MARCH 1993 Vol.11 No.1 £2.95

Acorn COMPUTING

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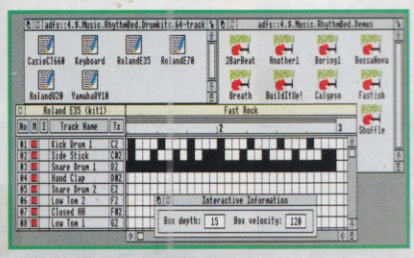

RHYTHM BED
Check out this excellent drum pattern generator

ALDEBARAN
A unique space adventure plus all the latest games

EUREKA!
At last – the complete spreadsheet is ready

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Hard core graphics!

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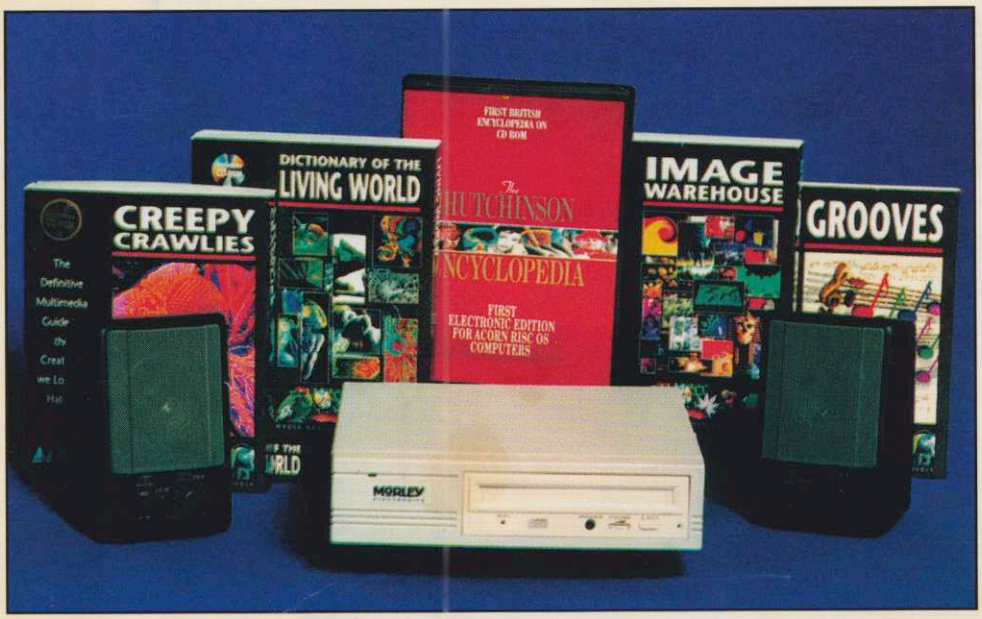
EXCLUSIVE REPORT
BETT show latest

9 770967 525014 03>
EUROPRESS PUBLICATIONS

FREE 32-PAGE EDUCATION SPECIAL • CLASSIFIEDS • CLIP ART CATALOGUE

SCSI CD ROM the collections from Morley



Morley Electronics are pleased to announce their new CD ROM bundle for the Acorn ARM powered range of computers. The system comprises of a Morley 16 bit SCSI card, a high quality externally cased CD ROM drive, a set of stereo speakers all cables necessary and a choice of four different collections of CD ROM discs.

The CD discs themselves are all RISC OS format and require no use of a PC Emulator whatsoever. They range from a disc which is crammed full of clip art to an encylopeadia of bugs, slugs and insects with full motion video clips in Acorn !Replay format.

The information on all of the discs can be accessed directly or if desired exported for use in other software. For instance the sound samples on the Grooves disc can be exported straight out to music packages for re-arranging.

The Collections

INCLUDED AS STANDARD

CD ROM Mechanism
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All Cables
Stereo Speakers

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Grooves
Creepy Crawlies
Image Warehouse

COLLECTION 2
Grooves
Creepy Crawlies
Image Warehouse
Hutchinsons Encyclopedia

COLLECTION 3
Grooves
Creepy Crawlies
Image Warehouse
D.O.L.W.

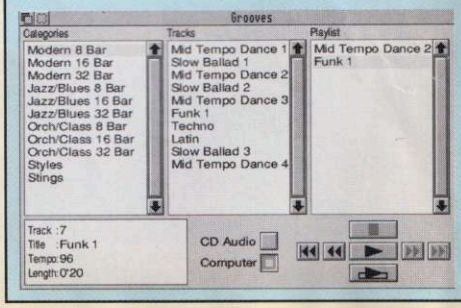
COLLECTION 3
Grooves
Creepy Crawlies
Image Warehouse
Hutchinsons Encyclopedia
D.O.L.W.

Grooves

This is a unique music CD ROM featuring 100 professionally created clips of music. The music varies from classical to funk and the majority of clips are available in 8, 16 and 32 bar samples. The pieces themselves vary from short presentation strings or "musical dingbats" to compostions lasting one and a half minutes.

Using appropriate music software it is possible to build creative 'tunes' demonstrating different musical styles. All the clips come in ready to use formats and users can preview the tracks by using a special application in which an animated jukebox selects and plays the audio versions of the clips.

All samples can be exported as Sound Samples, Modules or as !Replay sound file. All are royalty free for non-profitable use.



Creepy Crawlies

A complete world of bugs, beetles and spiders engulfs the screen right in front of you. This new disc produced by Media Design Interactive has been formed specifically for the RISC OS format.

Offering an exciting introduction to the fascinating biology of these creatures. The information is in the form of text, pictures, narration/voice over and !Replay video material produced by the worlds leading biologists. A very useful feature is that the text descriptions can be set to display for either Key Stages 2/3 or 1/2.

Text, Sprites, !Replay frames and narration can all be exported directly for use in other programs.

Image Warehouse

The colour Image Warehouse is a vast selection of professionally created high quality images ideal for use in DTP, presentation and artwork in general.

The warehouse consists of five main sections as follows:

Artwork
Scans
Textures
Clip Art
Backgrounds

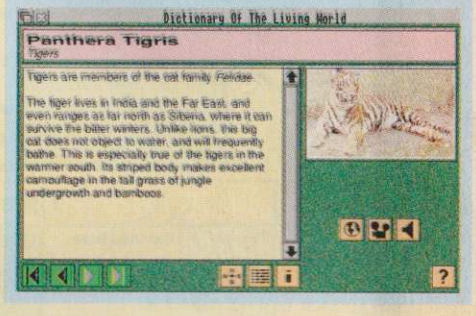
All images are in Sprite format in large and small Modes 15,28 perfect for use on all Acorn computers and monitors from the A3000 upwards. All are royalty free for non-profitable use.

Dictionary Of The Living World

This multimedia encyclopedia of Life on Earth incorporates text, pictures, sound, and !Replay video scenes. More than 2500 text entries are supplemented with over 1000 pictures, 100 animal sounds and 100 full motion video clips.

When a small picture such as the one below appears, the user simply double clicks in the picture and it is immediately displayed full screen in full 256 colours.

Ideal for educating students from 10 years upwards the Dictionary of the Living World can teach about the biology of life. All of the sprites and text files can be exported for later use and the !Replay video files can also be shown in isolation.

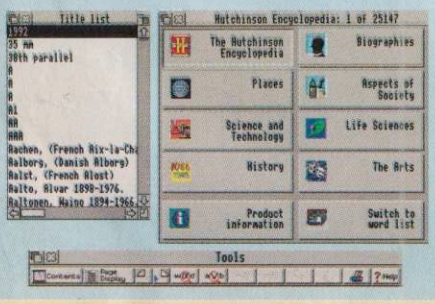


Hutchinsons Encyclopedia

This exciting CD ROM version of the Hutchinson encyclopedia is an up-to-date reference for vast amounts of informations available in seconds.

The package is fully RISC OS compliant and has over 25,000 entries and 7,500 biographies listed in its information. Searches can be carried out quickly and easily and then the results fine tuned even further by allowing further searches to be carried out on those that were successful from the first.

A very useful feature of the software is that all text and sprites can be exported from the software for use in projects or reports that you might be working on.



Individual Prices

CD ROM Collection 1	£649.00
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CD ROM Collection 4	£849.00
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CD ROM drive (External) & SCSI interface	£489.00
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External Loudspeakers	£21.28
RISC OS CD ROM DISCS	
Creepy Crawlies	£99.00
Grooves	£59.00
Image Warehouse	£59.00
Dictionary of the living world	£175.00
Hutchinsons Encyclopedia	£99.00
Frontier 2000	£175.00
Revelation 2	£139.00

CD ROM collections are suitable for all Acorn computers with 16 bit expansion slot. Some CD discs require 2MB RAM minimum and a multiscan monitor is recommended. All prices exclude VAT and carriage. E&OE Specifications subject to change. All trademarks acknowledged.

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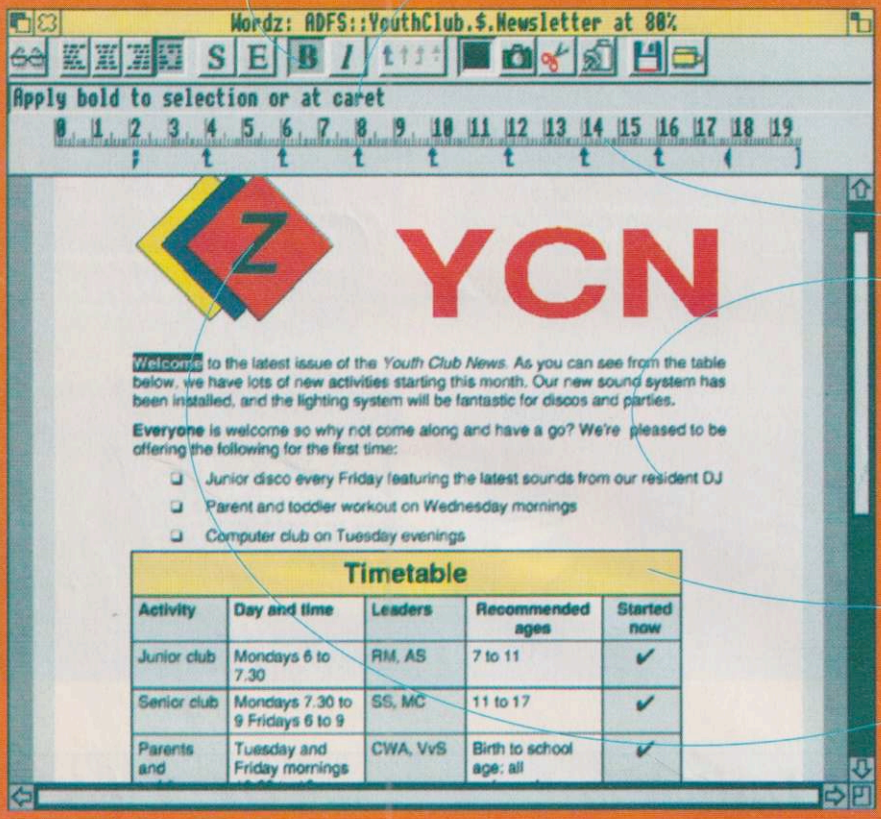
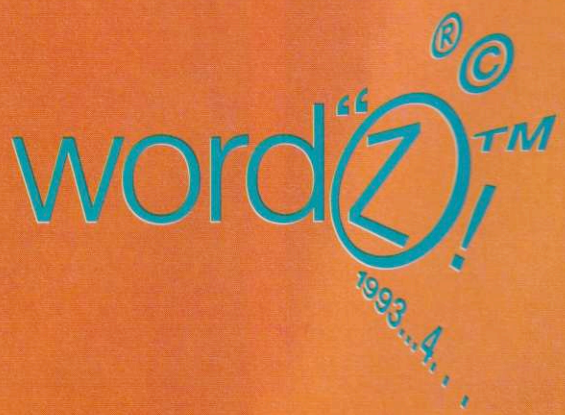


At last, the word processor the Archimedes has been waiting for. A program that's so easy to use you'll be able to create great-looking documents the first time you use it. The facilities used most are in the *button bar*, and the *status line* gives you instant feedback. Just click and drag in the *ruler* to set margins and tabs; click on a button to cut and paste - it's that easy.

Wordz has all the features you'd expect from a state-of-the-art word processor. The powerful style editor gives you complete control over all aspects of your text; *font, spacing, margins*, and *colour*. Unparalleled control over *tables* including dragging to resize columns and rows. Speedy check-as-you-type or whole document spell checking. Import *pictures* and text from other programs, including PipeDream.

Wordz is the first of a family of programs which share the same easy user interface and include dynamic data linking. The spreadsheet Resultz will be available in mid-1993.

Wordz costs £99+VAT. *"Is it easy to use? It's falling-off-a-log easy to use."*



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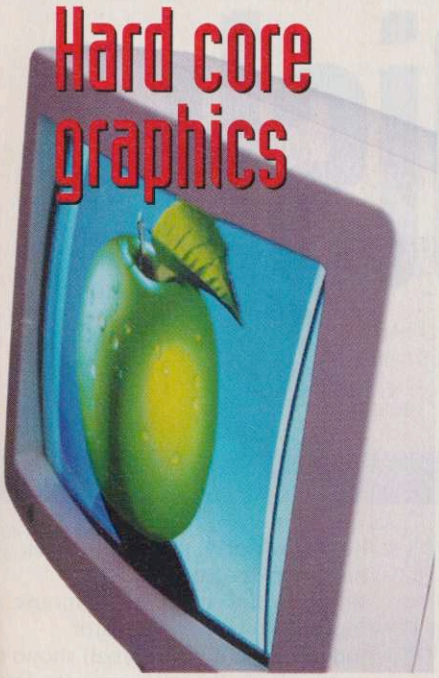
Hard core graphics



It's the battle of the giants with two impressive colour expansion systems: ColourCard from Computer Concepts/Wild Vision and the G8+ from State Machine, with a look-in from the Graphic Accelerator by Evolution.

See how they stood up to the test on Page 34.

REGULARS

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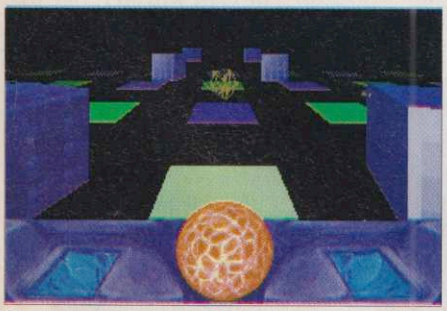
Bargains are back!

Turn to the reader classsified ads on page 111 and snap up the buy of the year.



● *Aldebaran – space game review – Page 47*

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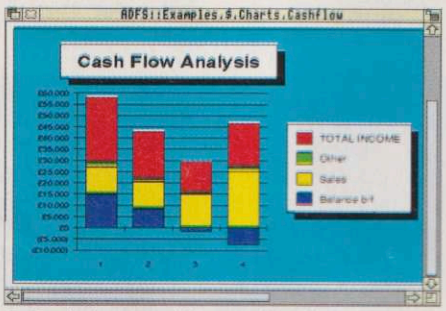
● *The editorial and many of the adverts in this magazine were prepared using Impresssion and ArtWorks by Computer Concepts.*



● *Eureka! – spreadsheet and analysis – Page 40*

YOU can subscribe to *Acorn Computing* NOW – see Page 32

Find out how to use the best and brightest cover disk by turning over the page

March subscription disks

This month's exclusive *Acorn Computing* subscriber-only disks feature an excellent selection of quality software.

The Archimedes disk contains:
- CATtris by Mike Goldberg
- DeskRoids
- More super clip-art
- Up-to-date reviews listing
- Plus the best of PD software

The BBC Micro disk contains:
- BBC Sound sample package
- Easy star Command Creator
- Potato Baker

The MegaDisk

Interdictor: Flights of fancy

INTERDICTION is the name of a type of mission performed by modern jet fighters, to prevent enemy supplies reaching the front line. In Interdictor your task is to capture all the airfields in a river valley.

This can only be achieved by preventing enemy trucks re-supplying airfields, and the best way to this is to destroy bridges and supply depots along the river – before attacking the now-isolated defences.

The enemy have combat aircraft, ack-ack guns and surface-to-air missiles (SAMs), you have 30mm cannon with 250 shells, air-to-ground rockets (36, fired in pairs) and four heat-seeking air-to-air missiles.

You can also fire flares and drop chaff to confuse the air-to-air and SAM missiles respectively.

When you run the game you will be asked to enter two colours from the protection grid shown here – just cross-reference the letter with the number to find the colour.

Once into the game follow this sequence to get airborne:

Press A to switch on auto-stabiliser, press E for engine start, hold down Select on mouse to throttle up to full power, press B to release brakes at 150 knots (on head-up display) pull mouse back half an inch – avoiding any sideways movement. Move mouse forward slowly until elevator indicator (on display panel) shows a gentle climb. Press L to raise landing gear.

Press the Menu (middle) mouse button to throttle back a little, out of the red zone on the rpm gauge on the main display. At 5,000 feet push mouse forward until level flight is attained. To turn, move the mouse gently left or right, the nose will drop as you do this so pull back gently to correct it.

Having practised flying around you will want to land, the secret is to line up with the runway a long distance from it – contrary to what's shown in the !InterDemo. The green inverted T-sight shows where the plane is going, so placing it and keeping it on the nearer end of the runway means the plane will fly to that point.

The engine RPM must be reduced as low as possible so that you cross the runway start at 150-200 knots and 100 feet up. The exact throttle setting depends on how steeply you're descending.

When you get down to 20 feet raise the nose by pulling back until the T-sight is just below the horizon. The craft will continue to descend until it touches down. Reduce thrust to idling and apply the brakes (B).

If you crash you are taken back to the start. The plane can be steered on the ground using the rudder controls.

When you are airborne press G to select the gun (cannon), and pressing Adjust on the mouse will fire it. You can see tracers that show where the shells are going. Try some practice shots near the runway.

The rockets – select with R – fire straight ahead and keep flying until

● *What the display means*

Getting started

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 a 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. The software that unpacks the programs, ArcFS 2, loads automatically ready for use. Double-click the Acorn Computing icon, the screen switches to the Acorn Computing logo and then, after a few seconds, back to the Desktop but now there's another window available.You can treat this new window just like any other one for viewing disk contents, you can run programs and open directories just by double-clicking them.

We recommend that you always read the !ReadMe files or access the help information via the Filer menu. See your Risc OS manuals for details.

EXCLUSIVE SUBSCRIBER DISKS

See pages 25, 26, 28, 29

FAULTY DISK?

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

Europress Direct
FREEPOST
Ellesmere Port
South Wirral L65 3EB.

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

Acorn Computing
Europress
Publications
Europa House
Adlington Park
Macclesfield
SK10 4NP

Just Pictures: Clip art from CD-Rom

Cumana and NW Semerc's successful bid for the government grant for the development of a CD-Rom Special Needs Resource led to the development of a CD-Rom packed full of clip art. The drawings were created by Uta Kessler and Jenny Taylor, and as well as being available on CD-Rom the clip art is also being released on theme floppy disks.

Ten packs for £9 each are now available from NW Semerc (061-627 4469) who have put together a selection from these themes especially for readers of *Acorn Computing*.

These sprite and drawfiles can be used is any number of applications and to give you some idea of their flexibility NW Semerc have created a program using their new and simple multimedia package Optima to show just this.

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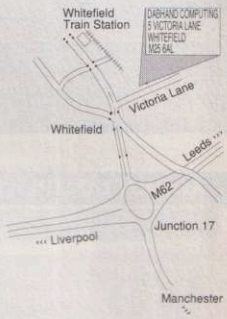

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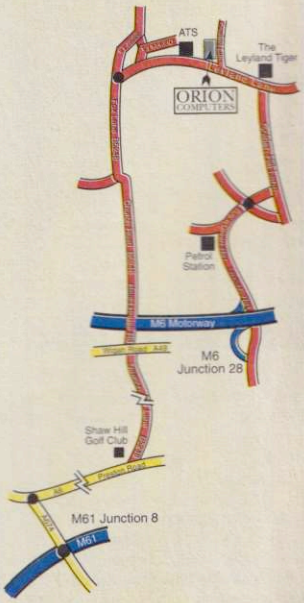

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Chess 3D	Micro Power	£21
Children's Graphics	Micro Studio	£16
Chocks Away	Fourth Dim	£19
– Compendium	Fourth Dim	£27
– Extra Missions	Fourth Dim	£15
Chopper Force	Fourth Dim	£21
Christmas Adventure, age 5-8	Storm	£19
Chuck Rock	Krisalis	£19
Clip Art	Graphics Factory	
– Vol 1 (General), sprites		£19
– Vol 2 (General) / Vol 3 (Animals) / Vol 4 (Sport) / Vol 5 (Characters)	each	£25
Clip Art Set 1, drawfiles	Midnight	£29
Clip Art Set 2, drawfiles	Midnight	£29
CNC Designer V3 for Lathe	TechSoft	£343
CNC Designer V3 for Lathe and Miller	TechSoft	£493
CNC Designer V3 for Miller	TechSoft	£343
Coffee, age 9+	Storm	£28
Colour Screen»Mac	Human	£90
– Arc/Mac Cable	Human	£24
ColourSep	ICS	£25
– site licence		£60
Compression	CC	£35
Computer Basics	Computer Tutorial	£17
Concept Designer	Longman	£23
Conqueror	Superior	£17
Control Logo	Longman	£25
Converta-Key	Triple R	£15
Cops	Alpine	£15
Corruption	Magnetic	£21
Countdown to Doom / Return to Doom / Philosopher's Quest	Topologika	£25
Craftshop 1	4mation	**£19**
Craftshop 2	4mation	**£19**
Creator	Alpine	£31
Crisis	CIS	£12
Cross-32 Meta-Assembler	Baildon	£175
– manual for evaluation	Baildon	V0 £15
Curves	Topologika	£39
Cyber Chess	Fourth Dim	£35
DataGraph	Topologika	£29
Datapower	Iota	**£145**
DataVision	Silicon	£79
DataWord	Triple R	£15
DBEdit	4mation	£28
Decorated Alphabet, sprites	Micro Studio	£17
Designer V3	TechSoft	£193
Designer Intro (not OS 3)	TechSoft	£75
Designer's Graphics, draw/sprites	Micro Studio	£16
DeskEdit2	RISC	£27
Desktop Assembler Release 2	Acorn	£119
Desktop C Release 4	Acorn	£185
Desktop Folio	ESM	£64
– Themes: Christmas, Editors, Maths, Space, World War II	each	£22
Desktop Office v2	Minerva	£95
Desktop Publishing on the Archimedes	Sigma	V0 £13
Desktop Thesaurus	RISC	£18
Detect-a-Pet, age 5-11	ESM	£49
DFS Reader	RISC	£9
Disc Tree	Mitre	£38
DrawBender	ICS	£15
– site licence		£50
Draw Print & Plot	Oak	£37
Dreamwave	EMR	£34
Drop Ship	Fourth Dim	£15
DTP Graphics 1 Mono, sprites	Micro Studio	£15
DTP Graphics 2 Colour	Micro Studio	£17
DTP Graphics combined	Micro Studio	£25
DTP Seeds	4mation	V0 £8
DTP Theme Packs, age 5-16	ESM	
– Christmas		£35
– Editor's, Maths	– each	£29
Dungeon	Fourth Dim	£26
Easiword Plus	Minerva	£54
EasiWriter 2	Icon	£115
– Dictionaries: Danish / French / German / Italian / Norwegian / Spanish / Swedish / Welsh	each	£30
Einstein	Ace	£106
Elite	Hybrid	£31
EluciData (OCR)	Irlam	£155
– bought with Irlam Scanner		£79
Enter the Realm	Fourth Dim	£18
Equasor	CC	£37
Ethnic Borders	4mation	£10
E-Type Compendium	Fourth Dim	£18
Euclid	Ace	£50
Eureka	Longman	**£99**
ExcellonDrill	Silicon	£63
Express	Midnight	£45
Eye for Spelling	ESM	£35
Family Favourites (not OS 3)	Minerva	£11
Farmer Giles	Computer Tutorial	£16
Farmer Giles II	Computer Tutorial	£17
Fervour	Clares	£19
Film-Maker	Silicon	£63
Fine Racer	Eterna	£14
Fireball II Xtra	CIS	£9
First Impression	Word Processing	V0 £28
First Logo	Longman	£24
First Words and Pictures	Chalksoft	£21
Flexifile	Minerva	£84
Flight Path, age 9+	Storm	£27
Flight Sim Toolkit	Simis	£31
Flying Start II	Mitre	£86
Fontasy	ICS	£25
Fontasy / DrawBender / Placard site licence		£80
FontFX	Data Store	£9
– site licence		£70
Font Pack – Newhall, Starter, Symbol – each pack	Acorn	£35
Font Pack 1 – Paladin, Swiss B, Symbol B, Vogue	RISC	£47
Font Pack – Avant Garde, Bookman Pembroke – each pack	CC	£24
Freddy's Folly (not OS 3)	Minerva	£8
Freddy Teddy	Topologika	£19
– Balloons & The Zoo	Topologika	£29
– The Playground	Topologika	£29
– The Puddle & The Wardrobe	Topologika	£29
Freddy Teddy's Adventure	Topologika	£19
Fun School 2	Database	
– age -6, age 6-8, age 8+	each	£17
Fun School 3	Database	
– age -5, age 5-7, age 8+	each	£18
Fun School 4	Database	
– age -5, age 5-7, age 7-11	each	£18
Galactic Dan	Fourth Dim	£18
Gammaplot	Minerva	£36
Gate Array Design System	Silicon	£114
Genesis II	Oak	£99
Genesis Plus	Oak	£68
GerberPlot	Silicon	£63
Giant Killer, age 10+	Topologika	£29
Giant Killer Support Disc	Topologika	£24
Gods	Krisalis	£19
Good Impression	Word Processing	V0 £25
GraphBox	Minerva	£57
GraphBox Professional	Minerva	£104
Granny's Garden	4mation	**£24**
Granny's Garden Resource Pack	4mation	£15
Graphics on the ARM	Dabs	V0 £POA
Graphic Writer	Clares	£24
Greetings Graphics, draw/sprites	Micro Studio	£16
Gribbly's Day Out	Coin-Age	£19
GridIT	Widgit	£30
Grievous Bodily 'ARM	Fourth Dim	£18
Hard Disc Companion	RISC	£45
Hearsay II	RISC	£69
HelixBasic	PDK	**£64**
History Costume, sprites	Micro Studio	£16
Holed Out Compendium	Fourth Dim	£18
Home Accounts	Minerva	£34
HotLink Presenter	Lingenuity	**£19**
House of Numbers	Chalksoft	£20
Hoverbod (not OS 3)	Minerva	£11
Hyperbook Electronic Library (including Reader)	Longman	£109
Hyperbook Reader	Longman	£47
Ibix the Viking (not OS 3)	Minerva	£11
I²C SWI	Baildon	£15
– bought with Oddule		£5
Illusionist	Clares	£69
Illustrators' Graphics, draw/sprites	Micro Studio	£16
Image Animator	Iota	£68
Image OCR	Iota	£POA
Image Outliner	Iota	£72
Imagery	Palette Studio	**£70**
Imagine	Topologika	£44
Impact!	Circle	£47
Impact! Demo	Circle	£2
Impression	CC	£123
– network version		£650
– site licence		£545
– extra hardware key for sites only		£15
– extra manual for sites only		V0 £8
Impression	Dabs	V0 £POA
Impression Borders	CC	£19
Impression Business Supplement	CC	£39
Impression Junior	CC	£69
– site licence		£435
– extra manual for sites only		V0 £7
Insight	Longman	£68
Instigator	Dabs	£39
Interdictor 2	Clares	£25
Investigator 2 (not OS 3)	Leading Edge	£21
IronLord	UBI Soft	£14
Isle of Wight	Computer Tutorial	£20
Jahangir Khan World Championship Squash	Krisalis	£19
James Pond	Krisalis	£18
Jet Fighter	Minerva	£10
Jiglet	4mation	**£19**
Jigsaw	4mation	**£19**
Junior Database	Iota	£45
Junior PinPoint	Longman	£23
Karma	Periscope	£20
Kerbang	Eterna	£12
Keyboard Player	Chalksoft	£17
Keylink Prolog	Keylink	£69
Kid Pix	ESM	£35
Knowledge Organiser	Clares	£42
Krisalis Collection	Krisalis	£21
Krisalis Collection 2	Krisalis	£POA
Landmarks – 1940, Aztecs, Civil War, Columbus, Egypt, Elizabeth I, Rainforest, Victorians – each	Longman	£18
Last Days of Doom / Hezarin	Topologika	£17
Last Ninja	Superior	£18
Legend of the Lost Temple (not OS 3)	Eterna	£19
Lemmings	Krisalis	£18
Letters and Pictures	Chalksoft	£20
Linkword – French, German, Spanish – each	Minerva	£37
Little Red Riding Hood, age 5-8	Selective	£14
Logo	Longman	£55
LogoPlotter	Longman	£20
Lotus Turbo Challenge 2	Krisalis	£19
Maddingly Hall	Minerva	£11
Mad Professor Mariarti	Krisalis	£14
Magpie	Longman	£40
Mah-Jong European – The Game	CIS	£19
Mah-Jong Patience	CIS	£15
Mailshot	Minerva	£27
Manchester United Europe	Krisalis	£18
Manchester United Football Club	Krisalis	£19
Maps and Landscapes 1	Chalksoft	£19
Maps and Landscapes 2	Chalksoft	£19
Mark Master	Chalksoft	£67
Master Break	Superior	£14
Masterfile (Version 3)	RISC	£49
Maths Sieve	Computer Tutorial	£16
Mazes, drawfiles	Micro Studio	£16
Memory Magic	CIS	£12
Mental Maths	CIS	£15
MicroDrive 2	CIS	£29
MicroDrive Designer	CIS	£34
MicroSpell 3.XX	David Pilling	£5
Micro Trader Accounts	PRES	£270
MiG-29 Superfulcrum	Domark	£29
Military History, sprites	Micro Studio	£16
Minotaur	Minerva	£8
Missile Control	Minerva	£8
Mogul	Ace	£20
Money Matters	Triple R	£15
Movaword	Chalksoft	£17
MultiFS	Arxe	£27
Multistore version II	Minerva	**£154**
Nature Graphics, draw/sprites	Micro Studio	£16
Navigator	Topologika	£39
Nebulus	Krisalis	£19
Nevryon	Fourth Dim	£15
Newton	Longman	£20
No Excuses	Arcana	£21
Nominal Ledger	Minerva	£78

Noot	4mation	£43
Noot Art Disc	4mation	£10
Notate	Longman	**£42**
Note Invaders	Chalksoft	£20
Numbers and Pictures	Chalksoft	£20
Numerator	Longman	**£39**
Numerator Chaos	Longman	£18
Oh No! More Lemmings (requires Lemmings)	Krisalis	£15
Ollie Octopus' Sketchpad, age 4+	Storm	£14
Omar Sharif's Bridge	Krisalis	£22
Order Processing/Invoicing	Minerva	£78
Orion	Minerva	£8
Orrery	Spacetech	£93
Ovation	RISC	£85
Overload	Clares	£13
Padlock	ICS	£10
– site licence		£30
Pandora's Box	Fourth Dim	**£18**
Pappus	Computer Tutorial	£17
Paradroid Arc	Coin-Age	£22
PC Access	Minerva	£19
PC Emulator 1.8	Acorn	**£89**
Pendown	Longman	£46
Pendown Etoiles	Longman	£50
Pendown Outline Fonts	Longman	£19
Pendown Plus	Longman	£68
Personal Accounts	Apricote	£29
Perspectives	TechSoft	£44
Pesky Muskrats	Coin-Age	£18
Picture Book	Triple R	£15
Picture It!	Appian	£29
– Topic discs	each	£9
PinPoint	Longman	£65
– site licence		£390
PipeDream 3	Colton	£116
PipeDream 4	Colton	£146
PipeDriver Dot 1	ICS	£10
Pipe Mania	Empire	£18
Pirate, age 8-14	Chalksoft	£19
Placard	ICS	£10
– site licence		£30
Plague Planet	Alpine	£13
PlayBack	RISC	£19
Podd	ESM	£25
Poizone	Eterna	£14
Polyominoes	Tocopologika	£29
Populous	Krisalis	£22
Poster	4mation	£75
Powerband	Fourth Dim	£19
PowerROUTER	Silicon	£159
Prehistoric Animals, sprites	Micro Studio	£16
Premier	Circle	£71
– DataBase	Circle	£25
– WordProc	Circle	£25
Presenter GTi	Lingenuity	£66
PrimeArt	Minerva	£69
PrimeMover	Minerva	£POA
PrimeWord	Minerva	£55
Printer Drivers, RISC OS:		
BJ-10ex / BJ-200 TurboDriver + Cable	CC	£42
BJC-800 TurboDriver + Cable	CC	£89
CA (Canon PW1080A), CC (ColourCel), HP (HP Colour), JX (Epson / Star / Citizen colour) – each	Ace	£14
Deskjet 500C, Epson / Star colour – each	RISC	£15
!Printers upgrade	Ace	£25
ProDrivers: Canon LBP, Epson ESC-P2, HP Colour – each	Ace	£37
Pro Artisan	Clares	£70
ProCAD	Minerva	**£394**
Programming in ANSI Standard C on the Archimedes	Sigma	V0 £15
Prophet (requires 2 Mb)	Apricote	**£132**
Prophet Demo	Apricote	£10
Protext	Amor	£117
Provocator	Computer Tutorial	£15
Puncman 1 and 2	Chalksoft	£16
Puncman 3 and 4	Chalksoft	£16
Puncman 5 to 7	Chalksoft	£18
Punctuate	Xavier	£31
Punctuate!	Topologika	£29
Purchase Ledger	Minerva	£78
Quest for Gold	Krisalis	£18
QuicKey	ICS	£15
– site licence		£45

Real McCoy 2	Fourth Dim	£22
Real McCoy 3	Fourth Dim	£22
Redshift	Minerva	£10
Render Bender I	Clares	£58
Render Bender II	Clares	**£78**
Reporter	Minerva	£29
Repton 3	Superior	£14
Revelation 1	Longman	£39
Revelation 2	Longman	£75
Revelation 2 CD Rom	Longman	£98
Revelation ImagePro	Longman	£127
Reversals	Chalksoft	£17
Rhapsody 2	Clares	£45
Rhythm-Bed	Clares	£39
RiscBASIC Compiler	Silicon	£79
RiscForth Compiler	Silicon	£79
Risc OS Companion Vol 1	Oak	V0 £49
Risc OS Extras 1992	Acorn	£9
Risc OS Programmer's Reference Manual	Acorn	V0 £79
Risc OS Style Guide	Acorn	V0 £11
RoboLogo	Silicon	£39
Round the World Yacht Race, age 9+	Storm	£29
Sales Ledger	Minerva	£78
Saloon Cars Deluxe	Fourth Dim	£24
– Deluxe Extra Courses	Fourth Dim	£16
S-Base Developer	Longman	£175
S-Base Developer Plus	Longman	£275
S-Base Personal	Longman	**£95**
Schema	Clares	£89
Science, drawfiles	Micro Studio	£25
Score Draw	Clares	£44
Scorewriter	EMR	
– PMS Dot matrix, Version 1		£127
– PMS Dot matrix, Version 2		£147
– PMS PostScript		£422
ScreenPlay	Widgit	£35
ScreenTurtle	Topologika	£44
Search and Rescue, age 9+	Storm	£27
Seashore Guide, drawfiles	Micro Studio	£16
Sesame Street	Electric Crayon	
– Letters for You		£16
– Numbers Count		£16
ShapeFX	Data Store	£10
ShareHolder	Silicon	£106
ShareHolder Professional	Silicon	£234
ShowPage	CC	£149
Shylock Gnomes, age 10-15	Selective	£17
Sim City	Krisalis	£19
SkyHunter	Longman	£22
smArt	4mation	£50
smArt Aliens, Animals, Dinosaurs, Egypt, Faces*, Fantasy, Fashion, Fiddles & Drums, Heraldry, Homes*, Leisure*, Look Smart, Smartoons, Trees and Gardens *Please specify English, French, German, Spanish or Welsh – each	4mation	£15
smArtFiler	4mation	£32
smArt Modern Languages	4mation	£19
Smudge the Spaniel, age 4-8	Storm	£22
Snippet (new version)	4mation	£35
Soapbox	Xavier	£34
SolidCAD	Silicon	£79
SolidsRender	Silicon	£79
SolidTools	Silicon	£234
Sound Engineer	EMR	£69
Sound FX Maker	CIS	£34
Spark	David Pilling	£5
SparkFS	David Pilling	£20
Sparkle	Morley	£59
Special	ICS	£10
– site licence		£30
Speech!	Superior	£14
Spelling week-by-week	Chalksoft	£21
Spheres of Chaos	Matt Black	**£14**
Splice	Ace	£29
Spooler	Computer Tutorial	£9
Sporting Triangles	CDS	£19
Sports Day	Selective	£22
SpriteEd	Computer Tutorial	£17
SpySnatcher	Topologika	£12
Square Route	Computer Eyes	£16
StartWrite	Icon	£POA
Stock Management	Minerva	£78
StockPack	Topologika	£39
Studio24Plus Version 2, age 11+	EMR	£149
Studio24Plus Version 3, age 12+	EMR	£210
SuperDump	Silicon	£20
Superior Golf	Superior	£14
SuperPlot	Silicon	£20

Supersounds	CIS	£15
Supersounds 2	CIS	£12
Swiv	Krisalis	£18
System Delta Plus II	Minerva	£50
– Reference Guide	Minerva	V0 £25
TABS	ExpLAN	£95
Tactic	Eterna	£15
Talisman	Minerva	£8
Talking Pictures	Wyddfa	£POA
Target Maths	Triple R	£15
TechWriter	Icon	£200
Thinklink	Xavier	£29
Thundermonk	Minerva	£11
Tiles	Brain Games	£16
Timetabler	Minerva	£549
Time Traveller	ESM	
– Britain Since the 1930s		£27
– The Victorians		£POA
TimeWatch	Mitre	£24
TinyLogo/Draw	Topologika	£34
TinyPuzzle	Topologika	£24
Titler	Clares	£119
Toolkit Plus	Clares	£35
Tools Graphics, drawfiles	Micro Studio	£23
Top Banana	Hex	£19
Touch Type	Iota	£39
Tower of Babel	Cygnus	£17
Trace	David Pilling	£5
Tracer	Midnight	£46
Tracker	Leading Edge	£37
Transport, drawfiles	Micro Studio	£25
Trivial Pursuit	Domark	£22
Turbo Type	CIS	£20
Tween	Ace	£26
Twin	Acorn	£24
Twin World	UBI Soft	£14
TWO (Task and Window Organiser)	ICS	£15
– site licence		£60
TypeStudio	RISC	£39
Utility Disc 1	Data Store	£8
Utility Disc 2	Data Store	£13
Utility Disc 3	Data Store	£7
Utility Collection	Data Store	£21
Vector	4mation	£75
View»Mac 3	Human	£65
– Arc/Mac Cable	Human	£24
Vox Box	Clares	£46
Waterloo (not OS 3.1)	Turcan	£19
Whale Adventure	Topologika	£26
Whale Facts	Topologika	£34
Wimp Game	Fourth Dim	£15
WindowEd	Armen	£27
Words and Pictures	Chalksoft	£18
WordWorks	CC	£38
Wordz	Colton	**£95**
World Championship Boxing Manager	Krisalis	£18
World Geography Maps, draw	Micro Studio	£23
World Map Study, age 7-16	ESM	£42
Worldscape	Leading Edge	£17
World Wildlife, sprites	Micro Studio	£16
Worra Battle	Oak	£15
WorraCAD	Oak	£83
X-Fire	Fourth Dim	£18
Yacht 1	Computer Tutorial	£49
Yacht 7	Computer Tutorial	£94
Zarch	Superior	£14
Zelanites (not OS 3)	Micro Power	£15

HARDWARE

MEMORY . . .

Fitting extra unless otherwise stated
† Fitting easy ‡ Fitting needs expertise

A3000 2 Mb Non-upgradable †	IFEL	£41
A3000 2 Mb Upgradable †	IFEL	£45
A3000 4 Mb †	Atomwide/IFEL	£110
A3010 1-2 Mb		£49
A310 2 Mb Upgradable soldered ‡	IFEL	£88
– as above + MEMC1a		£124
– as above + MEMC1a + fitting		£154
A310 4 Mb soldered + MEMC1a ‡	IFEL	£180
– as above + fitting		£210
A5000 2-4 Mb Non-upgradable †	Atomwide	£85
A5000 2-4 Mb Upgradable †	IFEL	£85
A5000 2-8 Mb including fitting	Atomwide	£500
A5000 4-8 Mb including fitting	Atomwide	£391
A540 4 Mb †	Atomwide	£POA

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COMPUTERS . . .

A3010 1MB FD Family Solution	Acorn	£420
Family Solution + ideA		
Special price when you buy an A3010 with an ICS internal hard disc upgrade:		
– Family Solution + 20 Mb hard disc		£599
– Family Solution + 60 Mb hard disc		£699
– Family Solution + 80 Mb hard disc		£759
– Family Solution + 120 Mb hard disc		£859
A3010 2MB FD Learning Curve with Monitor	Acorn	£675
– as above + JP150 Printer		£889
A3020 2MB FD	Acorn	£749
A3020 2MB HD60	Acorn	£899
A4 2MB FD	Acorn	£1395
A4 4MB HD60	Acorn	£1695
A4 4MB HD80	Acorn	£1795
A4 4MB HD120	Acorn	£1895
A4 Extra Battery Pack	Acorn	£50
A4 Shoulder Bag	Acorn	£35
A4000 2MB HD80	Acorn	£945
– as above + Home Office		£995
A5000 2MB HD80 Multiscan	Acorn	£1395
– as above + Learning Curve		£1455
Pocket Book	Acorn	£212

MISCELLANEOUS. . .

