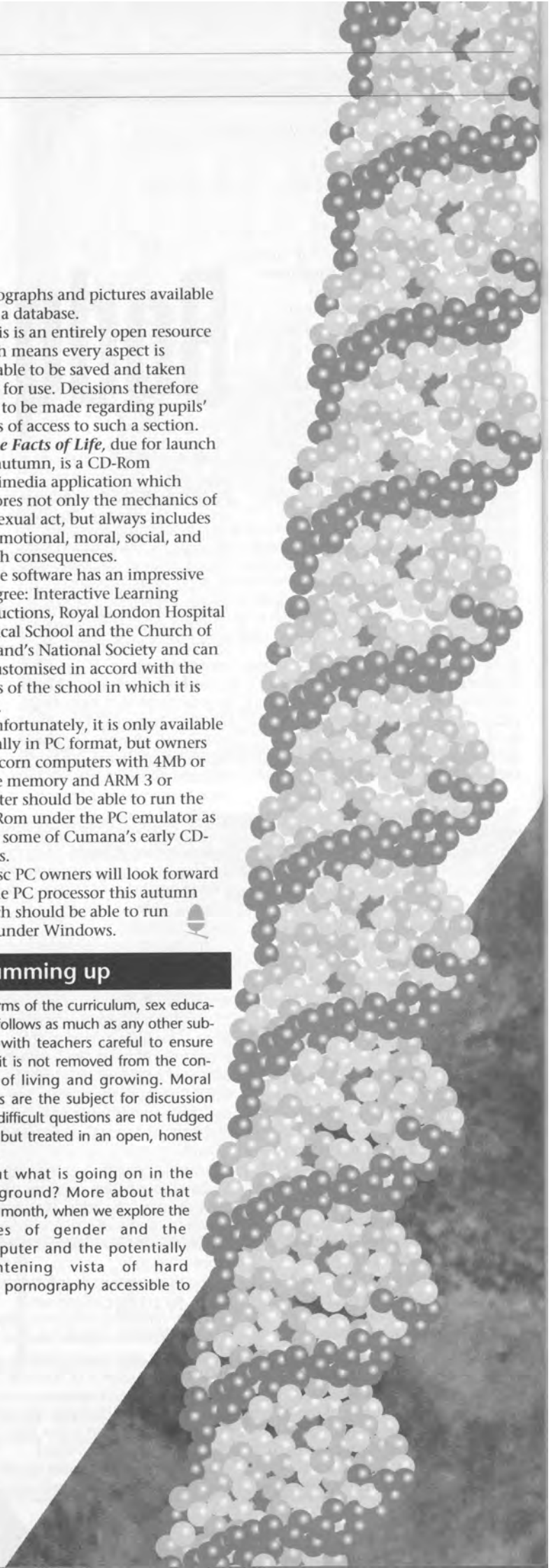
The set-up page provides the opportunity to select the systems the teacher wants the children to explore in the main program, or to select the alternative *placing parts of the body* option in the program and to set the level of difficulty of the text and labels. With Bodywise the teacher has the choice whether or not children get to *see* the reproductive system.

A similar situation exists with ***Bodymapper*** which explores the physiology of the body, the nature of which can be of either gender and in the usual variety of ethnic types.

The presentation of information builds on existing classroom practice, providing children with opportunities to explore their own ideas. For example, the body is illustrated by choice of relevant system. With each system, information can be called up or, if preferred, pupils can input their own information and ideas.

Animated graphics add to the appeal. With Bodymapper, collecting, collating and interpreting their own personal data is an important part of the application: There are data collection sheets, body recording cards and comprehensive graphing and charting facilities to help children make comparisons and to discover patterns.

Most usefully, ➤



the program can be configured by the teacher to suit the abilities of the children. The issue of sex hardly rears its head in Bodymapper apart from showing the reproductive system if requested.

Moving on

By secondary school the accent shifts from the purely biological to include the religious, moral and social issues as well. At this level few programs surpass Anglia TV's ***Understanding The Body***, a self-contained, multimedia CD-Rom which aims to provide 11 to 15 year olds with a rich source of learning resources. It is designed to fit National Curriculum requirements at Key Stage 3 but is so comprehensive as to be of use in a much broader context.

Richly endowed with quality photography, video, sound clips and animation UTB offers a superbly structured tour of the major systems of the body and of environmental aspects of human life. Although it tackles sex from the purely biological point of view, new elements are introduced – the basic sex act, conception, growth of embryo and foetus and birth.

Contraception (eight methods) is graphically illustrated and genetics is handled in terms of *why we look the way we do*. The descriptive media includes text, photographic stills, drawings, animations and video clips – sperm-meets-ovum and an ultra-scan clip of a baby in the womb. There are even extra photographs and pictures available from a database.

This is an entirely open resource which means every aspect is available to be saved and taken away for use. Decisions therefore need to be made regarding pupils' rights of access to such a section.

The Facts of Life, due for launch this autumn, is a CD-Rom multimedia application which explores not only the mechanics of the sexual act, but always includes the emotional, moral, social, and health consequences.

The software has an impressive pedigree: Interactive Learning Productions, Royal London Hospital Medical School and the Church of England's National Society and can be customised in accord with the ethos of the school in which it is used.

Unfortunately, it is only available initially in PC format, but owners of Acorn computers with 4Mb or more memory and ARM 3 or greater should be able to run the CD-Rom under the PC emulator as with some of Cumana's early CD-Roms.

Risc PC owners will look forward to the PC processor this autumn which should be able to run FoL under Windows.

Summing up

In terms of the curriculum, sex education follows as much as any other subject, with teachers careful to ensure that it is not removed from the context of living and growing. Moral issues are the subject for discussion and difficult questions are not fudged over but treated in an open, honest way.

But what is going on in the playground? More about that next month, when we explore the issues of gender and the computer and the potentially frightening vista of hard core pornography accessible to all.

Available software

Bodymapper
Price: £44.95
TAG Developments, Unit 5b, Callywhite Lane Industrial Estate, Sheffield, S18 6NS.

Bodywise
Price: £39.95
Sherston Software, Swan Barton, Sherston, Malmesbury, Wiltshire, SN16 0LH.

The Facts of Life
Projection Visual Communications
Further information available on: 071-250-1706

Understanding The Body
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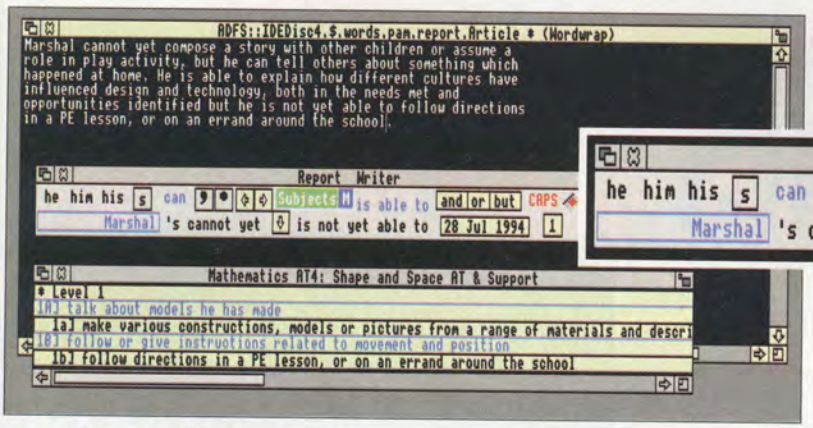
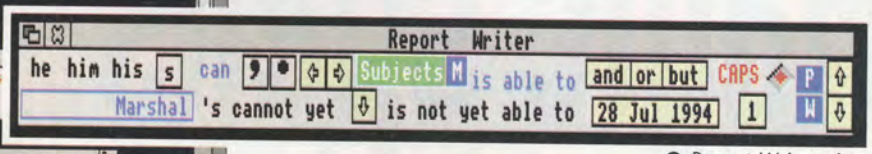


● *Using the Attainment targets as a base*



● *Report Writer aims to remove the tedium from report writing*

All in the report

Marshal Anderson reports on a piece of software aiming to take the strain

WHEN we think of the uses of computers in education we tend to assume that their only function is to help our children or students learn – this is not so. Computers have become an integral part of the administration of even the smallest schools and ways of using the technology to assist teachers in their role are always welcome.

One of the main areas for development here is in report writing and the latest addition to this is Report Writer from Creative Curriculum Software. Writing reports, often twice a year now, can be a long and loathsome task for many teachers. Now that the National Curriculum has narrowed down the things we teach it gets a little easier, as a large part of each report simply relays a child's position in relation to the knowledge and skills they are supposed to acquire.

Each of these bits of knowledge, each skill, can be expressed in such a way as to sound like part of a report. For instance, the National Curriculum statement *listen attentively, and respond to stories and poems* easily becomes *Hilary can listen attentively, and responds well to stories and poems.*

Report Writer gives you the tools you need to use the National Curriculum documents in this way by providing all the attainment targets and support statements in textual form, as well as letting you write your own. To these text files it adds a front-end that gives you a well chosen group of tools that will enable you to create a report very quickly and accurately.

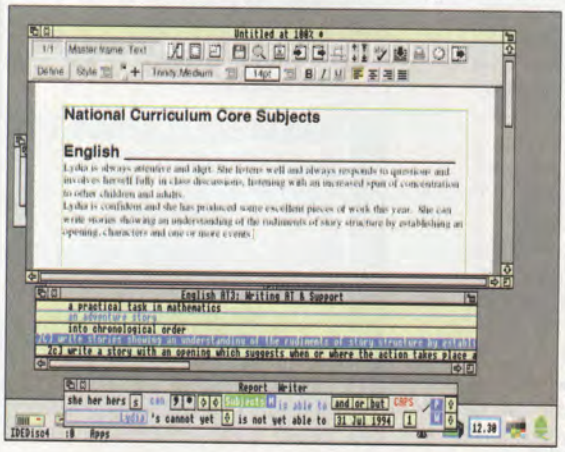
Report Writer works by sending text to wherever the caret is. The idea is that you use the package alongside a word processor as it is of little use on its own. The Report Writer window is a masterpiece of minimalism. Only about three lines of text high and one screen wide in most modes, it gives you access to all the tools you need while leaving the rest of the screen clear for your word processor

From this window you can select a variety of useful words and punctuation: *He, she, his, hers, and, or, but* and so on. You can also access the child's name, the phenomenally useful phrases *is able to, cannot yet*, and *is not able to* along with *s*, apostrophe *s* and cursor control.

With automatic capitalization after a full stop these letters, words and phrases provide a fully functional, if rather dry, grammatical structure in which to write a report.

Clicking on the Subjects icon takes you to a menu of 12 subjects, 10 of which relate directly to the National Curriculum documents. From each subject menu you can choose the Attainment Targets themselves, the support statements or your own phrases. This ability to tailor the package obviously helps get rid of the stilted prose it might encourage.

Once you have chosen the text list you want, it is displayed in a five line box, starting with the level you have preselected. The facility to preselect a level speeds up searching by taking you into the list at that level. Now select your phrase from the list and it is transferred on to your document.



● *The finished comments in Impression Style*

Summing up

Report Writer does its job very well and I can imagine it will save a lot of teachers a lot of time. My reservations are in the way it might be used. As the launching point for a report and parts thereof it's fine, the problem comes if it is used to create the whole thing.