386 PC Expansion Card 25 MHz	Aleph One	
– 1 Mb		£374
– 4 Mb		£468
486 PC Expansion Card	Aleph One	
– 1 Mb		£463
– 4 Mb		£557
4-slot 4-layer Backplane	IFEL	£57
9060S Monitor	Elzo	£450
A300/400 Fan kit	ICS	£15
A310 RISC OS Carrier Board ‡	IFEL	£21
A5000 Fitting Kit for second hard disc	ICS	£15
Arckey Function KeyStrip Holder	ICS	V0 £3
– pack of 4		V0 £10
ArcNET	ACS	£69
ARM3 ‡	Aleph One/IFEL	£175
ColourCard	CC	£238
Dongle Dangle with screw fittings	ICS	£6
Fan filters (pack of 10) (not A5000)	ICS	£6
FaxPack	CC	£289
Floppy Discs, 10 x 3½" High Density		£10
G8 Plus	State	£238
G8 Plus Video Switch	State	£23
G8 Professional	State	£348
HiPoint Mouse for A4	Genius	£49
Micro Mouse	Clares	£26
Monitor Stand for A3000	ICS	£21
Podule Case for A3000		£16
RISC OS 3 Upgrade	Acorn	£41
– Bulk package	Acorn	£335
– A5000	Acorn	£17
Seal 'n Type spill-proof Keyboard Covers		
– Archimedes / A5000	Kador	£14
– A3000	Kador	£14
TouchWindow	Lindis	£234
Whisper Fan Quietener (for A300/A400 series only)	ICS	£15

I²C PRODUCTS . . .

AnDi Oddule	Baildon	£39
I²C Adaptor (needed unless you already have an I²C socket)	Baildon	£10
I²C SWI (enhanced IIC_Control)	Baildon	£15
– bought with Oddule		£5

For ordering details please turn to page 3

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PRINTERS . . .

ArcLaser 300-6	*Calligraph*	£895
ArcServer 300-8	*Calligraph*	£985
Bubble Jet BJ-10ex	*Canon*	£187
Bubble Jet BJ-10ex + TurboDriver	*Canon/CC*	£219
Bubble Jet BJ-20	*Canon*	£255
Bubble Jet BJ-200	*Canon*	£POA
Bubble Jet BJ-300	*Canon*	£299
Bubble Jet BJ-330	*Canon*	£405
Bubble Jet BJC-800 + TurboDriver	*Canon/CC*	£1499
DeskJet 500	*Hewlett-Packard*	£299
DeskJet 500C	*Hewlett-Packard*	£375
DeskJet 550	*Hewlett-Packard*	£475
Laser Direct HiRes4 with 50-sheet tray	*CC*	£899
– 250-sheet Paper Cassette		£99
Laser Direct HiRes8	*CC*	£1280
Laser Direct LBP-4 Card	*CC*	£325
LBP-4	*Canon*	£659
Refill toner cartridge for Canon EPS		£50
New toner cartridge for Canon LBP-4		£59

SCANNERS, DIGITISERS . . .

ArcScanner including Epson GT-4000	*Clares*	£1660
Colour Converter	*Lindis*	£145
FaxScan	*Spacetech*	£94
Handipad	*TechSoft*	£173
Hawk V9	*Wild Vision*	£199
– A3000 version	*Wild Vision*	£278
Hawk V9 MkII	*Wild Vision*	£259
iMage (Sharp JX-100)	*Irlam*	
– for A5000		£490
– for other computers		£589
Image Scanner	*Iota*	£383
– Colour Upgrade Kit	*Iota*	£239
– Fast Parallel Card	*Iota*	£98
i-Scan 200	*Irlam*	£539
i-Scan 400	*Irlam*	£589
Pineapple Colour Video Digitiser	*Pineapple*	£195
– A3000 boxed	*Pineapple*	£230
ProImage (Epson GT6000)	*Irlam*	
– for A5000		£989
– for other computers		£1089
Scan-Light A4	*CC*	£277
– with Sheet Feeder	*CC*	£360
Scan-Light 256	*CC*	£190
– A3000 internal	*CC*	£190
Scan-Light Professional	*CC*	£565
– as above + SCSI interface	*CC*	£699
SnapShot Colour Video Digitiser	*Lingenuity*	£195
– A3000 version	*Lingenuity*	£275
Spectra	*RISC*	
– Archimedes / A5000		£545
– A3000 Series / A4000 Internal		£545
– A3000 External		£555
Vision Digitiser	*HCCS*	
– Mono		£47
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Credit cards are welcome. We do not charge your account until your order is fulfilled. Your name and address must be as known to the credit card company. If you are leaving an order on our answering machine please include your telephone number, the expiry date of your card, and your calculation of the total payment due. We will make no charge for credit card commission unless we have informed you first.

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LICENSED CREDIT BROKER

A matter of style

BACK in the early '80s Apple Computers Inc. had enormous success with their Apple II. In the USA it did for home and education what the BBC Micro did in the UK – it was well designed, robust and relatively low priced.

In 1984-5 Apple did something unusual, they created a micro that was radically different from anything that had come before. It used a mouse to control a pointer in an on-screen environment composed of windows, menus and icons that represented a desktop.

The computer was the Lisa: It was big and it cost a fortune.

The Lisa was not a great success. People were very impressed with the system and it drew ooohs and aaahs as it was put through its paces, but the cost was too high and the change too radical.

Well there's almost no way of compromising with a Wimp style – you can't cut out the menus or not use icons – so Apple created a similar machine with reduced hardware and called it the Macintosh.

The rest, as they say, is history. The Mac is the machine on which DTP was born – with an integral mouse it was a natural for drawing and painting applications. And its ease of use was legendary.

However, its graphical user interface (GUI) did not go unnoticed by the PC community and GEM (Graphical Environment for Micros) was born. This comprised a set of routines which allowed a program to present itself in a windows environment – but, unlike the Mac, the environment did not control the program.

Atari adopted GEM for their ST computer which also had an integral mouse. GEM was interesting but failed to really tackle the Wimp problem for PCs. MS-Dos and DR Dos steamed ahead in more and different versions, not achieving any level of stability.

Apple ignored GEM completely, but in the late '80s Microsoft produced Windows for PCs, a system that provided a real GUI. Then Apple sat up and took notice.

Popping back to the origin of the Wimp for a moment, it should be recognised that Apple did not invent the windows, icons, menus and pointers concept.

It was developed at Palo Alto in California by people who had no interest in commercial gain – some of the concepts were refined by Apple and have been enhanced over the years.

Another important aspect to the story involves American law and the *sue first ask questions later* approach. Apple's lawyers had for some time been trying to stamp out of existence any other company with the word Apple in their name. The story goes that they even tried it on a Californian antique dealer who had been trading for years before Apple Computers had even been thought of.

Microsoft invented Windows and Apple took them to court. From Apple's viewpoint PCs had suddenly become a threat because the Wimp system was, they thought, what made the Mac so special. The criteria for the court action was based on *look and feel*. If Windows gave a PC the same look and feel as the Mac then Apple had been ripped off, otherwise not.

Now anyone who's used even the latest version of Windows, and also a Mac, knows that there's no similarity beyond the fundamental windows, icons, menus and pointers. The windows don't look or work the same, the menus are operated differently, and the icons and pointer are just icons and a pointer.

Lawyers got rich and Apple lost – thank goodness.

In 1987 Acorn brought out the 32-bit Archimedes that incorporated a GUI which, with the original Arthur operating system, was equivalent to GEM. In the next year came Risc OS 2 which contained the Wimp Manager that controlled the whole user interface and allowed many programs to run simultaneously.

Anyone who's used an Acorn Risc OS machine and a Mac will know that there are far more similarities between the two than there ever were between Windows and a Mac.

Luckily, in the early days, Acorn hadn't made sufficient impact to be noticed. And by the time the power of the ARM chip and the excellent software built around it began to make a stir Apple had recovered from their paranoia.

● *Now of course Apple and Acorn are partners in ARM Ltd. and Acorn are finally safe because nobody is going to sue them for having a GUI that's like somebody else's. All they have to do is be more successful.*

> Another important aspect to the story involves American law and the sue first ask questions later approach.

Steve Turnbull

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Published by: Europress Publications Limited, Europa House, Adlington Park, Macclesfield SK10 4NP.

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News Trade Distribution: Comag 0895 444055

Printed in the UK by BPCC Magazines (Carlisle) Ltd

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Wizzo scores

GAMES Wizard is a piece of software ideal for those stuck on a level of their favourite game. Available from Leading Edge (0532 621111) for £29.99 it allows you to add extra lives, give yourself that added energy boost, save the screen as a sprite to remind yourself of victory or even add a bit of protection with infinite shields.

Still on the games front Leading Edge have created the Joymaster program for the A3010 which has been developed from their Joystick Interface software. This program enables the built-in joystick ports on the A3010 to be used with most of the early games not written to support the new Acorn Joystick Standard. So now you can use the A3010's joystick with some of the older classic games.

Acorn rentals

ACORN Options is a new initiative from Acorn (0223 254254) which recognises the lack of capital available to the majority of schools and allows them to rent rather than buy computer equipment.

The principle behind the scheme is that schools can acquire state-of-the-art computers without the need for capital expenditure. The rental will be at a fixed rate over three years with the option to add more machines or upgrade at any time.

Commenting on the scheme, Acorn's education marketing manager Frank Burdett said: "By allowing a school to use its revenue, rather than capital, Acorn Options budgets and improves cashflow by spreading the acquisition cost of the equipment over a realistic three-year replacement period."

Education move

THE popular Triple-R range of education programs is now being distributed by TCA (0582 761395), the Harpenden-based software company. All enquiries and orders for Triple-R products including DataWord, PictureBook, Money Matters and Target Maths should now be addressed to TCA. Prices are unchanged by the move.

CD-Rom power

PHOTO CDs are now here. Acorn (0223 254254) have completed their deal with Kodak allowing Photo CD images to be displayed and manipulated on 32-bit Acorns.

Under the agreement Acorn are upgrading their CDFS to read Photo CD and other Mode 2 Form 1 CDs as well as porting the Kodak Photo CD Access Developer's Toolkit to run on Acorn machines.

In practical terms this means that 35mm films can be transferred to a recordable CD-Rom storing up to 100 images per disk. The pictures are encoded in five formats: Thumbnail, Snapshot, TV comparable and Full Detail which gives 2,048x3,072 pixels for photographic quality printing and enlargement.

The images can be read on any 32-bit machine with the new CDFS and a Photo CD compatible CD drive. Most devices can read the first format of images but for best results the CD drive marketed with the Multimedia Expansion System – launched at BETT '93 – supports the full image access referred to as multisession.

Acorn have also released a series of CDs with an educational note. The fourth edition of the Acorn Education Directory listing of all Acorn programs by company as well as cross-referencing on topics is now available on CD-Rom as well as in its more usual paper format.

The 32-bit and 8-bit sections are separate and icons are used throughout to show what memory and operating system are needed as well as other compatibility details.

The CD-Rom version lets you browse through data files using key words to search for companies or particular types of software. Pages are linked and some feature screen shots and demonstrations of the actual programs. With more of an application bias Acorn have also released four mathematics CD-Roms called the World of Number series. These aim to support key stages three and four by combining text, sound, pictures and video.

● *The new Acorn multimedia expansion unit compatible with all systems*

The programs were originally developed in Interactive Video format but their reworking on CD-Rom means that they are more accessible. There are four CDs in the series: Who Stole the Decimal Point?, Picture Gallery, Number Games and Short Tasks and finally Perspectives.

The first is an adventure game while Number Games is a collection of seven puzzles. Picture Gallery is a large collection of images and tools aimed at measuring and counting and Perspectives uses four on-screen windows to look at information from different viewpoints in video, graphics and data.

Special price A5000 and A3010

BEEBUG (0727 40303) are offering the brand new style of A5000 with Risc OS 3.1 for £699. Though no monitor or hard disk is included in the price you do get 2Mb of ram and about £200 of software including Pipedream 3, Artisan II and a game of Chess for your leisure moments.

Beebug are also offering a range of monitors and hard drives as well as ram upgrades at reduced prices including fitting and guarantee.

They are also offering their own version of the A3010 Family Solution. For £529 you receive all the programs which come as standard – Draw, Paint, Edit, EasiWord, Quest for Gold – as well as a colour monitor and the £200 software bundle which comes with their A5000 offer.

This will be music to your ears

QD Computers is a fully qualified Acorn dealership and service centre, offering the full range of products for the Acorn machines, including these exciting new products designed by our sister company Vertical Twist.

- DESKTOP TRACKER
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- PRINTER PORT SAMPLER
- GAMES WIZARD

Desktop -T-R-A-C-K-E-R-

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Acorn User January 1993

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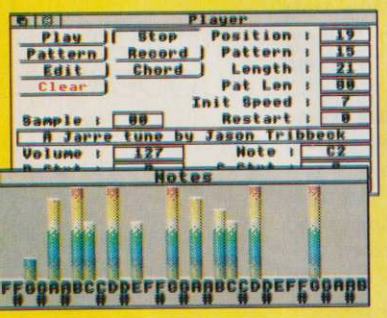
Based on the highly successful Tracker program, Desktop Tracker has been re-written from scratch, and includes many new and innovative features : Up to 16 tracks Fast playroutines 4 effects per note on each track, allowing up to 64 simultaneously.



Real time effects include pitch bend, arpeggio, volume slide, phasor effects, note retriggering, fine tempo and many more

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- All cables and software supplied.
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Printer Port Sampler *Contact us for price + availability.*

Compatible with all Acorn machines - plugs into the printer port.

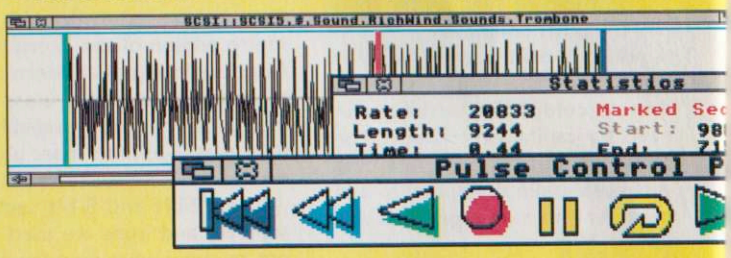
- Perfect for A3010 owners who don't have an Econet Socket. Compatible with all Acorn computers.
- Input socket for connection to your Hi-Fi, radio, microphone etc.
- All cables and software supplied.
- User friendly Pulse software provided.

SPECIAL OFFER:- DesktopTracker + Midi/Sampler Card £125.00+VAT

-P-U-L-S-E-

Easy to use software with powerful features.

- Editing features include Fade in / Fade out, over and under sampling, zoom in / zoom out, save and edit marked section.
- Play forward or backwards at normal or high speed.
- Save in various file formats - Armadeus, Tracker, Sound Module.



Games Wizard £22.12+VAT

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End of Mitre

MITRE Software have ceased trading but until the end of June will continue to offer free upgrades to DiscTree and TimeWatch so that existing users can use these programs under Risc OS 3. Mitre's other program. Flying Start. does not need upgrading.

To take advantage of this offer send your original system disk with a SSAE to Mitre Software at International House, 26 Creechurch Lane, London EC3A 5BA.

Wear your art

PRINT and Wear is a package which can be used for fun or fund raising. It can also be used in school as it crosses the curriculum and is suitable for primary to sixth form students covering topics in Maths, English, Technology and Art.

Print and Wear uses a special brand of transfer paper so that designs can be printed on to a whole range of garments. As well the transfer paper the kit comes with a video for students and one for teachers and a selection of T-shirts all for £38.95 from Power Point Communications (0926 612848).

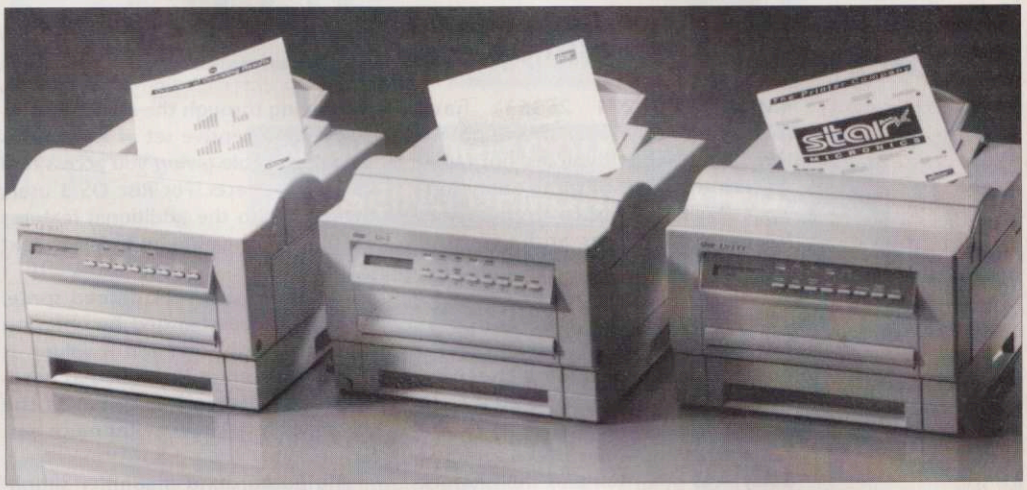
Multitasking Ed

LAMBDA Publications (0793 695296) have now finished the multitasking version of EdScheme – an easy-to-use version of Lisp. They also have a Teachers' Resource Pack containing exercises, examples and quizzes based around EdScheme which wii be priced at £25.

Powering up

IS it economic to repair a broken power supply or should you just replace it? RW Electronics (040484 648) would definitely opt for the former as they repair and restore to full working order power supplies for the Master 128, A3000, A4000, A4 and A5000.

And the price? A complete repair and refurbishment of the A5000 PSU with a six month warranty will cost just £19.90.



● *The new entry level Star LS-5 laser printer*

Compact printing from Star

STAR (0494 471111) have added an entry-level laser printer to their range.

Priced at £799 the LS-5 gives five pages per minute and produces 600 x 300 dpi prints using the new Star-Xerox engine. It has software-controlled paper bins with an optional third bin and a maximum capacity of 800 sheets.

This small footprint printer comes with 0.5Mb of memory which can be upgraded to 4.5Mb.

Multimedia progress

THE majority of CD-Roms can be found in education in this country and so it isn't surprising that Acorn have introduced a Multimedia Expansion Unit designed to add CD-Rom capability to any Acorn 32-bit machine.

The unit consists of a Sony CD-Rom and enough room in the casing to house another CD-Rom, a 3.5in magneto-optical drive, a tape streamer or a hard disk.

Hidden away in the unit is a sophisticated audio mixer and pre-amp which means that you can combine three audio sources from the drives in the case mixing them together or switching between them. There is also support for headphones or loud speakers.

The Sony CD-Rom is a double-speed device transferring data at 300k a second – necessary for PhotoCD access.

The Multimedia Expansion Unit connects to a computer via a standard SCSI interface. A mini card connects the A3000/A3020 while a full-sized card is needed for the A400 series, A4000 and A5000.

Ego help

Here are few hints to help people stuck on the second level of the Repton 4 demo from last month's MegaDisk:

● If you access the Help file into Edit and change the word *finalise* to *finilise* and save it back to the disk, you'll have three lives instead of one.

● The password to the second screen is Motorist.

● This is what the picture should look like:

Carry on shipping

4MATION (0271 25353) have launched a new version of Snippet for the 32-bit range. If you are not familiar with this piece of sprite utility software it allows you to grab sprites from most sources and save and manipulate them at will.

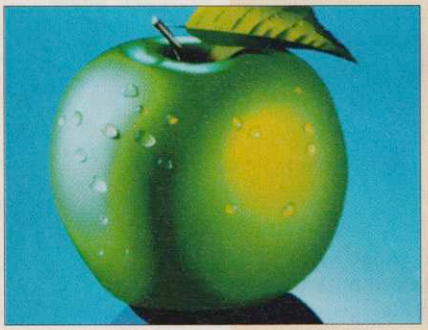
With the new features and improvements Snippet windows behave like directory displays and a new sort facility means that you can sort by name, mode or size in ascending or descending order. You can also save sprites – after a specified delay – to a spritefile in the Snippet window.

Size, mode and mask changes can now be done *en masse* which is faster, and the on-screen colour and tool boxes are much more convenient than going through the menu system.

A comprehensive set of Fill options is now available giving you access to a variety of effects. For Risc OS 3 users there are also the additional features of rotation, shearing and placing text at an angle.

Once you have your desired sprite, its size can be changed by entering different height and width values. It can also be centred or scaled as needed while auto scrolling makes the editing of very large sprites much easier.

The background magnifier simplifies working on small sprites, as the whole screen is used to provide an enlarged view of the area around the pointer. Snippet costs £37.50 or £11 if you are upgrading.



Art for Artworks

ONE of the best aspects to computer drawing and painting is that you can use other people's creativity. Most clip art is available as sprite or drawfiles but there is a growing amount available in ArtWorks format.

ABC of Art (0278 751317) are a clip art company who, every two months, produce a new disk packed full of compressed images. Disk A is now available and each costs £8.

Computer Concepts (0442 63933) have released version 2.18 of Impression II which incorporates the ability to render ArtWorks files. This means that you can drop the ArtWorks file icon into a frame in the same way as a sprite or drawfile.

If you are a registered owner of Impression and ArtWorks simply call Computer Concepts with both serial numbers. However, if you only have Impression there will be a charge of £10.

Oak is Ace – and vice versa

OAK (0274 620423) and Ace Computing are set to merge, with the two companies becoming one and staying as Oak Solutions. However, the Ace Computing name will continue on the branding of the printers drivers.

With CAD being common ground between the two companies a new range in being hinted at by both companies – perhaps even the elusive Einstein. Ace MD, Tony Cheal commented:

"Our own success and the consequential volume of sales have recently been holding up development work on some significant projects. We believe this merger will allow us to focus attention on software development and support and cross fertilisation of ideas and expertise should prove to be inspiring."

Watford Open Day

A DATE to mark in your diary is March 10 when Luton will be home to the Watford Electronics Open Day at their new purpose built showrooms. Whether you prefer PCs, Apples or Acorns there'll be something there for you.

The *Acorn Computing* editorial team will also be there giving advice on everything from education to DTP to programming.

Talking to yourself

XAVIER Software (0248 351151) have released a disk of resources called Chooser to complement their Soapbox speaking spelling program.

Soapbox allowed you to add your own words through such devices as the Oak Recorder but due to requests from teachers Chooser lets Soapbox pronounce words by letter sounds – as opposed to letter names. This makes the program more suitable for younger children.

The disk holds about 50 words or three and four letters and more resources are under development.

Classic midi

WORDS and Music (091-529 5327) have converted a range of midi files to work on 32-bit machines allowing you to play and arrange music from the classics.

The Midi Classic Collection comes on three disks. Volume one includes Beethoven's Symphony No 8 in all four movements as well as Beethoven's and Shostakovich's fifth symphonies and a selection of works from Mozart and Chopin.

Volume two moves to Bach and Gershwin with volume three featuring Mussorgsky, Debussy and Strauss among others. If ragtime or drum patterns are more to your liking then Words and Music have volumes of these too.

All files are in standard Midi file format and will load into any Archimedes program which supports this – Inspiration or EMR's Studio 24 Plus with the EMR Midi File Converter for instance. Files will also load into Rhapsody although the program's internal note resolution means that some resolution may be lost. Disks cost £8.95 each.

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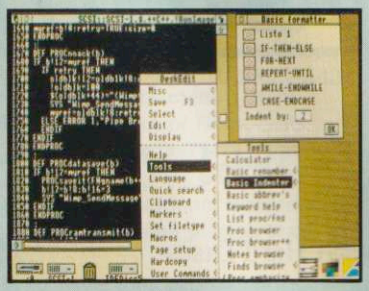
HAS JUST GOT A LOT BETTER

A major new release of the popular and powerful editor DeskEdit brings a whole toolkit of features that will assist all programmers, whether novice or experienced, and whether using Basic or C - and all within Acorn's powerful multi-tasking RISC OS Desktop. There is a lot for text users too.

New features include:

- **Basic program Renumber** - including partial renumber and marked sections.
- **Basic Program Indenter** - automatically reformats Basic programs to indent after IF THEN, REPEAT, FOR etc. - all fully customisable.
- **Basic Abbreviations** - all Basic V's several hundred abbreviations are implemented (optionally).
- **Programmer's Calculator** - a powerful calculator especially designed for handling bits and bytes. Simultaneously operates in decimal, hex and binary, and can import and export results to and from any text window.
- **Multi-purpose Browsers** - F2 and a search string brings up a browser window containing a list of finds. Click on any one of these to go to the corresponding place in your source or text file.
- **Throwback** is fully implemented so DeskEdit can respond to messages from C compilers etc.
- **!FIND** - DeskEdit comes with a powerful stand-alone Acorn application called *Find*, which can find text strings in a whole group of files, just given a wildcarded filename.
- **Extended Saves** - DeskEdit 2 will (optionally) save a special data file so that next time you load your file, not only will the caret be where it was when you saved it, but wordwrap will be correctly set, all markers will be set to their previous positions, and pressing Undo will actually take you through what you did when you last edited your file!



And there is much more that is new in DeskEdit 2:

A new Keyword **Help** can now give help on any keyword marked in your text. A full Basic Help file is included.

QuickSearch can now be performed backwards as well as forwards, and can also find procedure and function definitions. You can even use a marked piece of text to supply the target string for a Quicksearch.

And a lot more - all designed to make editing fast and efficient.

All this of course is in addition to the features that have made DeskEdit so popular among users of Acorn machines, and which resulted in GLOWING REVIEWS when it was first launched a year ago.

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

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

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

IN FACT DESKEDIT IS SO GOOD THAT IT IS USED WITHIN ACORN ITSELF!

DeskEdit 2 (disc, new manual, keystri and quick reference card) PDE2b **£31.95** inc + £2 p&p
DeskEdit 2 Upgrade (please return original disc) Code PDEXa £9.95 inc + £2 p&p

Wimp Programming for All on Acorn RISC Computers

book by Lee Calcraft and Alan Wrigley

This new book provides programmers with a complete introduction to all the techniques involved in writing multi-tasking Wimp programs to run within the RISC OS Desktop environment. No prior knowledge of the Wimp is assumed and the tutorial style of the book will enable all programmers to understand the concepts involved and to develop their skills in writing high quality Wimp programs.

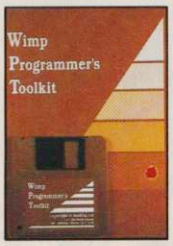
The book consists of ten main chapters and a number of appendices:

- Chapter 1: Introducing the Wimp
- Chapter 2: Windows
- Chapter 3: The Wimp Poll Loop
- Chapter 4: Error Handling
- Chapter 5: Icons
- Chapter 6: Menus
- Chapter 7: Redrawing Windows
- Chapter 8: The Wimp Message System, Loading and Saving Data
- Chapter 9: Templates
- Chapter 10: Printer Drivers and Outline Fonts

To support the book there is a **disc** containing all the programs as listed within the book, together with additional supporting applications.

Wimp Programming for All book £12.95 + £2 p&p Code BK12 **Disc** £4.95 + £1 p&p Code BK13

Wimp Programmer's Toolkit



12 powerful utilities complementing the Wimp Programming for All book

- **Spyglass** - displays the contents of memory allocated to any task currently running.
- **Wimp Debugger** - debug Wimp-based programs while testing and running them.
- **Template Editor** - the latest version of Acorn's FormEd for designing windows and icons.
- **Template File Browser** allows you to view the contents of a template file.
- **Application Shell Generator** - for creating application directories, Obey files and sprites.
- **Menu Editor** - create and edit Wimp menu structures for use in your own programs.
- **WimpAid** allows pointer, window and icon parameters to be dynamically displayed on screen.
- **Iconbar Shell Generator** allows you to build simple multi-tasking programs very easily, by creating a shell.
- **Desktop File Loader** allows you to load a program from the Desktop, rather than run it.
- **Icon Flag Generator** calculates the value of icon flags without recourse to binary arithmetic.
- **EasyWimp** provides a ready-made Wimp application shell to be used for creation of single-window applications.
- **Wimp Message Monitor** provides a means of monitoring the Wimp polling system.

Wimp Programmer's Toolkit and manual **£19.95** + £2 p&p Code **PWPTb**

File Handling for All

book y David Spencer and Mike Williams

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

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

The associated disc (£4.75) contains complete working programs based on the routines described in the book and a copy of Filer, a full-feature Database program.

File Handling for All book **£9.95** + £2 p&p
Stock Code **BKO2b**
Disc supporting the book **£4.75** + £2 p&p
Stock Code **BKO3a**

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

Win a Canon

WITH all the recent emphasis on clip art, Computer Concepts have thrown down the gauntlet to any budding artist. All you have to do is send your original masterpieces created on ArtWorks to them before April 30.

Credit will be given for creativity and imagination as well as technical skill and attention to detail. Everyone who enters will receive a certificate.

The first prize is the top of the range Canon BJC800 colour printer worth more than £1,800. Runners up will receive vouchers for £100 offset against any CC product. If your work is chosen for the ArtWorks clip art library you'll receive a £10 discount voucher. Entry forms are available by calling 0442 62933.

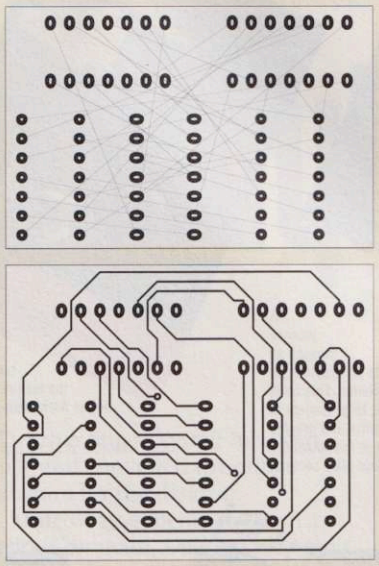
Back to school

COMPUTER courses with the Acorn machines in mind are not very widespread. However, The Arm Club (081-959 3321) are running a series of courses throughout the year. These are all based at Mill Hill School, The Ridgeway, Mill Hill, London and cost £20 or £10 if you are sharing a machine. The cost includes lunch and coffee.

March 7	Beginners Day
March 21	Games Day
April 4	Building Blocks
April 18	Music Day
May 2	Teaching for teachers
May 16	Pipedream
June 6	Beginners Day
June 20	Impression
July 4	Building Blocks
July 18	Squirrel
August 8	Artworks
August 22	Genesis
September 5	Applications Day
September 19	Games Day

More dungeons

FOR anyone who enjoyed Dungeons of the Beast by David Law and David Brookes there is a sequel available called Dungeons of the Beast 2. A very simple arcade adventure it costs £12.99 or you can buy both for only £14.99 from David Law, 24 Woodbourne Road, Brooklands, Sale, Cheshire M33 3SY.



● *Before and after using PowerRouter*

PCB power

POWERROUTER from Silicon Vision (081-861 2173) is a new enhancement for the ARC-PCB range giving complete rip-up retry autorouting which is an improvement over the built-in autorouters.

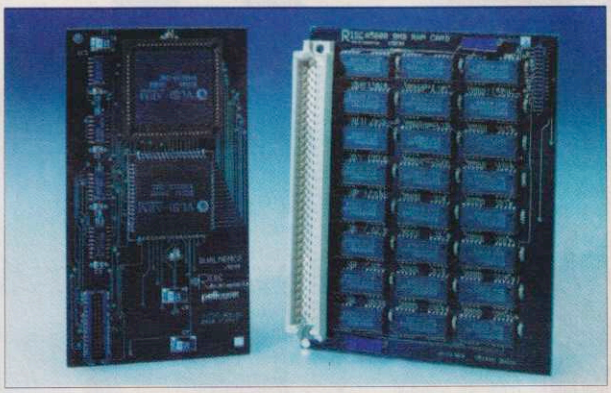
If a physical solution to routing is difficult then PowerRouter can take over with simultaneous multi-layer routing with Auto-Via placement and allows Bias preference settings for Via placement and for horizontal, vertical and diagonal tracks for each individual layer.

Routing can be on a specific grid and the Rats-nest is also scanned for network connections which results in better routing than individual rat-line routing. The price is £195 inc VAT.

Extra ram

OWNERS of A5000s can upgrade their system to 8Mb for £499 from a 2Mb machine – or £429 for those with 4Mb – courtesy of Risc Developments (0727 40303).

An added incentive for those who opt for the 4Mb upgrade is that it comes with a £60 refund when they trade in their original cards. Though very simple the upgrade must be fitted by an Acorn-approved dealer.



● *The new 8Mb ram card for the A5000*

Home movies on the cards

THE much talked about Acorn Replay DIY is now available. Covered in the December issue of *Acorn Computing* this package comprises a capture card available from Irlam Instruments (0895 811401) which plugs into the back of an A5000 or A540 and captures video input – for instance from a video recorder or camcorder – in real-time into a 24-bit colour form compressing the data.

The raw video takes up about 37Mb a minute which is compressed to under 5Mb in the final Replay file. As a result of the reduced data processing bandwidth, Acorn Replay is ideally suited to run directly from CD-Rom.

Audio tracks can be captured simultaneously by these cards too, with their data being compressed by 50 per cent. Asked about the development, Acorn's technical director, Malcolm Bird commented: "These DIY cards will now permit anyone to add their own clips to this existing resource for use in their own particular applications".

Looking up the relatives

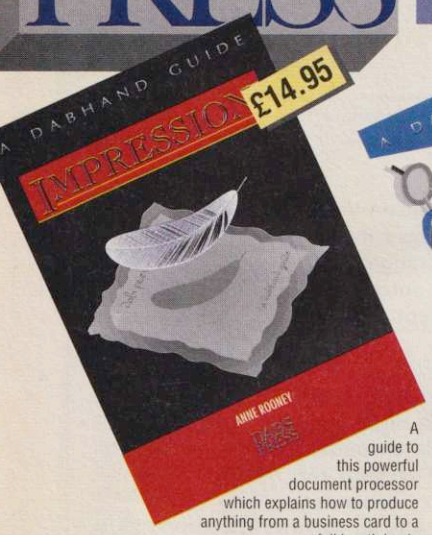
GENEALOGY is a very popular pastime as Ancestry from Minerva (0392 437756) has shown. This easy-to-use program helps you as you discover more branches to your family tree. Now Ancestry has been upgraded to allow the sideways print options to be seen on screen and scrolled before printing.

There is now no need for a master key disk. Existing users of Ancestry can upgrade their programs by returning the master disk to Minerva with a cheque for £11.75.

DABS PRESS

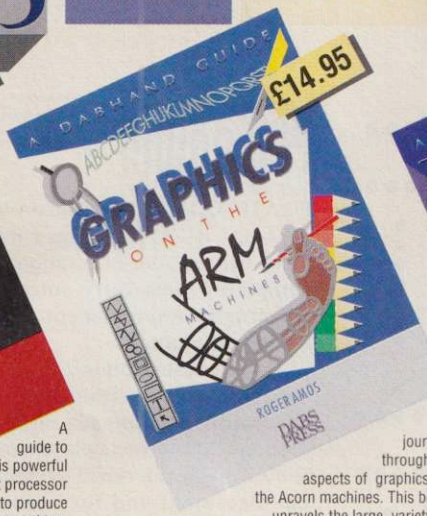
THE ACORN BOOKSHELF

DABS PRESS DABS PRESS DABS PRESS DABS PRESS DABS PRESS DABS PRESS



£14.95

A guide to this powerful document processor which explains how to produce anything from a business card to a full length book.



£14.95

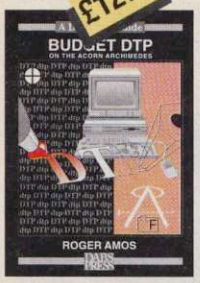
A journey through all aspects of graphics on the Acorn machines. This book unravels the large variety of programs available for all illustrative and graphic work, scanning and picture manipulation. Extensive colour plate section.

£13.95

A step-by-step guide that takes you through all the features of 1st Word Plus on the Archimedes, from installation to mail-merge. Disc available at £7.95 inc. VAT or £21.90 for book and disc.

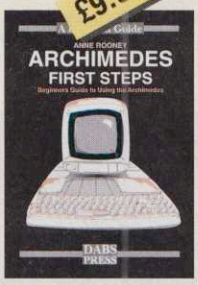
£16.95

This acclaimed popular account of C programming language is the most detailed yet written. Packed with useful example programs and written in clear in efficient way, the third edition of this book boasts even more information than before.



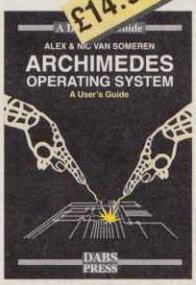
£12.95

The book that will save you money. Takes you step by step through all aspects of DTP on the Archimedes



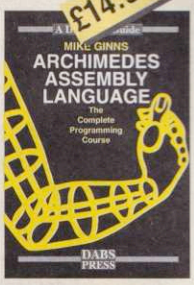
£9.95

Introductory book for the Arc, covering the basic operations and use of !Edit, !Draw, etc.



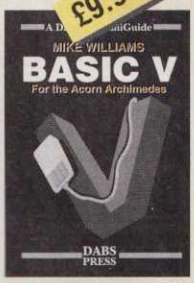
£14.95

Useful summary of OS information with detailed examples. (£21.95) with disc.



£14.95

The only tutorial and reference on ARM assembler on the market, with many RISC OS examples. (£21.95 with disc.)



£9.95

A practical guide to programming in BASIC V on the Acorn Archimedes, with a wealth of easy-to-follow examples.

THE BBC BOOKSHELF & MORE

BBC SOFTWARE

Hyperdriver The ultimate printer driver ROM, with over 80 commands, a built-in NLQ character set, WYSIWIG previewing, access from View, Wordwise, Interword or BASIC. 100 page manual. For B/B+/E/M/C. Price £29.95 ROM, £24.95 disc for SRAM.

Minidriver As HyperDriver but for Mini Office II. Includes Viewdata terminal. £24.95 ROM. SRAM version £19.95.

Mos Plus Utility ROM for Master 128s only fixing EDIT and CLOSE#0 bugs, ADFS format, verify and backup in ROM, backup/compacting in SRAM, alarm clock and configurable startup facility and much more. Price £12.95 ROM, £7.95 SRAM.

Sidewriter Pop-up notepad for SRAM users (any SRAM machine), works with any software. Price £7.95.

Fingerprint SRAM or main memory 6502 machine code monitor/disassembler/memory editor. For B/B+/E/M/C/ Price £9.95.

Conversion Kit Ready-made 6502 assembler routines, for learning or development. Price £7.95

BBC BOOKS

View Dabhand Guide Bruce Smith's comprehensive guide to View word-processor. "For those who want a complete thorough and readable guide to View, then Bruce Smith is your man" (Beebug). £12.95 or £17.95 with disc.

Master Operating System David Atherton's definitive reference work including the famous 'differences between all eight-bit models' section used by countless programmers to ensure compatibility across the full eight-bit range. £12.95 or £17.95 with disc.

Mini Office II Guide Detailed tutorial by Bruce Smith and Robin Burton for the BBC/Master versions of the software. Price £9.95 or £14.95 with disc.

Mastering Interpreters and Compilers Fascinating Bruce Smith title on creating high level languages. £14.95 with free disc.

MASTER 512

Master 512 Shareware Collections Two collections of PC shareware, all tried and tested on the 512. Includes WP's, spreadsheets, databases, games etc. Five full 800k discs in each. Each collection normally £29.95, special offer £25 for both.

Master 512 User Guide Full instruction for using the 512 and DOS Plus, with tips on soft-ware compatibility. £9.95 or £14.95 with disc

Master 512 Technical Guide The companion guide with full 512 programming information and hardware expansion projects. Price £14.95 or £19.95 with disc.

ARCHIMEDES SOFTWARE

Instigator Utility system providing disc sector editor, memory editor, disassembler, command line archiving, and much more. Price £49.95

Arc PC Emulator Shareware Similar to Master 512 Shareware but for the Arc PC Emulator. Two collections of five discs each. Normal Price £34.95. Now on special offer, both collections for £25.

OTHER BOOKS

Z88: A Dabhand Guide Introduction to the Z88, by the designers of the machines own software. £14.95

Z88 Pipedream Guide John Allen's detailed work on all aspects of Z88 PipeDream. Good explanations of printing. Price £14.95

Psion LZ OPL Guide Ian Sinclair's guide to OPL programming on the LZ series of Organiser machines. £12.95

NEW Getting the Most from The Amstrad NC100 Notepad computer Ian Sinclair's guide to this popular new notepad computer, packed with hints and tips on how to get round problems, tackle awkward jobs etc. This is the book to get when you realise that you cannot get full potential from this machine in 5 minutes! £9.95

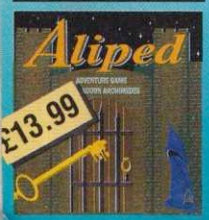
Alien Images *Excellent Entertainment now at LOWER PRICES!!*

£13.99

"Harry and Dave manage the laundry firm, but things have been going wrong. They work all night but will they put things right?"
Multi level game, high quality graphics, simple key controls for easy movement of characters. Needs 1MB. RISC OS compatible.

"a great deal of fun" "fiercely competitive" "to the accompaniment of decent music, effects and humourous speech"

Duncan Evans - ARCHIMEDES WORLD



£13.99

"Aliped - wing footed like a bat is the spell that has been put on you by the evil step-mother of your fair princess Natasha".
Smooth multi-directional scrolling castle, stunning use of stereo sound, high quality graphics. Needs 1MB. RISC OS compatible.

"Aliped is a sideways scrolling arcade adventure starring you as the bat-winged, red caped crusader."

"Decent looking game" "Worth investigating"

Duncan Evans - ARCHIMEDES WORLD

GAMES

£13.99

The date is 2143 A.D., the universe has started to contract, causing the most inner galaxies' fine balance to be upset. Their only chance is you in your humble rescue ship. Multi level game with high quality graphics. Needs 1MB. RISC OS compatible.

ALERION	Classic shoot-'em-up scroller.RISC OS compatible £13.99.
ARCENDIUM	Draughts, Backgammon, Reversi and Quadline, now RISC OS compatible. £13.99.
ALIEN INVASION	Classic Space Invaders £13.99.
ALL-IN BOXING	Realistic boxing game, 1 or 2 player. £13.99.

Orders to Dabs Press Publishing, FREEPOST (PR1327) Leyland, Preston PR5 3BR (Phone 0772 623000)

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SUBSCIBER SPECIAL
Four great programs on your disk this month

Desktop mayhem

DeskRoids: Bubble wrath

Way back in February 1989 we published an asteroids-style program called ArcRoids or, less formerly, Bubble-Roids because the rocks were drawn using the operating system's circle routines and they look like bubbles.

It worked very well but wasn't a multitasking program – not much surprise there. However, well-known PD writer Stuart Tyrrell has been busy and converted the entire program for the desktop.

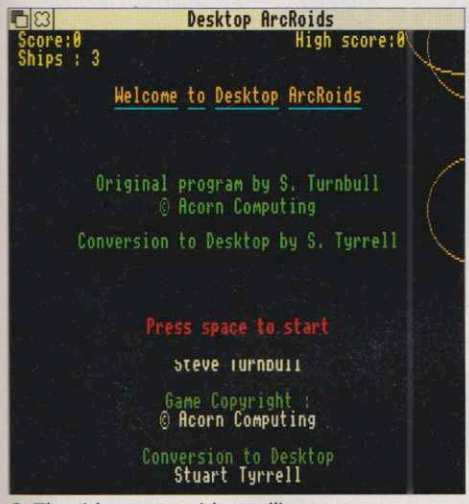
More of an experiment than a serious program, DeskRoids doesn't go too fast on an ARM2 machine but is fairly playable on ARM250 and ARM3.

The original program loops through a single routine which makes it easy to insert a Wimp_Poll call to implement the multitasking aspect. And every time the keys routine is called there's a check to ensure that the DeskRoids window is the currently highlighted one. If it isn't the game stops – providing a pause option if you need it.

There's a set of instructions at the start but briefly the idea is to blow up the bubbles – you have a maximum of five bullets at any one time. Each bubble breaks in half when you hit it until you get down to the smallest which explodes revealing a crystal and gives you extra points if you can pick it up.

The controls are Z and X for rotation, Return for fire and Shift for thrust. Happy blasting on your Desktop.

Steve Turnbull and Stuart Tyrrell



● *The title screen with scrolling text*

● *Burst the bubbles and collect the gems*

SUBSCRIPTIONS
Are you missing out on all these great programs plus loads of PD software? Get a 32-bit subscription now and get two disks per month for less cost than buying *Acorn Computing* in the shops

Subscribe now, turn to Page 32

Chemistry: Arsenic and old boron

With more students owning computers, revision can become a lot more enjoyable if a computer is involved. !Chem is a chemistry teaching aid aimed at the GCSE syllabus. It contains a copy of the first 20 elements (the only ones used in the course) from the periodic table.

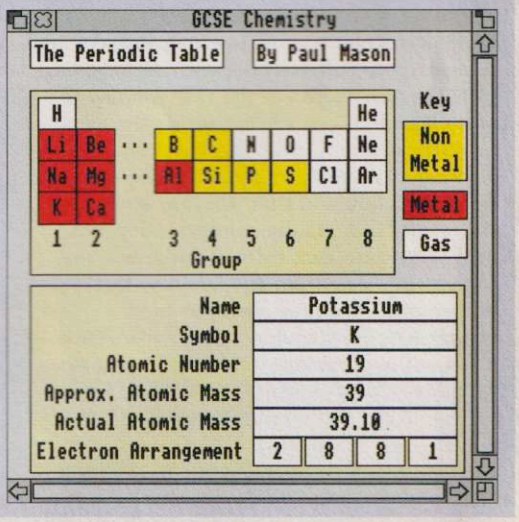
Although the periodic table does not need to be learnt for the exam, it can be a lot quicker recalling the facts from memory than having to look at the table chart supplied. Also, it gives the student an idea about trends in atomic mass and electron arrangement, and more importantly, the symbols.

The program has a simple Wimp front end – in accordance with Acorn's regulations, and is a true multitasking application. Once launched with the normal double-click, its icon – a small Bunsen burner – sits on the icon bar. If clicked on with Select, it brings up a window consisting of a simplified periodic table.

Clicking on an element from the periodic table will bring up information on that element in a table form below it: Name, symbol, atomic number, approx. atomic mass (the figure given in most tables), actual atomic mass (a two decimal place figure) and electron arrangement (how the electrons are arranged in their shells).

If menu is clicked over either the window or the icon on the iconbar, a menu will appear giving the option of quitting or information about the program.

Paul Mason



32-bit reviews index...all the best

THE *Acorn Computing* subscription disk contains an up-to-date list of all the products for the Acorn 32-bit micros that have been reviewed in *The Micro User* and *Acorn Computing*.

Stephen Wade

FAULTY DISK?

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

Europress Direct
FREEPOST
Ellesmere Port
South Wirral L65 3EB.

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

Acorn Computing
Europress
Publications
Europa House
Adlington Park
Macclesfield
SK10 4NP

File Converter: Any which way...

This is an easy-to-customise multitasking program that can change a file byte by byte. It performs a basic search-and-replace function better than the !Edit and makes it easy to carry out operations such as:

- Force all characters to upper case
- Remove all control codes
- Turn CR,LF – as used on PCs – to LF.

However, as this only does a bytewise search and replace you'd better stick to !Edit for word swaps.

The program uses a Basic library module which may be selected from one of the examples given, contained in the directory !FileConv.Libraries. To load a new library – once !FileConv has been launched – simply drag it to the !FileConv icon on the iconbar with Alt held down.

To convert a file just drag it to the iconbar icon and it will be processed according to the currently loaded library. Each library is a Basic program which contains the following procedures and function:

```
DEFPROC_Init
ENDPROC

DEFFN_Change(In%)
Out%=In%
=Out%

DEFPROC_Final
ENDPROC
```

PROC_Init allows you to set up any variables before FN_Change is called, and PROC_Final is called after the last time FN_Change is accessed. The middle line on FN_Change is where the processing occurs. The example above is taken from the library Blank. Take a peek at a few to get the hang of it – none of the libraries given use PROC_Init or PROC_Final.

To delete a character then return a negative value, for example, the library StripCR contains the following change code:

```
DEFFN_Change(In%)
IF In%=&0D THEN Out%=-1 ELSE Out%=In%
=Out%
```

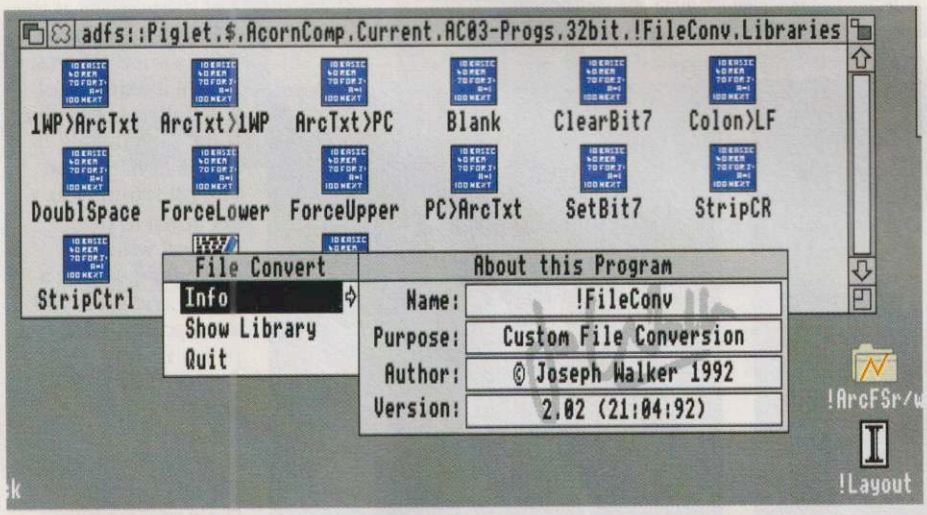
To insert a character in addition to the one passed to the routine, pass back a number greater than 255. Only one extra character can be included per call to FN_Change, and here's how it's done in the Acorn text to PC text converter:

```
DEFFN_Change(In%)
Out% =In%
IF Out% =10 THEN
 Out% =13+256*10
=Out%
```

The character 13 is added to the output file.

If you are not sure of the effect that a library will have just try it out – remembering to make a backup first. The directory Libraries also contains a file Test which contains all the characters from 0 to 255 arranged in order, and you can double-click the GenTest program to recreate Test after you've modified it.

Joseph Walker



● *The File converter plus its library of routines*

Base Converter: Easy number changes

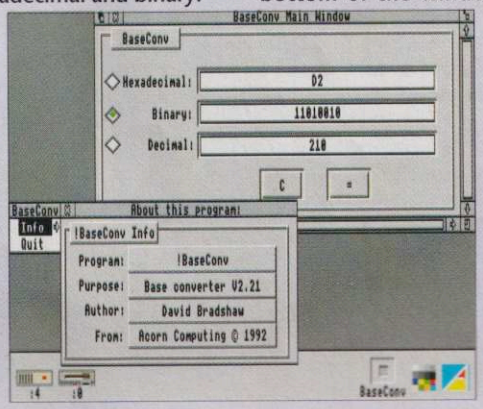
Nothing can be more annoying than having to change a number from base to base, especially when you don't have a scientific calculator handy. BaseConv is a multitasking Risc OS application which makes number conversions easy between decimal, hexadecimal and binary.

Double-click its icon in the Filer window to launch it and its icon will appear on the iconbar. Clicking Menu over the BaseConv icon will bring up a simple menu, consisting of just two entries, Info and Quit. Moving across on Info results in a standard information box, while clicking on Quit exits the program and removes the icon from the iconbar, freeing the memory it had previously occupied.

Using BaseConv couldn't be simpler. Click Select on the program's iconbar icon to open the main window. This consists of three writable icons, three radio buttons and two control icons.

To convert a number from one form to the other double click on the icon that corresponds to the form you wish to convert.

Now, click on the writable icon, and type in the number to be converted. Press Return to confirm entry, and click on the = icon at the bottom of the window. The number in the other two forms will appear in the corresponding writable icons. Clicking on the C icon results in all the writable icons being cleared.



● *Changing a number base is simple*

For example, to change the binary value 11010010 into decimal, you would take the following actions. Firstly, clear the writable icons by clicking on the C icon, then click on the binary radio icon, and then the binary writable icon. Enter 11010010 followed by a Return then click =. The values D2 and 210 will appear in the hexadecimal and decimal icons respectively.

When the program is finished with, simply click on Quit from the BaseConv menu. This will leave the program as explained above.

David Bradshaw

NETGAIN

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Netgain is a real breakthrough in Econet technology which reduces the frustration of slow load times for applications.
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To the user, Netgain appears on the icon bar as a standard Acorn filing system, just like a floppy drive or network. The user simply clicks on the icon to open a directory viewer containing his applications. These may be loaded at hard disc speed simply by clicking.
Netgain is compatible with all types of Acorn fileserver as well as SJ Research MDFS.

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WHEN you subscribe to *Acorn Computing* as an 8-bit BBC Micro/Electron user, you receive a special package of software designed to entertain and help you continue to get the most from your machine.

This month's exclusive subscriber-only package contains a fun game for the younger player plus three utility programs. With *Pirate's Gold* you follow a single track in a race against the computer to reach the buried treasure.

Star Command Creator is an excellent utility for building your own machine code routines by providing a standard interface with the BBC Micro operating system.

Using *Palette* you can view all the different ways that the limited colours of the BBC Micro can be dithered to present a wide variety of shades.

Finally there's *Morse* – not the TV detective – but a program that displays in sound and by graphics the Morse codes of characters typed in.

Star performance

IT can be very useful having your machine code programs run by a simple star command – but it can be a tedious job setting up the correct code to allow this. Now the strife is no more with this quick and simple-to-use star command creator.

This routine allows you to choose a command name of no more than 11 characters and select which area of memory your code will be placed in. When called it will also pass to your program any remaining characters after the command name. All this by means of four commands of its own.

But first you must run the Basic assembler program to set the code up and save it. You are asked for the assembly address. If there is no obvious reason why not, I suggest &900 to start with. The machine code will be saved as *Star*. To initiate type:

```
*RUN STAR
```

However, please note that because the program has been designed to survive a Break, you must ensure that it is well and truly out of the computer's memory by turning the computer off before running the assembler again, otherwise the Basic program will hang and so will every Star command after that.

Here are the commands that the control software provides:

***CSTAR aaaa <command>**

where *aaaa* is the memory location where your code is situated, in hexadecimal form. This should be followed by the command name you wish to assign your code. The moment the above command is issued, it is active.

***CS OFF**

Switches the commands off. None of the Star commands will now work with exception of *CS ON.

***CS ON**

Switches the commands back on again after *CS OFF. It cannot be disabled when the program is active.

***CSPROG**

Displays all current Star commands in operation from CS, including the routine's own commands and their call addresses. The start and end addresses of the table will also be displayed.

***<command>**

where *command* is your own star command. On issue – assuming *CS ON – your code will be called at the address given. Zero page locations &70, &71 with offset in register Y, will point indirectly to the memory location holding the next character in the Star command. It can be read by issuing the standard assembly command LDA(&70),Y – the string ends with a return, Ascii 13.

The program uses zero page locations from &70 to &7B inclusive and if you use them it will cause unreliable operation.

Two different errors are reported from CS, a specific error *Bad address* which signifies that the call address given in the *CSTAR command is an impossibility and *CS command error* which usually means you've missed a space in the command somewhere or you've missed out a parameter.

One final important note: Whenever you want to move the program to a BBC Micro with a different version of operating system it is important to run the Basic assembler program, not the saved machine code, as it is in the Basic program that the call address for passing unknown CS commands to the OSCLI is set up.

Mark Bannister

Pirate's Gold: Racing for the finish

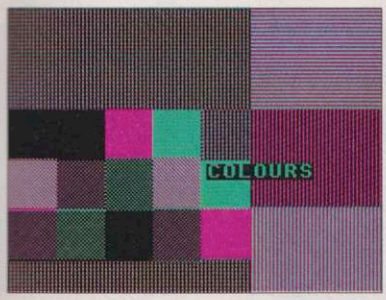
This is a simple game which is really suitable for the young or easily pleased. It's for one player against the computer and is a simple strip board game. Your own and the computer's pieces are placed in the start box on the right – you go first. Press the spacebar and the digital dice will roll and finally stop on a number between 1 and 9.

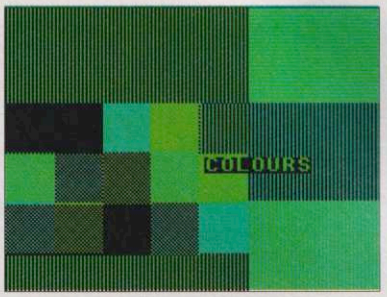
Your piece will be moved forward, and then the computer will have its turn. If you land on a square occupied by the computer, or vice versa, the landed-on piece is sent back to the start. If a piece lands on a treasure chest the player gets another roll – it happens automatically. Landing on a skull also gives another roll, but the piece is moved backwards. The exact roll is needed to reach the end.

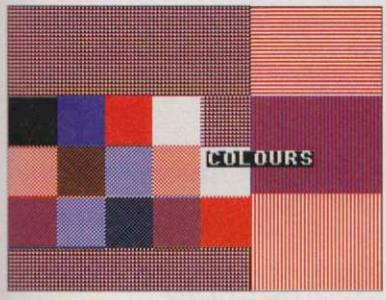
Mike Goldberg

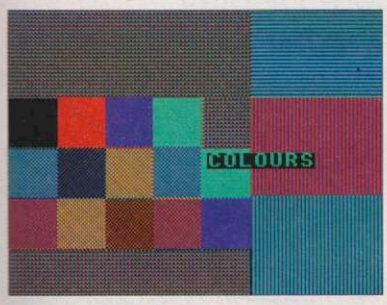
SUBSCRIBER SPECIAL
Four great programs on your disk this month

Palette: Colours of the rainbow









Although the 8-bit BBC Micro has a limited range of colours it's possible to generate more by dithering. In Mode 2 the pixels are too big but it can be very successful in Mode 1.

Apart from the colours used for dithering the choice of pattern is also very important in the resulting effect and this Palette program displays just about every pattern for dithering you can get.

It's very simple to use – you just run it and watch the screen take shape. The program cycles through all the colours available showing how they all affect each other under the different patterns.

It's interesting to see how the horizontal line patterns differ from the equivalent vertical patterns because of the non-square pixels.

There are 4,096 combinations which are switched every half second so it'll take just over half an hour to go through the lot.

Joshua Westbury

Next month...

The *Acorn Computing* 8-bit subscription disk will feature a demo of the great arcade/puzzle TimeSlip, originally titled Paradox. In this special version you will have 10 of the original 50 fully playable levels.

So get your subscription now and don't miss out on this excellent opportunity to get the demo version of TimeSlip from The Really Good Software Company. See Page 32.

FAULTY DISK?

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

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

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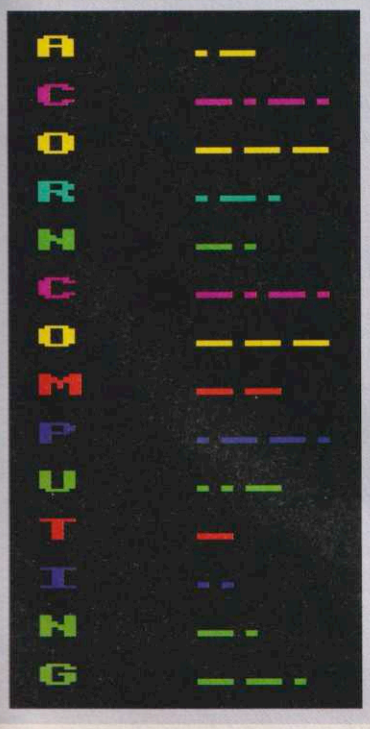
Morse: Going dotty over dashes



In 1837 the American inventor Samuel Morse wanted to devise a code for use with his electric telegraph. He decided to allocate his shortest signals to the most frequently used letters so he sent his assistant to the local printing office to find out how many there were of each letter in the type case – a clever piece of lateral thinking, unlike Braille which is, very impractically, designed around the Lord's Prayer.

Morse might have been surprised to know that his code would still be in use over 150 years later, although it has been modified a little over the years, and the one used in this program is International Code.

The program simply converts any entered letters into the Morse equivalent and displays the pattern on the screen, at the same time sending the appropriate sounds. In the DATA files the digit 1 is a dot and 3 is a dash.

If you want to put the program on random auto-pilot change line 70 to:

```
G=RND(26)+64:C=64
```

and delete line 80.

To make the program transmit an entire message in one go replace lines 50-80 and 120 with the following:

```
 50 INPUT"Enter your message",A$
 60 FOR M=1 TO LEN A$:RESTORE
 70 G=ASCMID$(A$,1):C=64
 80 IF G<65 OR G>90 THEN 210
210 NEXT:REPEATUNTILGET=32:RUN
```

After the message has been sent, press space for another go.

Jon Millington

Acorn COMPUTING

Don't miss out on the great programs for the Acorn 8-bit machines that you can receive every month. From listings written specially for *Acorn Computing* readers to an excellent selection of PD programs.

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Digital Symphony

The Soundtrack Editor offering

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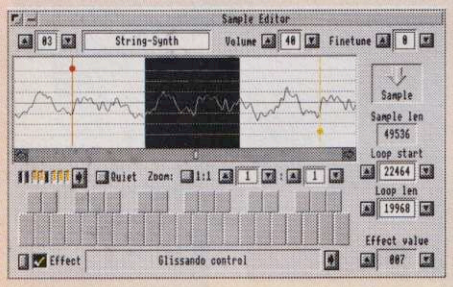
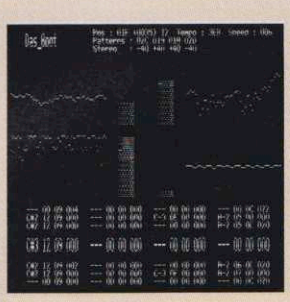
Advanced Features



Built in Sample editor, allows you to Cut and Paste parts of the sample. You can try out any of the 40 different special effects, and define a repeat loop by dragging visual markers.



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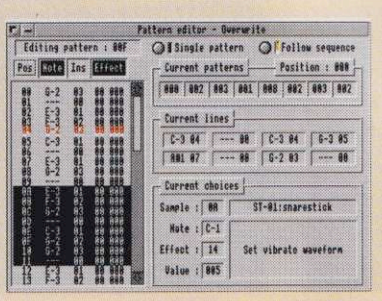

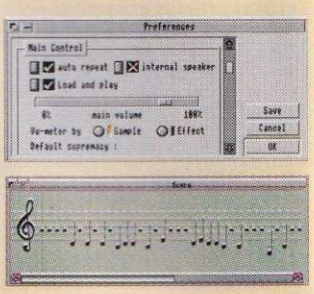

The Pattern Editor, used in conjunction with the Musical Notation score display, makes editing a track very easy. Once created each pattern can be slotted into the sequence, wherever you wish. Cut and Paste, Copy, Transpose, Exchange, etc... facilities are offered to enhance flexibility.

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Archivist 2

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Cards are created with the Designer part of the package, a new form can be designed simply by selecting fields, and dragging them to their required position.

Text, Integer, & Real field types can be set,in addition to multiple format Date fields, and Formula fields with user definable equations.

Alterations, for example - extra fields can be added to a card, even if you have started imputing data, and no data will be lost.

Archivist is able to Store and Display or Play Textfiles, Sprites, Drawfiles, Maestros, Samples and Soundtracks.

Archivist can be interrogated using either of two search routines, Easy Search gives you a duplicate copy of the card, you type the variable to be searched for in the appropriate field, and Archivist does the rest.

For those requiring a little more flexibility, a complex search equation can be built up using mathematical, and Basic Operands.

Archivist of cause, also provides a Search and Replace facility, plus a fast Primary & Secondary Sort routine.

A Clipboard, allowing cut and paste operations, and a user definable Quick Entry routine, speeds up data entry into Archivist considerably.

Card Print allows printing of cards in WYSIWYG format, using of course the standard Outline fonts. (2 supplied)

Reports generator, allows your data to be presented in a tabular form. Archivist also has a specifically designed Label Printer for your Names and Addresses files.

Archivist files are saved compressed to save valuable disc space, and with a Password for privacy if required.

Archivist can automatically produce CSV files, with the option to create Graphbox headers. Also it is possible to save data as a textfile for export to DTP's etc.

Statistics window displays the Averages, Minimums, Maximums and Totals of each field for the entire database.

Archivist is able to Import files from many existing databases, on the Archimedes, as well as the BBC and PC.

Existing users can upgrade to Version 4.40 for just £5, by returning the original disc.

Powerful Database

Quick as a flash

Mike Cook looks at a new option in permanent storage

THE technology that goes to make today's modern computers is rapidly changing and evolving. Take memory chips for example. In the early computers they were quite limited – an A4 size board full of chips would have just 4k of memory.

It's always difficult to predict the shape of future computers but one way is to keep an eye on component manufacturers' press releases. The component announcements of today often find their way into the products of tomorrow.

Whether any particular one will, depends on a number of factors, the main ones being price and availability, as well as function. Not a lot excites me in this field but last month I came across something that might just have a big influence on the future direction of Acorn's computers.

Mitsubishi have announced a 20Mbyte flash memory card which is already generally available. *So what?*, you might ask, but just think about it:

Here we have a card, about the size of a credit card, only slightly thicker, that can store the equivalent of 25 800k floppies. Not only that but it is flash memory, which means it uses Eeproms with a 200nS access time. That means it's as fast as the main memory in your computer, has the capacity of a small hard disk and is non-volatile.

Normal memory is *volatile*, that is, when you switch off the power your chips get an instant attack of amnesia. However, with non-volatile memory the contents remain until you change them. This is like the battery-backup that holds just a few parameters in the Archimedes. However, now you have 20Mb of information that can be permanently on tap.

Eeprom stands for Electrically Erasable Programmable Read Only Memory. With the old eprom, much beloved of sideways rom slots in the old 8-bits, you had to erase them by exposing them to ultra-violet light for about 15 minutes.

Then you could put them in an eprom programmer and feed them large voltage pulses (well, 12 or 24 volts actually) before you could transfer them, physically, to the computer. With an Eeprom not only can you program it in situ, you can also erase it with a normal logic pulse in situ.

Eeproms take longer to write to than to read, so we won't be seeing them used as a computer's main memory, but as a solid state replacement for a hard drive they have a lot going for them.

For a start they consume much less power than a conventional drive as you don't drive a motor to spin the disk round – ideal for portables. Secondly they are much more robust as there is no delicate read/write mechanism – again ideal for portables. Finally there is the ability to swap cards, just like a removable drive.

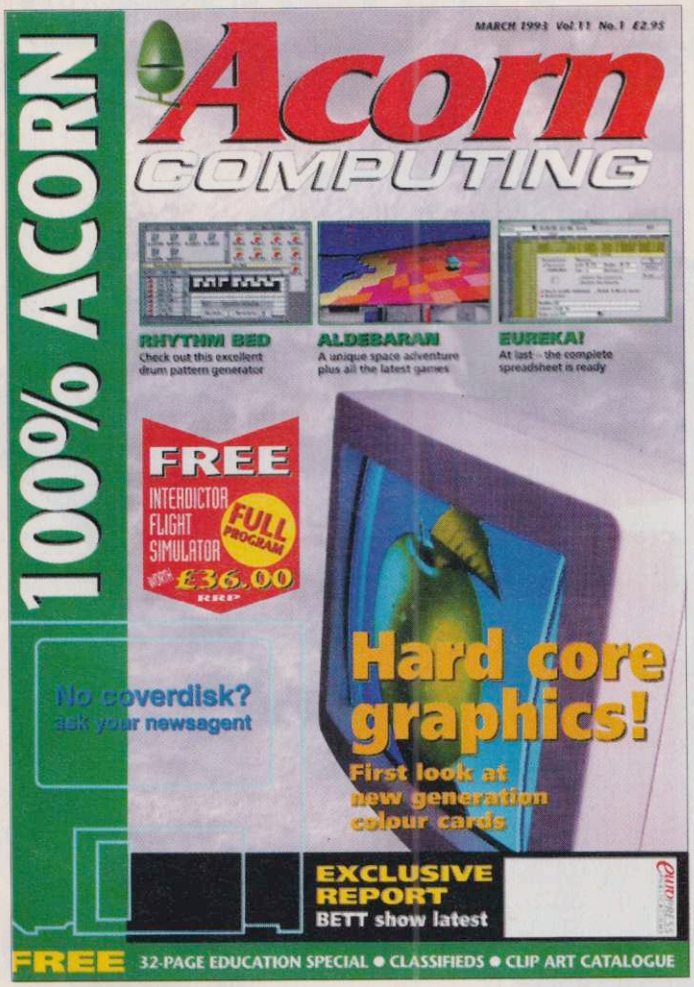
Imagine having a ram disk on your desktop not confined to the few Kb of memory you can spare, but 20Mb in size. Also you will not have to load up this ram disk every time you switch on computer.

Imagine a hard disk that you don't have to park before switch off, and one that will not suffer from head crashes as there is no head to crash. Imagine a disk drive with 200nS access time for *any* track.

Well we might just see all that within the next year, the technology has arrived. However, one important consideration will be the price – press releases on new components are notoriously reticent about telling you things like that. This is vital as any system built round these cards has to compete with the rising technology of floptical and optical storage.

Who knows, it might appear built into future Acorn machines. One day you might be telling the incredulous young: *When I were a lad, everything was stored magnetically*. Is this the future direction of computing? Only time will tell, but remember you heard it first in *Acorn Computing*.

> Imagine having a ram disk on your desktop not confined to the few Kb of memory you can spare, but 20Mb in size



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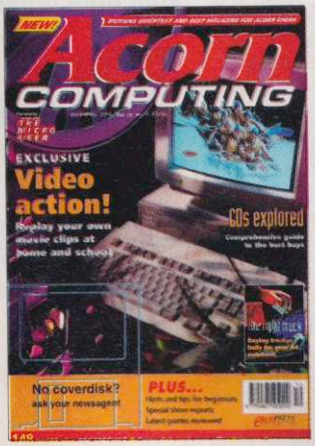

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A multitasking Risc OS application which makes number conversions easy between decimal, hexadecimal and binary.

Chemistry: What it's made of

A teaching aid aimed at the GCSE syllabus with a copy of the first 20 elements – the only ones used in the course – from the Periodic Table presented in its standard form.

DeskRoids: Dangerous bubbles

The whys and wherefores of a asteroids-style game and the game itself multi-tasking with the rest of your desktop.

File Converter

An easy-to-customise multitasking program that can change a file byte by byte – for example stripping out control codes.

Lots, lots, more...

Profesional clip art, 8-bit listings, index of all 32-bit reviews in *Acorn Computing/Micro User*, and the best of the public domain.

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If you have an 8-bit machine such as BBC B and Master you get your own subscribers' disk featuring ingenious and new programs written especially for you. AND your subscription will cost you £8 less than 32-bit subscribers.

Quantity and quality – that's got to be a combination you can't afford to ignore!

Steve Turnbull
Editor, Acorn Computing

opinion on all areas. Hardware and software are reviewed by the people at the sharp end whether they are teachers, graphic artists, business men and so on.

Information is given and technical queries are answered in an accessible easy-to-understand style. Steering clear of jargon, our technical editor, Mike Cook, uses his extensive knowledge of computers and electronics to help you make the most of your hardware as well as setting challenges for the more adventurous.

Our open and friendly style – as well as our personal enthusiasm for the machines we are talking about – not only shows in the magazine but in the massive response we get from you, the reader.

DISKS...

For the 8-bit user:

Star Performance

It can be very useful having your machine code programs run by a simple star command and this quick and simple-to-use star command creator does just that.

Pirate's Gold: Racing for the finish

A very simple game for one player against the computer and is a simple strip board game – just like you get in comics and annuals.

Palette: Colours of the rainbow

Although the 8-bit BBC Micro has a limited range of colours it's possible to generate many more by dithering.

Morse: Going dotty over dashes

By converting any letters into the Morse equivalent, the program displays the pattern on the screen with the sounds.

Plus...

The listings from CyberDoc – this month, Potato Baker – and your own sound sample package.

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Hard core graphi

ALTHOUGH at the forefront of technology with their Risc-based architecture, the Acorn machines look rather dated graphically when compared to rivals such as PC compatibles and Apple Macintoshes.

There are two main factors that effect the quality of graphics on a computer – the resolution and the amount of colours available on screen at once. By increasing the resolution, jagged edges on lines can effectively be smoothed out by using pixels that are too small to be seen.

Increasing the resolution also means that dithering can be used to simulate more colours than are actually available. This involves placing pixels of alternate colour in a chequer-board arrangement. If the pixels are small enough, the two colours appear to blend together to form something roughly mid-way between the two.

Finally, increasing the resolution has a practical effect of giving you more space on screen in which to work. If you often use the desktop and especially use applications that require large windows – such as spreadsheets, the extra room can greatly enhance the usefulness of such programs.

If you use your computer for DTP you may wish to get a better idea of what your work will look like when printed out. This would only apply, though, if you were outputting to a rather expensive colour printer that could match the onscreen portrayal.

If, on the other hand, you were image processing or producing graphics for presentation purposes, an increased colour range would be a benefit. It's difficult to cite a purely practical reason for having more colours, although there are a few areas of image processing – especially in medicine – where an extended palette would be advantageous.

There have been a number of graphics enhancers around for Archimedes for quite a while now. The first to appear – and now discontinued – was the Atomwide VIDC Enhancer. This was a small plug-in card that gave increased resolution on any computer utilising a multi-frequency monitor. Several other similar devices were available, such as those from Watford Electronics and Beebug which operated in a similar fashion to the Atomwide upgrade.

The other alternative, up until recently, has been the Vertical Twist Graphics Enhancer previously sold by The Serial Port. This single width expansion card gives you an increase in resolution, much in the same way as the VIDC enhancers, and also provides an extended palette, although this second feature is restricted to non-desktop modes only. With the Graphics Enhancer it is possible to display specially created graphics using more colours than are normally available on the Archimedes.

You now have a choice of three new graphics boards: Computer Concepts' Colour Card, State Machine's G8 Graphics Accelerator and the SpeedGraph from Evolution Computer which is promised shortly.

Computer Concepts' Colour Card

This is the product of the alliance between Computer Concepts and Wild Vision who joined forces to develop new hardware add-ons for the Archimedes range. The Colour Card is a single width expansion card that fits in any 32-bit machine with a standard backplane.

Fitting is simple. Just install it in an empty back-plane slot and attach a small ribbon cable to a connector on the main board. On some early machines – A310s and A440s – there is no connector but it can be fitted by a dealer for a small charge or you can do it yourself if you know which end of a soldering iron is hot.

Finally, a short cable is used to connect the video out from to the card. The monitor is then connected to the card. There is video pass-through for compatibility with all existing Acorn or third-party screen modes and hardware. A user-fit A3000 version of the card should be ready when you read this.

The Colour Card will not work with an A4, A3010, A3020 or A4000, and at the time of going to press, there are no plans for a mini-podule slot compatible version of the card – it would require a minor miracle.

Low level control software is supplied in a rom on the card and additional software on disk provides a selection of modules for driving different types of monitor. Two further utilities are supplied: !FlipTop which is an extended version of the mode selection application supplied with ArtWorks, and !Clearly, a utility for displaying 24-bit Clear format files in 15-bit colour – 2^{15} or 32,768 colours – modes.

The Colour Card implements a completely new set of modes but when not using them, the video signal is passed unaltered, straight through to the monitor, thus maintaining compatibility with all software. Even programs, such as games, that write directly to the screen, work properly.

Once fitted and the software is installed, you can try out the new modes. !FlipTop installs on the icon bar and gives you instant access to the complete set of new modes, as well as those supplied as standard.

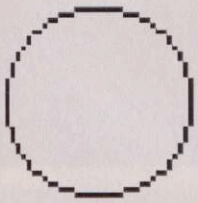
Running !FlipTop produces a grid in a window, with dimensions – or

PRODUCT SPOTLIGHT

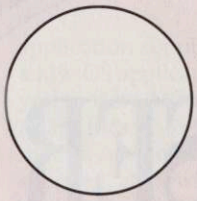
Product: Colour Card
Price: £249
Supplier: Computer Concepts, Gaddesden Place, Hemel Hempstead, Herts HP2 6EX.
Tel: 0442 63933
Requirements: Risc OS 3

ics

Rob Miller looks at the world of graphics boards for the Acorn range of 32-bit computers



Low resolution



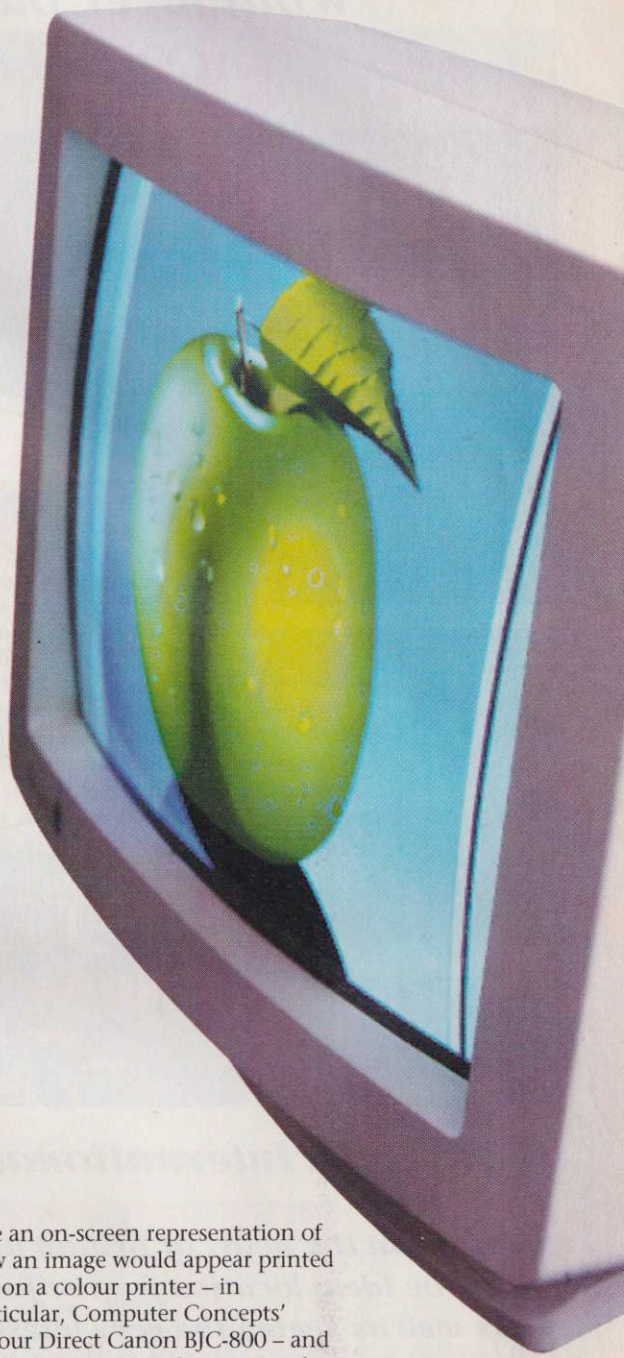
High resolution

● *The smoothing effect of increasing resolution*

Red and yellow pixels magnified to show dithering

Red and yellow pixels 'merge' to produce orange

● *How dithering creates new colours*



resolutions – listed down the side and the number of colours along the top. Different coloured icons are used to signify whether or not a mode exists for each resolution and number of colours.

Green means an Acorn mode, yellow a colour card mode. Squares are for square pixel modes and rectangular for non-square pixels while unavailable modes are blank.

If a cell is empty, that particular setting is not supported. In particular, the two columns marked K (thousands) and M (millions) are completely empty, but have been included for future Desktop modes that allow more than 256 colours.

To select a new mode, you just click on a particular cell – there's no need to remember awkward mode numbers or any need to use the keyboard at all. !FlipTop also provides other options for selecting equivalent screen modes with different numbers of colours and counting through the available modes to choose one you like.

The final option available from !FlipTop is the ability to select different palettes for 256 colour modes. Unlike the standard Archimedes, the Colour Card allows any colour in the palette to be changed independently of the rest.

In addition, selection is from a full 24-bit – 16,777,216 colours – palette, allowing for true grey-scales or whatever 256 colours you fancy. Four 256-colour palettes are supplied with !Fliptop: Default256, Grey256, Printer 256 and Primary 256.

Default256 is the standard Acorn 256 colour palette, Grey256 is a 256 shade white to black palette – useful for true representation of scanned images and previewing black and white DTP. ArtWorks graduated fills look particularly impressive.

Printer256 adjusts the colours to give an on-screen representation of how an image would appear printed out on a colour printer – in particular, Computer Concepts' Colour Direct Canon BJC-800 – and finally Primary256 adjusts a number of colours so that they contain 100 per cent parts red, green, and blue and so on.

At present, the only way of generating new palettes is by hand – typing a list of 256 red, green, ➤

Jargon box

Sprites are usually regarded as two-dimensional – they have height and width – but in the world of graphics there's a third dimension: Colour. The accuracy to which colour is represented in a sprite is called its *depth*.

A two-colour sprite has a depth of one bit, four colours is two bits, eight for three bits and so on. The current trend in the Acorn market is to refer to 16-bit sprites as *deep sprites* – it's certainly quicker to say.