Apart from the appallingly dull read this would produce, the more insidious aspect is the way in which it could make us think of our pupils only in National Curriculum terms, rather than the whole people they are – neither language nor technology are neutral.

PRODUCT SPOTLIGHT

Product: Report Writer
Price: £49
Supplier: Creative Curriculum Software, 5 Clover Hill Road, Savile Park, Halifax HX1 2YG
Tel: 0422 340524

Magic spells

Will Geoff Love be bewitched by Magic e?

I HAVE never actually used any software produced by a Department of Psychology before. I was somewhat nervous that it might begin to learn all sorts of hidden truths about my id or my interpretation of the universe but luckily it didn't – or, if it did, it didn't tell me.

Magic e from Xavier Software in the University of Bangor is, in fact, aimed at those with dyslexia, although it would also be suitable for younger users meeting the ideas for the first time. It demonstrates and gives practice in the use of the magic 'e' in different words. In fact it covers a number of different letter combinations: Magic e, soft c, ck/ke, ce/ke and soft g. Sampled sound and attractive graphics are used to get the ideas across.

PRODUCT SPOTLIGHT

Product: Magic e
Price: £29.50
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Tel: 0248 351151 ext. 2616

● *Choose two words you want to practice*

Magic e actually comprises of two applications and is supplied on three disks. The first application is the Magic e Teacher. The teacher can select which sounds they wish to use and, if applicable, which vowels they wish to use them with.

On selecting Run the whole screen is taken over by a letter machine. A word is first presented and clicking on the speaker will read the word out using sampled speech. A click on the mouse will move you on and the word will be *processed*. This may consist of adding an *e* to the end, changing a *c* to a *k* or whatever other option has been selected.

● *From rat to rate in one easy move*

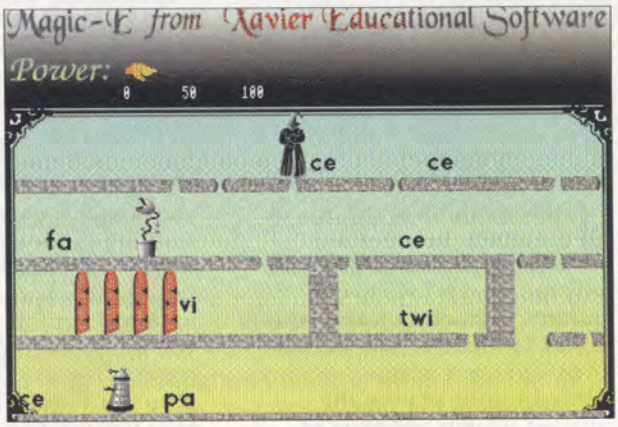
All these changes are nicely animated. For instance, in changing *rat* to *rate* the *e* slides along to join the word and a hand reaches out from the *e* to stretch and release the *a* showing, very visually, the effect of adding the *e*.

Other animations are similarly well thought out and provide a very strong visual image of the process. Clicking on the replay button replays the sequence sounding the word before and after the change to show the difference. This combination of sound and graphics is a very powerful learning aid.

The second application, Magic e Practice allows you to play a game based on linking two word halves together. You control a wizard and can move him across platforms using the keyboard. At various places on the platform someone has carelessly left a variety of word parts.

A word is read out and you have to collect the two correct halves of the word. Success is rewarded by power. This is needed to get rid of some of the baddies acting as obstacles, but if you run out of power it's curtains.

At the end of each level you are given a word to spell before you can proceed. Again, the game can be used to practice a variety of letter sounds. There is a good vocabulary provided but if you have a sound sampler it is possible to add your own words too.



● *The wizard's trying a spell*

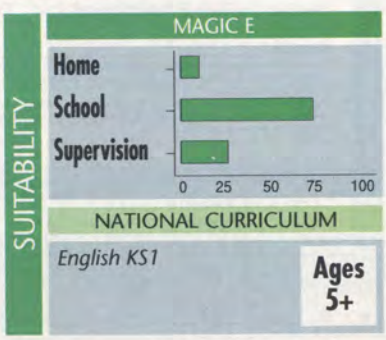
Summing up

My main complaint is about the Magic e Practice game. The sampled sound didn't seem as clear as on the Magic e Teacher. S sounds in particular sounded as if they were spoken with a lisp and made the words difficult to understand.

The problem was compounded by the fact that if, when playing the game, you miss hearing a word there is no way to hear it again. You just have to randomly guess until you get the answer right. A means of re-hearing the word would have lessened the problem.

I was using the software with extension speakers connected to my computer. In a classroom environment these, or headphones, would be just about essential.

All in all I feel this is a good package – particularly the Magic e Teacher. If you need a package to reinforce your teaching of these specific word skills this will certainly do the job.



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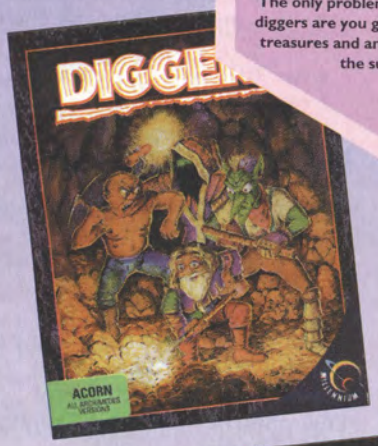

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Just

Michael Rozdoba turns a paler shade of green

IT seems to be my turn to cash in on some false pretensions to eco-friendliness. Everyone else has, from politicians to soap powder manufacturers, so we might as well join the flow. This month's subjects will include the all important issue of how to safely dispose of toxic sprite wastage, without causing wider damage to the desktop environment.

As if that wasn't enough, also on the inventory is some instant medical attention for the ailing DragASprite module, and a word or two to the wise, or not so wise, in high places...

Transformed wastage

Sprite format permits left-hand wastage. The first pixel on all rows, each of which is word aligned, can be at any pixel-aligned address within the first word of row data. If this is not bit zero, all data within the sprite image, to its left, is ignored when plotting the sprite.

That's fine and dandy, however it is a bit of a nuisance when it comes to writing code to directly manipulate sprite data, as it adds a further parameter that must be taken into account. Unfortunately, Acorn has failed to do so, with regard to the RISC OS 3 transformed sprite plotting calls.

If the sprite to be transformed has left-hand wastage it will not be rendered correctly. The fault which occurs takes the form of the sprite being shifted right by however many pixels the wastage occupies.

For example, for a Mode 27, 4bpp sprite with wastage of &14, the sprite is pushed right by five pixels. This may not seem a lot but it can cause problems when rendering draw files containing transformed sprites, even when precision isn't crucial.

This is because while the sprite is shifted, its bounding box isn't, and this can lead to the right-most pixels being clipped off as part of the sprite will then lie outside of its own bounding box. I discovered this while trying to embed some screenshots within a draw file in a DTP document.

In such cases, these sprites may well have wastage, being grabbed from the screen by Paint and then – this is the crucial bit – clipped to size using Paint's flip and adjust size options, which can introduce wastage. When embedded in a draw file, transformed sprites will always need a transformed plot, whereas scaled sprites may be plotted using the scaled or transformed OS_SpriteOp – Impression will render all sprite objects with the transformed call, whereas Draw uses both.

In the case of Impression, the fault only appears if its dither graphics option is off, otherwise the operating system's sprite plotting code is bypassed by Computer Concepts' custom routine, which is bug free.

You can see the problem by importing into Draw a sprite with wastage. Some troubled sprites are included on the cover disk in Waster.trial.

Initially the sprite will be rendered correctly, as it is stored as a type 5 *scaled sprite* object. However, if you force it into a type 13 *transformed sprite* by, say, applying a rotation of 0.001, it will jump right through however many pixels correspond to the wastage.

The only work-around to this problem is to avoid sprites with wastage at all costs.

You can manually remove any wastage using Paint, by choosing the tool *copy export*, and selecting a region of the sprite – you don't actually need to carry out the export, just click outside the save box, which discards it.

This, as for many Paint operations, will cause an automatic wastage removal prior to the operation itself, which in this case does nothing else.

That's okay if you only have one or two sprites to deal with. However, for larger numbers, or where they are already embedded within a draw file, it isn't practical.

Facing this dilemma, I've written a small application called *Waster* which will scan sprite and draw files, removing wastage from any sprites it finds. It will overwrite the original file being processed with the modified version, if changes are required.

Should you intend processing any important files, while I'm pretty sure Waster is bug free, as with any valuable data, you ought to keep backups of the originals, just in case.

Waster is command-line driven. You can use it by copying the directory *Waster.cmdline* from the cover disk to a writable medium. Place your files into *cmdline*, run *ClickMe* to set the current directory, go to the command line and enter:

```
waster <filename1> [<filename2> ...
] <return>
```

to process the named file/s.

This is a little cumbersome and inelegant in the desktop, so I've also provided a multitasking shell to drive it. Unfortunately, you'll need to have a copy of Acorn's FrontEnd and DDEUtils modules in your !System resources in order to use it.

These are supplied as part of Acorn's Desktop Development Environment – with both Desktop Assembler and Desktop C.

If you do have a copy of the DDE, you'll also find that the desktop shell !Waster provides a good example of how to extend the DDE's range of non-interactive tools, in a consistent manner, via Acorn's very useful FrontEnd module.

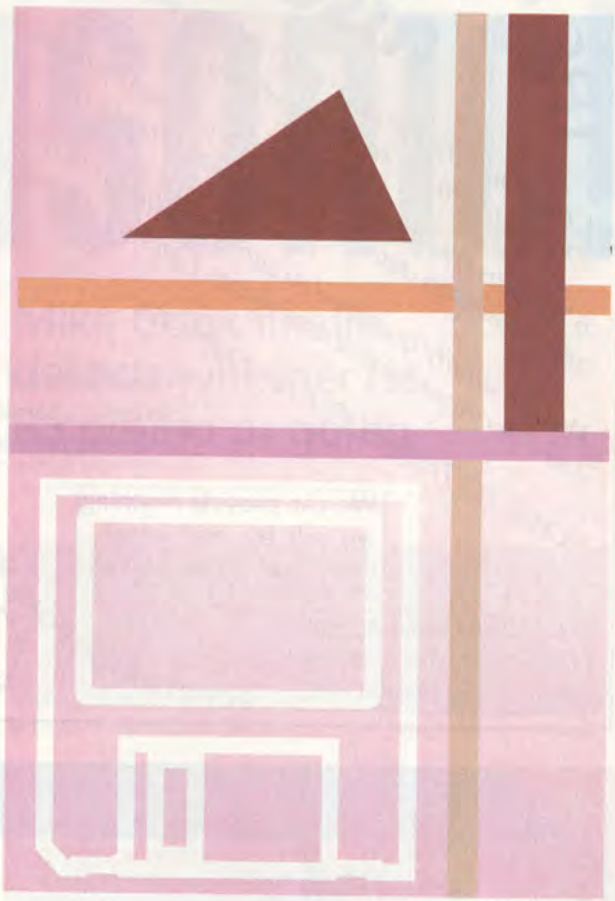
Waster itself is written in C – the source is included as usual. It makes a simple but useful illustration of how a Draw file may be processed by direct manipulation of one or more objects within it.

DragAWhat ?

Back in the 1993 Special issue I mentioned a small problem with DragASprite v0.03, and nearly a year later Acorn have yet to release a soft-loaded replacement for RISC OS 3.1 machines, which fixes this bug – ever get the feeling they have better things to do than listen to their customers?

If you can't remember that far back, I then described how there's a single faulty instruction in the

a waste



module which can screw up initial sprite alignment within the drag box. For top alignment, the original code uses sprite width in a calculation that should use height.

The resulting error in initial sprite position may be only cosmetic, but it can be very noticeable when it does occur.

Why am I bringing this up again? Good question, and here's the answer – I recently wanted to distribute an application which required this bug to be fixed and, although I had patched a single copy of DragASprite, I couldn't distribute it due to copyright restrictions.

The original Basic routine which I wrote to patch the module could itself have been distributed, as it was with TechForum. However, to non-programmers it was rather awkward to use, so instead I've now written a short ARM code utility which when run has the similar effect of patching the module, but does so only temporarily – up to the next hard reset.

Unlike the former routine which saved the patched module to disk for manual loading and relied on the user only running it if they did indeed have the bugged 0.03 version, this one can be executed from an application's !Run file to automatically patch and reinitialise the module, prior to loading of the application which requires the fix. Thus, the end user need know nothing about what is going on.

Most importantly, this code takes much more care to ensure that, before it makes any modifications, the version of DragASprite currently present is the bugged one so it should be safe to run on any machine.

The bugged version is identified by checking the module length, the specific instruction to be changed, and by performing an OS_CRC on the whole module.

DASpatch is only 640 bytes long and can be found on the cover disk. Its assembler source is also present, for your perusal.

It's usually silent in operation, but if you add the argument *verbose* to its command tail, you will get a report on the action taken by the utility, via Wimp_ReportError.

Assuming you put DASpatch into your application directory, with which you wish to distribute it, I suggest you invoke it from !Run using something like:

```
SetEval App$DAS3 0
RMEnsure DragASprite 0.04 SetEval A
pp$DAS3 -1
RMEnsure DragASprite 0.03 SetEval A
pp$DAS3 0
If App$DAS3 Then Run <App$Dir>.DASp
atch
UnSet App$DAS3
```

Pleading Acorn

Dr. Nigel Hawkes of Oxford wrote in to TechForum recently – well, sometime within the last six months at any rate – the post can be a little sluggish. He wants to know how he can get a copy of the source code to Acorn's RISC_OSLib. I suppose he means a legitimate copy.

I have to confess, I'm not at all sure, aside from becoming a registered developer – assuming you're eligible and can afford the fees. Acorn, will you please clarify this query?

And while they're thinking about that, perhaps they should keep in mind that RISC_OSLib is virtually worse than useless without its source code.

Obviously there are reasons not to make the source as accessible as the library – it could lead to less compliance with the Style guide, as customising would be easier to implement.

Nevertheless, a standard interface isn't much use if it's full of bugs and isn't well documented – and the source code is of course the most comprehensive documentation that could reasonably be asked for.

How about a compromise? Acorn could release the source code for sale at nominal cost, subject to the purchaser agreeing to abide by the spirit of the RISC OS style guide in respect of any software they write and distribute.

Failure to reasonably comply with this would lead to the individual concerned being barred from obtaining any future updates to the source code.

This wouldn't require any support, or much policing – the threat of being barred would be enough to make most users comply, and Acorn would, subsequently, only need to patrol the most well-known and widespread applications which arise as a result.

It's just an idea, but then what would I know about such matters? Anyone care to comment?

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Ultrasonic!

Mike Cook finally detects whether he is coming or going

DID you ever have one of those projects that starts off as one thing and ends up as another. Well this month's offering has been through many changes before arriving in its final form. Basically it is a detector that can sense someone approaching or departing, and it turns out to have lots of different uses.

It all started when I was playing about with a couple of ultrasonic transducers that I have had lying about for about ten years waiting to be used for something totally different, which might be revealed if I ever get them to work. I had the transmitter sending out a continuous signal and was displaying the received signal on the oscilloscope.

Now, if I locked the oscilloscope to the signal I was sending and viewed the received signal on the other trace, I could see it move as I moved my hand away from and towards the transducers. I was instantly reminded of that strange electronic musical instrument that you see on old science films, the one that gives a variable frequency in response to you waving your hands in front of it – it was given a proper name at the time but I can't remember it now. (*Something like Theramon, used on the soundtrack of Forbidden Planet. Ed.*) It struck me that it might be fun to make something similar with the computer.

What I was seeing was the sound signal bouncing off my hand and back to the receiver. As the frequency of the sound was about 40KHz, this meant the wavelength of the sound was about 8mm, so that the phase of the returned signal went through 360 degrees for each 8mm my hand moved. As you can see this is quite sensitive and for this project it is much too sensitive, although the effect might be useful in future projects.

What I wanted was a circuit that would detect whether the received signal was increasing or decreasing in phase. It all sounds very simple but in practice this proved to be rather difficult. The problem is that whenever the signal goes through the 360 to zero or zero to 360 transition you have a sudden opposite change in the phase that you have been tracking.

With all problems like this there is a trade-off between how much you do in software and how much in hardware. I tend to favour doing more in hardware as you don't tie up the computer so much. With signals at 25uS intervals, timing the phase for each one won't leave much time for anything else, even on a Risc PC.

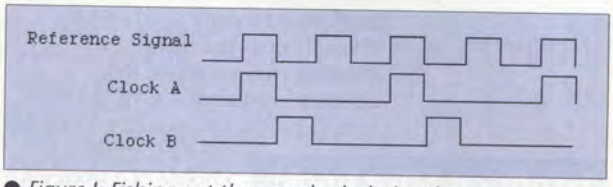
I will not go through my unsuccessful circuits to do that as there were two before I arrived at this solution. Basically what a circuit has to do is to remember the past phase and compare it to the current phase in order to detect any change in direction.

As a detection sensitivity of 8mm seemed fine for my intended application, I only need do this one point on each cycle. What I wanted to do was sample the received signal at two specific points on the reference signal. In fact it was easier to work with the reference signal and a divide by two version of the received signal. Figure I shows the relationship between the reference signal and the sampling clock signals.

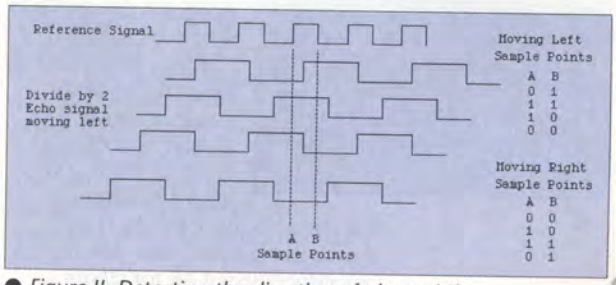
This sampling signal is used to store the current state of the received signal by clocking a two-bit shift register. In that way I can have both the current state and the previous state available at each sample point. Figure II shows the relationship between these sample points and a received signal whose phase change makes it look as if it is moving to the left on an oscilloscope.

Notice that there is a definite progression of logic states as it moves across the sample points. The table in the same figure shows what movement to the right will look like. Now this in itself is not enough to determine the direction unless you had a computer continually looking for any change in these two sampled states.

We are only interested in the change from one state to another so we can build up a table of the current state and previous state of the received signal for each direction ➤



● *Figure I: Fishing out the sample clock signal*



● *Figure II: Detecting the direction of phase drift*

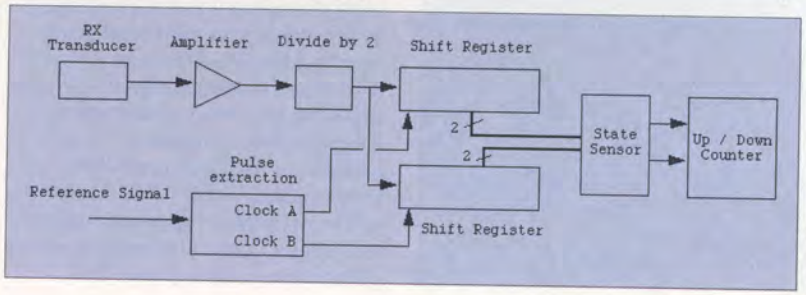
Moving Right

Last A	Current A	Last B	Current B
0	0	1	0
0	1	0	0
1	1	0	1
1	0	1	1

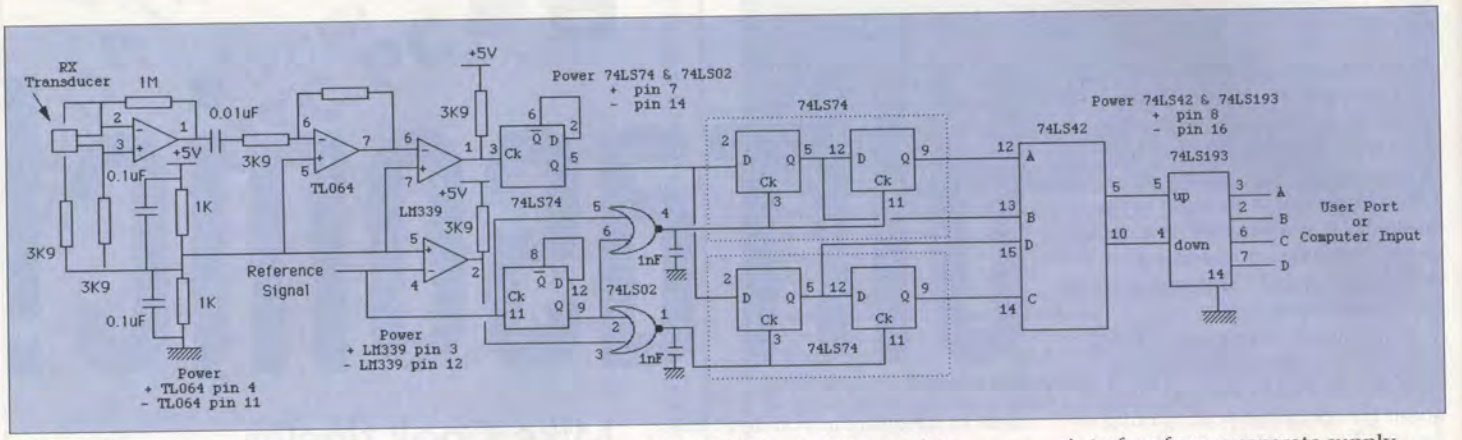
Moving Left

Last A	Current A	Last B	Current B
0	0	0	1
0	1	1	1
1	1	1	0
1	0	0	0

● *Figure III: The critical phase change states*



● *Figure IV: The block diagram of the direction detector*



● *Figure VI: The circuit of the Ultrasonic transmitter*

➤

of movement – this is shown in Figure III. Note there are four states per cycle or change of phase of 360 degrees.

These are not distributed evenly over the signal and anyway, for our resolution we only need one of them. Therefore this table is showing that you have four different combinations of the two sample points for each direction. All we have to do is to choose one from each table to clock an up/down counter and we have cracked it.

Figure IV shows the block figure of the detector circuit and should be looked at while re-reading the above description.

The final circuit of the receiver is shown in Figure V, with decoupling capacitors missed off for clarity. These are simply five 0.1uF disk ceramic capacitors placed across the power supply, distributed evenly over the circuit board.

The TL064 amplifier chip only uses two out of the four amplifiers as does the LM339 threshold detector chip. It is best to try to understand this circuit with reference to the block figure. I have only used a 4-bit up/down counter but if you like you can easily make this an 8-bit one by cascading another 74LS193. To do this you connect the carry and borrow signals of the one in the figure to the count up and count down inputs of the extra counter.