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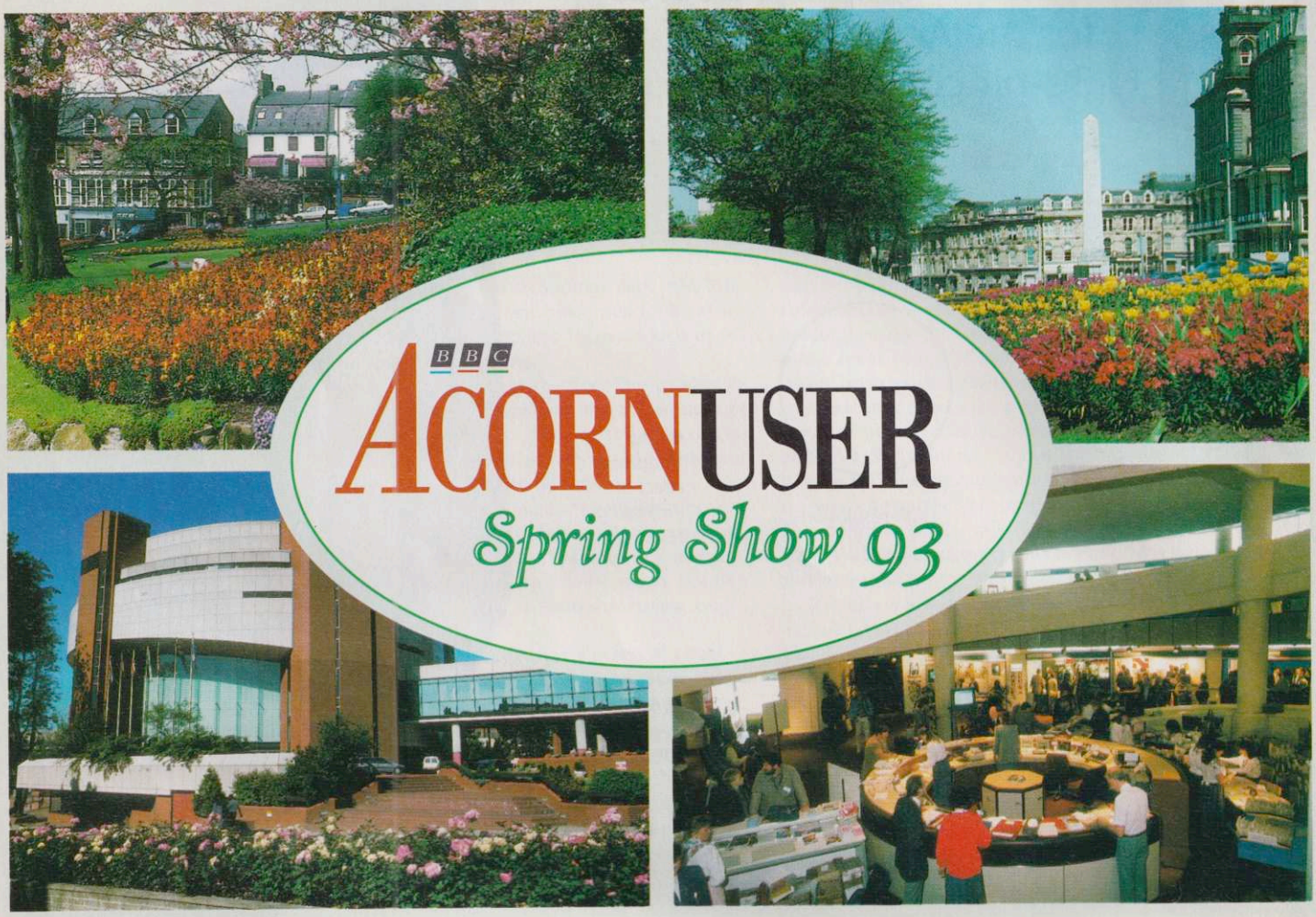

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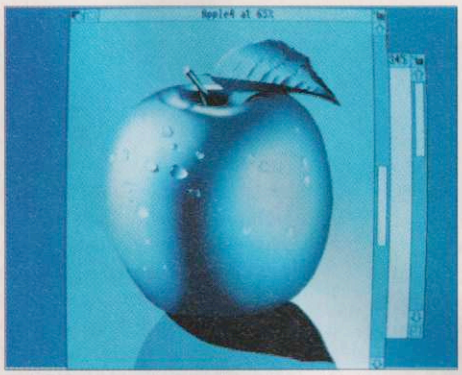
● *15-bit colour preview in ArtWorks*



● *256 grey scales on show in ArtWorks*

● *15-bit colour picture on Colour Card*

➤

blue values into a textfile and setting the file type to Palette. There are provisional plans at Computer Concepts to produce a 256-colour version of the desktop Palette utility, although this will depend on user feedback. The other main application supplied is !Clearly. It's a Risc OS application that allows you to view 24-bit, Clear-format image files in 15-bit (32,768 colour) modes. A number of images are supplied, all of which show off the card to amazing effect.

Although the pictures are all originally 24-bit images, the implementation of a clever dithering algorithm means that the downgrade to 32,768 colours is hardly noticeable.

To support the non-Acorn modes Computer Concepts have updated ArtWorks so that you can preview any documents in full colour.

Unfortunately until Acorn themselves confirm the exact format of the 16-bit sprites there's no point in re-issuing programs to display the *deep* sprites.

How many bits?

A normal graphics screen is stored in a special area in 32-bit memory as a series of numbers indicating the particular colour of each successive pixel.

Each pixel is composed of a certain amount of blue, green and red, and this is represented by the value. The amount of blue, green and red in a pixel can be determined by converting the pixel colour value to binary like so.

If you were to pick a colour at random, say COLOUR 37, this would mean that the pixel would be:

37 (decimal) = 100101 (binary)
10 / 01 / 01 is a mix of mid blue, dark green and dark red therefore COLOUR 37 is a kind of *duck-egg* blue.

On the Acorn, the remaining two bits are used to specify the shade of a colour. This brings the total of bits up to eight, hence the Archimedes uses 8-bit graphics as standard.

Although you can choose different shades of a colour on the Archimedes, there are only 64 real colours to choose from.

Each colour is made up of two bits, of blue, two bits of green and two bits of red, hence the Archimedes has a 6-bit palette. With a true 24-bit palette, each level of blue, green and red is specified by 8 bits each.

This gives a total of 2 to the power of 24, that is, 16,777,216 possible colours.

Summing up

For your money you get increased resolution, a steadier screen so less flicker, a programmable palette in 256 colour modes and a 24-bit palette of colours.

What's not made very clear in the adverts is that there is a trade off between screen update times against the screen refresh. Basically, although the screen is drawn much quicker than normal, it is not updated as often as before, which means that menus and windows jump, rather than glide across the screen.

This does not really effect the use of the desktop and it's hardly noticeable after a while. Computer Concepts, incidentally, are already working on a solution to this which will be supplied as a software upgrade to existing users.

> A clever dithering algorithm means that the downgrade is hardly noticeable

The State Machine G8+ Graphic Accelerator

Physically installing the G8+ card is identical to the Colour Card – a single width card that slots into the backplane. A similar ribbon cable also connects the G8+ to the Genlock connector on the computer's main circuit board.

A special cable set-up has been designed for the A3000 – though not the A3010 or A3020 – and A3000 users wishing to purchase the G8+ card can have it fitted by State Machine for a small, extra fee. Again, there are no plans to produce a version of the card for the A3010, A3020 or A4000.

Unlike the Colour Card, the software to drive the G8+ is supplied entirely on a rom situated on the card. This contains a set of modules, all of which install themselves automatically. The first provides low-level control over the G8+ card and uses part of the battery-backed ram to store configuration options such as monitor type and so on.

When first using the G8+ card, you are advised to connect the monitor directly to the computer and type in a series of configuration settings suitable for your particular monitor. This is different to the

➤

PRODUCT SPOTLIGHT

Product: G8+ Graphic Accelerator
Price: £249
Supplier: State Machine, Advanced House, Upper Wellington Street, Luton, Bedfordshire LU1 5AA.
Tel: 0582 483377
Requirements: Risc OS 3

Compatibility

State Machine and Computer Concepts are producing what are in many ways the same product although they go about it differently.

To this end Computer Concepts are enhancing ArtWorks to recognise the G8+ so documents can receive the *deep* preview treatment.

➤

Colour Card's separate software module for each monitor approach but, once done, can be forgotten about. However, it may make configuring the card a little confusing for the non-technical user.

The second module is very similar to the !FlipTop application supplied with the Colour Card. As it is held in rom, it loads immediately and neatly locates itself in the ResourceFS Apps directory alongside !Paint, !Draw & !Edit and so on.

When launched, the !G8 application installs itself on the iconbar, just to the left of the palette icon, and immediately gives details of what resolution the current mode is and how many colours are available.

Clicking it produces a similar grid to !FlipTop's, with numbers of colours along the top and resolutions down the side. Square pixel modes and rectangular pixel modes are listed separately. Unlike FlipTop, the G8 application does not list all the possible modes available – only the new high-res modes. The G8+ does not provide modes with more than 256 colours.

The G8+ has no video pass-through and the modes you see are all custom-written for the card. Therefore, a number of programs that write directly to screen – games usually – will not work. A video switch which plugs into the back of the card is currently being designed to overcome this problem and will be available soon at £22.50.

A set of demonstration pictures is supplied, each with its own 256 colour palette though not quite as good as the 15-bit images of the Colour Card, look significantly more real than those on a standard Archimedes.

The next card up in the G8 range – the G8 Professional – has a 1Mb frame store and supports resolutions of up to 800x600 with 16-bit (65,536) colour. This is a higher capability than the Colour Card, but costs £349.

Sixteen and 256 colour palette selection is also possible with the G8 application, with five possibilities included in the G8+ rom. Like FlipTop, these include a default palette, a 256 grey palette, and a primary palette.

A 192 grey and 16 desktop colours palette – plus 48 blank colours to make it up to 256 – is useful for displaying grey-scale images without changing the colour of icons and so on. A VGA palette provides a default palette as used in 256 colour VGA modes on a PC.

In use, !G8 is almost identical to FlipTop as both aim to simplify the selection of modes without the need for cumbersome mode numbers and both do it well.

State Machine have upgrades already, the first being compatability with Acorn Replay in 32768 colour. 24-bit pixel clear files can be converted and displayed automatically by the new !TrueView utility.

In addition, Modes 12, 13 and so on – the TV broadcast modes – can now be seen full-size on screen for an upgrade price of £10, if you don't opt for the first upgrade which includes this.

The future

With the arrival of Acorn's new VIDC20 24-bit graphic controller chip, it won't be long before software is produced to take advantage of the extra colours. It doesn't take long to work out why Computer Concepts have included the option of selecting desktop modes with more than 256 colours.

Acorn's recent deal signed with Kodak means that PhotoCDs should soon find their way on to the Archimedes. More colours are essential for such an application and the ability to utilise these resources, is likely to be a major feature of any new Acorn computer.

The Evolution SpeedGraph

This graphics card is designed to sit in a separate case, alongside an Archimedes. This gives it a number of advantages over other boards, namely it doesn't take up a podule slot and it works with every Acorn 32-bit computer except the A4 portable.

Like the G8+ and Colour Card, it offers higher resolutions – up to 1024x768 with 16 colours – and higher refresh rates to reduce screen flicker. It also allows 12-bit (4096) colour pictures to be displayed in a special non-desktop mode. 100 per cent compatibility with all past and present software is guaranteed.

The SpeedGraph is the most expensive of all the boards. It is however, the only current choice for A3010, A3020 and A4000 users who want higher resolution, flicker-free displays.

PRODUCT SPOTLIGHT

Product: SpeedGraph
Price: £350 (inc VAT)
Supplier: Evolution Computer/MAPS, PO Box 2841, 87 Vivian Road, Harborne, Birmingham B17 ODL.
Tel. 021-428 2696

● *Parrot picture on G8+*

Summing up

All new modes on the G8+ card were rock steady, without suffering from the window jumping of the Colour Card.

The Colour Card, on the other hand, has a more general-purpose feel to it as well as having the benefit of increased resolution on the desktop.

Having the video-pass through, also means that it is fully compatible with all past and present software.

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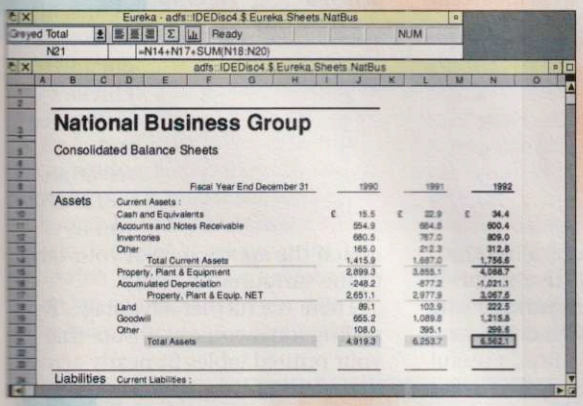

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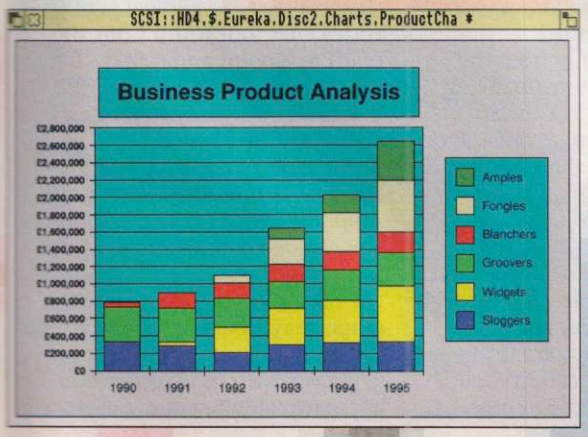

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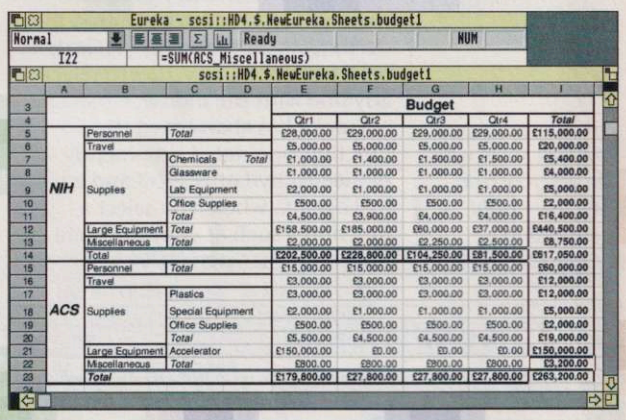

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Spreading the

PRODUCT SPOTLIGHT

Product: Eureka
Price: £119
Supplier: Longman Logotron, 124 Cambridge Science Park, Milton Road, Cambridge CB4 4ZS.
Tel: 0223 425558

EUREKA is such an apt name for an Archimedes product, it's surprising no one has used it before. It is not recorded how long Archimedes sat in the bath awaiting inspiration, but he'd have got cold waiting for Eureka.

Longman Logotron promised it months ago and have been advertising it – seemingly – since the battle of Syracuse (*circa* 400BC). Now it's here.

Fully Risc OS-compliant, Eureka can address multiple worksheets of up to a maximum four million cells, each having 16,384 rows by 256 columns. Whether your computer has sufficient memory to realise these sizes is a different matter. By default, sheets are neatly stacked, with just enough overlap to select any one with the mouse.

Eureka has abandoned the function-orientated ring-menu pioneered by Lotus 1-2-3 and copied by Logistix, where you select a function – such as copy or delete – then state the target cells. Like Pipedream and Schema, it is *object-oriented*. You first select an object, then do something to it. To move a range you select it, cut it, move to the new location and paste it back.

Memory management seemed a bit crude to me. Eureka grabs memory when it needs it, and hangs on to it when it doesn't – which seems a bit selfish. Deleting rows and columns actually ties up more memory. Pipedream and Schema share the same greedy habit.

I lined Eureka up against the main Risc OS opposition to do a quick and not very scientific speed comparison. I used a 6,000 byte file of mixed text and floating point numerals and timed a few common operations:

	Pipedream	Schema	Eureka
Program memory (k)	864	640	1120
Timings in seconds			
Load file	4	25	4
Scroll vertically	8	5	2
Scroll horizontally	8	2	1
Sort on one variable	9	6	4
Re-format	20	18	3

You can see that Eureka has the edge for speed over its rivals. This is no guide to speed performance with much larger files or with different sorts of data, but is, I think, a useful indicator as most users will frequently work with files of this size and type.

One of Eureka's chief strengths is the extent to which it allows you to tailor the sheet's finished appearance. This comes from the provision of a format menu giving access to a style editor. You can select a region as small as one cell or as large as the entire sheet and apply a new style to it.

A style is a collection of characteristics such as font type, font size – height and width independently scalable – foreground and background colour and cell borders together with formatting choices such as justification – left, right or centre – and the number of decimal places as well as the addition of prefixes or suffixes like £, $, %.

There is a helpful preview window in the font editor which you can use to try out style changes before implementing them.

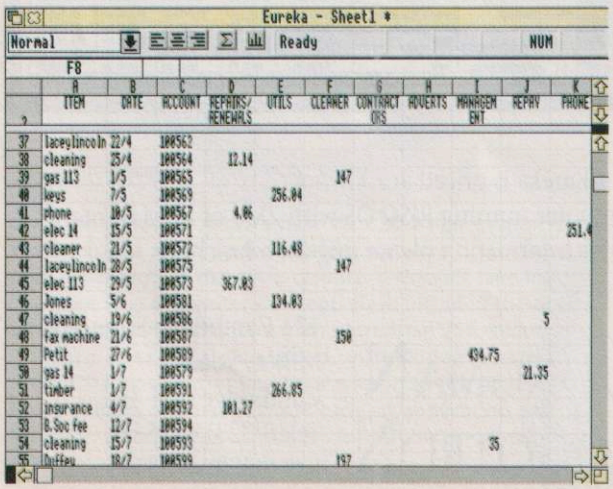
The presentation is strongly wysiwyg – the appearance on screen is a good representation of the ensuing hardcopy. By now you may be wondering whether I have mixed up Eureka and a DTP package, since style editing lies at the core of DTP software like Impression.

The parallel extends further, since you can effortlessly save all or part of your Eureka sheet as a drawfile and load it into your DTP document – having created a graphics frame of suitable size. If you need to import tables of figures into DTP documents, Eureka's facility for style selection will enable you to match the appearance of your table to the surrounding text.

There is a further advantage. By scaling fonts you can ensure that your printed tables fit neatly across the width of the paper. No more editing column widths and abbreviating column headings in a frantic effort to fit it all on one sheet. Spreadsheet 20 per cent too wide? Alter font width from 10 point to 8 point and it fits beautifully.

It takes an eternity to print of course, but the slowness, incidentally, is not a fault of Eureka's, or indeed of Acorn's, but simply evidence of the extraordinary amount of computation going on in scaling and rotating outline fonts. On a PC, collecting copy from the output tray would have to be written into your Will.

Eureka, with its object-oriented approach, allows you to select



	A	B	C	D	E	F	G	H	I	J	K
1	ITEM	DATE	ACCOUNT	REPAIRS/ RENEWALS	UTILS	CLEANER	CONTRACT ORS	ADVERTS	MANAGEM ENT	REPAY	PHONE
37	lacey lincoln	22/4	100562								
38	cleaning	25/4	100564	12.14							
39	gas 113	1/5	100565			147					
40	keys	7/5	100569		256.84						
41	phone	10/5	100567	4.86							
42	elec 14	15/5	100571								251.4
43	cleaner	21/5	100572		116.48						
44	lacey lincoln	28/5	100575			147					
45	elec 113	29/5	100573	367.83							
46	Jones	5/6	100581		134.83						
47	cleaning	19/6	100586							5	
48	fax machine	21/6	100587			150					
49	Petit	27/6	100589						434.75		
50	gas 14	1/7	100579							21.35	
51	timber	1/7	100591		266.85						
52	insurance	4/7	100592	181.27							
53	B.Soc fee	12/7	100594								
54	cleaning	15/7	100593						35		
55	Duffau	18/7	100599			197					

● *A split sheet with the title row held. Title row height is increased to accommodate text*

eword

A spreadsheet worth getting out of the bath for? Clem Vogler investigates

different sets of cells and ranges together – in other words selected areas don't have to be in a single rectangular block. You can apply style features to all selected items at once. Disappointingly, you can't cut and paste a multiple selection in one batch. Nor can you select a non-contiguous range for graphing.

This is a serious weakness, shared by the other Arc spreadsheets. If you want to plot students' marks in column C against students' names in column A, you can't do it, because you can't de-select column B which contains students' dates of birth. You have to waste time editing column B out of your spreadsheet to get a contiguous range which you can plot.

On the other hand, it lacks a few desirable features: There is no option to select advance up/down/left or right when you press Return – though the arrow keys do enter and advance. There is no macro facility, so you can't store sequences of keystrokes. A facility for assigning names to your own functions is a partial substitute.

Eureka lacks Pipedream's invaluable *print at x%* pre-print formatter which makes a neat and effortless job of fitting your data to your page. There is no goal-seeking capability, whereby the software guesses, by successive iterations, the relationship between variables. This may seem recondite, but is actually a very useful feature for financial calculations involving compound interest.

The quality of Longman Logotron's documentation has always been high but the Eureka documentation falls short of their previous standards. Although the function keys are used, there is no function key strip. The handbook has no index at all – a staggering omission for a document which not even the most ardent user can be expected to read from cover to cover.

I wasted two thirds of the time spent on this review trying to ascertain simple things like how Eureka likes you to input dates and how it distinguishes datatypes. Don't try to use online help – there isn't any.

There is a three level sort facility with ascending/descending and case sensitive options and it succeeded in sorting dates correctly but no search capability is provided. File formats supported for both import and export include CSV and Lotus. Charts and spreadsheets can also be exported as drawfiles.

Most spreadsheets seem to come with presentation graphics included these days. Eureka's graphics are pretty good, with a wide choice of post-plot editing facilities and a satisfactory range of graph types, including the essential horizontal bar chart – vertical bar charts never have enough space for labels on the category axis.

The ease with which you can edit ➤

Include me out

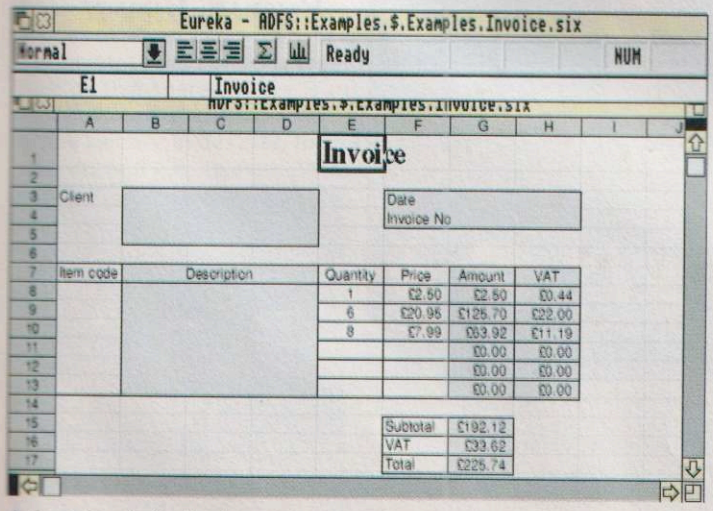
Spreadsheets differ in their ability to handle groups of cells. A contiguous range is a collection of cells bounded by a single rectangle, usually specified by the top-left and bottom-right corner cell coordinates.

A non-contiguous range is bounded by a rectangle, but contains void rows or columns. It is defined by a list of rows followed by a list of columns: for example (A..D,H..K) (1..7,22..24).

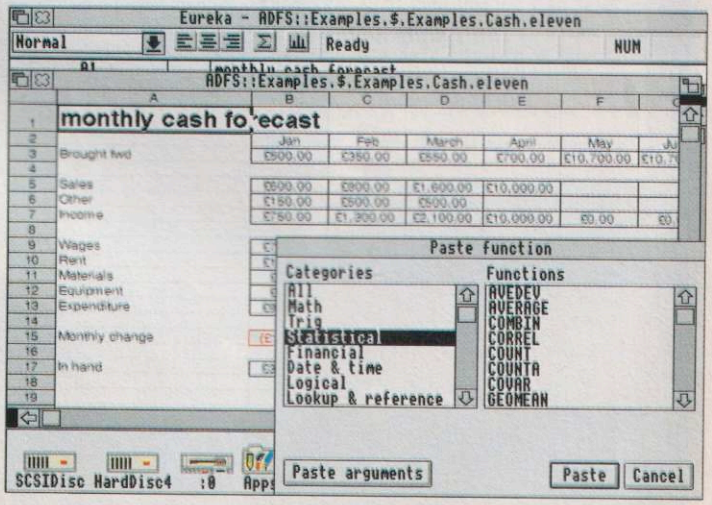
A list includes both contiguous ranges and individual cells dotted about anywhere, such as: A1..B3, A6..E9, H17, J18..L20. Lists are the most flexible arrangement as you can include or exclude exactly the cells you choose.

Clem Vogler has taught physics, electronics and computing at a number of schools and colleges.

His industry pedigree comes from working as a standards physicist for Marconi and as test engineer working on spectrum analysers and scanning electron microscopes.



● *Samples of effective layouts*



● *Eureka has a plethora of functions*

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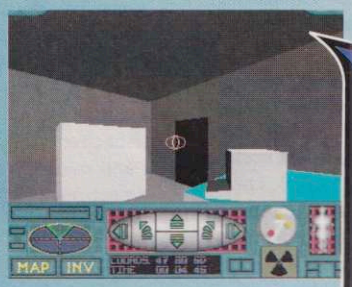

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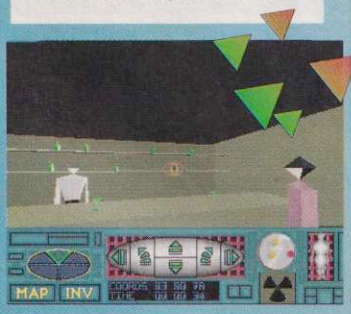

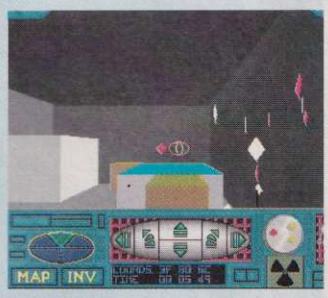

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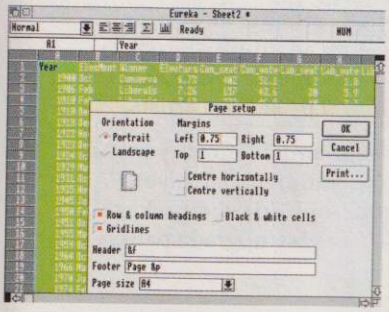


● *The available print options*

➤

the font sizes of the axis labels overcomes the dreaded crowded axis syndrome. All graph types except scatter-diagrams plot a category against a variable. Scatter plots two variables against one another, though if you select the option to join up the scatter points, they join in category – such as with a spreadsheet – order.

I would have liked an option to plot two variables on a line graph. You can get round it using the joined scatter diagram if you sort the spreadsheet for ascending values of x beforehand. I particularly liked the way that graphs were actively linked to the sheet and reflected data changes immediately.

You cannot plot functions directly. For instance, you can't graph y = sin(x) other than by calculating a series of discrete points, but that would be a maths graph package task which you wouldn't expect or need from presentation graphics.

Spreadsheet geometry and memory

Spreadsheets are two-dimensional: Flat grids of squares with a horizontal axis (the x-axis) and a vertical axis (y). Spreadsheet rows all have the same value of y and columns the same value of x. A cell is the rectangle at the intersection of a row and a column and has a unique position defined by values of x and y.

To match spreadsheet and database terminology, it is common to think of a single, two-dimensional spreadsheet as being equivalent to a database *table*, with the rows equating to database *records* and the columns to database *fields*. For three-dimensional data a third (z) axis must come *out of the screen*.

The memory requirement is made up of a fixed element plus a data element, but for large numbers of cells, it can be regarded as proportional to the number of cells in the sheet. As you would expect, cell for cell, floating point numbers take up more memory than integers or text.

Eureka, like rivals Pipedream and Schema, runs in memory, so the amount of data that can be handled is limited by the micro's hardware memory or ram.

Leading edge spreadsheets like Unix's Wingz use so called virtual memory – reserved hard disk space for data which overflows hardware memory.

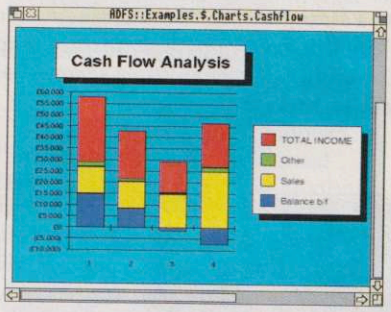
This permits much larger spreadsheets to be run, though with some speed penalties resulting from disk accessing.

Summing up

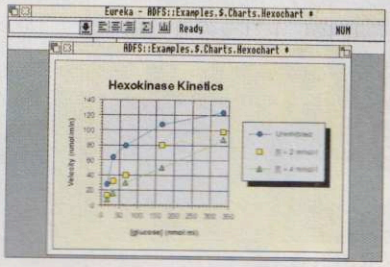
Eureka is a competent spreadsheet package. Having been competitively priced, it represents good value. Its performance is on a par with the best PC spreadsheets, with the added benefits of Risc processing speed.

There are more powerful spreadsheets, but they run on workstations and cost upwards of £500. The serious opposition comes from Pipedream, which in version 4 has evolved a lot of refinements – as the length of its menu options shows.

If you regularly import tables into Impression, it's worth remembering that Pipedream has a Pipedream-to-Impression conversion utility. Overall, the choice is not clear-cut. In the end it may come down to price.



● *A cashflow chart showing some of Eureka's features*



● *A scatter diagram is one aspect of Eureka's presentation graphics*

A posthumous nota bene

A known problem with presentation graphics is the ability to label bar chart axes clearly when the data density becomes high. Suppose we use a bar chart to display past and present values of a share portfolio. With four or five shares, there is no problem. There is room on the horizontal axis for four or five labels – in this case, the names of the companies: B.Gas, Telecom, Shell, Acorn, and so on.

As a result of astute stock market manipulation, aided by our unique advantage in managing our portfolio with Eureka, our portfolio grows. We now have 14 or 15 companies to display. There is insufficient room on the horizontal axis and the labels either overlap or truncate to baffling abbreviations like B.,Te,Sl,Acc, and the like.

The solution is simple. Display the bar chart horizontally. The vertical axis has plenty of space for 15 labels, since each label, however long, is only one character high. Of course, if the package had allowed us to tip the labels on end, we could have continued using the vertical bar chart – but Eureka doesn't permit this.

As a result of having software which displays horizontal bar charts we remain in total control of our portfolio while big shot city merchant bankers, using inferior PC-based software, are queueing to jump off the Telecom Tower. As they and their portfolios crash we buy cheaply and are now handling 100 different companies.

Even with horizontal plotting, the company names overlap. Panic ensues, as with all this wheeler dealing, we've had no time to re-read the Eureka handbook. We head dutifully for the Telecom Tower and cast ourselves into the abyss.

As is usual in these cases, all our past life flashes before our eyes and we are particularly intrigued by a distant memory of a carefree former existence when, unburdened by business cares we enjoyed leisurely evenings computing.

On one such evening we had selected edit font size from the format menu thereby reducing the axis label font from 6mm to 2mm.

Fortunately, we are so rich that we are carrying the latest Acorn pocket portable with built-in radio modem and are able to make the necessary file adjustments during the descent.

Although we personally cannot benefit, this is of enormous value to our heirs and, through extensive publicity in the financial press, becomes widely known, thus increasing the sales of Eureka and simultaneously stemming the flow of business failures.

The country's economy picks up. The Government gets re-elected and we get a posthumous knighthood. Centuries later, archaeologists find *set fontsize 8 point* engraved in Corpus.Medium on our heart.

GRAPHIC PROGRAMS TO BRING LIFE TO YOUR PICTURES

ProArtisan £105

First there was the *Artisan* and *ProArtisan* series – still the most widely used art packages in education today. They feature an intuitive icon based menu system that has proved usable by children as young as three years old. Yet they are powerful enough to be used by serious artists.

Artisan is in its second generation *(Artisan II)* and provides many useful and unique features. This is the one for younger children and anyone interested in textile design. ProArtisan is a more sophisticated package but retains the familiar interface of Artisan II – an easy upgrade path.

No, this isn't a bird eating spider and no *Illusionist* doesn't replace *ProArtisan*. *Illusionist* is a graphics package for those who don't have the skills or inclination for free format painting.

Illusionist £99.95

With *Illusionist* you create a wire frame outline of your image using pre defined shapes. In addition you can define your own shapes or distort any existing shapes. This makes it very easy to generate images even if you can't draw a straight line. You can assign colours and textures to your objects. You can even give them texture maps. A texture map is any Mode 12 or 13 screen. So you can use a scanned or digitised image, a painting – literally anything!

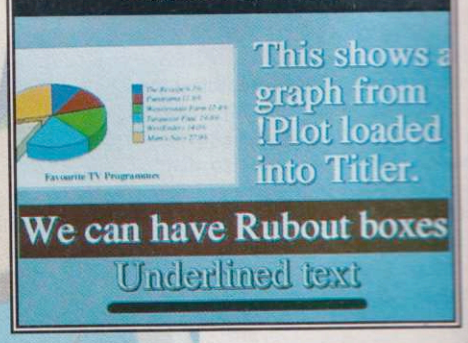
Render Bender II £99.95

NEW REDUCED PRICE

Render Bender II is another top rated graphics package from Clares. Images are created in a similar way to *Illusionist* by defining objects using pre defined shapes. You then add colour, texture, lighting etc. *Render Bender* images can include glass and mirror objects as well as shadowing. *Render Bender* actually calculates the path of light from its source to the imaginary eye at the viewing position. This path takes account of any reflections and refractions.

In addition *Render Bender* can create animated sequences very easily. You can either give objects a formula to control their movement or you can give start and end positions and ask the program to 'in between' the other frames. The result is a stand alone animation that can be passed to friends or even sold.

Titler £149.95



Finally we have *Titler*. This is a video titling and sequencing package. The *Titler* program uses outline fonts enabling you to create text screens, credits etc. You can have any colour text, background, drop shadow, underline or rub out boxes. You can also include sprites and Draw files in your screen.

The *Titler* screens can be used in the *Sequencer* program along with screens from *Artisan, ProArtisan, Illusionist* and *Render Bender*, as well as lots of other formats. You can also include *Render Bender* or *Euclid* animations, *Tracker* tunes, *Armadeus* samples or Archimedes samples in your sequence. *Sequencer* gives you total control over the display of the screens and provides many effects to switch from one screen to the other. As well as being a tool for video titling this package can be used purely as a presentational tool for preparing and showing lecture notes, demonstrations etc. In fact all of Clares demos are now created using *Titler* and *Sequencer*. *Please request a demo disc that will illustrate the potential of these packages.*

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I got rhythm...

Ian Waugh assesses a new way to create drum patterns

PRODUCT SPOTLIGHT

Product: Rhythm-Bed
Price: £49.95
Supplier: Clares Micro Supplies, 98 Middlewich Road, Northwich, Cheshire CW9 7DA
Tel: 0606 48511

YOU'VE got to give Clares full marks for supporting the 32-bit music market and their latest program is a drum pattern sequencer. Even if you've never created a drum pattern before, you'll soon pick it up.

Programming basically consists of clicking drum hits on to a grid. The drums can play back using the Arc's internal sounds or via Midi and the patterns can be saved as a standard Midi file for loading into compatible programs such as Rhapsody. To playback through a Midi instrument you will, of course, need a Midi interface.

There are two sections to the program – Drum kits and Sequences. The Drum kit appears down the left of the window and is a list of the drums assigned to each track. There can be up to 64 drums/tracks.

Several eight-part – for the Arc's internal sounds, and 64-part Drum kits – for Midi, are supplied. There's no GM – General Midi – map, which seems strange, although the kit for the Roland E35 is close and Midi Drum kits are easy to set up.

You can create your own drum voices using a program such as Vox Beat which squashes 12 sounds into one module. Rhythm-Bed, however, only supports eight sounds which is the maximum the Arc can play at once but we could still choose from a larger palette of drum sounds.

Check boxes on the left of the Drum list are used to make a drum playback through the Arc or via Midi. They can be used to mute tracks, too, although there's no solo feature.

Each hit can have one of 16 velocity values and the louder the velocity, the darker the hit appears in the grid. Velocity control is essential in order to avoid the hi-hat machine gun effect and it lets you create crescendos and diminuendos which can be very effective on a snare.

You can record in real-time from a Midi keyboard and there are Fill options which fill a track with hits Uniformly, Softly or Randomly. There are copy, cut, paste and merge functions, too.

You can specify the number of beats in a bar and set the grid resolution – the number of hits to a bar – from 4 to 64 in increments of 4. You can create patterns up to 62 bars in 4/4 time with a grid resolution of 1/16 notes – it's only 15 bars if you use a resolution of 1/64. This will be long enough for an average intro/verse/chorus song.

In the Bar Sequencer window you can link individual bars to produce a longer song. There are 255 Parts to which you assign a bar number and a number of repeats. That's it – simple but effective. The Arrange Sequence you create can be saved as a Midi file.

The program is easy to use and you will soon be able to do without the manual. As well as sections on the windows and menus and the various options at your disposal Rhythm-Bed has a number of hot keys built in. These are logically set out which makes them easy to learn.

Finally there is a short problem solving section and some useful techy bits on drumkit and Rhythm-Bed file format. What more could you want?

> You can record in real-time from a Midi keyboard

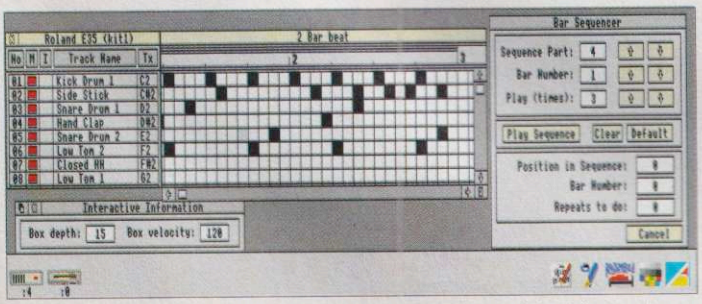
Summing Up

Some areas of implementation could be tightened up. For example, when setting up a Drum kit you have to switch on Midi transmission and select an Arc sound voice – where applicable – for each drum individually as there's no global function to do this.

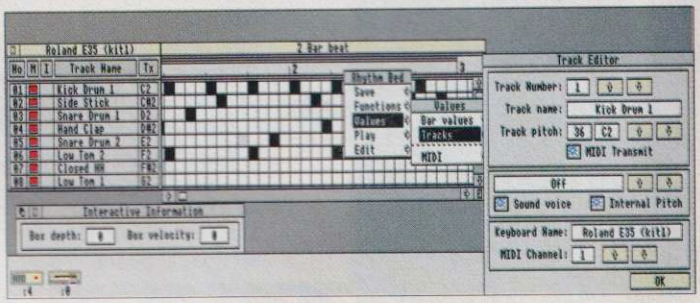
The Midi channel, however, is global. This is fine but prevents you using two drum voices with a pattern.

It would be useful to be able to add one pattern on to the end of another and nice if the grid showed the pattern current in the Bar Sequencer. Picky, picky. Oddly, the window has no back icon

But Rhythm-Bed is a great way of creating drum patterns. It's flexible and versatile enough to create all kinds of patterns from Jazz to Rap. And its support for Midi files lets you use them in a separate sequencer.



● *Rhythm-Bed main screen showing the Drum kit and the hits on the grid. The Bar Sequencer is used to link individual bars into a song*



● *The Track Editor is used to assign Midi notes and Arc sound parameters to each drum/track*

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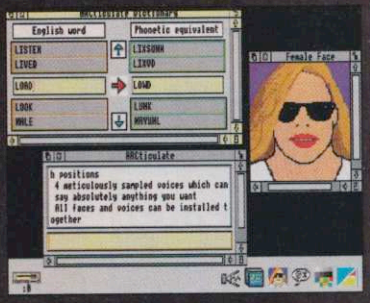

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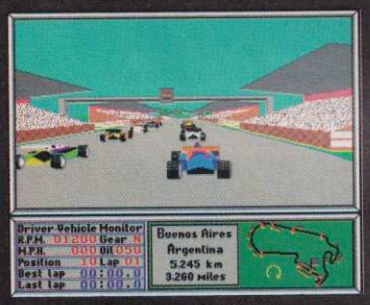

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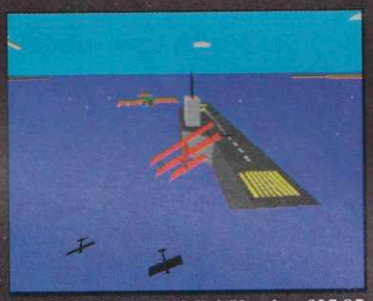

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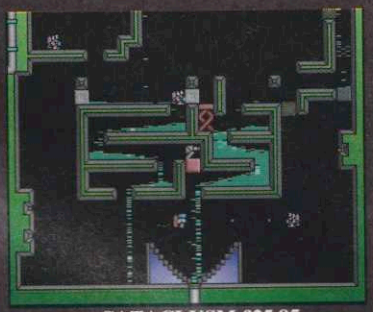

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Alderbaran

...planet hopping

● *In a Zarch-like environment, this is just a taxi ride – isn't it?*

SOMETIME in the 27th century the human race has moved to the 12 planets of the Aldebaran system and abandoned most of its weapons. Unfortunately, the nasties from the next solar system have sent over a deadly weapon, housed in an asteroid.

This is not designed to attack Aldebaran's planets but to eat the energy of the star itself. The only fighting ship in the system must set out to stop it.

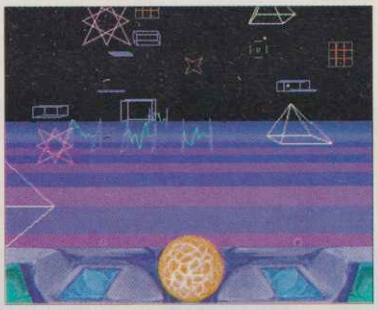
Aldebaran has plenty of action but it's not a traditional shoot-'em-up. What makes this game different is that the actual world saving is mostly done by the backroom boys. Teams of scientists labour to build a variety of secret weapons before the star goes supernova.

Your job as pilot is to set up projects and ferry around the scientists and resources needed to build them – and, incidentally, to get shot at a lot.

Each planet has a base, with repair facilities and a central computer that gives you information and controls the research. You operate this computer through an icon bar and various displays showing professors, projects and resources.

There is a wide range of possible projects, some of which are building blocks for others. Some are weapons and some are protections for the star.

Projects have names like the Energy Absorber and the Chronomolecular Ray that are splendidly reminiscent of the 1950s B-movies.