Finally Figure VI shows the circuit of the ultrasonic transmitter driver – this is simply a 74LS13 oscillator driving the transducer directly. You should adjust the variable resistor so that you get a maximum signal output, although I found in practice this is not too critical.

The problem of using ultrasonics is that the receiver will pick up several signals at once. First of all some signal leaks out of the side of the transmitter but this can be minimised by placing a sheet of cardboard between the two.

Alternatively, you can give them a bit more direction and sensitivity by mounting them in the bottom of plastic coffee cups or even pot noodle tubs.

The other source of signals are from multiple reflections. What happens is that you can get destructive interference between these signals and the reflected one you are trying to measure. This results in the received signal dropping down to nothing and the detector getting multiple counts. In practice this is not too much of a difficulty but it does stop it from being absolutely precise.

Having got our sensor, what can we do with it on our computer. First we have to get the count into our computer and as the hardware is doing most of the work the speed is not too critical, so most input methods will do. I used the User Port but you could have used the digital input from an I²C interface of the printer port on those computers with a bidirectional printer port.

The only small snag with using the printer port is that you have to get the five volts to power the interface from a separate supply.

If you want more than a 4-bit counter you have to look at the difference between the current count and the last one to work out how much you have to update your large counter. You can then use this count value to generate a sound.

The example I have written requires a change before the next note is produced, but you can change this to be continuous. I must admit that I can't get much of a tune out of it but it is certainly a strange feeling waving your hands about and producing sound. The transducers can be mounted pointing up or horizontally – my preference is pointing up.

Two other examples of using this interface immediately spring to mind. First of all, imagine a computer displaying some information at an open day or in a museum. Using this sensor you could start the sequence when the computer was approached and stop it when the person wandered away.

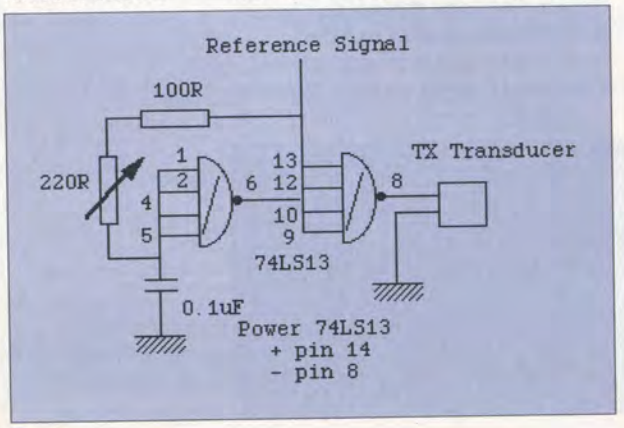
The second example is altogether more frivolous. When I was testing the hardware I found that I was making strange arm movements in front of the computer. My wife thought I had finally flipped, but it did occur to me that it might make a good game. The movements involved pulling my hand away in the ultrasonic beam, lifting it out of the beam, moving it back towards it and finally placing my hand back in the beam.

When this was performed with alternating hands it looked like I was practising swimming. Therefore, this would make a very good swimming race simulator. You could have a graphic of a little person swimming and the graphic could change for each stroke. Then you could time how long it took for you to reach a certain count value. Alternatively if you made two of these circuits you could have a race with your friend and see who could cross the finishing line first.

Hands on Mike Cook!

This project and others from the last 12 years of Body Building will be available for you to try out at the Acorn World Show. Mike Cook will be there to answer your hardware problems and give advice.

● *Figure V: The circuit of the direction detector*



Memory movers

Mike Cook tackles a range of your questions and posers

Q I HAVE got some of the 10 out of 10 educational software titles and when I first got my Risc PC these worked. Now, when I try to load them I get an error message saying it can't move the font memory. Why should this happen?

Tom Trafford, Salford, Manchester

A *When you got your Risc PC fresh out of the box it was configured to use the system font. What you have done is to switch this to a fancy desktop font. When any software tries to reduce the font cache to zero to get extra memory the operating system will not let go of the memory.*

The short term solution is to switch back to the system font for your desktop when running this software, or you could try running it after a Shift+Break to prevent auto-booting – which includes starting up the fonts. However, there is likely to be an upgrade from 10 out of 10 soon.

Power down

Q I HAVE a problem with my A310 that is quite frustrating. In a nutshell, it will not go through its power-on self test. When switched on, the machine's RGB monitor will either stay pink or black. At present it is useless. I sent the machine to the main offices in Melbourne but the technical department informed me that there was nothing wrong. When I got the machine back it worked for a week before crashing again.

I have upgraded the machine to RISC OS 3 with 4Mb ram and MEMC1a upgrade, added a hard disk with IDE interface and ICS carrier board. However, the mouse pointer began to freeze and could only be reset by rebooting. Then the machine crashed altogether and would not power on. If left for a day or two it would boot up but then crash again.

It was suggested that the position of the interface ribbon cable was at fault so I should remove the interface and reboot. This worked and reconnecting the interface didn't cause a problem. The machine worked temperamentally and disconnecting and reconnecting the interface is a pain but it fixed the problem.

However, now even disconnecting the interface doesn't help and the machine won't go through its preboot checks. I rang ICS who were adamant it was not an interface problem. I have been assured that the hardware and firmware versions are fully compatible with RISC OS 3.11. What do I do now?

The facilities and support for Acorn machines in Australia could be better – Alto Computers in Brisbane provide very expensive support and are quite arrogant. They have an Acorn-endorsed monopoly in Brisbane yet they never advertise Acorn computers. I don't understand why they are not more popular and why Acorn Australia are so apathetic in marketing a superior product. Nevertheless, I am sold and all my savings are going towards the new Risc PC.

Paul Beier, Brisbane, Australia

A *Thanks for the full history of the computer which is much too long to print in full. I would suspect two problems here. First of all these are classic symptoms of a dead or dying battery. The only one missing is trouble with the real-time clock. I would recommend replacing the batteries with fresh ones but as it sounds like the parameters in the ram*

➤

AGENDA

- Font memory
- High density disks
- Battery failure
- Expanded memory chips
- Push switches

Formatting highs and lows

Q I HAVE quite a number of HD disks that were formatted and used in IBM 720k, Apple Mac and Archimedes DD 800k formats. I have read that it is not 100 per cent reliable to reformat HD Disks once these have been put in a different format. To date I have only used the 800k format on an upgraded A310 but I intend to upgrade to the new Risc PC in the near future.

A. Muntz, Leeds, Yorkshire

A *Formatting a disk involves putting magnetic tracks on to the surface. The high density disk uses narrower tracks so gets more information on each disk. The only problem you could come across would be due to trying to put narrow tracks over the top of old broad ones. It's not the tracks that are the problem but the gaps between them. The gap could be filled with the old broad track interfering with the reading of the new ones if the head is not precisely aligned.*

That's the theory anyway. In practice I have found no difficulty re-formatting disks from other machines. In fact one solution I have for disks that won't format on my A310 is to format them on my Mac and try again. If you want to be absolutely sure that you have no problems, perform a bulk erase on the disk first. A bulk eraser can be made quite simply from a coil and an AC supply.

The coil acts as an electromagnet giving an alternating field – wipe the disks across it several times and then slowly move it away. In this way you will de-magnetise the disk.

The practice of cutting holes in normal density disks to make high density ones should be avoided because although they will work at first they are far less reliable. This is because the size of the magnetic particles coating the disk is smaller in the high density ones.

On the Acorn machines you can format a normal density disk to high density, but I would not do this for data you wish to keep long term. Also, if you are going cross platform, both Macs and PCs look for the two holes. If it doesn't find both it can't read the disk unless it is formatted to normal density.

➤

have been scrambled, remove the batteries for about half an hour before replacing them.

The second problem sounds like a classic case of loose connections and the most likely candidate is the operating system chip extension board. These can give problems if they are not seated correctly or the socket is damaged. However, they are an absolute swine to find and track down. You should try pushing one chip down into place and attempt a hard reset with the reset button. If this fails then go to the next socketed chip and try again.

When you find which chip you have to press down to get the computer to come on then the socket will have to be replaced. This must be done carefully in order not to damage the printed circuit board. The best way I have found is to cut away the plastic of the socket and remove the pins one at a time. Then clean out the holes using a solder sucker and replace with a new socket. However, if you are not skilled with a soldering iron you can lift the tracks on the board and cause more damage.

Sorry about your arrogant Acorn agent, but then that's what giving someone a monopoly does, isn't it?

You can write to Mike Cook c/o Acorn Computing, Europa House, Adlington Park, Macclesfield SK10 4NP, or e-mail to acorncomputing@cix.compulink.co.uk

He will answer any questions about difficulties you may be having with your machines, mainly those to do with hardware. If you want a personal reply ensure that you enclose an SAE with your letter.

Projected results

Q RECENTLY I was given a choice of several projects that I could build for my Design and Technology GCSE. As I enjoy programming, I decided on the project that required me to produce a computerised help system that would give visitors to Bristol City Docks information about the various places of interest along the Floating Harbour.

I decided to build a large box containing a map of the Floating Harbour, with push switches over the places of interest. These switches would then be connected to the computer and when pushed the computer would display information about that place.

Originally, I decided to use my BBC Master Compact but I thought I would achieve better visual results with my family's A4000. I looked back through my old issues of *The Micro User/Acorn Computing*, but I could not find a simple setup to register a button being pressed and then open a window. I then looked in the city library but could only find one book about interfacing and that required me to buy an interface for about £50 – a bit expensive for me with my present financial state.

Please could you send me some information about connecting some push switches to an A4000 with RISC OS 3.11 and a program or procedure to extract the states of about 10 switches from the computer's memory. I have a fairly good knowledge of Basic and have written a few wimp programs.

Oliver Miller, Merchants Landing, Bristol

A *In the good old days all Acorn computers were fitted with a User Port – a connector under the computer allowing you to have eight lines to be programmed as inputs or outputs. In fact there is one fitted, although a bit hidden, in the Master Compact. There is a monograph describing user ports and how to use them which is an amalgam from four Body Building articles and costs £2.*

As people decided what they wanted to do with computers the manufacturers decided that only a minority needed a User Port, so it was omitted on grounds of cost in newer machines. So if you want to use inputs on these machines you have to buy an interface. Perhaps the cheapest is the PC interface covered in the body building articles from May to October '91. You can get a reprint of the whole series for £2 and the interface costs just under £30.

This will give you eight digital inputs and four analogue ones which should do. The analogue inputs can be used to detect switch inputs by simply connecting them up to 5 volts through a resistor, say 10k, and then connecting the input to one end of the push button and the other to earth. You will find the same things works for the digital inputs.

On the Master Compact these inputs are available on the joystick port, just connect your switch between the input pins and earth – see the computer manual for the pinout of all the inputs. The other four inputs are a bit more difficult to get at and are on the PCB expansion edge connector and unfortunately I haven't got the pinout of this at the moment.

As to interfacing references, you can do a lot worse than send off to Musbury Consultants for a list of past Body Building articles, most of what you want is covered there.

Micro detective

Q I HAVE recently acquired an old BBC B with a piece of hardware I have not come across before. It is called a Computer Village CVX16-2 Memory Expansion Card and did not come with any ram chips but with just the Basic and DNFS roms. The chip sockets are not labelled as rom or ram but are just marked from Page&00 to Page&0F and I presume that this means that it does not matter which socket my roms go in.

As well as fitting roms to the board to fit 16k of sideways ram, the board also holds a large battery which can be switched on by changing a link and I presume that this is used to back-up any ram on board.

Can you tell me whether it is possible to fit sideways ram and if so, what ram chips will I need, where can I obtain them and will the battery back-up work with them.

Gary Davison, Coventry, West Midlands

A *I have no specific knowledge of your type of expansion card but it should be easy to sort out with a little detective work. If all the sockets are 24-pin the sort of ram chip you need will probably be the HM6264 – these are 8k devices so you will need two of them.*

Usually these chips will only fit in to specific sockets on the board. These are easily identified by pins 1 and 28 which are not connected to the main power rails like the other chips, but go off towards the battery. Sometimes these boards needed a flying lead taken to the chip decoding circuitry or the write line of the CPU, but as you did not mention any such leads you might have the type that does not need them. Either that or they have dropped off.

Something for everyone

Knights: Solitaire for Chess players

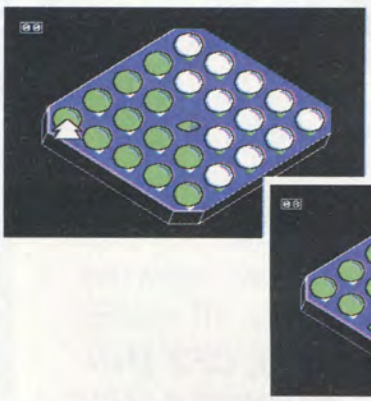
KNIGHTS is an unusual game of strategy which involves moving two sets of coloured balls around a 5x5 board. The objective is to relocate each ball to a position initially occupied by one of the opposite colour.

Balls can only be moved using the knight's move in chess – two positions along one axis, one across the other – into the vacant board position.

The aim is to move all the balls in as few moves as possible. I've done it in less than 50; over a hundred is not worth counting – the counter loops back to 0 after 99.

To move a ball, position the pointer over it using A, Z, : and ? then press Return. The board can be reset in mid-play using Escape, while Ctrl-Escape quits the game and returns you to the Basic prompt.

Barnaby Short



● *Remember the Knight's move*

WSquare: Speedier solutions

BACK on the September 1993 BBC disk there was a utility for solving wordsquare puzzles. WSquare is similar to this, but features many enhancements.

It can handle larger grids – up to 38x24 – features an improved algorithm, displays every occurence of a target word and uses separate data files instead of program modifications.

Upon running the utility, you are requested for the name of the data file to be searched. After loading, the number of rows, columns and target words contained are shown.

The wordsquare is displayed so you can check everything is correct, then re-drawn with dashes in place of the puzzle letters as the search begins. As each match is found, it is shown on this grid.

After marking these down on your original copy of the puzzle, tap the space bar. A list of all the target words is shown, with an indication of whether each could be found or not.

The format of a data file is:

- Number of rows
- Number of columns
- Wordsquare grid
- Number of target words
- List of target words

Each row of the grid must be on a separate line, as must the target words. A return character must be present after the last target word. The target list can consist of up to 20 words, though longer lists can be tackled by using the program several times.

Four example files – *D.Data1* to *D.Data4* – are provided as an illustraton.

Pete Dawes

Make100: Infinite combinations

TRY writing the digits from one to nine with one of the signs +, -, * or / between each, so that the sum works out as 100. Remember multiplication and division take precedence over addition and subtraction – 4+5*6 is 34, not 54.

An example is *1+2+3+4+5+6+7+8*9 = 100*. If you would like to know all the solutions, try this program – but give it time!

The micro has to make 4^8 = 65536 calculations altogether, which takes about 35 minutes if you wish every calculation to be displayed, 16 minutes if you only want to see the successful ones.

Jon Millington

PD Bonus

This month's disk is practically bursting at the seams. In addition to our usual selection of exclusive programs, we've squeezed on a host of exciting software from the Public Domain.

Demonstration: Dreamscape
Games action: Sixty Six, Wall Wally
Graphics: Chess Picture, Dalek Picture, Fractal Triangles, Mandelbrots, Triangles
Utilities: 40 Track Disk Backup, Smarter Dates

Primes in 6 columns: Mathematical mystery

MANY programs to produce prime numbers already exist. This one displays the results in a way that highlights the less well-known fact that, in a group of six consecutive whole numbers, a maximum of two can be prime.

Depending on the starting number, these will always be in the same position within each group. For example, starting at one as the program does, only those numbers in the first and fifth columns can possibly be prime.

Jon Millington

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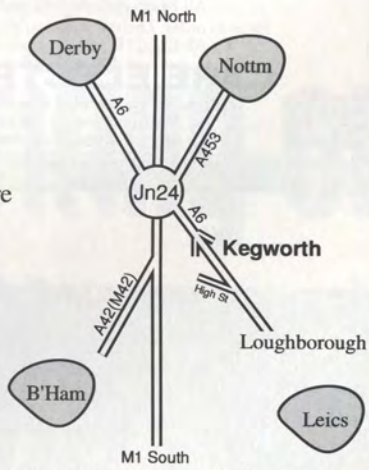

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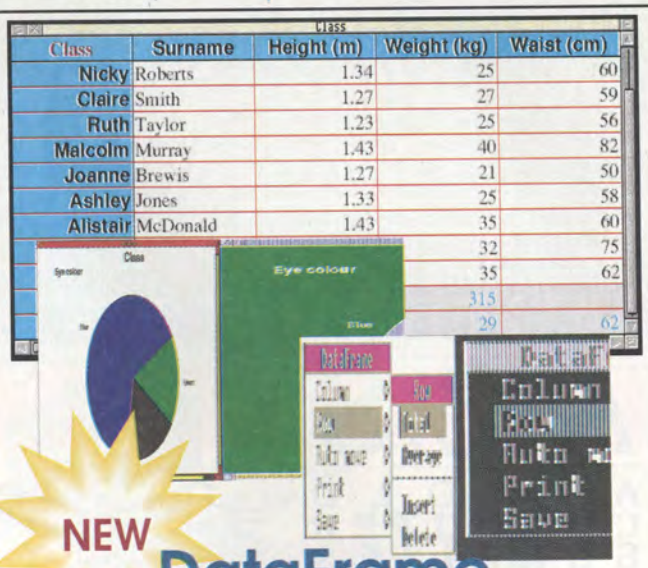

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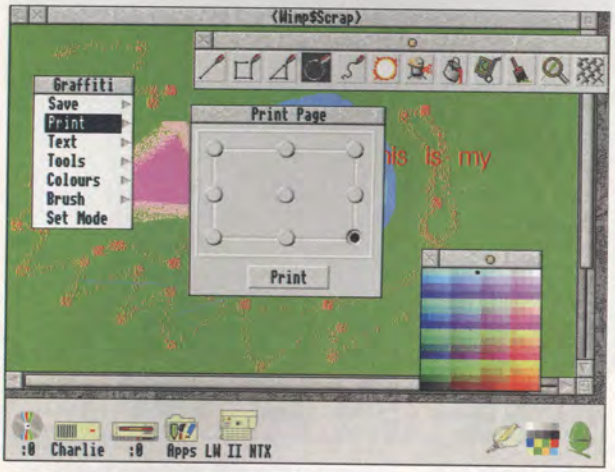
The writing on the wall

Teri Paul takes another look at the world of public domain and shareware



● *Simply artful Grafitti*

FROM time to time in the PD scene you find a program which fits the niche. Personally I could never get to grips with Paint, but I don't do enough artwork to justify buying a commercial package – or, to be honest the talent, to do it justice. Therefore, when Kiwi Andrew Armstrong's Graffiti fell on my desk it sounded just the job.

The software has been designed to be fun and the impressive manual which accompanies it is well-written and informative for novices without being condescending. The only drawback is that you will need RISC OS 3.1 or later to access it.

The application loads in the usual way and clicking select on the iconbar is met with a request for the type of picture you want – high or low resolution. A window will then appear and clicking the adjust button reveals colours and tools: Line, Rectangle, Triangle, Circle, Freeform, Explode, Spray, Fill, Move/Copy, Paint, Magnifier and Text. In addition you can set the size of the brush and spray tools as well as the density of the spray can.

Clicking Menu on the picture allows you to print, save (in Sprite format), change the font and size, open the tools and colours windows, change the brush/spray variables and set the mode.

Printing uses the standard drivers and the print sub-menu allows you to position the picture on the page. For instance, if you choose the upper right radio icon when the picture is printed it will appear at the upper right edge of your page.

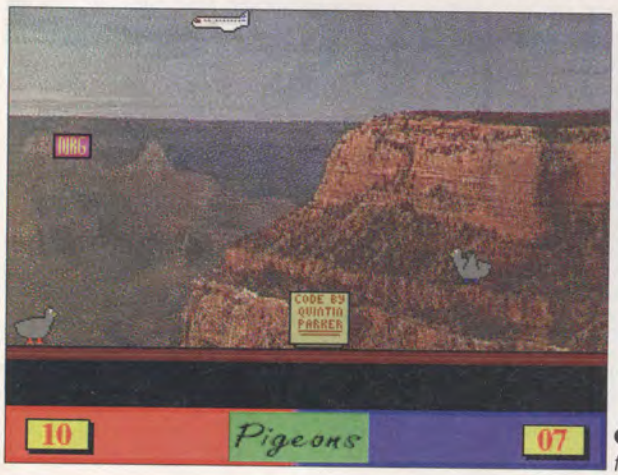
Nicely designed and implemented, it has some interesting features making it an excellent basic painting package. Recommended.

Pigeon pie

For a bit of light relief try **Pigeons**, a spoof of the very popular Amiga PD game – Biplanes. Instead of aircraft you are surrounded by flyers of the feathered variety. But these are pigeons with a mission – bump into neighbours and relatives and you'll blow up. Alternatively you can drop bombs on them.

But beware, once you've taken off, you can't land again. Thank you Mr Parker.

If you want a bit more meat in your entertainment, you could dust off your mathematical skills with **StarMath** by Raffaele Ferrigno. This simple game tests easy to advanced subtraction, addition, multiplication and division at three levels. Nicely put together way of practising arithmetic functions.



● *Pigeon fanciers beware*

Protection racket

PD author William Cooke comes up with two programs to keep sensitive information safe and sound and your machine away from the light-fingered. The default settings are noted in the help file and once accessed you can change them as you see fit. But first of all you need to access **PROtek** itself.

You can now test your new password by double-clicking on the !PROtek icon. Play around with this and see what happens if you get the password wrong a few times – but make sure you save your work first.

These programs are really only useful if booted-up automatically. However, PROtek will only boot up once. If you have multiple copies rename them so they all have different names.

Keeping track

Filer- is a menu-driven guide through your filing system's directory structure. Double-click to load – though this doesn't load on to the iconbar.