● *Keep a cool head*

● *Time is not on your side*

Protections are aimed at slowing down the star's collapse long enough for the weapons to be useful. It's a good idea to start with a defensive project and always to have at least one running – that way you gain valuable time.

Resources are found on the planet surfaces and it's here that the action comes in as your ship, the FlashLight, flies around harvesting resources and skirmishing with raiders.

Resources are limited on any world and though you can transport them, once used they're gone.

The action uses a cockpit display beneath some good 3-D graphics showing the ship in flight. Flying is a little different from most games. Propulsion is strictly reaction-drive and steering is highly responsive – sudden direction changes at low altitude are a good way to crash. I found the best way to manoeuvre on the planet surfaces was to stay grounded, nose-down, and skim along. Actual flying takes you a long way fast.

A nice touch is the areas of water. The Flashlight can run underwater, where it can't shoot or be shot at but it moves much slower. This is a handy defence and, from time to time, a useful braking system.

The planets go on about their orbits and the elapsing time is shown on one of the displays. This means that journey times change and some planets can be out of range of each other for a while.

The finale – if the solar system lasts that long – comes with an attack run on the alien asteroid, using the big weapons against its power stations.

It's a good idea to save your game often. You only have one ship and it starts out low on weapons. If destroyed everyone is stranded and there are no more resources. Meanwhile, if you're taking significant damage, running to orbit costs time but it does lose the enemy.

Aldebaran has a lot to recommend it. It can take many sessions to play, with a good mix of action and strategy as you juggle projects, gather resources and rescue scientists.

The different projects and variation in initial conditions means that there are many ways to reach the end. Very enjoyable.

Don Lesley

> What makes this game different is that the actual world saving is mostly done by the backroom boys

● *Pilot or hacker?*

● *Be careful out there*

PRODUCT SPOTLIGHT

Price: £34.90
Supplier: ArcAngels/Evolution AG, Industriestrasse 12, 3178 Bösingen, Switzerland.
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Entropy is an Arcade Adventure with the emphasis on Adventure. The Realm in which the game is set is vast, with over 700 locations. You must fight and think your way through the game in order to rescue Xanziva. As with conventional adventure games you can save your position to disc, at any time.

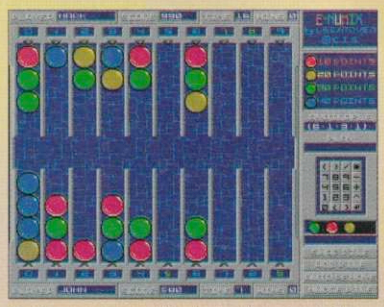
E-Numix

...mathematical challenge

E-NUMIX is a game for two players, both human or you can opt for a computerised opponent. Playing well requires some degree of strategy, plus the ability to do rapid mental arithmetic.

Basically, E-Numix provides a board game with two sides, each of which has 10 columns of four counters. The aim is to remove all your counters from the board and/or destroy your opponent's counters before he can remove them. If you remove all four digits from one of your columns a space invaders type missile effect destroys all your opponent's counters in the same column.

The 10 columns are numbered from 0 to 9. For each move the program gives you four random digits in the same range, for example 4 1 9 4. As a simple move this would allow you to remove two counters from column 4, one from column 1 and one from column 9.



● *Can your maths take the strain?*

If some of the digits you are given are the numbers of empty columns, then the mental arithmetic comes in. You can use the four digits, together with +-/*^ to make one to four new digits. For example, with 4 9 4 1 you could type in 4*9 4-1, which gives a result of 3 6 3 (36 and 3), which removes two counters from column 3 and one from column 6.

The game also allows for strategy in getting high scores – points are given for counters removed and particular combinations of counters – and in shuffling your columns out of the line of fire.

The normal time allowed for a move is 90 seconds which is enough to come up with a reasonable bit of arithmetic if you're mentally agile.

E-Numix is aimed at encouraging agility and quickness in mental arithmetic within a game format. On the negative side it is perhaps a little limited in the range of mathematics it uses and its graphics are fairly simple. Its effectiveness as a game probably depends on how challenging your opponent is.

Andrew Thomson

> E-Numix is aimed at encouraging agility and quickness in mental arithmetic

PRODUCT SPOTLIGHT

Price: £19.95 (available for the BBC Master as Numix for £12.50)
Supplier: CIS, Suite 2a, Leroy Business Centre, 436 Essex Road, London N1 3QP.
Tel: 071-226 3340

Serpents

...it's a snake's life

DOG eat dog has nothing in it when it comes to the land of Serpentia. This adventure-cum-puzzle game has the feel of that now ancient game where you had to move your snake/worm around a screen and not eat your own tail. In this game every other snake in the world has you on the menu.

The principle is simple: Eat or be eaten. The scenario places you as the hero of snakedom whose destiny is to foil the dastardly villain Saddame – strange name for a snake! There are 40 levels split over eight exasperating zones.

As an imprisoned hero you start in a dungeon which contains various different coloured snakes whose globular bodies act in different ways. Some are cowardly, others suicidal while the most dangerous are the devious ones.

Snakes comes in a minimum of two segments and maximum of 10 and you must eliminate a certain number assigned to each level before you can continue – a bar lets you know just how many to expect with a maximum of four on screen at once.

● *Eat or be eaten*

Your first lesson in snake disposal is as follows: Size is everything. If you are bigger than an opponent you can eat him head first, if you are smaller nibble away at the tail. But to join in with vampire culture, a bite in the neck will get you and them every time.

The second lesson is that snakes breed anywhere and your opponents delight in hatching small fast versions of themselves – eat the eggs as soon as possible though eggs won't hatch until there are less than four snakes on screen.

As you eat others you get longer and there are blocks scattered around the screen which enhance or reduce your size. Trial and error here I'm afraid.

Good music and sound effects accompany you on your adventure and there are passwords to levels. With cries of *Leave my tail alone you* ... I'll just have another go at this addictive, fun and infuriatingly frustrating game.

Jo Giles

> There are 40 levels split over eight exasperating zones

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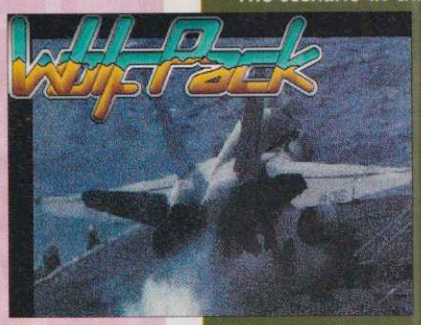
WolfPack ... in sheep's clothing?

THERE are quite a few flight simulators for the Acorn 32-bit machines and the latest to take-off is WolfPack, a 15 mission game for high fliers everywhere.



The scenario in this one is simple – World War III has begun, but thanks to an international treaty banning nuclear weapons, air combat is the only way to seek and destroy enemy targets and save the taxpayers who bought your plane.

The main aircraft itself is equipped with a *sophisticated* radar and various lights and screens on the front panel show your current status, altitude and the other vital statistics needed to guide your plane. There is also an alternative fighter for you to control, but this is only for the advanced pilot.

The planes, fortunately, have all the necessary hardware to help you take off and land – your own skill determines whether this actually happens. Different weapons can also be selected from your current armoury and targets can be locked before you fire at them. Another interesting feature in this game is the missile view – with a weapon's perspective of the target.

There are nine other viewpoints which you can select while in flight. These allow you to follow the progress of your plane from different vantage points along your course and watch as your craft gets blasted from the sky. This option also serves a more mundane purpose – it is extremely useful for making safe landings.

The Emergency Ejector Seat was one of the features I found most beneficial – particularly until I had mastered my plane. If you desert your plane before it is hit, you will return to the start of the level unharmed.

> The emergency ejector seat was a one of the features I found most beneficial

Once the game has loaded, a neat mouse-driven menu appears, along with a teletype-style display explaining the various features of the game and how to play. From here you can choose your own skill level – trainer, pilot or squadron leader – and your enemy's level of skill.

● *Keep a close eye on the instruments*

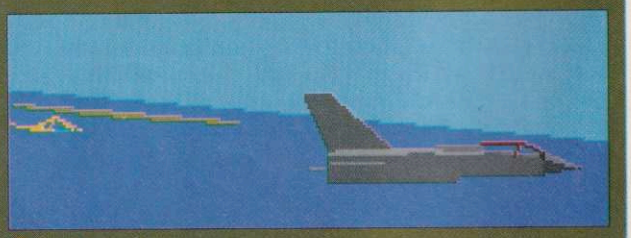
These levels range from fairly easy to damn near impossible and the level you choose determines how many weapons you or your opponent receive. There are also various flight times – day or night – and landscapes to choose from and you can select your type of plane from this menu as well.

The graphics in WolfPack are not spectacular, but they are 3-D and adequate enough not to detract a great deal from the gameplay. The colour combinations in some modes are less than aesthetically pleasing.

In night mode, for example, when the sky is black, a charcoal-coloured plane is very hard to see and the nine flight viewing angles are of very little use. More careful consideration of the colours used – or a pale outline of planes on night flights – would show a clearer picture of your nocturnal progress.

The title music for this game is a funky little tune which is quite catchy and suggests that the sound in the rest of the game will be equally good. This, unfortunately, is not the case and the bleeps and crashes of explosions and missile launches are not a fair reflection of 32-bit sound capabilities. More realistic audio effects, such as wind noise and passing missiles, would have enhanced the game and added a great deal to its realism.

The documentation comprised a thin pamphlet describing the game and showing the necessary key combinations to master. There was also a Good Luck sheet with some hints. Clearer explanations of the various options and illustrations of the cockpit and the other various displays would have helped me conquer the skies, but although there was an element of trial and error to start with, I soon became familiar with my plane and its specifications.



● *Easy goes it*

WolfPack is a reasonable flight simulator which caters for the skill levels of all pilots, from novice to Biggles. It's also one of the many flight simulators to have been created with the help of the Simis' Flight Simulator Toolkit.

Although there is a distinct sense of deja vu for anyone who plays Flight Simulators regularly, this has a number of challenges and manoeuvres which will involve many hours of concentration for all but the most experienced pilot.

WolfPack does have its weaknesses but the gameplay is quite good and the missions can be demanding. Worth a test flight.

Raj Sinha

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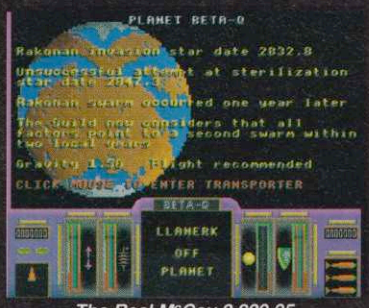

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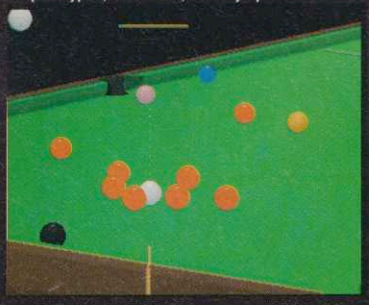

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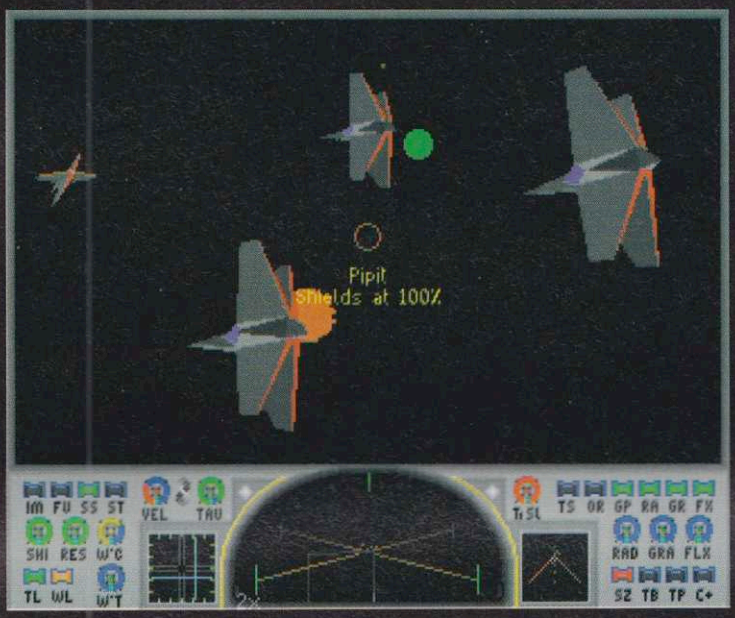

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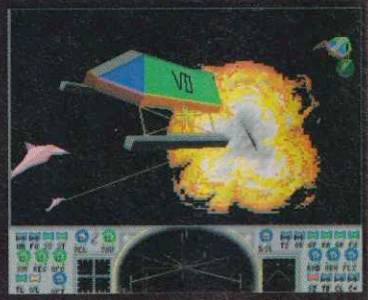

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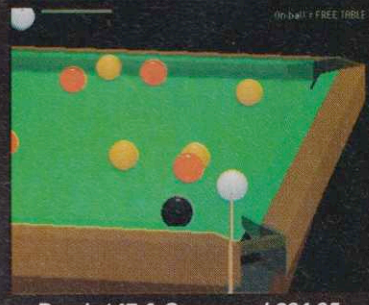

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Dragon Ball

...another brick in the wall

TBA may be new to the games scene on the Acorn machines but DragonBall isn't, being another implementation of Breakout which has had clones here before in the form of Impact, Fireball and a number of PD programs. Basically you have a wall of bricks, a bat and a ball – the rest is pretty straightforward.

Because a game is not a new idea doesn't mean that it isn't any good and Dragon Ball has some nice extras despite a few curious programming quirks.

A Smaug-like dragon introduces the game and if you manage to complete several of the levels his cousins will appear in one of two guises – friendly and malevolent. If you are lucky the charmer will throw you coins, all you have to do is catch them.

However, his counterpart prefers to drop a mixture of balls and bombs. The knack here is to bounce the ball back into the dragon's mouth. It doesn't sound easy and it isn't, more a case of hope over experience.

● *Will the dragon you rouse be friendly?*

As you demolish the wall the bricks will pleasantly melt, helpfully providing you with a slower option, more balls, or even clear the whole screen. However, some bricks need more than one knock to get the hint while others will speed up the ball. You can have two effects working at once too if you manage to catch them both.

Each level provides a different arrangement of bricks, and good bat control is vital. You can just concentrate on catching the bonus points but you've only got three lives. The gameplay is quite tough, and though the graphics aren't the best you'll see on the Archimedes, the 100 levels will keep you busy for some time.

Pam Turnbull

> Each level provides a different arrangement of bricks, and good bat control is vital

PRODUCT SPOTLIGHT

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CardMania

...a sharp entrance

CARDMANIA is a set of three card games in the same pack age, to whit Patience, Cribbage and Gin Rummy. The first is played solo, the others against the machine. Each has instructions and a sort of high scores table.

The game of Patience here is not the most familiar one. There are dozens of patience card games and this one goes by the name of two-pack clock patience. In this you have 104 cards to dispose of in 10 piles which build up in suit from a random base card.

The cards are dealt into 10 columns of three which can be built down in suit in 10 columns so long as they remain three or more cards long. This gives a degree of strategy as to when to put out into the finishing piles.

The version of Rummy is more familiar and plays quite fluidly. In Cribbage however, unlike the others, the program has a tendency to make facetious comments which can be a little annoying.

● *Gin Rummy – you versus the machine*

These range from claims of its own brilliance when scoring the needed total, to a certain cruelty when you score you own hand. If you come up with a total that is less than the best possible, the computer tells you but then says *But it is too late now HAH* and gives you only the points you thought you had.

All three games play quite well. However, the on-screen instructions, though thorough, could be more clearly written for the beginner. A bigger problem is a certain similarity between the symbols used for the different suits. It can at times be a little difficult to distinguish them (especially spades from clubs) when the pictures on the screen are small.

Keith Martin

> A bigger problem is a similarity between the symbols used for the different suits

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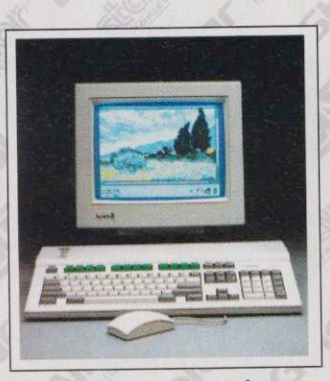

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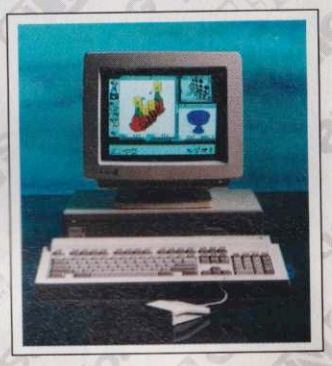

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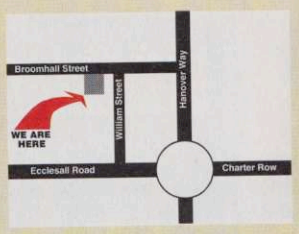

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Exiled once more

HacMan 2 performs an exploratory on the Beeb's biggest arcade game

GREETINGS, games fiends. I am very pleased to announce a complete solution for the Beeb game, Exile. This mammoth solution, written and sent in by Daniel Doran – with help from Peter Tillotson and Kevin Rooney – is very big, very detailed and very accurate.

In fact, this must be the best, most complete solution I have ever seen. It is so good, that it's being serialised over several issues. So all you frustrated Exile players – watch this space. Heartfelt thanks to Nathan, Peter and Kevin.

As stated in the manual, your Destinator was been stolen by Triax when you achieved geostationary orbit around the planet Phoebus. So, in addition to your existing mission, you now need to retrieve your Destinator.

You begin in your ship, the Perseus. A green figure briefly appears and steals your Destinator – this is the last of Triax that you will see for a long time. Press the button to the right to unlock the doors of the spaceship. Now, when you walk on the doors, they will open.

Go out of the spaceship and head west. You will find a grenade behind a bush, well into the windy area. Take it, go to the Pericles and stand beneath the undercarriage where you will see a *burger* which will shoot at you.

Descend the shaft below the burger and drop the grenade on the door making sure that you dodge the burger's shots. Quickly move to the left and lie down on the ledge. The grenade will blow open the door.

As you descend you will come across an inverted plant in a pot. From this comes some round things called Lightning Balls. Move left to ➤

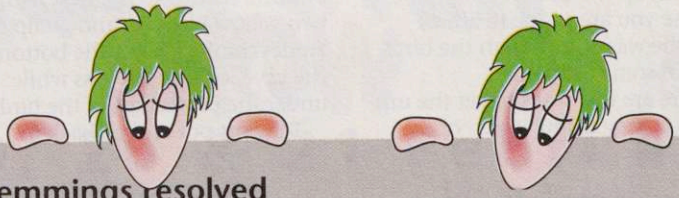
Rock aggression

Tom Hodkinson from Powys in Wales has written in with several cheats for two 32-bit games. Thanks Tom, and we'll include a few now and more next time...

On Aggressor when you are asked to enter your name, enter CLASSIFIED. On the scoreboard your name will appear as *Wrong.....!* The next game start will equip you with 15 lives and all the power-ups from the beginning.

In Chuck Rock, on the title screen when the band is playing, type in PINKYANDPERKY. When you then start the game, press F and you will be able to fly.

Tom also found three extra Nevryon passwords: SHIRE, GONDOR and RIVENDELL. Apart from being areas of Middle Earth, does anyone know what they do?



Lemmings resolved

Vintage HacMan 2 contributor, Nathan Atkinson from Stockton-on-Tees, has been extremely quick off the mark and has written in with a complete set of Oh no ... More Lemmings passwords. I have included the first three groups here, and will be featuring the Wicked and Havoc levels next issue. Thanks Nathan, and keep up the good work.

	Tame	Crazy	Wild
1	*none*	onewheelon	inwhatever
2	donetheone	craziernow	ithinkofok
3	blindmouse	fiddledede	neighbours
4	quodropods	knockknock	cellblockh
5	goldenring	whosethere	crossroads
6	middleyear	itsannhere	femmerdale
7	deadlysins	annannewho	homeanaway
8	spiderlegs	anotherlev	eastenders
9	numbernine	moretocome	jxjdxxfxsd
10	downingstr	greenbotts	therewasan
11	nineandtwo	gotyouthen	examplelem
12	sixplussix	itshardyou	passwordst
13	bakeadozen	seetothink	ohhidolike
14	twiceseven	ofpassword	tobebeside
15	fivethrees	afterpassw	theseaside
16	oneandasix	ordforthis	ohthebrass
17	sevenanten	levelsdisk	bandplayin
18	youcanvote	andiamabit	tiddlyumum
19	nnnineteen	lazynowand	wotsmyline
20	tenplusten	iamputting	hurtyhurty

➤ Hamlet Cave and you will find a grenade stuck to a wall, and a wasp's nest. You can make the bird from the planet surface follow you in order to eat some wasps while you collect the grenade.

Proceed to Waters Tunnels. Go out of the door with the robot with the energy pod behind it. Gently touch the door and prepare for the emergence of the pod. This is a bit tricky, because the robot fires heat seeking projectiles and sometimes they don't hit the pod which should come out to you. As soon as you have stored it in your suit, it is time to run away.

Go down to the monkeys below Orotund Cave. Carry on down to Drey Tunnel until you come across a bird's nest with two yellow birds outside. Wake the birds and jet up to the cave in which there is a wasp's nest and an urn. Just before entering the cave, remember your position outside.

Go in – the birds will follow you – and pick up the urn. Be careful now because you are prone to attack from the wasps, although the birds may eat some of them.

There are two ways to get the urn out: You may throw it out, or quickly fly it out. If the urn is still in the cave when the door closes, teleport out and go to the yellow plant pot near the monkeys and fly through it. A nearby door will open and you will be able to go back and try again.

When you manage to extract the urn, head off to the west. You will find a deep pool of water at the bottom of the Nemesis tunnel from which you should fill the urn. Be careful not to spill the water in later movements.

Now place the urn on the far right of the tile door in a cave beneath Orotund, which has a fire in it. Remember all your positions here. Now go back to the trigger plant pot near the monkeys. Once the door has opened and the fire has been extinguished by the water, teleport back and pick up the object in the pot. This is the RCD.

Pick up the urn and go out. Retrace your steps to the place where you first saw the lightning balls and throw the urn down to the bottom. Return to the nest with the two yellow birds in, and go up the Honeycomb cave. At the bottom of the cave, collect the pass while under the protection of the birds.

Teleport out and go back to Orotund cave. Use the RCD to open the door. The robot will come out shouting and guns ablaze. You can either run away – returning when you have lost it or try a grenade by priming it and pushing it against the robot. Once the robot has been despatched, you may enter the cave and collect the pistol. The button inside the cave will activate the transporter nearby.

You must enter the transporter, which will transport you to Rune cavern where you will be attacked by a very harmful flock of white birds. To escape these terrors, enter the transporter from Orotund and quickly go upwards, remembering your positions on the way.

As you fly out of the top of the cave, some birds may follow and be buffeted by the winds, but they will always be back at their nest if you have not killed them. They will not attack if you cannot see them.

Teleport back to Rune cavern and gently fly upwards and out of the top of the cave again ensuring that you either pick up the pass or knock it from its resting place. If you don't succeed, try again without forgetting to remember your position again.

After getting the second pass, fly to Honeycomb or Hamlet cave and pick up three wasps. Obviously you must be careful with these. Drop down to the monkeys beneath Orotund cave and feed one of them with a wasp. Get that same monkey to go back to its plant pot, and when it reaches its nest it will throw an energy pod out. There are four to collect in this special pack of blue monkeys.

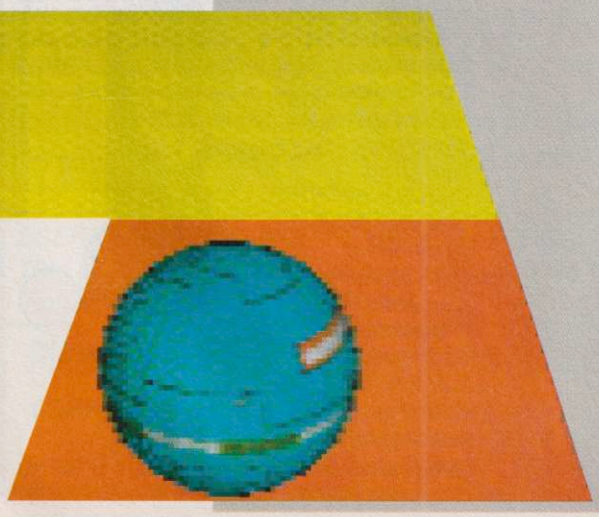
● *Continued next time*

> All you frustrated Exile players – watch this space

Fervour fever

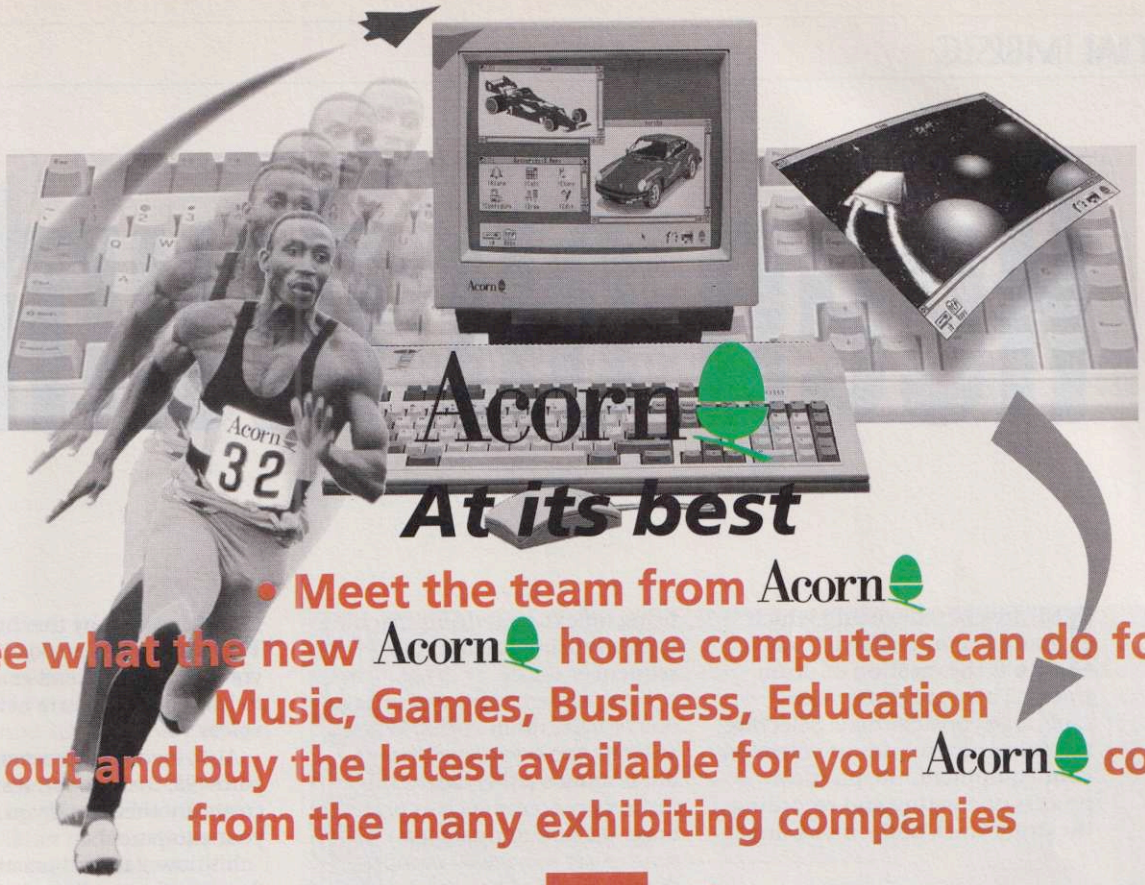
I have come across some more Fervour passwords for you, this time from the !General group of levels. If anyone has passwords for other groups, write in and let me know.

	Level Password	Editor Password
1	Polder	Lawyer
2	Scrawl	Prevent
3	Garfield	Magical
4	Source	Ketchup
5	Zigger	Zagger
6	Paradise	Flying
7	Corrupted	Information
8	Directrix	Tangent
9	Draughts	Reprimand
10	Shower	
11	Roister	Hauter
12	Embrasure	Prevaricate
13	Pragmatic	Dangle
14	Release	October
15	LowFriction	Cider
16	Password	Friendly
17	Station	Clement
18	Snowman	JingleBells
19	Flamingo	WildFlower
20	Shakespear	Desktop
21	Omega	Morbit
22	RandomDots	BlkTriangle
23	Project	Reserve
24	Smattering	Geodesic
25	Adrenalize	Hysteria



Coming soon

We'll have part 2 of the Exile solution, more (oh no) Lemmings passwords and a solution to Ricochet from Daniel Doran. Thanks to all for the – substantially increased – contributions.



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Keep on drumm

ONE area of sequencing which many beginners have trouble with is the creation of drum tracks. There are three main aspects to consider here: Selecting suitable drum sounds or voices on your equipment, the physical process of creating and recording the drum track and – if you are using an external drum machine – synchronising it with your sequencer.

Most modern synthesisers have one or more drum voices. When selected, the keys play different drum sounds rather than a single instrument sound such as piano or brass. It's not unusual for a synthesiser to have 60 or more drum sounds, although some have rather less.

You can play these drum sounds over Midi simply by selecting the drum voice and sending the Midi note number which corresponds to the drum sound you want to play. The assignment of the drum sounds to the Midi note numbers is known as the drum map.

Playing a drum track created with one particular drum map on an instrument with a different map produces rather different results. Trying to discover which notes are supposed to represent which instruments and then transposing them to the required pitches has been known to drive some Midi file users to take up the banjo.

The solution is simple, although it does require you to know the drum map used by the drum track you want to play: Create a new drum voice on your synth, mapped to the one used by the drum track. This is fairly easy to do although you may have to read your manual to learn how to create new drum voices.

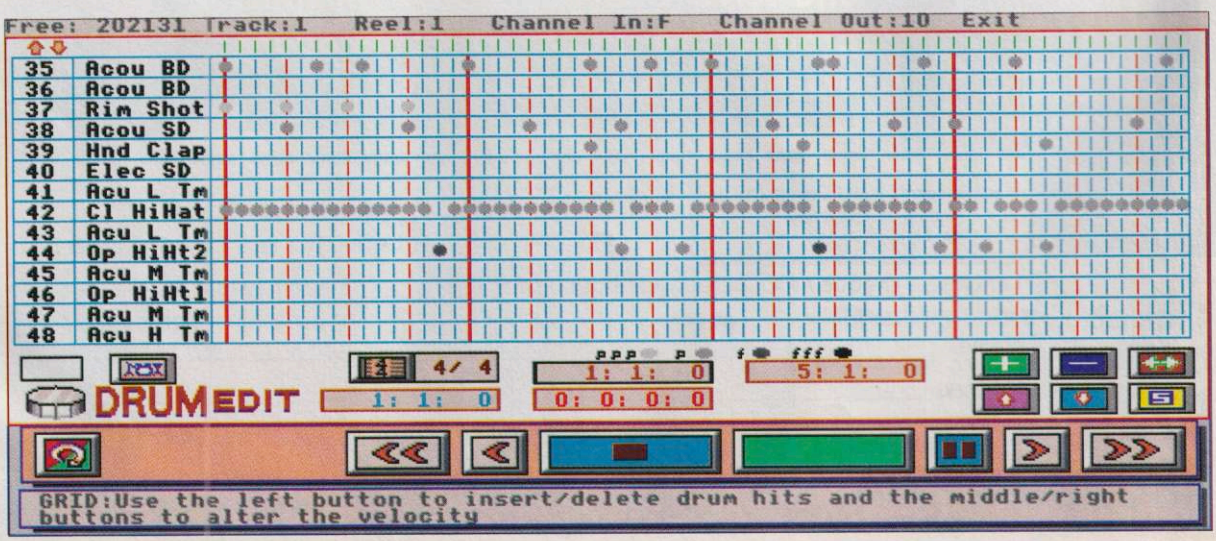
Also, if you create a map for a particular instrument, it's easy to create another one if you change your equipment.

It's now standard practice for drum tracks to follow the GM standard – see last month's article – and many modern instruments have a GM drum map even though they may not have GM voice setups.

By convention GM drum tracks are assigned to Midi channel 10. This follows Roland's normal practice and, in fact, the GM drum map is not far removed from that used by other Roland equipment. Yamaha uses a totally different drum map and normally assigns the drums to channel 16.

Recording drum tracks

To create a drum track on your sequencer, play the keyboard as a set of drum pads. Some sequencers have a Loop Mode which loops around a certain number of bars. You can build up the track by adding another drum each time through the loop. However, I prefer



● *The Drum Editor in EMR's Studio 24 Plus*

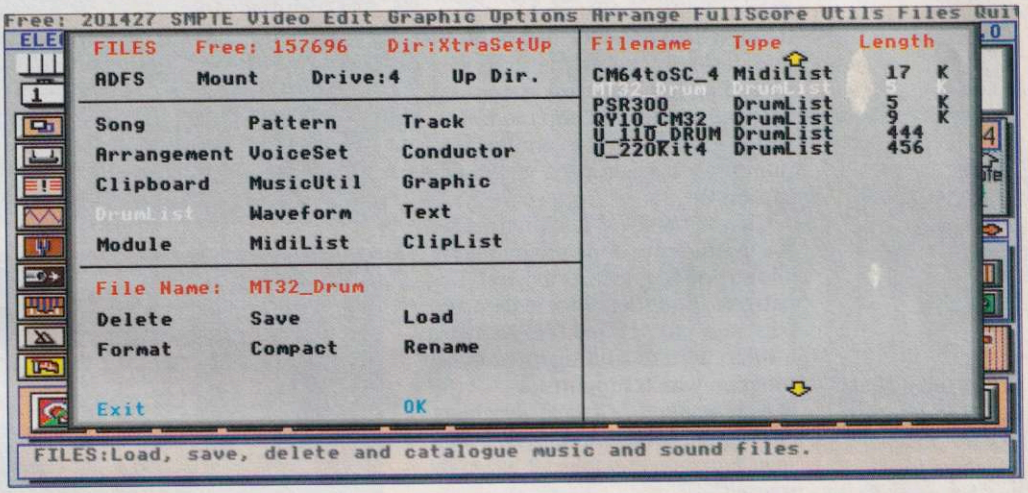
in'

Ian Waugh puts a little rhythm into his series on making music

to use a different track for each drum – it makes editing much easier – and then merge them when I'm happy with the result.

A sequencer has many advantages over a drum machine. You will probably have more control over note velocity, plus the benefits of editing facilities making it easy to alter the notes and add extra drum hits. It's also easier to run the drum track alongside the music and edit them together.

Most people seem to start with the foundation of the rhythm which is generally the bass and snare drums then add hi hat, toms and any additional percussion over the top.

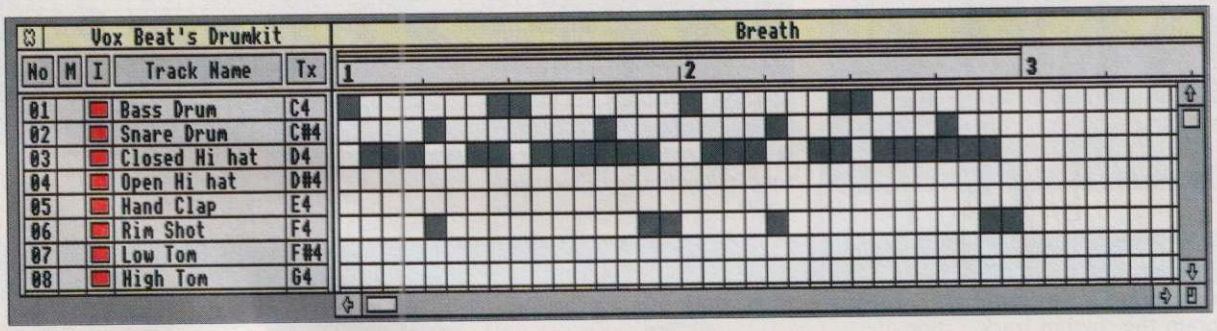


● *Some of the Drum Lists supplied with Studio 24 Plus*

Drum grids

By their nature drum tracks are repetitive, so many musicians find it easiest to construct half a dozen one or two-bar patterns and link them to form the final track. This was the approach used by early drum machines and it is now part of the drum machine and drum programming ethos.

Lacking notation facilities, most drum machines use a grid format for entering drum hits on. This idea ➤



● *Clares' Rhythm Bed*

A little help from your friends

IF rhythm programming is not your forte, a few aids are available to help you. For instance, there are several books containing drum patterns which you can enter into your sequencer.

They include *40 Patterns for Roland Drum Machines* and *40 patterns for Yamaha, Casio, Korg and Alesis Drum Machines* – essentially the same book but with different representations of the patterns. These are distributed by Music Sales (071-434 0066). There is also *260 Drum Machine Patterns Books 1 and 2* distributed by IMP (081-551 6131).

If you want to know how the real drummers do it, there's *Jazz Drums 1 and 2* from IMP which contains transcriptions of famous drum solos. Many books on drumming can be adapted for rhythm programming and there are doubtless other books of programmable patterns.

I would also recommend a unique series running in Keyboard Player magazine called *The Digital Drummer* which aims to help you to create new rhythm patterns of your own rather than simply giving you a single preset to program.

If you're not even up to recording your own patterns, you can buy off-the-shelf patterns from several purveyors of Midi files. I would recommend the Dr. Beat series from Heavenly Music (0255 434217) which includes a wide range of styles – disks are £13.95 each.

Although there is no specific Archimedes format, you should be able to convert and load the files into your machine using the techniques discussed last month.

Finally, if you are using a portable keyboard – one of those all-singin', all-dancin' machines with built-in auto accompaniments – you may be able to create a song around the built-in rhythms. Some of these instruments transmit the patterns via Midi which makes them very easy to edit. However, quite a few don't.

worked well, especially for musicians who weren't so hot with the dots and some sequencers have a Drum Grid Edit Page. It's an excellent idea and allows you to edit the pattern quite easily and see what effect the hits are having.

The grid also ensures that the hits are exactly on the beat – or wherever you want them – without the need for quantisation.

EMR's (0702 335747) Studio 24 Plus has a built-in Drum Editor. You can load different Drum Maps into it and it's easy to click hits on to the grid. It doesn't allow you to create several patterns and link them, although there is a Loop mode which loops around a certain number of bars allowing you to edit hits on the fly.

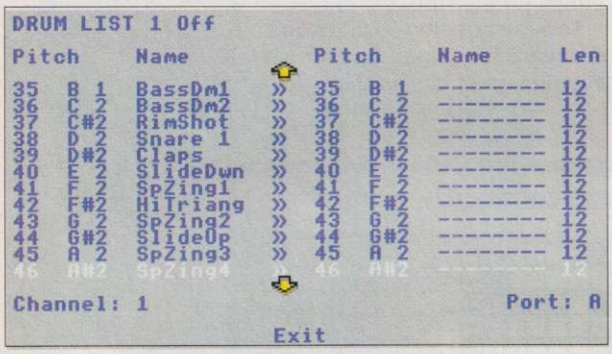
Clares' (0606 48511) Rhythm Bed is a useful standalone program as it allows you to create individual patterns, link them in a Sequencer page and save the result in standard Midi format for loading into any program which supports.

● *Next month: We'll have some hints and tips on rhythm programming plus some hands-on examples for you to try yourself.*

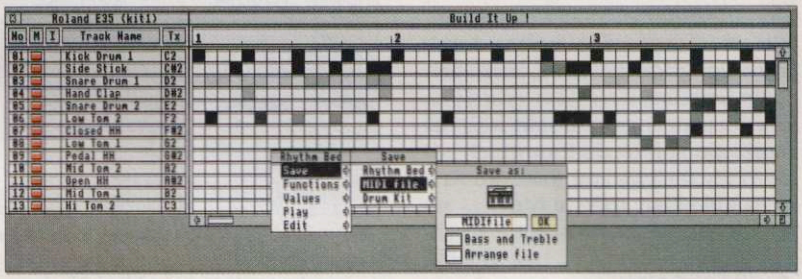
GM Drum Map

The numbers are the Midi note numbers assigned to the drum sounds. Middle C is 60. Just to confuse matters, some manufacturers label this C3 while others label it C4. However, whatever it's called, it's still note number 60.

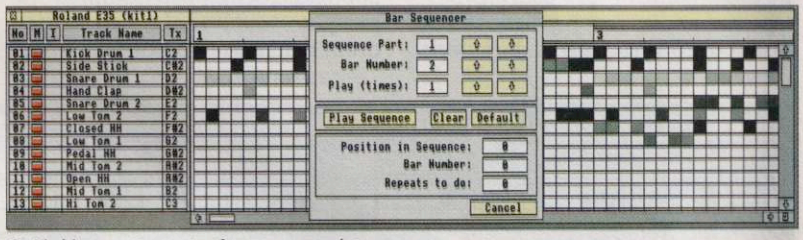
35 Acoustic Bass Drum	51 Ride Cymbal 1	67 High Agogo
36 Bass Drum 1	52 Chinese Cymbal	68 Low Agogo
37 Side Stick	53 Ride Bell	69 Cabasa
38 Snare Drum	54 Tambourine	70 Maracas
39 Hand Clap	55 Splash Cymbal	71 Short Whistle
40 Electric Snare	56 Cowbell	72 Long Whistle
41 Low Floor Tom	57 Crash Cymbal 2	73 Short Guiro
42 Closed Hi Hat	58 Vibraslap	74 Long Guiro
43 High Floor Tom	59 Ride Cymbal 2	75 Claves
44 Hi Hat	60 High Bongo	76 High Wood Block
45 Low Tom	61 Low Bongo	77 Low Wood Block
46 Open Hi Hat	62 Mute High Conga	78 Mute Cuica
47 Low Mid Tom	63 Open High Conga	79 Open Cuica
48 High Mid Tom	64 Low Conga	80 Mute Triangle
49 Crash Cymbal 1	65 High Timbale	81 Open Triangle
50 High Tom	66 Low Timbale	



● *The Drum List in EMR's Studio 24 Plus lets you map one drum to another*



● *Rhythm Bed lets you save drums in standard Midi file format*



● *Linking patterns to form a complete song in Rhythm Bed's Sequencer*

That syncing feeling

IN the early days of sequencing it was common practice to program the rhythm track on a drum machine and sync it to the sequencer on playback.