From now on, when you want to display the whole of an ADFS directory tree, for instance, click Adjust over an ADFS Filer icon. If ➤

Featured this month

DirCount	Beebware PD
Elminate	5 Star Marketing
fsck	5 Star Marketing
Grafitti	Subscription disk
Map Manager	5 Star Marketing
Pigeons	5 Star Marketing
ProTek	5 Star Marketing
StarMath	Gem PD
Undelete	5 Star Marketing

● *ProTek keeps out those prying eyes*

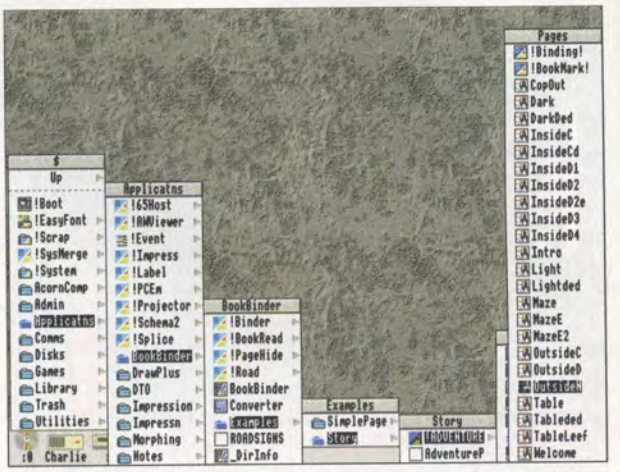
➤

you now click Menu on the desktop you'll be given the option of examining a series of filing systems: ADFS, IDEFS, MEM, RAM and Resources. Clicking Adjust over the ResourceFS Filer builds the Resources:$.Apps menu. Click on an object from a sub-menu and it will run.

If you choose the Up option the current menu will be discarded and you can build a new one starting with a parent directory. You can also add your own filing system by altering line 78 in the RunImage file.

Two versions of the Filer Pinboard Filters module are supplied: PinMen+Alt redirects Menu clicks over the Pinboard window to Filer if the Alt key is being held down and passes them on to the Pinboard, otherwise PinMen-Alt filters out Menu clicks over the Pinboard window if no modifier key is being held down and passes them on to the Pinboard otherwise. Make your choice in the !Run obey file.

Hands up those of you who have deleted a file to then discover that you needed it? I like the Apple Mac way of working of throwing everything into the trash from which you can retrieve it until such time as you specifically empty the bin.



● *Navigate the tree structure with Filer-*

Acorns don't work in that way, so I was intrigued by Christopher Jones' utility called **Undelete**. Its aim is to undelete whole and part files. Undelete reads in a whole 800k disk from drive 0 and attempts to find JPEG's, GIF's, Draw files, PBMPlus, Alarm save files and tracker sample (headed) which are saved out to a second or to the same floppy disk. Not a complete solution, but a start.

Though my hard disk is becoming full of useful modules I may need, I felt that I had to make room for the **MapManager** module which helps with examining and sometimes repairing hard drives whose maps do not correspond completely to the directory tree – *Map inconsistent with directory tree.*

CheckMap only does a simple integrity check and can't tell which files are affected. The command *MapCheck supplied by the MapManager module lists the offending fragments so you can assess the severity of the error. Alternatively, it is possible for *CheckMap to hang, when it can't find all the fragments for a file.

You'll probably still need to reformat the disk and restore its contents from a backup. However, it gives you the chance to see which files are endangered and could contain garbage. Later versions might include commands to modify the map or directory tree to restore a hard drive without reformatting.

Two other helpful utilities are **Eliminate** and **fsck.** Eliminate removes a file from the directory but not from the disk map. This means that the disk space used by the file is lost – though you could probably recover it using fsck – allowing you to remove files that cannot be deleted in the usual way by RISC OS.

fsck originated on UNIX systems and is distributed as shareware. The aim is to fix the map of an E-format disk if corrupted. fsck can also report information on the way the files are allocated – bytes lost due to sectors boundaries – and eventually print a detailed description of the map and directory organisation.

PD LIBRARIES

8-BIT HOUSES

8-bit Software, 17 Lambert Park Road, Hedon, Hull, East Yorkshire HU12 8HF.
BBC PD, 18 Carlton Close, Blackrod, Bolton BL6 5DL.
HeadFirst PD, 97 Chester Road, Southport PR9 7HH.
JJF PD, 49 Hollyberry Close, Winyates Green, Redditch, Worcester B98 0QT.
Masterdisc, 2 Seaview, Hoylake L47 2DD.

32-BIT HOUSES

3PD Swapshop, 66e Picardy Road, Belvedere Kent DA17 5QN.
Alpine PD, PO Box 25, Portadown, Craigavon BT63 5UT.
APDL, 39 Knighton Park Road, Sydenham, London SE26 5RN.
Arcaynia, PO Box 1927, Sutton Coldfield B74 3QZ.
ArchAngel PD, PO Box 41, Exeter, Devon EX4 3EN.
Archimedes Fractal Group (AFG), 30 Bowen Drive, West Dulwich, London SE21 8PN.
ARM PD, 109 Woodland Drive, Cassiobury, Watford WD1 3DA.
ARMistic PDSL, 136 Wellesley Road, Ilford, Esex IG1 4LJ.
Australian RISC, 241 Hawkesbury Road, Winmalee NSW 2777 Australia.
Cheap PD, Greenways, Grubwood Lane, Cookham Dean, Maidenhead, Berkshire SL6 9UB.
Craig Beech PD, 30 The Deerings, Harpenden, Herts AL5 2PE.
Datafile, 71 Anson Road, Locking, Weston-Super-Mare, Avon BS24 7DQ.
Datastream, 34 Norbreck Close, Great Sankey, Warrington, Cheshire WA5 2SX.
Different Ideas, Eyton House, Eyton, Leominster, Herefordshire HR6 0AG.
Digital Phenomena, 104 Manners Road, Southsea, Portsmouth, Hampshire PO4 0BG.
DigiTech, 20 Downing Crescent, Bottesford, Scunthorpe, South Humberside DN16 3LS.
Eureka PD, 78 Rawlinson Road, Southport, Merseyside PR9 9NE.
Gem PD, 15 Partridge Down, Oliver's Battery, Winchester, Hampshire SO22 4HL.
HeadFirst PD, 97 Chester Road, Southport PR9 7HH.
LowCost PD, 6 Furzeland House, Sheephouse Way, New Malden, Surrey KT3 5PH.
Lunchtime Disk Magazine, 203 London Road, Chesterton, Newcastle, Staffs ST5 7HF.
Moonlight Graphics, PO Box 3569, Cape Town 8000, South Africa.
Naked PD, Fayence, Fulford Road, Fulford, Stoke-on-Trent ST11 9QT.
Planet PD, 37 Manor Drive, Berrylands, Surbiton, Surrey KT5 8NF.
Skyfall, PO Box 2220, Birmingham B43 5RZ.
Westbourne Services, 34 Bradley Street, Wooton-under-Edge, Gloucester GL12 7AR.

● *Subtle, this game is not*

Wolfenstein 3D

...auf wiedersehen, pet

WOLFENSTEIN is a game that saw considerable success in the PC market a while back and, after spreading to several other platforms, has spawned a highly successful sequel. It's finally found its way to the Acorn, converted by Eddie Edwards of Powerslave, who must take the credit for pestering Id Software until they agreed to let him have a licence.

If you've not heard of Wolfenstein before, here's a quick summary – take an old 8-bit 3D maze game and put the main character on roller skates. Now you've got him spinning and sliding down the corridors at full tilt, give him a gun and throw in legions of trigger-happy guards. Add a variety of doors, texture-map the walls, riddle the place with secret passages and pop in some end-of-level guardians for spice.

The graphics were one of the hallmarks of the original – texture-mapping can be horrendously processor-intensive, and in those days they didn't have much of a processor to be intense with. As a result, the guards' sprites ended up looking like the artist had run amok with a pixellator. However, making this compromise allows the program to concentrate on a quick screen update, and in this style of game the speed of movement is critical.

Wolfenstein is set around the period of the second World War, and instead of firing your ammunition at hideous aliens from a distant planet you're shooting at Nazis. Nevertheless, parts of the game are definitely tongue-in-cheek – in one level you're chased by giant Pacman-style ghosts, and I don't remember them being involved in any world conflicts. The game contains a fair amount of death and destruction so it's perhaps not to everyone's taste, but thankfully there's much more to the gameplay than just watching a few lurid sprites.

Your target is the lift at the end of each level, and to get there you have to run, sneak or shoot your way past the armies of guards attempting to kill you. Choosing the correct route through the maze is vital, and if you open the wrong door, your chances of survival can rapidly diminish. In such situations, a change in strategy is called for – run away!

Secret passages have featured in many games, but I've never seen quite so many as in Wolfenstein. Even the first level has its share, with enhanced weapons, hordes of treasure and a concealed level exit waiting to be discovered.

Although the sprites can be blocky, they are well-drawn and help create the game's distinctive atmosphere. There are several environments throughout the levels, ranging from cold stone dungeons to wood-panelled offices – Hitler's portrait crops up all over the place, on oil paintings, photographs and even stained glass windows.

The same variety has gone into the creation of the guards, who range from your everyday sentry to a hypodermic-wielding doctor who's definitely a few tablets short of a prescription.

How fast does it play? The good news is that Eddie's hand-coded graphics routines deliver a fair turn of speed even on a humble A3010, and on an A5000 rotation and movement are slick and convincing. Control is by the mouse keyboard or joystick, and although I found rotation could be a touch slow – especially when someone was shooting at me from behind – gliding down the corridors gives you a real sense of motion, even though it is more like skating than walking.

Wolfenstein may be a little long in the tooth, but it's growing old gracefully and Eddie Edwards has performed a very professional conversion, producing a game that has the right mix of strategy and arcade action. It's a while since I've played a game that's raised my pulse rate to the same degree, so if you're after a fierce battle, Wolfenstein's the place you should go.

Hal

PRODUCT SPOTLIGHT

Price: £30
Supplier: Powerslave, PO Box 175, Enfield, Middlesex.

● *A good time to find a secret passage*

● *A Mexican stand-off*

● *The graphics give you no doubt as to the era*

StarFighter 3000

...battle for the Sky (ratings that is)

FEDNET is a name that may be familiar to many of you, although in its earlier incarnation it produced Stunt Racer 2000 for The Fourth Dimension. Well now they're back. With SR2000 the concept was that the game you were playing was actually a physical game in the future run by – you've guessed it – FedNet. The same is true here. You've been chosen to pilot a combat vessel, not in a war but in a TV programme – but it's just as lethal.

Of course making the game into a game, as it were, all the arguments about the unreality of power-ups, points and credits all become meaningless. This *is* a game so you *can* have credits, points and power-ups while wiping out immense spaceships and dozens of enemy fighters.

On entering the game proper you're presented with the map of the area with various indicators showing enemy ships, missile emplacements and the targets. It's crucially important you read the information available at the target sites because they fill in a lot of detail that the basic briefing fails to mention – it wasn't until I *did* read it that I found out why I couldn't destroy the most obvious target and how I could get help.

The first thing you do is take your basic ship and your 1100 credits and go to the shop to add weaponry, engines and shields – you can try it without these but you'll be wiped out pretty fast unless you've had some practice. Of course if you preserve your credits early on you'll have more to play with later.

The basic essentials are more shields, more thrust and more firepower. You could go for a tighter turning circle too which can be handy if you want to engage in more dogfighting, I found extra shields to be more important.

From there you play the game. The graphics are very good indeed, you should try watching the demos first. The ground is flat but textured – unlike the featurelessness of flight-sims – which gives an excellent impression of movement when you're flying low – a shadow is projected on to the ground so you can see when you're getting close.

There are hills and mountains, although these are less impressive than the buildings, ships and planes. There's a slight touch of Interdictor as enemy planes come out of their hangars and take off from runways and there are carriers on the water. If you fly high the sky becomes darker and eventually you see stars and there may be huge wheel space stations, as well as offensive satellites. It's very impressive.

PRODUCT SPOTLIGHT

Price: £29.95
Supplier: FedNet, 66 Park Road, Duffield, Belper, Derbyshire DE56 4GR.
Tel: 0332 840487

I'm not entirely happy with the controls although I've spent a good amount of time playing, it's a sort of uncomfortable compromise between Elite and Interdictor, which is to say you're flying a sort of plane-cum-spaceship but the controls don't really mimic either – for example you can't loop.

Combat is very exciting as ragged energy beams blast past you, missiles skim past the wing you've just dipped, mid-air collisions take place, and so on. Weaponry will strike anything that gets in the way so you often see messages about enemy ships being destroyed when you were running away – they flew into *friendly fire*.

You are equipped with three types of weapon: A standard laser, air-to-ground and air-to-air missiles. Target lock is illustrated very effectively by the currently targeted object having it's edges highlighted. When the object you want to shoot is highlighted you hit the fire button and the locked-on missile is fired.

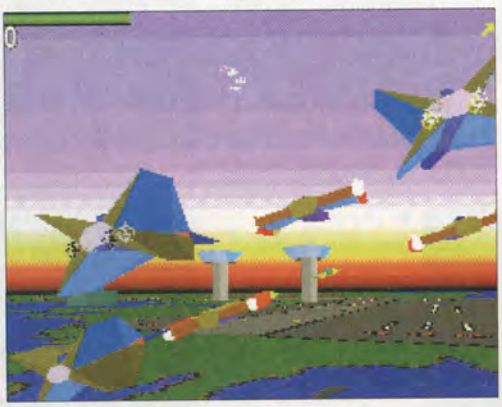
Although it may be possible to carry out the mission without any help, there is some at hand in the form of three friendly ships who are patrolling in a fixed pattern. All you have to do is fly past the leader and they will move into formation with you, shooting at what you target using the same weapons.

Alternatively, you can issue attack commands which sends a proportion of your wing off to do battle with the bad guys. You can also recall them, although that may be dangerous (to them).

The demos illustrate very well how your wing can be used to provide covering fire while you wipe out the ground installations. It makes such a change to have some planes on your side.

I found the demo level a bit tough – although I *did* keep at it until I got the hang of it which certainly says something. FedNet says it might make the earlier levels less hard just to *ease* the player in a bit more. Having said that I can confirm that this is an *excellent* game to play if you like a bit of mayhem with your strategy.

Steve Turnbull

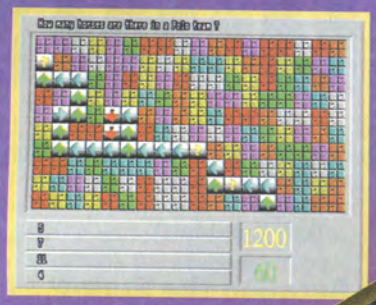


● *Support your wingmen and they'll support you*

● *It's off to Mars for more combat*

● *Okay team, let's take out the enemy HQ*

ARIES



QUIZMASTER

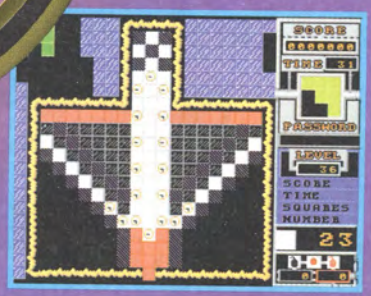
Over 2,000 questions from a choice of 8 categories will test your general knowledge to the limit. Quizmaster can be played by 1-4 people over five different rounds.

HAMSTERS

The world has been over run by a plague of cute furry little animals. Your only chance of saving the world is with a mallet. Superb colour graphics and catchy music – another Tom Cooper classic.

BLOWPIPE

The classic horizontal shoot 'em up. Contains over 2.5MB of 256 colour graphics with up to 64 sprites on the screen simultaneously. 4 channel stereo music with stunningly realistic sound effects.



SQUARE ROUTE

This hopelessly addictive puzzle game is bound to have you hooked. Your objective is to turn the white squares red over the 250 levels, each becoming progressively harder. Can you make it to the end?

GAMESWARE

JOYSTICK COMPATIBLE

RISC OS 3.1

MINIMUM 1 MB RAM REQUIRED

PRICE £29.99 INC. VAT

Available from all good Acorn software stockists or from GamesWare, Worthy House, High Street, Hamble, Hants SO3 5HA. Tel & Fax: 01703 450523. Visa and Access accepted.

GamesWare is a trading name of Astrom Computing Ltd.

Soul

LAST time, in our solution to The Pawn, we had just exercised our democratic right to vote for Gringo: Don't worry that he looks a bit like Comrade Fidel – we all have our problems in life. Check your inventory, I reckon you should have the following items: Pouch, trowel, rice, rope, coin, the white and some lumps.

If, as happened to me when replaying the game for the purposes of this solution, you still have the chest, you can now discard it.

It means you've missed the adventurer on the legless horse. Since you have used the blue key to open the safe there is no danger from him that I know of. We're finished with the tree, so move west twice, up twice, then out and down.

Next go north twice, northeast and east. This will bring you to a grassy plain and – more importantly – to a character called Honest John who has sundry items for sale. Careful choice is of the essence here, so select the Water-of-Life and the real ale which can both be bought with the coin you have.

The next bit gets you some points, but I can't see how else it helps in completing the adventure. Anyway, here it is: After dealing with Honest John, go west to the path, north to the foothills, northwest to the narrow track, climb the rocks again and go up twice to the plateau.

You'll remember there's an ice tower here to the southwest of you, but it has no entrance that you can discern: A move south though, followed by one west, will reveal an entrance to the northeast and a snowman who blocks your way.

It took me a while to figure out what to do next. The white is a source of light, as we all know, but it turned out to be a source of heat as well. So throw the white at the snowman and he will melt – but start to reform at once.

Use the opportunity to slip into the tower where you'll find some spiky boots in a store room to the west. Wear them to climb up to the landing and a heavy wooden door which is locked. I could find no way of opening the door, so it's up to you whether you want the points which are gained in this way.

From the tower, move east and then north to allow yourself to get down from the plateau on to the narrow track. Go down again and then east to the cave mouth, east twice more and then down to the small cave.

Next go north to the damp passage and then north once more to a laboratory where three alchemists are squabbling over who is to go out and get lunch.

Feed the blighters with the rice you are carrying and one of them will offer to turn any lead you have into gold. Remember those lumps? Well, hand them over and the three will scatter, leaving you free to roam at will.

Northeast takes you into a store room containing an aerosoul (no spelling mistake) and some tomes. The aerosoul sucks, rather than blows, and the tomes are very likely to crumble if you don't cast a spell on them first.

Dunno where I picked up that spell, but when I typed the command *cast spell on tomes* blow me if the book didn't obligingly open. Reading it will tell you that Kronos has sold his soul to the devil and when he shuffles off this mortal coil will suffer eternal torment unless he can find three substitute souls to offer instead: Guess who's one prime candidate? Nasty – so we'll leave things at that for the moment.

To be continued.

Burgling the Bunny

This session in Wonderland will take us into the game proper: Max left you in the broom cupboard, having made a clean sweep of all that was inside, so now go north, east and southeast.

Your job is to disguise yourself to look like Mary-Ann, the White Rabbit's maid. Take the blue fan and the blue gloves, but you'll find you are too big to get into the small overall you also found in the broom cupboard.

Answer: If you open and wave the fan, you can shrink yourself small enough to wear it and the blue gloves as well.

Now you simply wait until the White Rabbit trundles by, muttering to himself: He will give you the front door key to his house and also leave the door to the east open as well.

Last thing to do before leaving this location is to open the curtain, unlock the tiny door with the key in G and follow the rabbit east into the main part of Wonderland.

Your main purpose now is to emulate the Knave of Hearts and steal those tarts – but if you think that is going to be easy, you have never encountered a Magnetic Scrolls adventure. First things first: You can see a stick-insect, so take it. OK, you can't, since it scuttles off, but you can now take the stick. Next, take the poster and read it.

Now it's time for a little burglarious activity: Open the garden gate, go north and take the peg – you are going to need that small item desperately later if an unfortunate explosion is to be avoided. Next unlock the front door with the key the rabbit gave you, open it and go north twice.

Take the breakfast egg from the rack, open the cupboard and take the cup and then open the back

Food

door, going north and east into the shed where you'll find a nice vice.

Put the coathanger in the vice, straighten it and then open the vice again to release the straight(ish) bit of wire. West, and south twice will get you back to the hall and you are ready to go upstairs

At the top of the stairs is a clock: Open it and you'll find your first playing card – 6 of diamonds – inside. Taking the card will cause it to fly out of your grasp and into the card shoe: Since that's where we want it to be anyway, let's not get palpitations, shall we? Take the Right Hand pouch, too, as you'll need it later when encountering a certain fungoid growth.

Now then, there's this locked bedroom door – but we don't let little things like that deter us, do we? You can shove either the poster or the sheet music under the door and then put the straightened coathanger into the keyhole and dislodge the key. Next pull whichever piece of paper you used, and take the bedroom door key, then unlock and open the door. The points are now piling up nicely.

Finally for this session, go north into the bedroom and open the chest of drawers: Take the pink gloves, fan and the quartz bottle – which contains a certain substance that will cause your neck to look like an anaconda.

Now go south, down, south twice, west and north twice to land you outside the palace. Incidentally, when he wrote in with his elegant solution, Max was all of 12 years old. Well done, mate. And that's where we'll leave things for now.

To be continued.

Hatter's Helpline

I've had a letter from Ronald Park about a problem in Wonderland that leaves me totally baffled – easy to do, as I'm not all that technically-minded. He upgraded his A3000 to RISC OS 3.1 – no problem. He later upgraded his RAM from 2MB to 4MB, added a hard drive from ICS and now can't get the game to run from his hard disk.

Just about every error message gives an address line and the report *in anonymous function*. I had little trouble when I upgraded to RISC OS 3.1 and increased the ram to 4MB on my A310, particularly when I altered the configuration setting to make the screen type selected rather than Automatic. Mind you, I still run it from floppies.

I am passing on his letter to Mike Cook, just in case there is a hardware problem, but if any reader has a suggestion, Ronald and I would be very grateful.

Haunted House has, rightly, proved to be a very popular – and puzzling – adventure and offers of help to Jo Kenny have started to pour in. I'm writing to Jo direct (she sent me a stamped, self-addressed envelope) but some of the hints will prove universally useful.

Grateful thanks to all readers, but particularly to Emily Shields and Alison Leigh: It's only right that two ladies should help out a damsel in distress – I'm an old-fashioned codger.

Anyway, here we go: To get rid of the ghost in the hall, use the bell, book and candle. To stay in the bathroom, make sure the lady leaves first. Get the soap and towel from the small cupboard and the wardrobe. Open the bathroom door and *throw* them in from the back bedroom.

To light the lamp click on it with Adjust. The note in the shed is a help with the puzzle in the privy (our esteemed editor refers to it as a throne room) and he confirms that the glue is a red herring. Emily adds that it makes your rucksack sticky and after that you can't take anything out of it.

One final hint from Alison (I'll keep some of her others for next time) is that books can be read while holding down Select, clicking on Adjust and pointing at them. This proves useful where the safe is concerned: More details next time.

Meanwhile, Alison has a query: When she pours milk into the bowl belonging to the invisible cat she can move the basket safely – but how does that help? There's a quarry tile underneath that needs shifting.