Nowadays it's more common to record the drum track in the sequencer itself. Most people find it a more convenient and flexible way of working.

Of course, one of the advantages of modern synths is that they have built-in drum sounds and you don't have to use a separate drum machine. However, some people still prefer to work with a drum machine and if your sequencer isn't very flexible in the rhythm programming department you may find it easier to use one, too.

So having programmed some patterns into a drum machine and linked them to form a complete song, you have to get the machine and the sequencer to play together in time – a process known as syncing or synchronisation.

You must decide which one – sequencer or drum machine – will be the master or controlling instrument. It's probably easiest to make it the sequencer. You then set the sequencer's Sync to Internal or Transmit and the drum machine's Sync to External. All instruments' Sync setting will default to Internal so you should only have to alter the drum machine's setting. If in doubt, consult the manual.

Before Midi you could only play two units in sync if playback started at the beginning of the piece. Midi includes a code called Song Pointer Position which allows units to start playing in the middle of a song. However, not all sequencers or drum machines support this.

You can also sync to audio tape on a multi-track recorder or to video. This is a little more complex and requires a separate synchronisation unit. It involves recording a timing code on the tape and using this to control the sequencer.

Syncing to tape can be useful if you only have one instrument and want to record more sounds than it can play at once. Syncing to video allows you to add music to a video recording – score your home movies.

There are several methods of synchronisation and all require additional hardware. The professional standard – and also the most expensive to set up – is known as SMPTE and was developed by the Society of Motion Picture and Television Engineers. EMR produces an SMPTE unit costing around £130.

Many users never need to use sync facilities, particularly if they record all the parts of a song in the sequencer.

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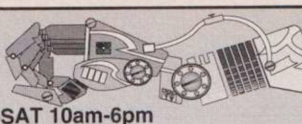

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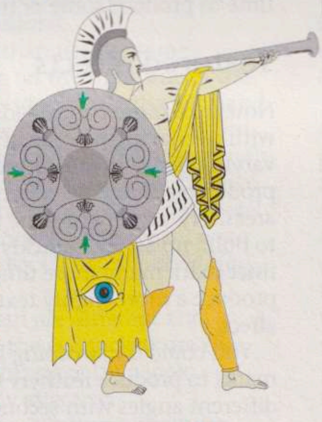

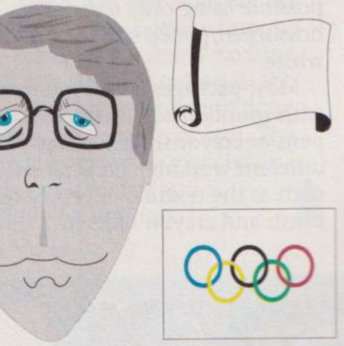

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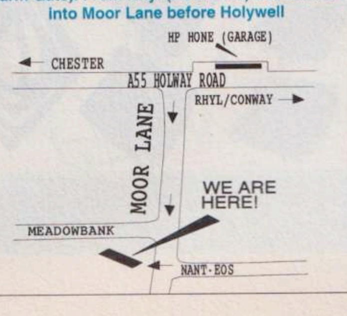

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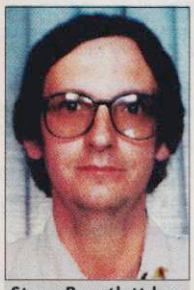


Steve Bruntlett has taught art, 3D design, graphics and photography for 14 years at secondary school level. With an MA in Art and Design Education he has developed a primer for Artisan and held master classes in CAD.

He is now senior lecturer at De Montfort University, Leicester, on PGCE and MA Art and Design courses.

THIS month we'll tackle freehand painting techniques plus a commentary on the production of a computer painting using basic tool variables such as brush shape, size and type to produce a worked single image in stages.

The painting is of a sheep's skull which I found half way up a Welsh mountain several years ago. You might like to try something which you can put either at the side of your computer or on top of the monitor – objects without a regular geometric shape or straight edges are the most interesting to draw if you don't happen to have a sheep's skull handy.

We'll take a Fine Art approach to try and get away from all those quick slick effects such as dithered graduated spherical fills and so on, that so many people concentrate on when painting for the first time.

Before we get started, I'd like to look at some experimental work (below) produced by a student-teacher I worked with who came from a Fine Art background.

The point of the exercise is to come up with as many effects and qualities of mark and line as possible using only a variable brush/pen/pencil size in black or white.

Most packages allow you to work with round or square brushes and pens or crayons. These often have different working characteristics such as the textural effects of the brush and crayon tools in Revelation ImagePro which are achieved by varying the density of the tools. But let's stick to basics.

It is important to make sure you are comfortable, that the screen is not too bright and that you are able to work easily with the mouse to produce lines and marks at any angle. To loosen up try drawing lines and marks of varying thicknesses and shapes in one colour at different angles.

Then try straight and curved lines in different directions, vertical, horizontal, clockwise and anti-clockwise. You may have to change your drawing position from time to time to produce some of them.

Textured effects

Now try a more controlled exercise with overlaying patches of marks of varying densities and degrees producing different types of shaded areas. Try varying the line thickness to build up an area quickly or use a finer mark many more times to produce a more highly textured effect.

You could try sweeping lines and marks to produce feathery effects at different angles with secondary curved hatching or shading. Try building up some feather shapes using a variety of different marks with a contrast between the heavy broad shading of thick strokes with the more textural effect of finer drawn straight or curved lines.

The last example is a complex textural drawing using all the previous techniques including negative drawing. There is much to be gained in what seems to be just doodling both in terms of discovering unusual or new visual effects as well as becoming more comfortable with the computer.

Six steps to success

The drawing of a sheep's skull was produced with Artisan and what I tried to do was to use a variety of techniques to produce a the qualities you'd associate with a 'proper' drawing.

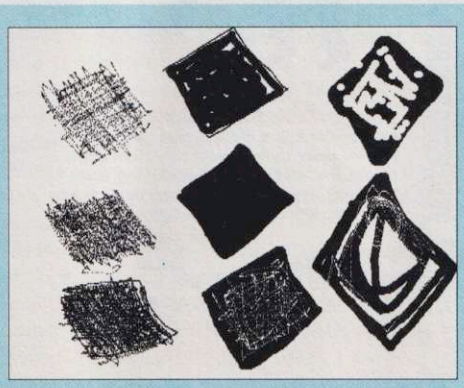
It started with a rough outline of the skull, drawn quickly with the smallest black round brush. Working with a mouse rather than a pencil was slightly more difficult, but a fairly sensitive line can be drawn.

What cannot be drawn is a pressure sensitive line – one that gets thicker the harder you press on the paper. It doesn't imitate a pencil line and has to be used on its own terms – it breaks up if the mouse is moved too quickly – but this can be used to good effect.

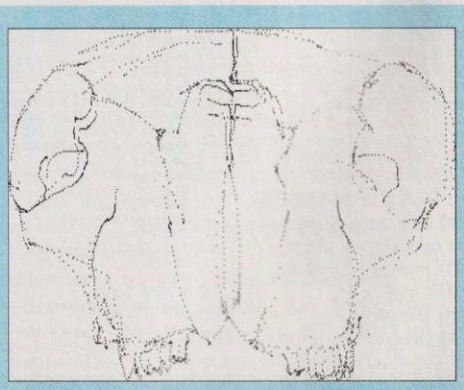
The second stage was to paint the different areas of the skull with shades of grey to try and represent the form. This was only done on the left hand side in case there was enough similarity between the two halves to enable one half to be reversed and copied.

Insufficient shades of grey were available to give enough smooth shading on the surface so three more were mixed to give a wider

● *Sweeps produce a variety of feathery effects with secondary curved hatching*



● *This exercise simulates a scraperboard and lets you practice a variety of effects*



● *Basis of the skull is a rough outline which is drawn using the smallest black round brush*

Continuing his series, Steve Bruntlett takes you through the stages in creating a freehand masterpiece

tonal range. This was possible as I was using Mode 12 – a 16 colour mode chosen from 4,096 shades, rather than Mode 15 with a fixed palette of 256 shades.

The areas were roughly filled in with varying sizes of brushes and the edges blended, dot by dot, by enlarging sections of the skull with the zoom option and working on them at a pixel level putting intermediate shades of grey between dark and light shades to give the blending effect.

You could use a blending or wash tool but I preferred to have complete control over the image.

The third stage was the completion of the colouring and shading of the missing nose section. I used a range of greys through to black, though shades of brown could be introduced. Again I used Mode 12 – though Modes 21 or 27 are appropriate for those with high resolution monitors.

Click on the palette icon on the iconbar and adjust the red, green and blue sliders to change a selected colour. The set of greys can then be modified to a series of brown or sepia shades for instance.

If you do modify the palette – and many superb effects can be achieved by this – make sure you save your palette on to the same disk as the picture and load it back in when you want to view or print your picture. The manual will cover this and I'll be talking more about this aspect next month.

We now move on to the detailed work around the teeth, eye sockets and central nose cavity. Gruesome isn't it. Several sections were zoomed in on to enable more detailed work to be carried out including correcting lines and reshading areas where the outlines had disappeared.

The shaded areas were produced using different thicknesses of brush strokes. Although you might be tempted to use some of the excellent airbrush facilities available in most packages.

Try sticking to the brush, pen or crayon facilities and see how far you can push them in terms of creating effects rather than relying on ready-made solutions.

Rather than use the same procedure on the right side of the skull, I decided to use the left hand side of the previous stage but two, cut, pasted and flipped horizontally on to the right hand side. The two sides of the skull are not completely identical but the differences were painted over identical underlying areas.

The teeth are different and although the eye sockets are the same at this stage they look reasonably effective.

If you're painting something symmetrical you have to decide when in the process you're going to flip and copy one side to the other so as to save yourself as much work as possible while ensuring that each side looks different enough when finished.

The sixth stage was to finalise detail on the right hand side of the skull. The finished drawing is a reasonable representation of the original, though more detail and more subtle shading would help. The few discrepancies in style could be overcome by further editing of the final image.

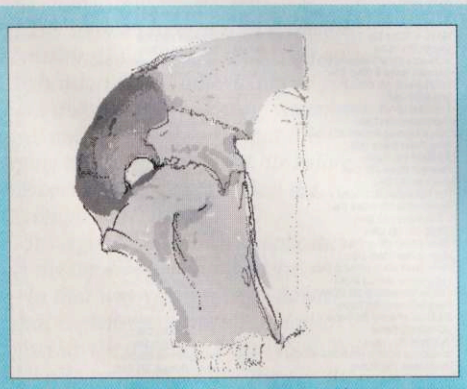
The main problem seems to be that of overworking: Some of the details seem rather black and heavy. It would have been better to have copied the left hand side at an earlier stage rather than going into so much detail before copying and flipping

The end product seemed to be more of a designed image than an intuitive drawing as so much was edited using the zoom option to try and get the details right.

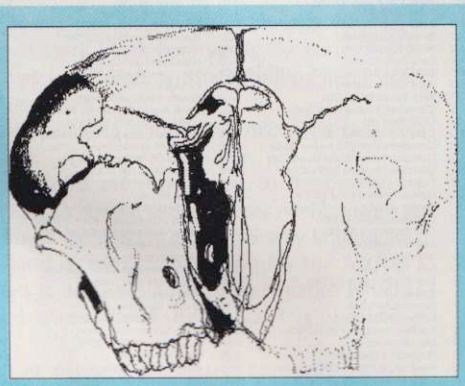
In retrospect I shouldn't have used the zoom at all but relied on drawing the skull at full size doing any modifications by repainting. So maybe you'd like to use a bit of self discipline when you start your drawing and ban the use of zoom in the same way as you should avoid using airbrush tools or wash effects at this stage.

There are similarities and frustrations between computer and more traditional painting. But the attraction for me is that computer aided painting has many exciting possibilities that far outweigh the feeling that you're trying to draw fine detail with lump of coal. The differences make the exercise an exciting one for me and hopefully for you too.

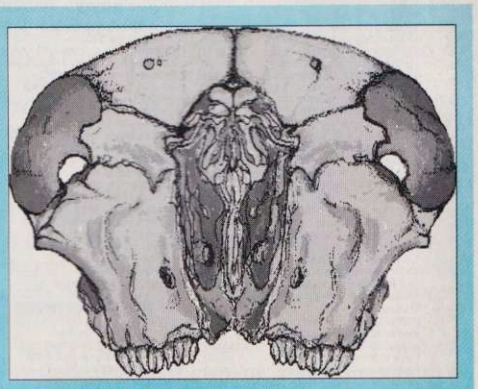
Insufficient shades of grey were available so three more were mixed



● *Different shades of grey are used to represent the form of the skull*



● *It's up to you to decide at which point you cut and paste, flip and rotate*



● *The finished sheep's skull is a pretty fair representation of the original*

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New start with Risc OS 3

Mike Cook answers another section of your technical questions

Q I OWN an A410/1 with 4Mb memory and a 40 Mb hard disk. Recently, a relative with an A5000 upgraded to Risc OS 3.10 and offered to upgrade my machine. This he has done and it works quite well, with a few minor compatibility hiccoughs which were to be expected.

A minor irritant is that Shift+Break returns to Supervisor and not the Desktop as before. Also, after power up, on selecting the hard disk I get the error message *No run action specified for this file type* which is deleted by clicking Select on the Cancel box. Only the backup application disks will work. – **A.T. Jenkin, Truro.**

A *Risc OS 3 handles the startup language differently from the previous operating system. If you do a list of the modules – with *Modules – you will find a number by the side of each one. Use that number in the *Configure Language command and press Return then Control+Break.*

You will then start up with that module unless it is not an appropriate one to start up in when you will get into the Supervisor mode. The problem arises because there are many different modules in Risc OS 3 and the position of modules such as Basic and Desktop has changed.

The second problem is that there is something in a !BOOT file inside an application on the top window of your hard disk that the operating system does not like. It might be that it is trying to run a compressed file before the operating system has seen the decompressor.

It's a good idea to move applications off the top window into folders:

In that way you can track down what is giving you trouble and also speed up the opening of your disk. You will also get more free memory as the system does not have to read in any application icons. Perhaps the only exceptions to this I would recommend are the !System and !Fonts folders.

Video with no title

Q I HAVE an A3000 upgraded to 2Mb and Risc OS 3.10 and also a Sony TR60 camcorder. I have written a program to display titles of my own choice and incorporated a selection of various fades. The program enables me to determine the background colour, any combination of text colours and the fade colour.

It was my intention to capture the screens from my monitor/TV with the video camera, but having tried all colour and contrast combinations I am unable to obtain satisfactory results.

I read every article I could lay my hands on and discovered that what I really require is a genlock which will let me overlay these titles on to my camcorder output when editing to a VHS video tape. As I am at the stage where I am about to attempt audio mixing/dubbing and being on a tight budget, I cannot afford the expense of a genlock.

All I really need at present is some means of converting the RGB output of my computer to composite video or UHF so that I can insert my titles and fades in between sections of camcorder output. Is there anyone who can supply such a device at a reasonable price? – **A.J. Borrill, Scunthorpe, South Humberside.**

A *As you say, in order to superimpose computer output on to a video source you need a genlock board. However if you just want to add titles, what you need is to convert the RGB output of your computer into a PAL format and then* ➤

AGENDA

- Risc OS 3 boot fault
- A3010 to Philips monitor
- Compact without a dump
- Video titling
- User Port on A3000
- Losing money

Screen with a slant

Q COULD you please advise me where I might purchase the correct cable to link my A3010 computer to a Phillips CM8833 II monitor? I've had a cable made up by an engineer at my local computer shop which followed the wiring diagram in my computer's manual.

The result was a slanted double picture with a couple of thick black bars vertically slanted. The cable was used with another Phillips 8833 with the same result.

On telephoning and faxing Acorn he received little help.

As a second attempt I sent to Beebug for a cable. The first one sent was an Archimedes to 8833 which did not fit as the 15-way D plug was female and it needs a male plug for the A3010. I returned it and was sent a Scart cable which I also returned. Both firms have given me a refund.

I am at present using the computer with a portable television via the aerial socket. I have a normal picture but, of course, I don't like the low resolution. I am at a bit of a loss as to where to go. ➤

Surely my computer and monitor are not incompatible? –D. Atkinson, Saxilby, Lincoln.

A *This is a problem, like so many I get, where I would love to get my hands on the equipment, because while everything seems to be set up correctly you still have a fault. For a start you can fit the Phillips monitor to the A3010.*

From the description of the fault it sounds like the monitor is not receiving the correct sync pulses. I am surprised that your computer engineer did not look at the sync pulses with an oscilloscope to see what was wrong.

It could be that the polarity of the sync pulses is wrong or that you are feeding composite syncs into a single sync input or single syncs where it is expecting a composite one.

Therefore what you need is to sit down with an oscilloscope and both manuals and make sure that you are understanding the labelling correctly. Then making up a lead should be a piece of cake.

➤ *UHF modulate this. This can be done using a Chroma 150 system from Wild Vision (091 519 1455), costing £185 plus VAT and carriage.*

However the new range of Acorn computers (A3010) contain a UHF-modulated output but, as it is not a full implementation of the PAL standard, the colour quality can vary with different manufacturers' TV sets.

Another option is to use one of the new home video editing suites. This takes two video sources, performs a time-base correction to them and then mixes them together, thus avoiding the need for a genlock. You do still, however, need to feed them with PAL video signals.

You can write to Mike Cook c/o Acorn Computing, Europa House, Adlington Park, Macclesfield SK10 4NP.

He will answer any questions about difficulties you are 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.

Port for A3000 users

Q I HAVE an A3000 and would be very grateful if you would answer the following questions:

If I bought a User Port would I be able to use it for projects which are designed for the BBC User Port? I am interested in interfacing a model railway to our computer, but all the books I have found are for the old BBC Micro. Would I be able to use it for the Body Building projects?

Do you know of any books which are helpful for people attempting to learn assembler? Is there a command in Basic to switch the Caps Lock key on/off (maybe an FX command?). – **R. Moffatt, Sheffield.**

A *Fitting a User Port to an A3000 is a good idea. You would then be able to perform most interfacing projects designed for the older computer including Body Build ones.*

You would have to change the software to use the appropriate SYS calls instead of the technique of writing directly to memory using the question mark indirection operator.

To read the User Port into a variable A% on an 8-bit machine you would use:

```
A%=?&FE60
```

but on a 32-bit machine you would have to use:

```
SYS "OS_Byte",150,&60 TO ,,A%
```

Note that the two commas after the TO are essential. This line should be read as: Make a system call (SYS) to the operating system routine OS_Byte, number 150. *This means read a memory location in a page that was called Shiela (address &FExx) on the old BBC Micros. This is the name of the block of memory where the User Port is to be found.*

Read the 60th memory location (equivalent to &FE60) in that page and pass the answer back to (TO) the variable A%. The two commas indicate: "Do nothing with the other values the call returns", namely the original numbers 150 and &60.

Writing to the User Port is accomplished by using a 151 SYS call. In the above example, if 151 were used in place of 150, the contents of the variable A% would be placed in the data register of the User Port.

A good book on ARM Assembler is the Dabs Press one Archimedes Assembly Language *by Mike Ginns.*

*The Caps Lock can be turned on by a *FX202,0 and off by *FX202,16. The LED is updated on the next key down event. Therefore, if you are in a program and want to flush the Caps Lock, follow this call with a *FX118.*

Dump with a Compact

Q I OWN a BBC Master Compact and have recently purchased an Epson FX80 printer. I have a lot of pictures I want to print out but can't seem to get a printer dump working for it. Please could you tell me how to print out any picture I want? – **L. Baragwanath, Sutton, Surrey.**

A *Try Dump Out 3 from Watford Electronics. It has a variety of methods for producing a screen dump on your printer.*

More value for money

Q **SOME time ago I bought an Archimedes 420/1 with monitor and 42Mb hard disk for around £1,600. Just recently I decided to upgrade, so I phoned a couple of dealers to find what sort of trade-in I could get.**

I was told, to my dismay, that my present computer was worth less than £600. Now I can just about live with £1,000 going to nowhere but I do not want to make the same mistake again.

Is the ARM250 (all chips in one) a one off, or is an ARM350 going to come out with cached ram? If the ARM350 comes out, will it include the VIDC20? How long will it be before VIDC20 becomes available in either single chip format or ARM350? If the ARM350 does come out, when will this be and will an upgrade from ARM250 be possible?

Is the ARM3/ARM2 four chip set going to end or will many faster processors such as the clock-less processor come along? Will ARM250 type clock-less processors come out or is this just not possible due to having to redesign VIDC, MEMC and so on?

If you could answer the questions it would help me to decide which to upgrade to, the A4000 or A5000. – Barron, Hull.

A ***There is a simple solution to avoiding losing money on computers: Don't buy any. This is a rapidly moving field and almost by definition if something is available then it's obsolete.***

Given that you might actually want to have a computer, what strategy should you adopt? Well, the best way of losing money is to trade in and purchase new equipment every time something new comes out. A strategy I adopt is only to purchase new equipment when it gives you a significant and needed increase in performance.

For example, I will be the first in the queue when the new video chip giving a proper colour system is available but I am still running an ARM2 chip. This is because, although the ARM3 offers you much more power at the moment, I don't need it that much.

Computers will tend to become more powerful but not cheaper. That is, you will get more power for your money but will always have to spend about the same.

Prices on individual models usually only fall when they are near the end of their lives due to newer models.

Some of your specific questions can't be answered as the appropriate decisions have not been made by Acorn or ARM Ltd yet. However, in the search for more power it makes sense to integrate as much circuitry as possible onto one piece of silicon, so in the future I would expect to see a trend towards reducing the number of chips in a family.

At the moment the A5000 represents Acorn's top of the range machine. I suspect this will not be the case for very much longer as it has held the top spot for so long now, at least in computer terms. So if you want to catch the fastest bus I would wait until the next one comes along. However, as always, it will cost you.

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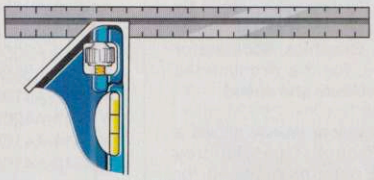

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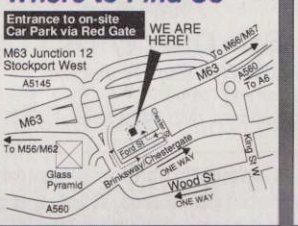

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Magnetic Scrolls Collection 1	£26
Mah-Jong Patience (CIS)	£15
Mah-Jong The Game (CIS)	£18
Manchester Utd Europe (Krisalis)	£19
MicroDrive 2	£25
MIG 29 Super Fulcrum (Domark)	£32
Nebulus (Krisalis)	£19
Nevryon (4D)	£15
Oh No More Lemmings (Kris)	£16
Omar Sharif's Bridge (Krisalis)	£22
Pandora's Box (4D)	£20
Pesky Muskrats (Coin-Age)	£19
Play It Again Sam 1 (Superior)	£20
Populous (Krisalis)	£22
Powerband (4D)	£20
Quest for Gold (Krisalis)	£19
Real McCoy 1/2/3 each (4D)	£24
Saloon Cars Deluxe (4D)	£26
Sal. Cars Del. Extra Cses (4D)	£15
Scorpius (Arxe)	£Call
Sim City (Krisalis)	£Call
Spheres of Chaos (Matt Black)	£19
SWIV (Krisalis)	£19
Twin World (Cygnus)	£14
Waterloo (Turcan)	£19
X-Fire (4D)	£20
Zelanites (Micro Power)	£15

Desktop Projects Ltd

Tel: 061-474 0778

Authorised Acorn Dealer (Fax No. 061 474 0781)
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Access VISA SWITCH

Registered Squirrel Dealer

FEB 93

Watford Electronics Ltd

Established 1972

Mail Order & Showroom: Jessa House, Finway, off Dallow Road, Luton, LU1 1TR, England
Tel: 0582 48 77 77 Tlx: 8956095 WATFRD Fax: 0582 488 588

Showroom Only: Jessa House, 250 Lower High Street, Watford WD1 2AN, England
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The sign of Quality

Shop Hours: 9am to 6pm (Mon.-Sat.) Thursday 9am to 8pm. FREE customer car park.
All prices exclusive of VAT; subject to change without notice & available on request.

Acorn

The choice of Experience

Archimedes micro

System	Basic	Colour	Multiscan
A3010-1Mb Family	£424	£584	£749
A3010-2Mb L/C	–	£680	–
A3020-2Mb FD	–	£749	£799
A3020-2Mb HD60	–	£899	£949
A4000-2Mb HD80	–	£949	£999
A4000-Home Office	–	£999	£1049
A5000-2Mb HD80	–	£–	£1399
A5000-L/C 2Mb HD80	–	–	£1445
A5000-4Mb HD120	–	–	£1599
A5000-2Mb ES	–	–	£1299
A5000-2Mb NS	–	–	£1399
Pocket Book	£212	–	–
Pocket Book Class	£2127	–	–

On-Site Maintenance now available on all Archimedes Micros. Please telephone for details.

Archi A4 Notebooks

A4 Notebook with 2Mb RAM	£1399
A4 Notebook 4M RAM/60M HD	£1699

FREE OFFER

When you purchase any of the above Archimedes Micros, we will give 10% of the value of the machine in Hardware or Software of your choice

Archi Accessories

- 3.5" 800K 2nd Floppy Drive (305/310) £118
- 5.25" 800K external Floppy Drive £80
- Acorn I/O Podule (Analogue/User/1MHz bus) £79
- I/O Podule (Analogue/User) £49
- MEMC 1A Upgrade £29
- MIDI add-on to Acorn I/O Podule £27
- MIDI Expansion Card £65
- Econet Network Board £38
- Archi replacement mouse – New design £29
- PC Emulator v1.9 £95
- Software Developers Toolbox £149
- Floating Point Unit £455
- Keyboard Extension Lead £6
- 2 Podule Backplane £20
- 4 Podule Backplane £25
- Fan for above backplanes £10
- Risc Os Extras Software Disc £5
- Ethernet Card £149
- SCSI Card 8 bit £129
- SCSI Card 16 bit £149
- SID Utilities Discs – Set of 4 £19
- ST506 Hard Disc Controller Card £99
- A5000 Dust Cover £9pr
- A5000 Technical Reference Manual £65
- A4 Spare Batteries £49

RISC OS 3 Upgrades

- A 5000 Software Upgrade Kit £16
- Software Upgrade Kit for the rest £40
- Hardware Upgrade Kit 300/440 £25

A3000 Accessories

- 3.5" External Drive £95
- Monitor Stand £15
- Technical Manual £39
- Serial Upgrade £19
- A3000 Dust Cover £5
- Micro+monitor cover £9
- Acorn Carrying Case for A3000 £10
- A3000 User Port/Midi Upgrade Card £44
- A3000 User/Analogue/IIC I/O Card £38
- A3000 External Podule Case £15

Graphics Accelerator Cards

The ultimate G8 range of Graphics Accelerator Cards from State Machine, for the Archimedes micro give more resolution, colours and speed.
Features:

- Fully programmable 24 bit colour palette allows a choice of 16.7 million colours. True 256 grey scale, primary and VGA palettes supplied for enhanced dithering with RISC OS applications.
- DTP now easier with fully legible one or two A4 page screen display in 2, 4, 16 or 256 colours.
- At least 25 frames per second local VRAM update allows applications to run without flicker or tearing of the graphics.
- Provides 50 frames per second update mode 12, 15, 20, 21, etc., on 30KHz+ line rate monitors.
- Extends the high resolution mode 23 from 2 colours to 16 at the same resolution allowing A3000 and A5000 computers to use high resolution in up to 16 colours.
- 4 layer single width podule – no soldering required
- Full documentation and operating software supplied.
- Requires RISC OS 3.10.

P.S. Not compatible with A3010/20, A4000 & A4

G8 Pro additional features:

- Desktop compatible 768 x 576 CCIR PAL interlace in 256 colours
- 1Mb on-board VRAM
- External genlock facility
- G8 Plus £239
- G8 Professional £345

A3010 DTP Family Pack

Supplied with 3.5" Floppy Disc Drive and a mouse, Colour Monitor and lead, TV modulator, 20Mb fast IDE Hard Disk Drive, 'Compression' utility to increase the Hard Drive capacity to typically 40Mb, the highly acclaimed Computer Concept's Impression Junior DTP package, EasiWord wordprocessor, Quest for Gold game, applications suite of software packages and comprehensive audio training tape.

RRP: £1095

Sale Offer Price: £729

- A3010 DTP Family Pack with Learning Curve £829
- Additional 1Mb RAM fitted £29

Special Education discounts available on micros, RAM upgrades, ARM 3 Turbo Card, etc. Please write in or telephone:

0582 48 77 77

Archimedes RAM Upgrade

All our memory upgrades are simple to fit. No soldering required. Fitting instructions supplied.

- **R300**-4 Layer RAM upgrade board (Bare). £25
- **R302**-A3000 – to 2MB RAM Upgrade £29
- **R303**-A3000 – to 2MB RAM Upgrade (expandable to 4MB) £49
- **R304**-A3000 – to 4MB RAM Upgrade £99
- **R305**-A3010 – to 2MB RAM Upgrade £29
- **R306**-A3020 – to 4MB RAM Upgrade £50
- **R311**-A305 – to 1MB RAM Upgrade £30
- **R312**-A305/310 – to 2MB RAM Upgrade £115
- **R314**-A305/310 – to 4MB RAM Upgrade £229
- **R412**-A410/1 – to 2MB RAM Upgrade £25
- **R413**-A420/1 – to 4MB RAM Upgrade £50
- **R414**-A410/1 – to 4MB RAM Upgrade £75
- **R810**-A410/1 – to 8MB RAM Upgrade £579
- **R820**-A420/1 – to 8MB RAM Upgrade £549
- **R840**-A440/1 – to 8MB RAM Upgrade £479
- **A5000** – to 2MB additional RAM Upgrade £82

Desk Top Publishers

Acorn's Archi DTP Package	£69
• Equasor £39; • Expression-PS	£19
Impression 2 DTP Pack	£123
Impression Junior	£65
Impression Business Supplement	£39
Impression II Borders Disc	£19
Ovation DTP	£85

Archi Wordprocessors

Pendown Archi	£48	Pipedream Spell Checker	£40
Pendown Plus	£68	Graphic Writer	£20
Pendown Outline Fonts	£18	Easiwriter	£115
1st Word Plus – 2	£63	EasiWord	£58
		Prime Word	£52

Databases

Flexifile	£79	Multistore v2.01	£174
Knowledge Organiser	£42	Pinpoint	£65
Magpie	£40	Pinpoint Junior	£23

Spreadsheets

Eureka	£99	Schema	£89

Business Graphics

GammaPlot	£39	Sigmaplot	£39

Integrated Packages

- Pipedream 3 £116
- Pipedream 4 £146
- Desktop Office – Database, Graphs & Charts, Wordprocessor Spreadsheet, Communications £98
- Desktop Folio – Wordprocessor, Desktop & Interactive Publishing. Ideal for school £75

VISA

CREDIT CARD 24 HOUR Ansaphone Hot Lines (0923) 250234 or 233383

Hi-Speed, Low Cost Archi Hard Disc Drive

Watford's advanced interface allows IDE drives to work on any Archimedes machine, speeds in excess of SCSI devices can be obtained at a fraction of the cost of a SCSI drive.

Up to four drives are supported by the IDE filing system IDEFS, up to two drives can be attached to each expansion card, up to four cards can be installed in a machine. An optional 20Mb or 40Mb hard disc can be supplied on the podule expansion card itself, with its fast transfer rate and power saving modes the drive is ideal for storing commonly used software such as the !Fonts application.

A powerful security feature has been provided with the two unique commands *IDELock and *IDEUnlock, ideal for educational establishments where hacking or tempering may be prevalent that may lead to loss of data. Once locked, the configuration can not be changed until a secret password is used. The !IDEForm Write Protect option is particularly useful in conjunction with *IDELock as it will prevent any unauthorised deletion of data.

By an innovative use of on-board memory, the card will remember its configuration, even if moved to another slot or even a different machine, this also includes the unique security features.

Hardware

- Single width EuroCard
- Supports proposed ANSI ATA (IDE) specification
- Fast 16 bit MEMC interface interrupt driven to support background disc operations
- 5 Mbytes per second peak transfer rate
- Optional on-card 20Mb or 40Mb hard disc
- Up to two drives (master and slave) per card
- Multiple cards per machine (up to four)

Software

- Conforms fully to the Acorn IDE Specification
- All software supplied in ROM
- Filing system 'IDEFS'
- Desktop filer with drive ready detection and disc name under icon
- !IDEForm, WIMP based configuration and formatting software
- Drives can be individually write protected
- Up to four drives over multiple cards
- Power saving standby modes supported with configurable timeout
- Drives can be used without translation in native mode for minimum overhead
- !IDEFSDisk, creates PC emulator hard discs

Prices

Part No.	Capacity	Access Speed	Price
ADA 0520	44Mb	28mS	£195
ADA 0530	100Mb	16mS	£295
ADA 0570	200Mb	15mS	£449
ADA 0580	330Mb	15mS	£799

All the above 3.5" hard drives are supplied complete with Controller Card, cable & Software on ROM. (Internal fitting). For use with A300/A400/A500 series machines.

AAA 0300 External Case & PSU for A3000 **£85**
AEA 1060 Archi IDE Hard Disc Podule only **£89**

Internal Hard Disc Drives for A3000

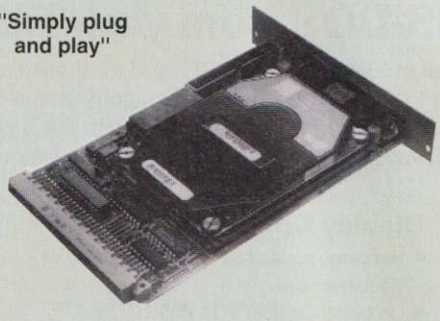
State of the art, 4 layer internal IDE Hard Cards for the A3000. Software supplied in, On-board ROM.

ADA 0150	20Mb	19mS	£149
ADA 0770	30Mb	19mS	£185
ADA 0710	40Mb	19mS	£279
ADA 0750	60MB	18MS	£329
ADA 0720	80Mb	18mS	£399
ADA 0730	120Mb	16mS	£POA

Supplied ready assembled. No soldering required. Simply plug into the allotted space.

Archi IDE Hard Cards

"Simply plug and play"



Watford's easy to instal, low cost, high performance, revolutionary IDE Hard Cards for the A300 & A400 series Archimedes.

ADA 0650	20Mb	19mS	£159
ADA 0800	30Mb	19mS	£185
ADA 0660	40Mb	28mS	£289
ADA 0810	60Mb	18mS	£339
ADA 0670	80Mb	18mS	£409

Also available 120Mb and 180Mb Cards. Please telephone for prices.
(All above Hard Cards can be used as Removable Hard Drives)

Archimedes A300/A400 SCSI Hard Disc Offer
(while stocks last)

100MB Hard Disc Upgrade complete with Controller card, Cables, Formatter and Manuals

RRP: £799

Offer Price: £325

Also available with 16-bit controller **£359**

Low Cost Finance now available on Archimedes. Please telephone for details.

Archi to BBC Serial Link Mk 2

Using this simple data link, it is possible to solve all your BBC to Archimedes data transfer problems. The kit is supplied with a disk, and the necessary cable to connect the two computers.
New RISC OS Version also available (please specify)

- For A3000 **£15** • For A5000 **£16**

For A3000 Serial Upgrade **(£19)** required

A3000 I/O Card (User, Analogue & IIC)

This NEW versatile I/O Card from Watford, fits inside the A3000 and includes an Analog to Digital Converter, a User Port, and an InterIC (IIC) connector.

The card allows many of the peripherals developed for the BBC to be used with the Archimedes A3000. The ADC and User Port have the same pin out and connectors as the BBC computers.

Extensive RISC OS software is supplied to provide BBC OSBYTE calls for support of the ADC and User Ports, including the BASIC keyword ADVAL. The software provides extended RISC OS support for separate interrupts from both the ADC and User Ports, permitting easy interrupt driven operation.

The card is provided with all the software in ROM and is automatically loaded when the machine is turned on.

Peripherals connected to the ports can obtain up to 500mA of power at +5V. A fuse is fitted to the card to protect the A3000 from damage arising from accidental short circuit of the power output.

Features

- An 8 bit User Port with a standard 20 way IDC connector, compatible with the User Port on the BBC computers and the Archimedes I/O Podule.
- A 10 bit Analog to Digital Converter with a standard 15 way D type connector, compatible with the ADC on the BBC range of computers and the Archimedes I/O podule.
- An InterIC (IIC) Port with a 5 pin DIN socket to connect the A3000 to external IIC devices.

£38

Archimedes External Disc Drive Interface

With this interface it is possible to connect almost any 5.25"/3.5" disc drive with its own power supply to the Archimedes. Upto 4 disc drives can be connected. Fully Buffered Board. NO SOLDERING is involved. Supplied complete with necessary lead.

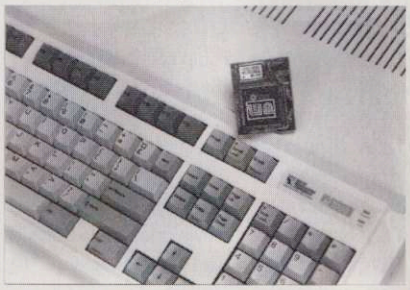
Price £21

Back Plate Extension

- A300/400 **£15;** • A3000 **£14**

ARM 3 Turbo Card MkII

Simply The Best



Here it is at last – the all new Mark 2 version of Watford's highly acclaimed ARM 3 processor board for the Archimedes and now also the A3000 series computers. Using the latest surface mount technology on a high quality four layer circuit board we have reduced the overall size to a mere 53mm x 45mm, and the cost to only £169. Mk II upgrade will increase the speed of your micro by a factor of 3 to 6.

Any competent A300 or A400/1 series micro owner can fit the upgrade himself, as we provide full fitting instructions and a special ARM chip extraction tool. However for A3000 micros and those not wishing to perform the upgrade themselves, we will collect, upgrade and return your micro by courier service, at an additional cost of £24.

(A300 and old A440 series owners please note – you will need to upgrade to MEMC1A for ARM3 to work.)

RRP £249

Special Offer £145

Acorn have satisfactorily evaluated Watford's ARM 3 upgrade and the A3000 upgrades are fitted by Acorn approved surface mount technology centre, therefore its fitment will not invalidate Acorn's warranty on the micro.

BBC MASTER

MASTER 128K Micro incl. Acorn's View, Viewsheet, ADFS, BASIC Editor & TERMINAL plus FREE OFFER (see below) **£329**

Add-Ons & Accessories

Econet Module for the Master		£42
Twin ROM Cartridge for Master		£9
Quad ROM Cartridge for Master		£14
Master Reference Manual I	(No VAT)	£14
Master Reference Manual II	(No VAT)	£14
Master Advance Ref Manual	(No VAT)	£14
64K Upgrade Kit for B+		£32
ECONET Upgrade Kit for BBC B		£42
ALL ECONET UPGRADES Available		
ARIES' IEEE Interface for BBC B & Master		£238

Leasing finance at very attractive rates now available to Businesses (subject to status), Schools, Colleges, Universities, Government Depts. and Local Councils. Minimum order £1,000. Please telephone for details.

Continued→ → → → → → → → →

Watford Electronics Aries PC Card

Access the world of MS-DOS from your RISC OS based computer

Watford Electronics brings you a full specification IBM compatible PC card for the Archimedes. You no longer require the Archimedes PC Emulator, all PC software is run locally on the expansion card with custom written software to interface the PC card into the RISC OS environment. The expansion card is a full hardware implementation, with the ability to be turned into an ISA Bus, fully fledged 386 PC just by the addition of a power supply, keyboard, storage device and a monitor!

Processor

386SXL 33MHz low power processor. Socket for optional 387SX 33MHz numeric co-processor.

On Board Peripherals

- Uses 82C107 single chip solution.
- 128 bytes of battery backed CMOS RAM.
- AT compatible Keyboard Controller.
- Uses standard Archimedes keyboard and mouse. Full standard ISA 16 bit expansion bus available.
- Optional expander allows one or two half size PC cards to be installed in the adjacent Archimedes expansion slots.

Memory

- Uses 82C311 memory controller 2Mb zero wait state DRAM as standard, upgradable to 4Mb DRAM just by adding 4 more chips.
- Bank interleaving and page mode memory operation for maximum performance.
- On-board BIOS ROM.

Display Controller

- Hardware support for VGA with 512Kb of video memory.
- On board Quadtel VGA BIOS ROM.
- Multitasking screen display on RISC OS.
- Desktop can be achieved in software.
- Separate VGA monitor can be connected for simultaneous RISC OS and PC display or your Archimedes VGA compatible monitor can be used with optional video switch.
- Much faster and improved video speed compared to PC Emulator.