Jonathan Tate (who also had some help for Haunted House – next time, folks) has a query. He's after games from Magnetic Scrolls: Try contacting Special Reserve (a discount club) at PO Box 847, Harlow, Essex CM21 9PH. They *used* to stock Archimedes software, including Magnetic Scrolls adventures, and while they don't anymore, a suitably grovelling letter might locate some remaindered stuff.

Adventure software house Topologika have moved into my back yard. Their address is Islington Wharf, Church Hill, Penryn, Cornwall TR10 8AT. Tel 0326 377771.

Elite tactics

Max Kolombos is also a fan of ArcElite and wonders in a general way what tactics to use: Well, he'll have had plenty of detailed advice since he wrote in with his solution to Wonderland, but there are two things I can't emphasise enough. Save frequently and regularly, and – above all – persevere.

Commander Zirlek wonders if I could devote a whole column to ArcElite: If there is sufficient demand I could, provided it doesn't irritate adventurers. Don't forget, I've got to please all of you all of the time, if possible.

An old letter from Peter Warlow asks questions that are well worth answering so that new readers know where they stand regarding Elite in its varied versions. The simple name *Elite* refers to the versions for the BBC B, B+, Master and Second processor-equipped machines.

ArcElite refers to the conversion by Clive Gringras and Warren Burch which runs on all RISC OS machines with 1MB or more memory. *Elite 2* refers to David Braben's new game that I have on my PC and, finally, I also have a version for the Atari ST which I think is more or less the same as that for the Amiga.

Missions, therefore, vary in number and difficulty. If you want my opinion, the Atari/Amiga version is for wimps (and I don't mean computer interfaces). The others are superb, though it can be argued that combat in Elite 2 is a trifle easier than it need be.

Elite had two Missions, ArcElite has four, Elite 2 has an awful lot – many are similar, though – and I've forgotten how many the Atari/Amiga version had: I got bored.

See you next time.

Mad Hatter

Making the difference

THE benefits of using computers with people with learning disabilities is well documented and my own experiences working with adults in a residential setting and being the father of a seven-year old daughter with Downs syndrome is a positive testimony to these benefits.

I currently run a computer loan scheme, based on Acorns, across Devon and Cornwall. We make available A3000s and A3010s with a range of software geared not just to the needs of the individual with a disability but to the whole family so that they can experience for themselves the benefits that computers can offer over a four to six month period. During the period of the loan I offer telephone and occasional visiting support to families as required, to help them master the hardware and software.

I must stress that my knowledge of computer matters is entirely amateur and my intervention is voluntary, my only expertise lies in having worked with a variety of children and adults with learning disabilities. I am very fortunate to have support from a teacher who works in a local *special school*, an IT adviser in Penzance (Di Hillage) who helps out with a variety of problems and Andy, a computer buff from RAF Culdrose who gives us some technical support when needed.

The scheme has been running successfully for the past four years and many of the families who used the scheme have gone on to buy their own systems. They keep in touch and form a kind of loose user group that I can call on to assess software.

As the word spreads I am increasingly being approached by individual families around the country who either have an Acorn bought specifically for a child with a disability or are considering getting one. I do my best to assist people where possible, but obviously time and resources are limited.

I have recently been involved with setting up another loan scheme in the Southwest, based on the Bristol area, and would be keen to hear from any teachers or Acorn enthusiasts who might be willing to offer occasional assistance to complete novices in that area.

People with learning disabilities are just as diverse as the rest of the population and you can no more write a program that is suitable to all, as you can write a commercial game that everyone wants to play. The software available for young children on the Acorn platform is very good and generally accommodates a wide range of abilities – even the commercial programs have entry levels that can be accessed by those with more limited abilities.

Finding suitable software for older children and adults is more difficult. Those with limited reading skills, poor coordination and slow reactions are hard to accommodate. So the search is always on for simple games and uncomplicated programs which may be suitable to the needs of any individual.

I am sure that this is not a unique problem and that there are loads of teachers and enthusiasts who have written programs to meet the needs of individual children or relatives, but finding them is a networking task of huge proportions.

I am keen to establish some kind of forum for individuals with a learning disability themselves and those who live and work with them. I would like to learn of anyone who would like to share their knowledge and experience. I am particularly keen to contact anyone working with Widget's *Grid IT*.

Bob Black, Falmouth, Cornwall

If you would like to help Bob – he is also looking for any unwanted 20 and 40Mb hard drives – contact him at: Computer Loan Scheme, 4 Fairfield Road, Falmouth, Cornwall TR11 2DN.

Moral maze

TERI Paul introduced a moral dimension into the review of Datafile's PDCD and suggested that four of the graphic images had moved beyond fantasy. I can guess the images in question but find the comments typical of the sad British attitude to sex. The four pictures still require an input of seven hundred megabytes from the imagination to move anywhere near a limit which I would find unacceptable.

Interestingly enough it was my daughter who pointed out that while these four pictures were of scantily clad women posing alone, the apparently acceptable fantasy pictures included almost without exception, in addition to naked or near naked women, explicit images of violence and horror. Among the graphics with no sexual content were representations of evil grotesque aliens and weapons of war.

If contributors to this magazine are to comment on matters of morality let us least examine the *genuinely* damaging images we put before our young or vulnerable population.

A. Stevens, St Albans, Herts

Teri Paul replies: *I wonder what your attitude to the pictures with a sexual content would have been if your daughter had accessed them at a young age and without your prior knowledge? Whether you find images of soft porn less offensive than a Conan-type warrior fighting a monster, is a matter for you and you alone.*

As writers we have to make readers aware of what they may be considering buying – whether they think a particular game or image is morally reprehensible is to up to them. We cannot voice all concerns but the issue of pornography and computers is centre stage at present.

Would you consider a gun as an example for the letter G in an educational program wrong, or how about P for pig on religious grounds? This may seem silly, but both complaints have been made.

Meaning business

IT was good to see the article by Baz Racon in the July issue. Oh how I can echo his sentiments and the frustration of convincing the IT department that an Acorn is what is required. Like Baz, I didn't succeed either. However, we managed to get one and now possess two A5000s.

I joined part of a large – if not *the* largest – multi-national and international group of companies in the world of textiles in 1992. The whole group policy on PCs is IBM only. No clones. My department had a PC, a PS2, on which a maintenance package was running and was run every day, all day. This put paid to me having access to the PC for any

of my work, or anyone including the Works Engineer having access to it, unless it was shut down.

We needed another PC. Now I have to be careful here, because while I use the term PC, I actually wanted an A5000. Is that a PC?

My first job was to convince the Works Engineer. He trusted my judgement and sold the idea to the Production Director but told us to *have a word* with the IT manager. We were met by the cry of *incompatibility*. We countered with *it will operate within our own department and where we need to be compatible with other IBM PCs we'll export our files accordingly*. Next shot: *we can't provide support*, returned with *we won't need any*.

I brought into work my 1991 A5000 with 2Mb memory and a 40Mb hard drive. The works engineer liked the desktop that appeared on boot up, the clarity, layout, utilities and Lemmings. The Works Manager and Production Director were impressed too. Indeed the Works Engineer bought an A3020 in Christmas '92.

Now the Financial Director was a good friend of the IT manager and it took us nearly eight months for money to be released. But the stigma of Acorn was the real stumbling block. The Financial Director saw Acorn as being synonymous with a BBC computer and not a *professional* machine at all. The IT Manager had never heard of an A5000. Oddly enough his subordinate had, and was keen for us to get one, so he could have a go.

The machine was finally purchased in February '93 – an A5000 Learning Curve with 2Mb ram, 80Mb hard disk and a DJ500C printers. We added Eureka, used Easiword from the Works Engineer's A3020 and my old copy of Interword and Acorn DTP.

The A5000 was to be used primarily for interrogating a remote Programmable Logic Controller that we were going to use as an Energy monitoring unit but using the PLC counters to store the pulses obtained from all the metering of Water, Gas and Electricity. A little program we wrote in Basic allowed us to interrogate, display and save the data as a CSV file which was dropped into Eureka to plot trends and present very professional looking graphs.

The maintenance package on the PC was capable of producing crude charts but as the program ran so slowly time could not be afforded to run the chart or graph utilities. The Works Engineer had an idea, why not print out the statistics and put them in Eureka. He did and the charts were presented monthly in a production report.

The monthly report contained reports from all areas of the site and all graphs were prepared on Lotus 1-2-3, except one – ours. We dropped Easiword files and draw files into Acorn DTP and a few key strokes to align the text and change font and it looked the best of all the reports. People visited to see what we had done, with 86 PCs on site no one had done anything like this before. We were then producing posters and charts for an important sales department presentation.

This year we obtained a second A5000/33 with 108Mb Syquest, Aleph One 486 card and two copies of Style to replace the PC maintenance machine. We also bought Datapower and S-Base 2 Developer 2. We are undecided which to use to replace the maintenance package. We are looking to connect the two A5000s with Ethernet. By the way the PC support – bug reporting only – costs £1,500 a year, the upgrade in software £4,000 and any corrupted data due to bugs is charged at £360 per disk.

The Energy Monitoring facility that we originally bought the first A5000 for is being presented in the organisation's group magazine. The cost is £6,000 including the time to write the software, buying the hardware and installing the meters. OEM PC-based packages were going to cost between £15-20,000 without metering. Okay, these would produce and print graphics whereas ours displayed graphs and charts crudely but had a mimic display as good as theirs. We can of course produce draw files and do what we want with them.

So Baz, you are not on your own, no doubt there are many others too, similarly frustrated by the ignorance of the *PC Dossers* as a friend of mine calls them – he has an A5000 too. Oh, have a guess what our IT manager thinks of our A5000. Don't ask me. She hasn't been to look at them.

Phil Coates, Wakefield, Yorkshire

Baz's experiences have struck a cord with a number of you, but this letter summed up the points a great many of you have made. We'd be interested to read any other stories of this sort.

Game, set and match

THANK you for publishing my game *Omniscient* in the July issue. There are some modifications I would like to add which would enable the game to be played on the BBC emulator, the !65Host. Originally the game was written on a BBC Micro so it works fine on DFS, but on ADFS – due to some directory changing – the program fails with the error message, *Not found at line 3610*.

To get round this de-archive the entire game into its own directory, enter the emulator !65Host and type:

```
*Dir Omniscient
LOAD "OMNISCI"
205PROCoscli("BACK")
250PROCoscli("BACK")
```

Next delete lines 820 and 950:

```
820
950
SAVE"OMNISCI"
```

This also takes out the delay loop which would have made the game a bit sluggish, although the speed at which it runs at may now be a bit erratic. The keys too are a bit awkward for the up motion, so to remedy this type – while still in the directory Omniscient:

```
LOAD "C.MCODE2"
2140CPX #79
SAVE "C.MCODE2"
RUN
*Dir Omniscient
```

Note that this program changes PAGE so you may get some spurious Bad Mode or Bad Program error messages. To remedy this type:

```
PAGE=&1900
NEW
```

The programs can then be run by typing CHAIN"LOADER". If you want to get more conventional left and right keys, change lines 2100 and 2120 in C,MCODE2 in the same way as above to:

```
2100CPX #97
2120CPX #66
```

The keys X and C were originally used as my Z key had broken. I hope this game provides at least some enjoyment to the dwindling number of BBC users as there seems that no more software is being developed for this still worthwhile machine.

Peter Brown, Dalkeith, Midlothian

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