Hard & Floppy Disc

- Full background disk access, the Archimedes is not adversely affected.
- Any existing Acorn PC Emulator hard disk partition can be used, with the ability to create new PC hard disk partitions on any RISC OS hard disk.
- Optional IDE hard disk and floppy drive option for direct connection of a dedicated hard disk and floppy to PC card.
- Access to the Archimedes floppy disc drive for reading and writing of PC disc formats from PC.

Bundled Software

- MS DOS 5.0, Lotus Works and PC Organiser

Sound

- Uses the Archimedes internal speaker by connecting to the Auxiliary sound connector.

Enhancements

Optional expansion card will be available either hardware parallel and serial ports or the ability to connect an external AT style keyboard and mouse.

The PC card can also be plugged into a stand alone backplane to form the heart of a fully expandable, industry compatible 386SX computer, with no reliance upon the Archimedes.

Specifications may be subject to change. E&OE.

Why not visit the Acorn Village in our Computer Boutique at our Luton HQ for a demonstration

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Scan256 – The only sensible scanner purchase

Scan256 – the innovative 256 grey-level hand scanner for the Archimedes range of micro computers. It offers up to 256 grey levels at a maximum of 400 dpi, and comes complete with the most advanced and sophisticated 256 grey scale scanner software currently available for the Archimedes.

- Multiple copies of the image in memory at once.
- Allows multiple consecutive operations without having to save the original image to disk.
- Instant re-draw of all 4 image buffers.
- No re-calculations needed unlike other packages that use on the fly screen-dithering.
- Highly advanced dithering and image size reduction.
- Available via industry standard Change FSI package for maximum image quality. An invaluable aid to reduce the size of the image whilst maintaining maximum image quality.
- Advanced in-built image processing options.
- Convolution digital filtering fully implemented with over 100 filters covering edge detection, image enhancement and image smoothing. Enables high quality images to be obtained from poor quality scans.
- A unique L.E.D. indicator on the scanner.
- Shows you when the scanner is being moved at close to the maximum scanning speed, not just when it is too late and a scan line has been missed by moving the scanner too fast.
- Fully adjustable scale and size of image preview when scanning
- Hand held scanner image preview window can even be behind other windows and preview is shown in real-time with maximum number of grey-scales available.
- Support for The Serial Port Graphics Enhancer.
- Forthcoming support for the State Machine G8 Graphics Card.
- Allows up to 256 simultaneous grey scales on screen at once.
- True brightness, contrast and gamma correction.
- All can be specified by a value to exactly match monitor/printer. No guessing with shapes of curves and correction is mathematically correct.
- RISC OS 3 features.
- Include rotation and shearing. Scans normally are scanned at a slant rather than being rotated, shearing enables the scan to be corrected better than rotation.
- Fast RISC OS printing.
- Multiple options such as scale to page, centre, sideways selected area, and any scale.
- Scanner scans at an amazing 3ms per line.
- A post card at 400dpi takes only 7.3 seconds to scan, creating over 3Mb of data.
- Selectable scanning modes.
- 256 grey-scale, 256 grey-scale half width, 16 grey-scale and monochrome scanning modes. Half width mode enables longer 256 grey-scale scans to be achieved.
- Save image foreign formats.
- Save as industry standard TIFF for exporting to other systems, AIM for further processing, or RISC OS Sprite format.
- Single width, high quality podule using surface mount technology

The only sensible scanning and image processing solution for the Acorn Archimedes. Just compare the features, there can only be one choice...

Scan256 Scanner, Interface Card, Software and Manual Only £185

Please specify Archimedes type.
Not compatible with A3010, A3020, A4000

Call now for details about our new Scan256 Flatbed Professional Scanner

BBC Education Software

A vous la France	French programs for beginners	£29
Au restaurant/Accident de route	French games for 12 years +	£26
Bolougne and oh les	French program for beginners	£26
Computer control	Program simulating computer control	£26
Computers at work	Primary education program	£17
Espana Viva	Spanish educational programs	£20
Folks Tales	Listening and reading for ages 7+	£22
Geordie Racer	Look and read for ages 7+	£22
Hall of Mirrors	Practice word & number skills	£22
Help your child learn basic mapwork 2		£18
Inside Science	Four common science subjects	£22
Letters and pictures	Educational programs for 6-8 years	£15
Make a wildlife garden	Explore wildlife/weather/garden growth	£22
Maths with a story 1	Primary level maths programs	£20
Maths with a story 2	4 further maths programs	£20
Note invaders	Learn sheet music for 7-Adults	£15
Numbers & Pictures	Early number learning (4-6 years)	£15
Picture craft	Geometrical design & Colouring	£17
Puncman 1 & 2	Learning Punctuation (7-13 years)	£15
Puncman 3 & 4	Learning Punctuation (8-14 years)	£15
Puncman 5, 6 & 7	Learning Punctuation (8-15 years)	£15
Ramayana Tales	Simple Desktop Publisher using pictures & characters from the Ramayana	£22
Skyhunter	Look and read educational adventure	£22
Technology and design	Problem solving programs	£22
Through the dragons eye	Adventure game and Map reading	£22
Fun School 3 (Under 5)	Varied range of Education subjects	£17
Fun School 3 (5-7)	Varied range of Education subjects	£17
Fun School 3 (Over 7)	Varied range of Education subjects	£17

Archi Educational Software

- Animated Alphabet (3-6 yrs) £21
- Arcventure (8-12 yrs) £29
- Bookbinder £43
- Bumper Disc £14
- Bumper Disc 2 £14
- Craftshop 1 £26
- Craftshop 2 £26
- Converta-Key £16
- Data Word £16
- Desktop Stories £35
- DigiSim £35
- Dream Time (5-7 yrs) £23
- Farm (5-7 yrs) £19
- Fleet Street Phantom (9-13 yrs) £25
- Fun School 3 Red (up to 6 years) £17
- Fun School 3 Green (6-8 years) £17
- Fun School 3 Blue (8 years +) £17
- Gate Array Teaching System £68
- Glimpse Clip Art Utility (7-16 yrs) £8
- Highlighter (6-16 yrs) £42
- Jigsaw £28
- Mapventure (9-13 yrs) £24
- Microbugs £24
- Money Matters £16
- Nature Park Adventure (7-9 yrs) £27
- Numerator £60
- Picture Book £16
- Recall (6-13 yrs) £39
- Sellardore Tales £24
- Snippet £26
- Space Mission Mada (9-13 yrs) –
- Sting of the Dump (9-13 yrs) £22
- Target Maths £16
- Viewpoints (9-12 yrs) £33
- Wizard's Revenge (7-10 yrs) £17
- Worst Witch (7-10 yrs) £25

Archimedes Software

GRAPHICS

3D Construction Kit	£39
Arc Light	£46
ARCtist	£19
ARCticulate	£19
Art Works	£139
Atelier	£60
Artisan II	£45
Artisan Gallery	£16
Autosketch II	£65
CADet (CAD)	£140
Clip Art Set 1	£28
Clip Art Set 2	£28
Concept Designer	£23
Craftshop 1 & 2	£28
Euclid 2	£50
Graph Box	£59
Graphbox Professional	£107
HotLink Presenter	£40
Illusionist	£69
Kermit	£46
Mogul	£17
PCAD Educ.	£395
Poster	£79
Pro Artisan	£70
ProCAD	£475
Prime Art	£46
Render Bender 2	£79
Revelation 2	£80
Snippet-New	£32
Titler	£119
Tween	£29

GAMES

Air Supremacy	£17
Apocalypse	£14
Arcade 3 Compilation	£12
Battletank	£10
Black Angel	£27
Boogie Buggy	£14
Break 147 + Supa Pool	£19
Bughunter in Space	£12
Bughunter/Moondash	£10
CADet	£135
Casino	£10
Cataclysm	£19
Caverns	£10
Chess 3D	£16
Chocks Away	£27
Compendium	£32
Chocks Away Extra	£14
Chuck Rock	£18
Conqueror	£15
Corruption	£18
Cyber Chess	£38
Ego Repton 4	£–
Elite	£33
Enter the Realm	£19
E-Type Compendium	£20
E-Type Designer	£13
Family Favourites	£13
Galactic Dan	£19
Gods	£24
Grievous Bodily Arm	£19
Holed Out Designer	£13
Holed Out Golf Comp	£20
Hostages	£14
Inter Dictor 2	£26
Iron Lord	£15
Jahangir Khan Squash	£19
Jigsaw	£27
Lemmings	£20
Oh no more Lemmings	£15
Lost Temple	POA
Lotus Turbo Challenge	£19
Mad Prof Mariarti	£17
Masterbreak	£16
Man at Arms	£14
MahJong Patience	£15
Manchester United II	£19
Mig 29	£24
Nebullus	£21
Nevryon II	£20
Omar Sharif's Bridge	£23
Pandoras Box	£18
Pipe Mania	£17
Play It Again Sam	£–
Populous	£23
Puncman 1 & 2	£16
Puncman 3 & 4	£16
Pysanki	£14
Quazer	£10
Real McCoy 2	£23
Real McCoy 3	£22
Redshift	£14
Return to Doom	£16
Repton 3	£14
Saloon Cars Deluxe	£27
Sim City	£19
Spitfire Fury	£22
Splice	£25
Sporting Triangles	£24
Superior Golf	£14
Superpool + Break 147	£22
Swiv	£19
Talisman	£12
Timewatch	£24
Trivial Pursuit	£22
Twin World	£15
U.I.M.	£23
White Magic 2	£15
Worldscape	£16
XFire	£19
Zelanites	£23

Miscellaneous

Ancestry	£59
Arccomm 2	£38
Arcterm 7	£64
Armadeus Sound	£60
Avante Garde Fonts	£23
BBC DFS Reader	£6
Broadcaster Loader	£65
Chameleon	£34
Chatter	£34
Compression (CC)	£38
Craftshop 1	£27
Craftshop 2	£27
Equasor	£38
FlexiFile	£97
Genesis Plus	£68
Genesis 2	£99
Investigator 2	£22
Magpie 2	£42
Notate	£42
Numerator	£66
Pin Point	£65
Presenter 2	£29
Presenter Story	£145
Prophet Accounts	£132
Prophet Demo Disc	£10
Rainforest	£17
Revelation 2	£95
Rhapsody in Blue 2	£45
Score Draw	£46
Show Page	£127
Speech!	£15
The Victorian	£17
Time Tabler	£549
Toolkit (Clares)	£35
Touchtype	£40
Tracker	£39
Turbo Driver BJ10E	£42
Vox Box	£46
WorldScape	£17

LANGUAGES

Desktop C	£199
Macro Assembler	£40
Robo Logo	£69
BASIC Compiler	£77
Logotron Logo	£45
Risc BASIC	£120
Risc FORTH	£110
Cambridge Pascal	£95

Minerva's Archimedes Software

EasyWord	£18	Time Tabler	£549
Home Accounts	£35	System Delta	£59
System Delta Program Reference Manual			£29

Stand alone Business Accounts Packages
Sales; Purchase; Order Processing and Invoicing; Nominal; Stock management
£79 per module
or Complete Business Package **£325**

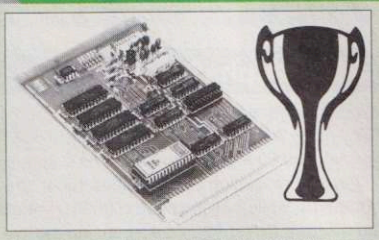
Cortian CKAI Interface

Eliminates the need to have a User port in A3000, A5000 and any other Archimedes without User Port. Fits to the Econet socket. **£29**

Concept Keyboards

- A4 Standard Pack £95
- A4 Primary Pack £100
- A4 Designer Pack £110
- A3 Standard Pack £99
- A3 Primary Pack £105
- A3 Designer Pack £110
- Universal 2010 Keyboard A3 £115
- Universal 2010 Keyboard A4 £110

Archi Real-Time Digitiser



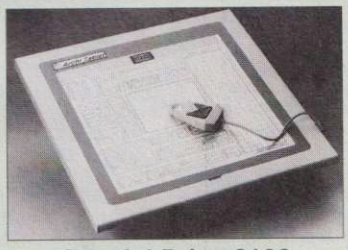
Now supplied with NEW RISC OS Version Software

Watfords' Archimedes Video Digitiser is the most sophisticated digitiser ever designed for a micro. It provides a fast and flexible means of capturing images from a video camera or recorder for display and manipulation on the Archimedes range of Micros. Off-air televison signals may also be digitised via a video recorder or TV tuner. Please write for further details.

Price £99

A Set of Colour Filters for colour image grabbing using a video camera **£16**

Archi Graphic Tablet



Special Price £199
(Price includes Tablet, Leads, Software & Puck)
Stylus Optional Extra **£20**

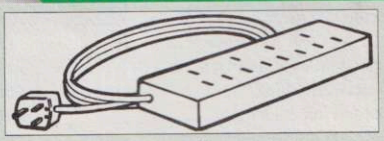
Archi Graphic Tablet Junior. Working area 9" x 6". Price includes Stylus **£105**

Surge Protector Plug

Fitted in place of your normal mains plug, this device protects your equipment (and data from corruption), against mains high voltage translent spikes/surges caused by lightning or thermostats switching.

Protection for only **£8.50**

4 Way Mains Distribution Socket



4 way top quality mains trailing sockets.
Supplied wired up with mains plug ready for use.
Can be screwed to floor or wall if required.
Very useful for tidying up all the mains leads from your peripherals.

£9.50

Aries Spike Cleaner Unit

A 4 way mains distribution unit as above with a built-in Surge Arrester, providing protection for your complete Computer/Hi-Fi System

£16

Microvitec Monitors

- **1431** – Standard Resolution Monitor #£169
- **1451** – Medium Resolution Monitor #£209
- **Cub3000** Medium Res for A3000 #£189
- Dust Cover for Microvitecs £5.50
- **Touchtec 501 Touch Screen** £239
- **Touchtec 3000** £–

Includes 3 years parts & labour warranty

Multiscan Colour

• Eizo F550i	£726	• Taxan 787	£225
• Eizo T560iT	£1319	• Taxan 787LR	£245
• Eizo T660i-T 20"	£1615	• Taxan 795PC	£415
• NEC 3FG	£345	• Taxan 875	£715
• NEC 4FG	£442	• Taxan 875+	£745
• NEC 5FG	£827	• Taxan 970	£1195
• NEC 6FG	£1485	• VIDC Enhancer	£25

Aries AlphaScan Monitor

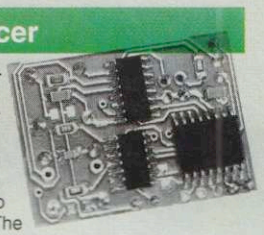
Its multiscan circuitry provides automatic adjustment for frequencies between 30 and 60KHz horizontal, and 50 and 90Hz vertical. Its 0.28mm dot pitch high resolution tube provides super sharp text graphics, while a high speed (70/72Hz) refresh rate provides a flicker-free display easing the eye strain. The VIDC Adaptor supplied with the monitor allows high resolution operation in all screen modes. £325

- Aries Alphascan 17" Plus £545

Philips Monitors

- **BM7502** 12" Hi-res Green Monitor £82
- **CM8833** 14" Med. Res Colour Monitor £185
- Dust Cover for Philips Monitors £6
- Spare Monitor Leads (various) £7

VIDC Enhancer



This unique VIDC add-on board for the Archimedes, caters for all types of Multiscan and VGA monitor and mode requirements. There are 2 versions to suit all requirements. The multimode software supplied, provides all the new modes for the selected monitor type, including the now standard Computer Concepts modes. With VGA monitor, you are no longer restricted to a few modes. A Desk Top application supplied on disc, allows new modes to be designed and existing modes to be modified for particular monitors.

Super VGA VIDC Card: Its unique design allows the horizontal and vertical sync to be buffered and have the polarity changed under software control £45

MultiVideo VIDC Card: As above but for MultiScan monitors only. £25

Integrex Ink Jet Printers

- Colour Jet 132 Printer £425
- Paper Roll £6.50
- BBC Screen Dump Software £10
- Colour Cartridge £21 • Black Cartridge £12.40
- 100 A4 OHP transparencies £55
- 8K Serial Interface Optional £123
- Colour Jet 2000 £529
- Betajet Ink Jet Printer £185
- Betajet Cut Sheet Feeder £43
- Integrex Colourjet Series 2 £335

Printer Leads

- BBC Centronics 4' £5; 6' £6
- Archi Parallel 2m £5; 5m £9 10m £13
- PC Parallel 2m £5; 5m £9; 10m £13
- 25 pin D Male/Male 2m £5; 5m £10
- Centronics Double Ended 4' £5
- Centronics Double Ended 6' £6
- RS232 Leads Various £POA

Star Printers

LC15	£168	LC200 Colour	£143
LC20	£98	SJ48 Inkjet	£160
LC100 Colour	£126	XB24-200 Colour	*£288
LC24-15	£233	XB24-250 Colour	*£350
LC24-20	£148	XB24 Colour kit	£29
LC24-100	£142	ZA200 Colour	*£230
LC24-200	£162	ZA250	*£295
LC24-200 Colour	£203		

- Star/Archimedes Colour Printer Driver £15

* Includes 12 months On-site warranty

Cut Sheet Feeder

LC10/200/24-10	£49	LC15/LC24-15	£119
XB24-10	£80	XB24-15	£139
XB24-200	£99	XB24-250	£149

Serial Interfaces

8K Ser LC-200; LC24-200; FR10; FR15; XB24-10; XB24-15 £52

Buffers

32K Ram Card for LC/XB24-10; 15; LC200 £55
32K Ram Cartridge for LC24 £54

Star Printer Ribbons

LC10; LC10-II; LC15	Black £4;	Colour £6
LC-200; LC24-200	Black £5;	Colour £12
XB24-10; XB24-15	Black £5;	Colour £12

- Dust Covers for Star Printers £6

NEC Pinwriter Printers

• P20#	£169	• P70	£396
• P30	£235	• P90	£589
• P62	£POA		

- P60/70 Colour Option Kit £59
- Ribbons Black for P20; P30 £6
- Ribbons for P60/70/90 Black £8 Colour £13.50

Includes 12 months on-site warranty

Cut Sheet Feeders

P20 £59; P30 £85; P60/62 £89; P70/90 £80

Panasonic Printers

KX-P1123	£126	KX-P2624	*£268
KX-P1170	£98	KX-P2123M	£165
KX-P1624	£250	KX-P2123C	£195
KX-P1654	*£330	KX-P2180M	£127
KX-P1695	£267	KX-P2180C	£145
KX-P2124	£215		

*** Price includes 12 months On-site warranty**

Cut Sheet Feeders

P36 – 1124/24i £69 **P37** – 1123/70/80 £59
P38 – P1624/95; P2624 £126

Buffers

P12 4K Buffer Board for KX-P1081 £55
P14 32K Buffer P1123/24/70/80 P1540/92/95; P1624/54/95 £16

Serial Interfaces

P13 for all above printers £46

Original Panasonic Ribbons

Guaranteed to last 3 million characters

- for P1081, 1180, 1123, 1124, 1170 £6
- for P1624, 1695, 2123/24, 2180, 2624 £8
- Colour Ribbons for KX-P1081, 1592 & 1595 Brown, Blue or Red £9 each
- **P150C** Colour for P2123/2180 £15
- Dust Covers for all 80 column Panasonic Printers £5

Citizen Printers

• 120D+	£98	• Swift 200	£178
• Swift 9	£145	• Swift 240	£200
• Swift 9X	£185	• Swift 240C	£212
• PN-48	£189	• Swift 24X	£299

- AH29804 Manual Cut Sheet Feeder for Swift 9/24/124. Holds 50 Sheets £29
- Cut Sheet Feeder for 80 col. printers £75

+ FREE 2 years Parts and Labour warranty on all Citizen Printers

- Swift 9 Colour Option £19
- Swift 24 Colour Option £29
- Swift 24 Ribbons Black £4 Colour £13
- Swift 24X Ribbons Black £8 Colour £16
- Citizen/Archimedes Colour Printer Driver £15

Laser Printers

All Laser Printers include 12 months On-site maintenance

Brother HL4-VE	4ppm	£549
Brother HL4-PS Postscript	4ppm	£970
Brother HL8-V	8ppm	£894
Brother HL-10V	10ppm	£1045
Brother HL10PS	10ppm	£1329
Brother HL10DV	10ppm	£1149
Brother HL10DPS	10ppm	£1449
Canon LBP4 LITE	4ppm	£479
Canon LBP4+ 1.5M RAM	4ppm	£632
Canon LBP-8III Plus	8ppm	£945
Canon LBP-8 plus IIIR	8ppm	£1435
Epson EPL4300	6ppm	£566
Epson EPL4000	6ppm	£475
Epson EPL5200	6ppm	£599
Epson EPL7500	6ppm	£1139
Epson EPL8100	10ppm	£920
Fujitsu VM800 (Best Buy)	8ppm	£685
HP Laserjet IIP+	4ppm	£530
HP Laserjet IIID	8ppm	£1482
HP Laserjet IIIP	4ppm	£597
HP Laserjet IIISi PS	16ppm	£2419
HP Laserjet IV (600 dpi)	8ppm	£989
HP Laserjet 4M PS	8ppm	£1369
NEC Silentwriter S62P P/script	6ppm	£994
NEC Silentwriter 266	8ppm	£669
NEC Silentwriter 290P P/script	8ppm	£1369
NEC Silentwriter S102	8ppm	£989
OKI OL400	4ppm	£440
Panasonic KX-P4410	5ppm*	£449
Panasonic KX-P4420	8ppm*	£615
Panasonic KX-P4430 Satin Print*	5ppm*	£575
Panasonic KX-P4451	11ppm*	£895
Panasonic KX-P4455 Postscript	11ppm*	£1249
Star LP-8 III 2	8ppm	£1249
Star LP-8 III	8ppm	£890
Star LP-8 Star(post)script	8ppm	£1130
Star LS-5 (RISC Based)	5ppm	£489
Star LS-5 EX	5ppm	£599
Star LS-5 TT True Type + Mac	5ppm	£799

* Now with 2 years On-site warranty

Laser Toners

Canon 2, 3 & 4	£46	Laserjet HP IIP & IIIP	£42
Epson GQ	£13	Laserjet II/D, III/D	£48
EPL4/41/4300	£55	Laserjet 4 & 4M	£75
EPL7100/7500/ 8100	£117	NEC SWriter	£78
		Star LP4/LP8	£42
KX-P4420/50/55	£20	Qume Crystal (3)	£58

Laser RAM Upgrades

IIP; III/P 1Mb	£49	Canon LBP8 2M	£125
IIP; III/P 2Mb	£80	EPL7100 256K	£39
IIP; III/P 4Mb	£132	GQ5000 512K	£42
II & IID 1Mb	£60	KX4420/50i 1M	£75
II & IID 2Mb	£96	KX4420/50i 2M	£115
II & IID 4Mb	£142	KX4420/50i 4M	£195
HP4 2Mb £73; 4M	£115	Star LP8 1M	£139
Canon LBP4 1M	£105	Star LP8 2M	£275

Laser Drum & Developer

- Epson Drum GQ5000 £93 EPL7100 £129
- Panasonic 4420 Drum £60 Developer £80
- Panasonic 4450 Drum £93

Jetpage Postscript Cartridge

- HP IIP/III £225 IID & IIID £227

Various Add-Ons

- HP Adobe costscript + Cartridge £359
- HP Premier Font Collection £28
- Laserjet various Font cartridges from £45
- Canon LBP-4 Lower Cassette Tray £75
- HPIIP/IIP Lower Cassette Tray £96
- Laserjet 4 Powered envelope feeder £199
- LP4 500 Sheet paper cassette 3rd Bin £205

Laser Direct

P.S. We have now discontinued Laser Direct as the Hewlett Packard Laserjet 4 printer offers better facilities at a lower price. See above.

Hewlett-Packard Printers

DeskJet 500	#£255	DJ500 colour	#£325
DJ550 colour	#£415	Paint Jet	+£495
Paint Jet XL	+£1045	PaintJet XL300	+£1529
QuietJet	+£293	PJet XL300 PS	+£2475

+ Includes 12 months on-site warranty
# Includes 3 years extended parts & labour warranty
• For additional £49, we will convert above 3 years warranty, to 3 years on-site maintenance warranty
• Paintjet Cartridges Black **£13;** Colour **£22**

Desk Jet 500 Accessories

- 256K RAM Cartridge £69
- HP Epson FX Emulation Cartridge £45
- DeskJet 500 Cart. Black **£12;** Colour £20
- High Capacity Black Ink Cartridge £17
- DJ500 Colour Archimedes Printer Driver £15
- Dust Cover £6
- DJ500 does not require Archimedes Driver
- 636G 50 x Transparencies A4 £32
- 636J 50 x Glossy Paper A4 (also XL) £25
- 630Z 50 x Cut Sheet Paper A4 £12
- 630P Paintjet 200 Z-Fold paper 8.5 x 11 £15
- 630Q Paintjet/XL 50 Transparencies 8.5 x 11 £32
- 630S Paintjet/XL 50 Transparencies A4 £32
- 630Y Paintjet/XL 200 Cut Sheets 8.5 x 11 £14
- 631Y Paintjet/XL 200 Cut Sheets A4 £POA

Plug In Font Cartridges for DJ 500

- 22706B – Prestige, Elite, Line Draw fonts £55
- 22706C Letter Gothic & HP Line Draw fonts £56
- 22707P – Proprint Emulation Cartridge £57
- Desk Jet Unlimited (Book No VAT) £19.75

Canon Bubblejet Printers

	Printer	CSF	2nd Bin	Ink Cart
BJ10EX	£160	£43	–	£16
BJ200	£275	–	–	£16
BJ300*	£335	£88	£65	£12
BJ330*	£373	£110	£79	£12
BJC800C	£1355	–	–	£16

* Includes 12 months On-site warranty

- Spare Battery pack for BJ10E £33
- BJ10EX – Archi Turbo Driver £42

Special Offer:
Canon BJ10EX Printer + CC's Turbo Driver £199

Epson Printers

FX870	£253	LQ1170	£432
FX1070	£327	LQ2550+	£673
FX1170	£327	LX100	£117
LQ100	£146	LX400	£93
LQ570	£197	LX850+	£134
LQ870	£357	LX1050	£203
LQ1060 Colour	£547	SQ870	£409
LQ1070	£308	SQ1170	£560

• Original Ribbon for LQ100 £6

Cut Sheet Feeders for

LQ570, LQ870			£47
LX400/850/LQ200/400/450/500/550 LQ1010/1070/1170			£72
LX1050	**£115**	FX850/LQ860	£128
FX1050/LQ1060/SQ850			£155
LQ2550	**£299**	SQ2550	£210

Tractor Feed for
LQ100 **£29;** LQ800 **£44;** LQ850/FX850 £69; LQ1050/FX1050 **£85;** LQ2500 **£90;** LQ2550 **£90.**

Accessories

- EX800/1000 Colour Option £45
- EX800/1000 Colour Ribbon £14
- LQ2500 Colour Option £65
- Multifont Card for LQ550/850/1050 £95

Epson Printer Interfaces

RS232 **£28** RS232 + 2K Buffer £52

Roland Plotters

- DXY1100 **£469** • DXY1200 **£607**
- DXY1300 **£823** • DXY2500 **£2345**
- Sketchmate A3 **£499** • Sketchmate A4 **£308**
- Roland plotter Pens, Fibre tip **£7.50**

Fujitsu Printers

Special Introductory Offer

- B-100 InkJet – HP Deskjet compatible 300dpi, whisper-quiet & 6 resident fonts #£159
- B-200 InkJet – HP Desk Jet compatible 300dpi. Built in Cut Sheet Feeder. Optional 2nd Bin/Tractor available #£249
- DL-1150 Dot Matrix – 24 pin, 110 column Colour optional £199
- DL-1150C Dot Matrix – 24 pin, 110 column With colour option £235

FREE 1 Year On-site maintenance.

- B-100 Cut Sheet Feeder £59
- B-200 2nd Bin Sheet Feeder £89
- B-200 Tractor Unit £59
- B-100/200 Ink Cartridges £14
- DL-1100 Colour Upgrade £39
- DL-1100 Black Ribbon £5
- DL-1100 Colour Ribbon £11
- VM 800 Toner Cartridge (8000 pgs) £99
- DL1200 **£309** • DL3600 **£439**
- DL4600C **£799** • DL5600C **£1049**
- DL5800 **£1048**

Full range of Fujitsu Printers available at very competitive prices. Please telephone for details

Listing Paper (Perforated)

- 1,000 Sheets 9.5" x 11" Fanfold Paper £7
- 2,000 Sheets 9.5" x 11" Fanfold Paper £11
- 1,000 Sheets 9.5" x 11" NCR 2 Part Fanfold £21
- 1,000 Sheets 15" x 11" Fanfold Paper £9
- 2,000 Sheets 15" x 11" Fanfold Paper £16
- 1,000 Sheets true A4 Fanfold Paper 70gms £11
- 2,000 Sheets true A4 Fanfold Paper 70gms £21

(All our Fanfold paper is Micro perforated leaving a smooth clean edge when the tractor feed strips are detached).
Carriage 1K Sheets £2.50, 2K Sheets £3.00

Printer Labels

(On continuous fanfold backing sheet)

1,000 off, 90 x 36mm (Single Row)	£6.00
1,000 off, 90 x 36mm (Twin Row)	£6.25
1,000 off, 90 x 49mm (Twin Row)	£7.50
1,000 off, 102 x 36mm (Twin Row)	£6.75

Laser Printer Labels on A4 Sheets

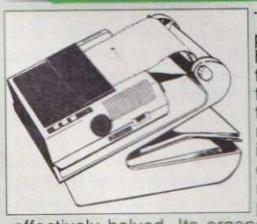
3750 off, 70 x 29mm (3 Rows x 10)	£15.50
2400 off, 70 x 37mm (3 Rows x 8)	£15.25

Printer Ribbons & Various Dust Covers

Type	Ribbons	Dust Covers
BBC B/BBC Master	–	£4.00
Archimedes Micro pair	–	£9.00
Citizen 120D	£3.25	£5.00
DMP2000/4000	£3.75	£4.95
EX800/1000	£3.50	£5.00
RX/FX80/85/800/MX80	£2.95	–
FX/MX/RX100/1000	£3.95	–
Kaga/Taxan KP810/815	£3.25	£5.00
LQ400/500/550/800/850	£3.25	£6.00
LQ1050/LQ2500	£12.00	–
LX400/800/850	£3.50	£5.00
M1009/GLP	£2.95	£3.75
NEC P2200	£4.50	£5.00

Dust covers for most 80 column printers available at £5 each

Professional Printer Stand



The professional printer stand takes hardly more space than your printer. Due to the positioning of the paper feed and re-fold compartments ie. one above the other, the desk space required for your printer functions is effectively halved. Its ergonomic design ensures smooth paper flow and automatic refolding.

80 Column version £24 (carr. £3)
132 Column version £29(carr. £4)

Universal Printer Sharers/Changer

Connect up to 5 Micros to 1 printer or 5 printers to 1 Micro with our combined, Sharer/Changer switch boxes.

Standard Low Cost Type

Connects	Serial	Parallel
• 2 to 1	£10	£10
• 3 to 1	£14	£15
• 4 to 1	£19	£20

Professional Type

Connects	Serial	Parallel
• 2 to 1	£15	£16
• 3 to 1	£20	£23
• 4 to 1	£30	£34

Cables extra at £5 each

Cross Over Manual Switch

2 In/2 Out Parallel	£29
2 In/2 Out Serial	£28
3 In/2 Out Serial	£36

Auto Printer Sharer

Connects	Serial	Parallel
2 to 1	£34	£36
4 to 1	£52	£53
8 to 1	–	£85

256k Multi Spooler

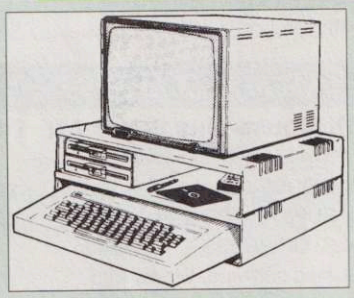
These Auto Parallel Printer Sharers have built-in 256K of Printer Buffers. They can be used as Auto Sharers, Printer Buffers or both.

- 2 In/2 out **£125** • 4 In/2 out **£139**
- 8 In/1 out **£185**

Compact Converter Units

Serial to Parallel **£32** Parallel to Serial **£32**

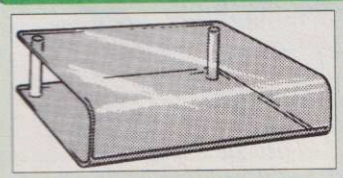
Plinths for the BBC B, BBC Master & A3000



- Single BBC Plinth 420 x 310 x 105mm £13
- Double BBC Plinth 420 x 310 x 210mm £24
- Single Master Plinth 490 x 310 x 105mm £14
- Double Master Plinth 490 x 310 x 210mm £26
- A3000 Single Plinth (very sturdy & precision made), has a slot on the left for the switch & cut out on the right for 3.5" Disc Drive £15

CREDIT CARD 24 HOUR
Ansaphone Hot Lines
(0923) 250234 or 233383

Perspex Printer Stand



Give your Computer System a touch of Class with our elegant, smoke finished Perspex Printer stand.

80 Column version **£16** (carr £3)
136 Column version **£20** (carr £4)

Continued→ → → → → → → → →

QUEST MOUSE Mk III

- Quest Mouse III & Quest Paint £49
- Quest Mouse III, Quest Paint, AMX Stop Press & Pagefont £69
- Quest Mouse III only £25
- Quest Paint Software only £28
- Quest Font Disc (22 Text Fonts) £15
- Quest Mouse Mat (Red or Blue or Green please specify) £3
- Conquest (Quest Paint Extension) ROM £24
- Quest Colour Dump Disc – This new software allows you to print direct from Quest Paint to your Integrex Colour Printer £18

(P.S. Quest Paint is not compatible with BBC Compact)

Quest Paint is the winner of the BBC Acorn User 1990 Award for the Best Art/Graphics software

Mouse Cleaning Kit

To obtain trouble free operation and prolong the life of your mouse, the high tech rodent requires regular cleaning. Our deluxe mouse cleaning kit is ideal for the purpose £3

Archi Mouse Port Splitter

Our handy little splitter unit eliminates the risk of damaging your micro due to constant plugging and unplugging of the mouse by allowing you to connect both, a joystick and a mouse simultaneously to your Archimedes. £15

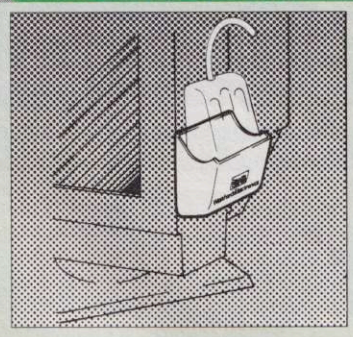
Mk III AMX MOUSE

- **AMX Mouse plus Super Art £49**

(Please specify for BBC, Master or Compact)

- AMX MOUSE ONLY £25
- AMX SUPERART Package £26
- AMX STOP PRESS – A Desktop publishing software. Works with Keyboard, Joystick or a mouse £25
- PAGE-FONTS – Over 20 Fonts for use with AMX Pagemaker £13
- AMX DESIGN (ROM) £29
- AMX EXTRA EXTRA £16
- MOUSE MAT £3

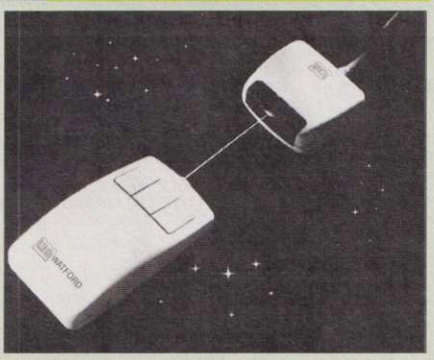
WE Mouse House



Treat your mouse to a cosy Mouse House. This handy little gadget solves the problem of where to store your mouse when it is having a rest. Made of sturdy plastic, the WE Mouse House attaches to the side of your computer, monitor, disc drive etc.

Only £3

Archi Cordless Mouse



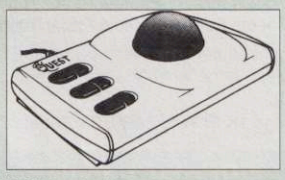
Features

- Infra Red Signal Transmission
- High Resolution 200 DPI
- High Tracking Speed of 600mm/s up
- Anti-static Silicon Rubber Coated Ball
- Low Friction Teflon Footpads
- Power - by two AAA size batteries (not included)
- Automatic Standby Mode after 5 seconds inactive
- Auto Power Shut-Down after 20 seconds inactive

Price £32

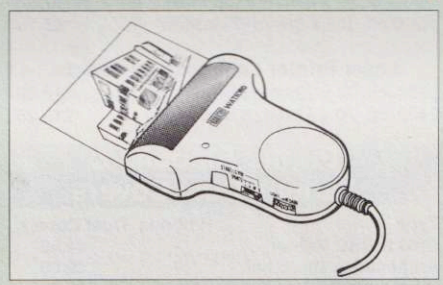
Quest – Tracer ball

An attractively finished, extremely reliable, mouse replacement, input device. Requires very little desk space. Connects directly to your BBC B, BBC Master or Archimedes Micro.



QT-10 BBC/Master Version £25
QT-20 Archimedes Version £26

Beeb Hand Scanner



Watford Beeb HandScan is a compact unit which will allow photographs, diagrams, or any other documents to be digitised quickly and easily, to then be used in a desk top publishing package, art program, or even in your own Basic programs!

Beeb HandScan & Firmware **£99**

Archi Mk II Hand Scanner

Watford's Mk II hand scanner has a maximum resolution of 400 dpi. The scanning width is 4". The sophisticated software is supplied in a 64K ROM, located on a standard single width expansion podule. As you scan a page, the image appears in the scanning window on the screen, scrolling up in real time. Other facilities include Cropping and scaling to any size including stretching and squashing in X and Y directions separately. Colour tinting. X and Y flip. Edge detection which turns solid objects into outlines.
Images can be printed on any printer supported by RISC OS.
On-screen help is provided via the RiscOS interactive help facility. (Please write in for full technical details).

AHS-4 Archi 300/400 Version £109
AHS-3 Archi A3000 Version £119

Winner of the BBC Acorn User 1990 Award for the Best DTP/Word Processor

The Wapping Editor

The Wapping Editor from Watford Electronics represents a breakthrough in Desktop Publishing for the Beeb. The package includes a 64K ROM containing ALL the software needed to get into print fast; a very sophisticated graphics module, professional quality typesetting software, a word processor, a comprehensive font editor for designing your own typefaces, and a variety of printer dumps. This mouse-driven system is designed for the BBC B, the B+ and Master computers and will take full advantage of any Sideways and Shadow RAM that may be fitted. It will run under DFS, ADFS and Network filing systems and requires as a minimum just a single 40 track drive.

Wapping Editor Software Pack £49
Wapping Editor plus Mouse £69

(Wapping Editor only works with Master Compact if a Mertec Expansion box is fitted)

Wapping Art Disc

Over 250K of clip art to cut and paste into your Wapping Editor pages. Pictures include maps, transport, people, media, sport, games etc.
Two 'ratio' screens for use with hi-res and rotated A5 pages to ensure images are not distorted when printed out. £15

Wapping Font Disc 1

Sixteen additional fonts, including smaller version of Oberon and Daisy and two new sizes of the standard font for the Wapping editor.
Also included are two Mode 0 screens containing giant 'headline' fonts to cut and paste to create extra smooth headlines.
Supplied complete with instructions. £12

Wapping Font Disc 2

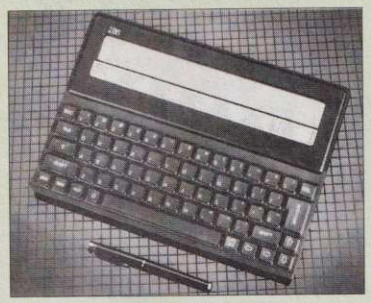
This new addition to our Wapping range of DTP software provides you with additional 23 fonts for the Wapping Editor DTP pack. (80 track discs only). £13

Archi A4 Scanner

The 216mm scanning width can cope with both desktop scanning of single sheets, photographs, diagrams, etc., with its fast ten page automatic document feeder, but it can also detach from the feeder to become a convenient hand-held full page scanner for larger documents or pictures.
Scanned image control can be freely adjusted in increments of 10 dots per inch from 100 up to 400 dpi resolution with 64 levels of grey scaling. A built in shading controller and manual brightness control achieve optimum image clarity.
Unlike some scanners, which use a red light source, the Watford scanner uses a yellow/green source which vastly improves the light/dark contrast, thus eliminating the effect where any red-based colours are faded down to white and so do not show up in the scanned image.

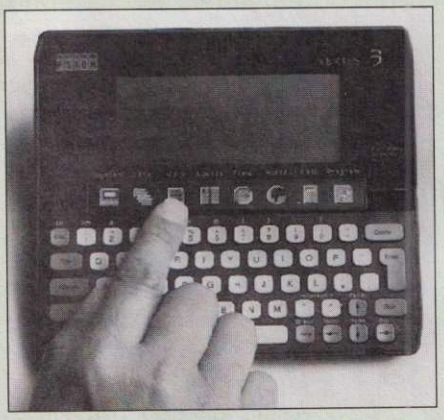
Archi A4 Scanner £269
Sheet Feeder for above £75
Scanner + Sheet Feeder £359

Z88 Portable Micro



- Z88 Portable Micro £169
- 32K RAM Pack or 32K EPROM Pack £16
- 128K RAM Pack or 128K EPROM Pack £32
- 512K RAM Pack £86
- 256K Eprom Pack £55
- Z88 Eprom Eraser Unit £38
- Z88 Carrying Case £8
- AA Nicad Rechargeable Battery £1.50
- Battery Charger Compact & Fast £6
- Z88 Serial Printer Cable £8
- Z88 Parallel Printer Cable £18
- Z88 to Archi Link £15
- Z88 to BBC Link £8 • Z BASE £56
- Z88 to PC Link II £27 • Z88 to Macintosh £32
- Z88 Mains Adaptor £9 • Z88 Modem £114

Psion Series III



Psion, pioneer of the handheld computer, have once again redefined the state-of-the-art with the Series III. Although only pocket sized, this powerful programmable computer has many features found in desk top machines, plus powerful built-in software. They include a full specification wordprocessor and an outliner that is compatible with Microsoft Word, an extensive database, intelligent time and personal management and a powerful multifunction calculator. And with an interchangeable memory of up to 4Mb, you'll never be short of data storage space.

Psion Series III Computer
- Series 3 128K £139 • Series 3 256K £179

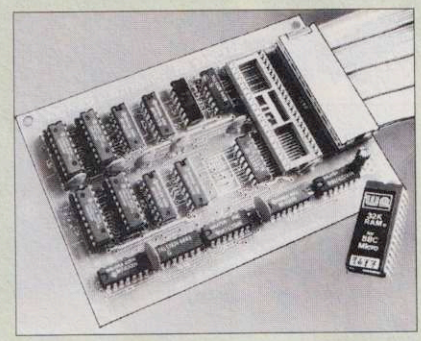
RAM Solid State Discs (SSD)
- 128K £68 • 512K £170 • 1Mb £255

Flash Solid State Disc (SSD)
- 128K £34 • 256K £59 • 512K £102
- 1Mb £170 • 2Mb £255

Communications
- Parallel Interface Link £25
- RS 232 Serial Link for PC £58; Mac £59

Various
- Mains Adaptor 9V AC £12
- Spreadsheet £59
- Professional Finance £42
- Spelling Checker/Thesaurus £42

32K Shadow RAM/Printer Buffer Card Expansion Board



A MUST FOR WORD PROCESSING

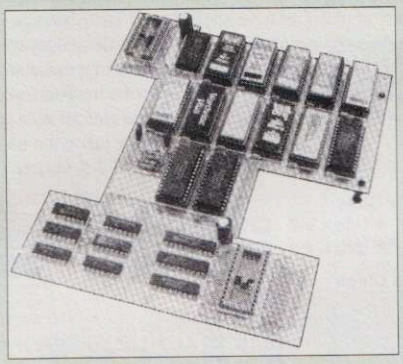
Simply plug the ribbon cable plug into the 6502 socket and gain a massive 32K of extra RAM.

- "VIEW" Wordprocessor users can now type in letters in 80 columns and have up to 28K bytes free – 5 times as much as normal.

- In WORDWISE (or WORDWISE-PLUS), preview in 80 columns with the full 24k of text in memory. This product is recommended as an ideal complement by Computer Concepts.

Only £49

Solderless Sideways ROM Socket Board



- Increases your BBC Micro's ROM capacity from 4 to 16.
- **No soldering required.**
- Socket 14 takes two 6264 RAM chips.
- Read protect to make RAM "Vanish" allows recovery from ROM crashes.
- Battery backup option for RAM chips.
- Supplied ready to fit with comprehensive instructions.

Price: Only £32

Battery Backup fitted **£35**

Battery Backup only **£3**

16K Sideways RAM **£8**

- Sideways RAM Utilities Disc for Solderless ROM Board. Includes the options to load and save ROM Images and the facility to use Sideways RAM as Printer Buffer.

Only: £8

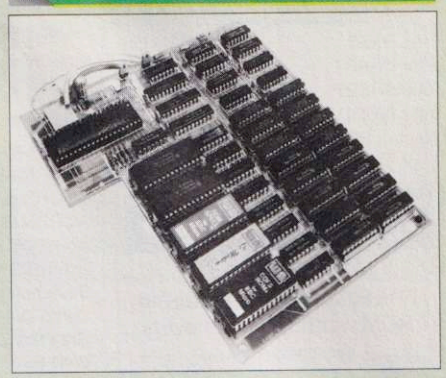
Watford DATA DUCK

Convert two single Disc Drives into one Dual Drive with this simple external unit (Suitable for Disc Drives with PSU. For Disc Drives without PSU, you will also require Watford Power Duck, see below).

£14

Watford POWER DUCK £8

ROM/RAM Card



- No Soldering required to fit the board.
- Compatible with BBC B
- Total number of ROMs increased from 4 to 8.
- Up to 8 banks of sideways RAM (dynamic).

PRICES:
- ROM/RAM card with 32k DRAM £39
- ROM/RAM card with 64k DRAM £52
- ROM/RAM card with 128k DRAM £83

OPTIONAL EXTRAS:
- 16k plug-in Static RAM kit £8
- 16k DRAM for Upgrade £13
- Battery backup £3
- Read and Write protect switches £2 each
- Complete ROM-RAM card with all options fitted £99

ROM Cartridges for the BBC Master

Will accept the larger Piggy Back ROMs like Interword, Quest, etc.

- Twin **£8;** • Quad **£13**

Disc Drive Power Leads

Supply from BBC power supply to standard Disc Drive Connection: Single **£3.00;** Dual **£3.75**

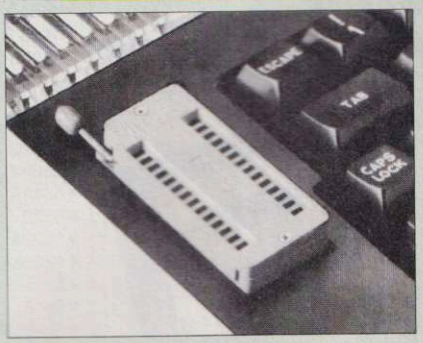
Disc Drive Interface Leads

BBC to Disc Drives Ribbon Cable
Single **£4** Twin **£6**

Miscellaneous Connectors

	Plugs	Sockets
RGB (6 PIN DIN)	50p	75p
RS423 (5 pin Domino)	70p	80p
Cassette (7 pin DIN)	40p	95p
ECONET (5 pin DIN)	35p	50p
Paddles (15 pin 'D')	150p	250p
Disc Drive Plug 4 way	100p	–
6 way Power Connector	120p	150p

Sideways ROM ZIF Socket System



Allows you to change your ROMs quickly and efficiently, without having to open the lid. The ZIF socket is located into the ROM Cartridge's position. It is very simple to install. No soldering required. Also included in the price is a plastic see through storage case with antistatic lining, which allows you to store 12 ROMs.

£18

Computer Concept's ROMS

Inter BASE	£49
Inter CHART	£25
Inter SHEET	£37
Inter WORD	£36
Mega-3 ROM	£76
Spell Master	£42

Wordwise plus

£38

FREE, the superb Word-Aid ROM worth £24, with every Wordwise Plus.

Word-Aid

This advance utilities ROM extends the power of your Wordwise plus ROM.

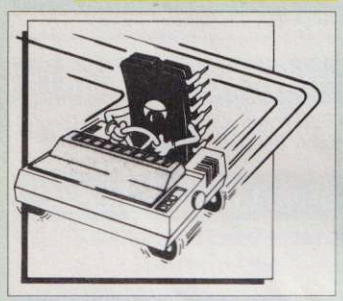
Only **£24**

(N.B. Word Aid requires a Disc interface in your Micro)

Acorn ROMS

View 3.0 ROM	£45
Viewsheet (Acornsoft)	£36
Viewstore	£36
Viewspell – 80T disc	£25
View-Index	£12

View Printer Driver ROM



View is a powerful word processor, but it seriously lacks in terms of printer driver support. With the View Printer Driver ROM, the View users will find themselves in the realms of advanced word processing.

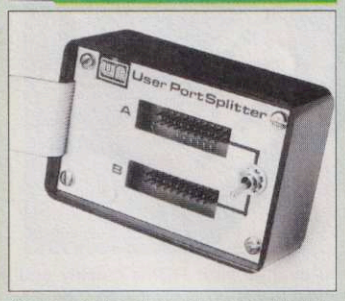
Price: Only £29

Mini Office 2 – Disc

for BBC B & B+ **£12**

(When ordering please specify for which Micro & 40 or 80T Disc)

User Port Splitter Unit



Gone are the days when you had to plug and unplug devices from the User Port. This extremely useful little device allows you to connect two devices simultaneously to the BBC's user port.

Excellent Value at **£22**

Assorted ROMS

ACORN ADFS	£25
ACORN BASIC 2 plus User Guide	£22
ACORN DNFS	£17
Acorn OS B+	£25
Acorn OS 1.2	£14
Beebmon	£22
Dump Out 3	£25
Graphics Extension Rom GXR-B	£21
GXR-B+	£22
Logotron LOGO	£43
MASTER OS ROM	£38
Master ULA (47)	£15
Master ULA (60)	£10
Numerator – Archi	£69
Numerator – BBC	£39
Pendown ROM	£32
Rom Manager	£20
SERIAL ULA	£13
TED	£35
Video ULA	£14
1Mb OS ROM	£39

Watford Electronics' New High Tech Computer Boutique is now open in Luton. Don't miss your chance to visit the Acorn Village.

CHIP SHOP

1 MB-10 DIL D-RAM	£4.50
1 MB ZIF D-RAM	£4.00
256K x 4-8 DIP	£4.75
256K x 4-8 ZIF	£4.00

Memory SIMs

• 256K x 9-7	£9	• 1Mb x 9-7	£29
• 256K x 9-8	£9	• 1Mb x 9-8	£33

Various Chips

DS3691	£4.50
DS88LS120	£5.25
LM324	£0.45
SN76489	£5.50
SAA5050	£8.75
UPD7002	£6.00
2764-250nS	£3.00
27128A-250n (12V5)	£2.50
27128-250nS (21V)	£4.00
27256-2	£3.00
27512-2	£4.50
27C101G (1 Meg)	£7.00

• 4013	75p	• 68B50	£2.95
• 4020	£1.00	• 7438	50p
• 4164-10	£1.55	• 74LS00	50p
• 4464-10	£3.50	• 74LS04	50p
• 4816 RAM	£2.00	• 74LS10	50p
• 41256-8	£2.00	• 74LS123	£1.00
• 41256-10	£1.50	• 74LS163	£1.00
• 6264LP-8K	£4.00	• 74LS244	£1.00
• 6502A	£5.00	• 74LS245	£1.00
• 65C02 3M	£9.75	• 74ALS245	£2.75
• 65C12	£9.00	• 74LS373	£1.00
• 6512A	£10.00	• 74LS393	£1.00
• 6522	£4.00	• 75453	£1.00
• 6522A	£5.00	• 75159	£3.00
• 62256ALS	£10	• 8271	£32
• 62256P-12	£8.50	• 9637	£2.00
• 6818	£4.00	• ICL7673PA	£3.00
• 6845SP	£6.00		

Acorn Speech Synthesizer package complete, for the BBC B Microcomputer

Special Offer £14

Commander Joystick

Features:

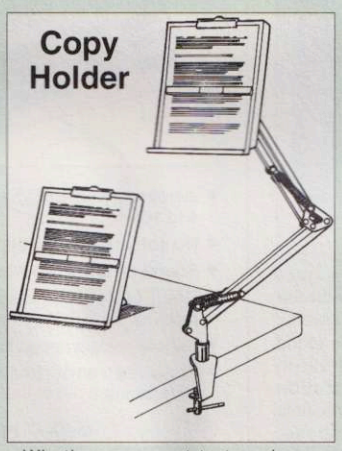
- Direct connection to BBC Analogue input port – interface needed.
- Fully compatible with all BBC Joystick controlled games programmes.
- Switchable springs allow selection of floating or centring operation.
- Trim adjusters for both X and Y axes for fine centre adjustment.
- Convenient stick mounted fire button with additional base buttons.

Price: £15

Voltmace Joysticks

Delta 3B Single Joystick	£10
Delta 3B Twin Joysticks	£15
Delta 14B Single Joystick	£11
Delta-Cat A mouse eliminator Joystick for the Archimedes	£24
Analogue aircraft style yoke Joystick to run in the analogue port of the BBC B & Master 128	£25

Copy Holder



Whether you want to type in your latest program or the draft of a new trilogy, Watford's manuscript holders are superb for holding your paper at the ideal height and angle to allow you to read and type in ease and comfort.

Available in 2 full A4 versions, desk resting and shelf clamping. Paper is held firmly be means of a plastic retaining ruler and a clip grip.

Desk Top **£8**
Angle poise **£12**

NEW Copy holders as above but with a battery operated, remote controlled cursor/ruler. (By hand or foot pedal.) (Batteries 2 x AA not included.)

Desk Top **£15**
Angle poise **£20**

Adder EPROM Programmer

Adder EPROM Programs 2764 and 27128 EPROMs for the BBC and BBC Master. Connects to the User port.

Offer Price: **£39**

TEX EPROM ERASERS

Over erasure of EPROMs very rapidly turns them into ROMs!
The TEX erasers operate following the manufacturers specifications to give the maximum possible working life by not erasing too fast.

- **ERASER GT** – Deluxe version erases up to 18 chips. Has automatic safety cut-off to switch off the UV lamp when opened. **£36**
- Spare UV tubes. **£12**

ROM Extraction Tool

This extremely useful tool allows you trouble free chip insertion and removal from your computer by distributing the removal force over the whole body of any 24 or 28 pin chip.

- Plastic Chip Extractor **£2**
- Metal Chip Extractor **£3**

Servisol Foam Cleaner

This king size multipurpose foam cleaner spray is ideal for cleaning Keyboard, Monitor, Disc Drive & Computer furniture surfaces.

£2.50

Antistatic Aerosol Spray

Ideal for cleaning and preventing static build-up on TV/Monitor Screens.

£2.50

Aerosol Dust Spray

Ideal for removing dust & dirt from Keyboard & similar inaccessible spaces. **£3**

OFFICE MASTER

• CASHBOOK • FINAL ACCOUNTS • MAILIST • EASILEDGER – • INVOICES & STATEMENT

All this for only **£21** (Disc)

OFFICE MATE

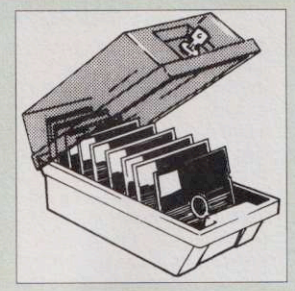
• DATABASE • SPREADSHEET • BEEBPLOT

Only £10 (Disc)

Spares for BBC Micro

UHF Modulator	£4
Speaker £3; Speaker Grill	£1
Keyswitches	£1
16MHz Crystal	£2
17.734 MHz Crystal	£2
32.768MHz Crystal	£2
Replacement 17 way Flexible Keyboard Connector	£4
BBC Master Power Supply	£59
BBC Master Keyboard	£62
BBC Master Casing	£49
Refurbished BBC B Spares	
BBC B Casing	£19
Clear Perspex Keystrip Holder	£3
BBC B Keyboard	£35
BBC B Power Supply	£42

Antistatic Lockable Disc Storage Units



- **M35** – holds up to 50 5.25" discs **£4.95**
- **M85** – holds up to 95 5.25" discs **£6.95**
- **M25*** – holds up to 25 3.5" discs **£4.95**
- **M50** – holds 50 3.5" discs **£6.50**
- **M100** – holds 100 3.5" discs **£6.99**
- **M10** – holds 8 of No. 10 Data Cartridges **£15**

* Not lockable

Disc Plonker Rack

When using ones micro, there is a tendency to have more than one Disc on the desk. This exposes them to the hazards of fingerprints, scratches, dust, coffee and an untidy desk. Why not protect your valuable data from all these hazards with the help of our extremely handy and low cost DISC PLONKER RACK. Holds up to eight 5.25" discs.

Protection at Only: **£2**

3M – Diskettes

Lifetime warranty on 3M Discs

- *10 x 5.25" S/S D/D 40T (744)* **£5**
- *10 x 5.25" D/S D/D 40T (745)* **£5**
- *10 x 5.25" S/S D/D 80 Track (746)* **£6**
- *10 x 5.25" D/S D/D 80 Track (747)* **£7**
- *10 x 5.25" 1.6M D/S D/D High Density for IBM XT and AT* **£8**
- *10 x 3.5" S/S D/D 40/80 Track* **£6**
- *10 x 3.5" D/S D/D 40/80 Track* **£6**
- *10 x 3.5" Double Sided High Density* **£10**

Top Quality Diskettes

Watford's life time guaranteed disc are supplied complete with self stick labels & plastic library case.

- *10 x **M3** 3.5" D/S D/D 80 Track* **£6**
- *10 x **M9** 3.5" D/S High Density* **£10**
- *10 x **M4** 5.25" S/S D/D 40 Track* **£5**
- *10 x **M5** 5.25" D/S D/D 40 Track* **£5**
- *10 x **M7** 5.25" D/S D/D 80 Track* **£6**
- *10 x **M8** 5.25" D/S H/D Hi-Density* **£9**
- ***M2** 3" Double Sided* **£2.50** *each*

Special Bulk Offer Discs

(Lifetime warranty on Discs)

BULK PACK DISCS in lots of 100

Type	S/S 40T	D/S 40T	D/S 80T
• Without Sleeves 5.25"	£25	£30	£35
• With Sleeves 5.25"	£28	£33	£38
• 3.5" D/S D/D	£21 for 50	£39 for 100	
• 3.5" D/S H/D	£40 for 50	£75 for 100	

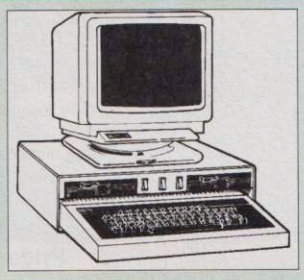
3.5" Disc Drive

These top quality 3.5" Double sided, 80 track, are attractively finished in BBC beige. They are supplied complete with all cables and a Utilities Disc.

Type	Description	
	Disc Drive without PSU	
• **CLS35:**	Single Disc Drive, 400K	**£59**
• **CLD35:**	Twin Disc Drives, 800K	**£109**
	Disc Drive with PSU	
• **CS35:**	Single Disc Drive, 400K	**£82**
• **CD35:**	Twin Disc Drives, 800K	**£126**

(P.S. CS35 is supplied in a twin case with a blanking plate to enable easy expansion to a dual drive at a later stage)

Disc Drives in Monitor Stand



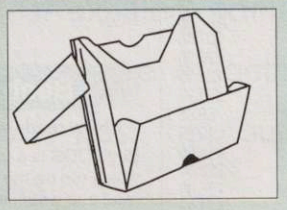
• **CDPM 800S** – Twin 5.25", 800K Double sided 40-80 track switchable disc drives mounted in an attractively finished Beige colour plinth for the BBC B & Master 128K micros. Supplied complete with integral power supply, cables and Utilities disc. The mains switch with neon On/Off light indicator, and the two 40/80 track switches are mounted on the front panel for ease of use.

£165

• **DP35 800** – Same as above except, one disc drive is a 5.25" and the other is 3.5".

£154

Plastic Library Cases



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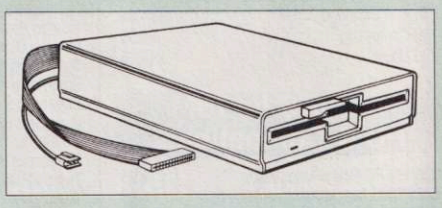

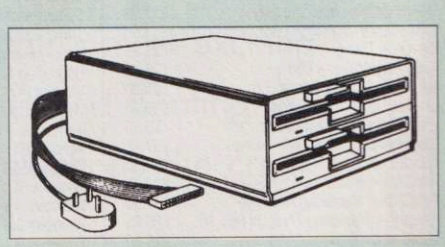

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Finishing the third dimension

LAST month we went through the stages in drawing a widget as a 3-D isometric drawing. The basic shape was quite simple and we'll finish with the steps to create a more complicated design.

To add a hole to our widget, as in Figure I, draw a circle in 2-D on a grid. I wanted a 1cm circle so that it would fit nicely into the widget. This is done best by turning on the grid and choosing a grid cross to be the centre of the circle and then going a certain number of crosses or half crosses across and the same number of crosses or half crosses down.

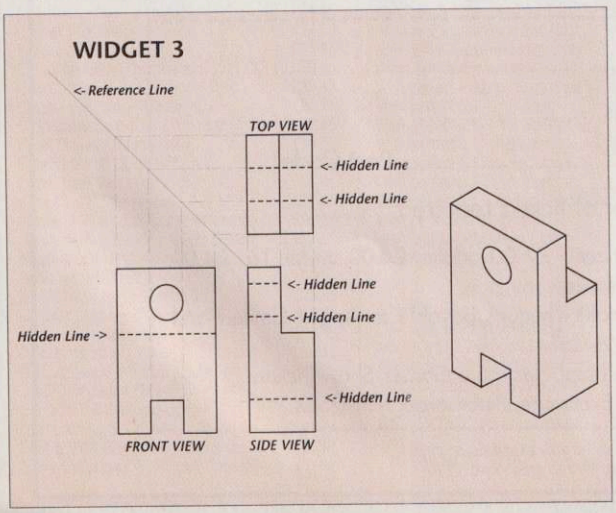
This will produce a circle with a diameter of twice the number of crosses or half crosses. I used half across in my example to produce a circle one cross in diameter.

Next, we have to squeeze the circle. First select it and using the transform X-axis option and entering 0.71 in the box. This will change the X-Y ratio to 71 per cent of the original width without affecting the height. We also want to increase the height and we do this by using the transform Y-axis option using a number of 1.23 to stretch the height to 123 per cent of its previous size.

On your screen, you should have something resembling a thin vertical oval. To keep the aspect and orientation of the hole, when we rotate it, these squeeze and stretch techniques are an easy way to reproduce the desired effect and are also graphically correct.

Now, we need to rotate the egg to the angle we need for our drawing. This is very similar to the rotating of the horizontal lines we did earlier, however, because the plane of our hole is in the opposite direction to the depth (or axis), we need to reverse the rotation value. In other words, if the hole is in the front view, it must be rotated by 30 degrees, though the lines in front view are rotated by 330 degrees.

Likewise, if the hole is to be in the side view, it will be rotated by 330 degrees though the side view horizontal lines are rotated by 30 degrees. I will leave you to work on the fourth widget as in Figure II, which is produced in a similar way to the other widgets and expands your understanding of the circles. I have shaded my version of the widget to show what can be done.



● *Figure 1: The widget with the hole, a bit complex*

3-D tubing

Let's take a look at Figure III – we want to convert this orthographic drawing into a isometric one. From the drawings it appears to be a piece of tubing. So let's set about converting it to an isometric design.

We really only need two views of the tube, a front and a side, as the top would provide no further information to help in drawing the 3-D isometric. Set the grid to rectangular and turn the grid lock on to help draw straight lines. Draw the two concentric circles using the circle tool in Draw.

Drawing the circles is a matter of repeating the process of making one circle with a different width and height, but using the same cross as the centre starting point. I chose one cross to produce a circle of two crosses, or 2cm for the inner of my tube and 1.5 crosses to produce my outer circle of 3cm. Select both of these circles and group them.

Produce the single line drawing of the side view by drawing a line from the topmost and bottommost parts of the circles. Draw these lines to the right of the circle and have them extend about 7-8 units across the page horizontally.

To complete the side view you need to draw the vertical ends of the tube, and then tidy up the horizontal lines to match the new end lines you have just drawn. Group all the elements of the side view and proceed with the next step.

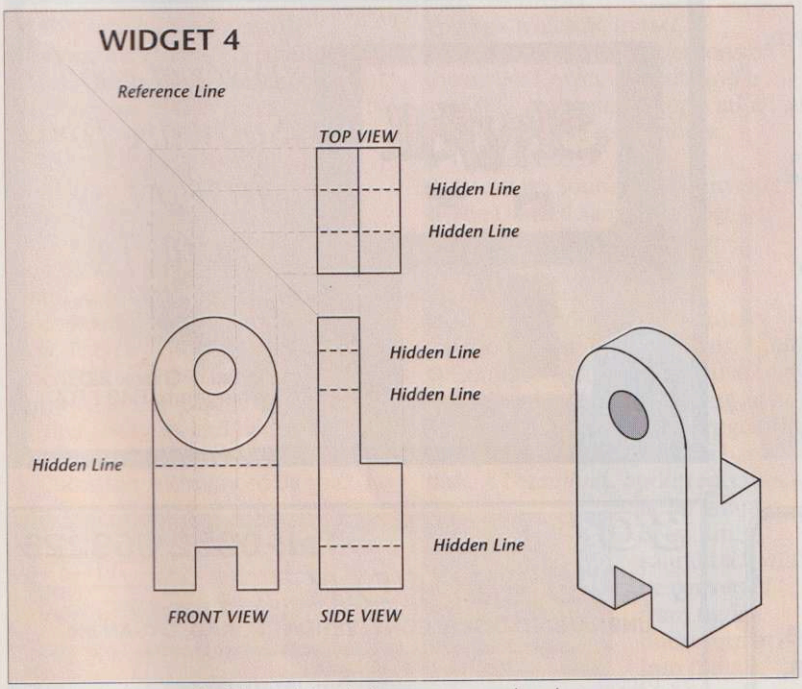
Change the grid to an isometric one, for alignment and checking. Select the front view inner circle and squeeze it horizontally by 0.71 and stretch it vertically by 1.23 then rotate it through 30 degrees using transform and the sub-menu rotate, follow that by the same procedure on the outer circle and regroup the two tilted circles.

Select the side view and rotate it through 30 degrees. Move it so that the left hand end line is located in the centre of the two circles of the front view and the top and bottom lines are virtually matching the top and bottom edges of the circles.

The next step is to select the front view and copy it, dragging the copy so that it is aligned with the centre of the right end line of the side view and positioned correctly with respect to the circle edges. As the centremost of the two circles can not be seen by the viewer, it can be deleted.

To do this, ungroup the two circles, select the centre one and delete. With the three circles in the

David Reid completes his run-down on isometric 3-D using Draw



● *Figure II: A curved widget with a hole, a very complex shape*

correct place for the isometric drawing, you can also select the side view and delete this, or you can move the individual elements so they line up correctly with the sides of the circles.

Adding light and dark

Again, if you want to shade the drawing, this can be done by outlining the shape and filling the new outline with the colour you require. Figure IV is a couple of tubes joined at right angles. This effect was produced by using the existing tube and making a copy, then rotating the copy by 120 degrees – 90 degrees plus the 30 degrees tilt on the first tube.

This tube was then positioned to overlap the first in the correct position. The joining line was created by getting copies of the front rotated views of each individual tube and setting them temporarily in roughly the correct position where the join was to be made. Using the open curve tool, I followed freehand the left facing template, until I thought it was in the right place. I then followed the right facing tube, until I had gone far enough round the tube to be *out of sight,* making few adjustments to the line, until I was happy with the result.

There is no easy way of producing the results of two intersecting tubes, and I found this to be quite acceptable in most circumstances. The other little frills added to the drawing just help the viewer understand that the two objects are round tubes and they add a bit of realism to the image.

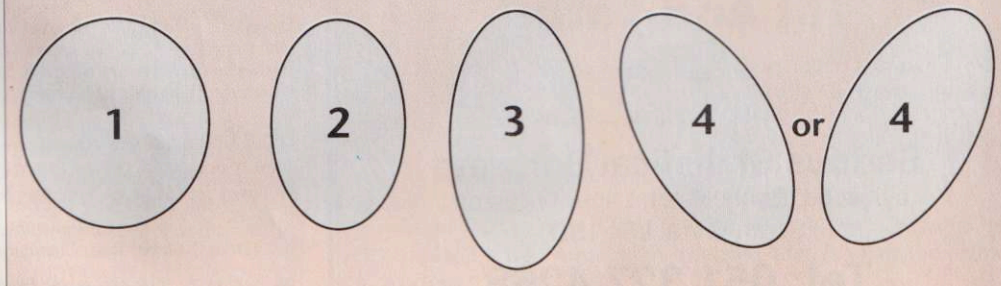
● *That rounds it up. I hope these two articles will help you create the 3-D drawings you need.*

● *Figure III: Creating a piece of tubing...*

● *How to apply the circles formulae*

Steps in producing an Isometric circle

1 Draw circle in 2D plane
2 Transform X-Scale by 0.71
3 Transform Y-Scale by 1.23
4 Transform rotate by 30 degrees if on left face or by 330 degrees if on right face



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The Hacker, the original Archimedes game cheater, now runs in a user friendly WIMP environment modelled on the RISC OS Desktop. You can easily get extra or infinite lives, time, etc., find passwords, slow down the game, save screens and the game itself, rip music, and many other unique and sophisticated (yet easy to use) features - just press Alt-Alt during the game, and the Hacker is there. For the ARM code literate, there are even more helpful and unique features for hacking games such as SWI trapping and the useful and friendly disassembler. And once you have discovered your cheat, you can easily make game-specific cheat modules which you can then distribute as you wish.

What's more, The Hacker is superb value for money at only £5, any future upgrades requiring only a blank disc. If you're not yet convinced, send 50p or a blank disc for a PD demo version of The Hacker.

DoggySoft, 7 Blackhorse Crescent, Amersham, Bucks., HP6 6HP.
Cheques payable to 'Andrew Clover'.

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Marching to the beat

Teri Paul dips into a hat of goodies, some free and some less so ...

JUST when I find a music program I like – PD, shareware or commercial – along comes another one which has a little bit extra.

The latest version of the **Coconizer Wimp Player** from Eduard Pfarr of Armaxess in Germany is now available from a number of sources. This version has changed the old filetype &664 for CocoSongs to &364, and there is a new filetype &365 for Trackfiles/ CocoTrak. Other changes are outlined in the readme files, mainly to alter the types and names of older files.

Coconizer is enhanced by the Toolbox which is, in fact, a collection of the latest versions of the earlier Coconizer tools and is available as a separate application.

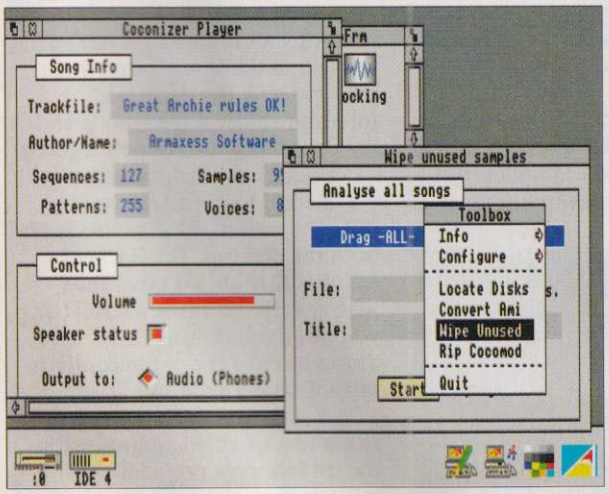
There are five sets of tools:

- The Locator
- An Amiga Soundtrack Converter
- The Unused Samples Wiper – when you delete songs some samples remain so this utility detects and deletes them.
- A Coco Module Ripper – useful for people with older versions.
- Configure which gives you access to outline fonts, multi-tasking and an option which tells the program that you are running from a hard disk. A *Logarithmic* option specifies if the samples of an Amiga soundtrack will be converted from signed linear format into the logarithmic one – if you get it wrong you'll soon hear the results.

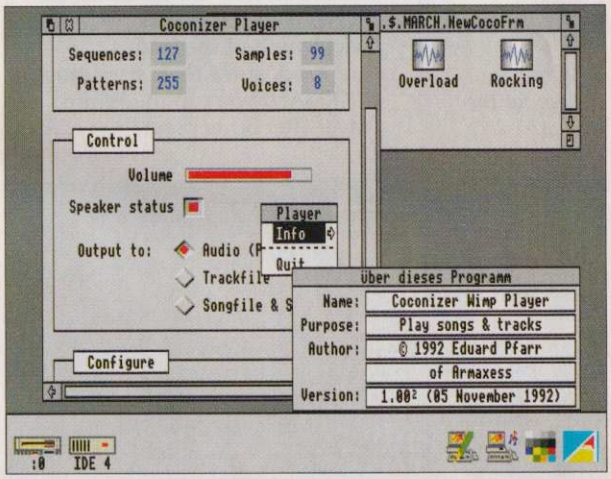
This simple-to-use player is especially useful to people who have access to a large selection of Amiga tunes. If you want to go into some more depth you'll find the readme files available with the programs very useful.

The application runs on the Desktop and the window gives you slider control over the volume and output. A radio button turns the speaker off and you can Output to audio – play – but dragging a song or trackfile on to the iconbar or window or just double-click it.

An *Output to trackfile* option lets you convert a song and its samples into a trackfile. It works like Audio output with the difference that the assembled soundtrack isn't played – instead you drag it to a Filer ➤



● *Coconizer provides many configuration options*



● *You'll get some new tunes on the subscription disk*

The big Bens

Ben Chalmers has opened a PD swap shop called 3PD. You send him a disk of PD software and an SSAE and you'll get a disk full of programs in return.

32-bit readers will be glad to know that next month will see the end of our temporary disk menu system and the introduction of a specially written one. It is an application called ACmenu written by Ben Summers and we're releasing it into the PD just for you so you can put all your disks in the same format, or use it for your own collection.

You'll have to ask Ben to change the logo if you don't want ours, but a mention that it was produced through *Acorn Computing* is required – 'cos we paid for it.

ACMenu allows programs to be accessed via a friendly interface as well as displaying help files for the disk and for individual objects. It looks and acts like a Filer window and objects can be dragged out of it, counted and so on.

The difference comes with a space for a logo and three icons: Help, Root – which immediately goes to the very top directory – and Up which is the same as open parent.

Just drag the directory you want to display on to the icon bar and there you are. Help files in directories can then be accessed via the Help button.

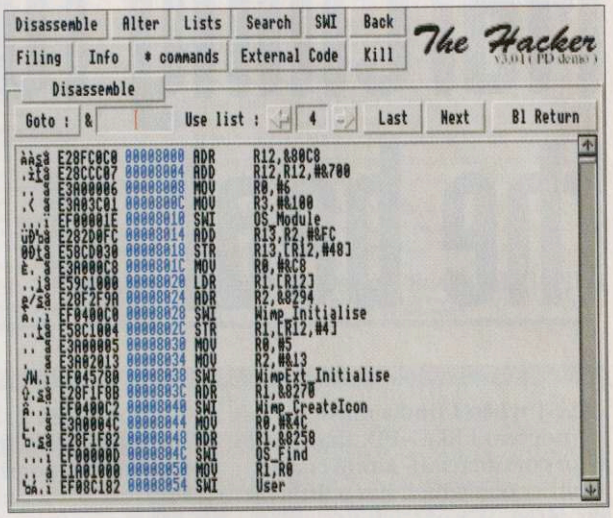
If you drag an archive to the iconbar icon, ACMenu will look for ArcFS and load it if its not already available, then it treats the archive as a directory.

window. *Output to song & samples* reverses the effect – it splits a trackfile into a song and its samples.

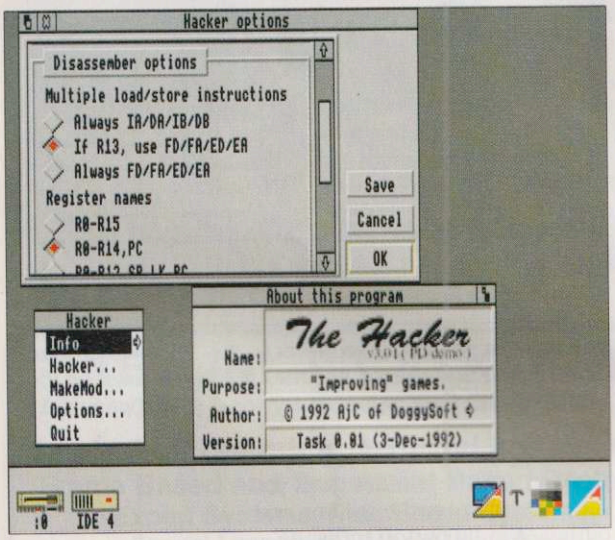
You can customise the program with four configure options, the volume setting and the speaker status can be saved permanently and take effect when the Player is loaded. Apart from the button *outline fonts* – only with Risc OS 3 – the others take effect during the program.

The button to fix the RMA size toggles between a block with the exact length of the loaded song/track and a fixed sized block in the RMA. If you run the Wimp Player after other programs you can disable this option

Staying with music take a look at **Strobe** which is an add-on from David Thornycroft, which you run after you've chosen your music. As you'd expect it's a strobe light.



● *Disassembling main memory*



● *Setting your options for the Hacker*

Making gaming easier

First of all let's get something straight – hacking is illegal. The fact that software – commercial and PD – is available to let you investigate how others managed to program something is not a licence to rip off other people's hard work.

DoggySoft have produced a new piece of software called **The Hacker** which lets you poke around in game code, specifically to acquire infinite lives, time, passwords and so on. A demo version is available in the PD which has a nice help facility and lets you play around with the features but stops short of letting you hack.

This is not a program for 1Mb users though, as you'll need more memory to work with both a game and Hacker at the same time. The full version of The Hacker will cost £5 and is available directly from Andrew Clover at DoggySoft.

You can enter The Hacker at any time during the game – you just press Alt+Alt to interrupt it. You then enter the Info screen which tells you why the game was interrupted, the screen mode and the contents of the game's registers – but not in the demo version.

Different buttons take you to different screens, back to the game, or to the desktop. The Hacker's facilities include a disassembler where, with the aid of a scroll bar, you can scroll through a disassembly of the entire contents of application memory.

The alter window lets you write a string to a specified address, while the lists window provides a viewer to let you see the contents of a list. You can also choose which type of search you want, by inputting the value/string/swi/mnemonic or part of mnemonic you want to look for, then input a list to send the results to and click the button for the type of search.

A SWI window allows you to execute SWIs, and trap them so that you are called when the game uses them – useful. You can also slow the game down to make it easier. The Filing window allows you to save lists, screens and application memory so you can dissect it with a desktop assembler. Nicely written and an inexpensive piece of shareware.

PD LIBRARIES

8-BIT HOUSES

8-bit Software, 1 Oakwood Drive, Heaton, Bolton BL1 5EE.
BBC PD,18 Carlton Close, Blackrod, Bolton BL6 5DL.
Elk PD, 5 Edward Street, Clifton, Brighouse, Yorkshire HG6 1QR.
Frisky Clams, 37 Cassiobury Drive, Watford, Herts WD1 3AA.
GLM PD, 2 Pierrefondes Avenue, Farnborough, Hampshire GU14 8NF.
HeadFirst PD, 97 Chester Road, Southport PR9 7HH.
JJF PD, 49 Hollberry Close, Wingates Green, Redditch, Worcester B98 0QT.
Mad Rabbit PD, 174 Duke Street, Southport, Merseyside PR8 5EL.
ScreenTeach, 21 Highlands Road, Rochdale, Lancashire.
The Wizard - BBC, Ryburn, Thorpe Lane, Cawood, Selby, North Yorkshire YO8 0SQ.
Welsh Boys PD, 88 Queen Street, Barry, South Glamorgan CF6 8EE.
The Yorkshire Boys, 40 Spotswood Place, Gleadless, Sheffield S14 1LE.

32-BIT HOUSES

3PD, 66E Picardy Road, Belvedere, Kent DA17 5QN.
Abyss Software, 35 Grantley Crescent, Kingswinford, Valley Fields, West Mids DY6 9EH.
Alpine PD, PO Box 25, Craigavon, BT63 5UT.
Arcaynia, PO BOX 1927, Sutton Coldfield B74 3YZ.
ArchAngel, 9 Chancel Court, Chancel Lane, Pinhoe, Exeter EX4 8QE.
Arch PD, 109 Ferry Road, Hullbridge, Hockley, Essex SS5 6EL.
ARMistic, 136 Wellesley Road, Ilford, Essex IG1 4LJ.
Busy Bee Computers, PO Box 25, Ormskirk, Lancashire L39 3QR.
Cream PD, 38 Baunton, Cirencester, Gloscester GL7 7BB.
Datafile PD, 22 Duxford Drive, Aldergrove, County Antrim, Northern Ireland BT29 4BG.
DataStream, 34 Norbreck Close, Great Sankey, Warrington, Cheshire WA5 2SX.
Diamond PD, 86 Meadowbank, Moor Lane, Holway, Holywell, Clwyd CH8 7EF.
Different Ideas Music, 48 Merthyr Road, Dallington, Northants NN5 7BS.
Digital Illusions, 20 College Road, Wembley, Middlesex HA9 8RL.
Digital Phenomena, 104 Manners Road, Southsea, Hants PO4 0BG.
DigiTech PD, 20 Downing Crescent, Bottesfird, Scunthorpe, South Humberside DN16 3LS.
DoggySoft, 7 Blackhorse Crescent, Amersham, Bucks HP6 6HP.
Equinox PD, 27 Station Road, Earls Barton, Northampton NN6 0NT.
Five Star Marketing, 18 Woburn Close, Bushey, Herts WD2 3XA.
Genesis PD, 19 The Greenway, Hillfields, Bristol BS16 4HB.
HeadFirst PD, 97 Chester Road, Southport PR9 7HH.
I-APL, 11 Auburn Road, Redland, Bristol BS6 6LS.
Kinsway Computer Services, 72 Glencoe Road, Sheffield S2 2SR.
Low Cost PD, 6 Furzeland House, Sheephouse Way, New Malden, Surrey KT3 5PH.
Mad Rabbit PD, 174 Duke Street, Southport, Merseyside PR8 5EL.
Matt Browne PD, 5 Inglefield, Pottres Bar, Herts EN6 1HD.
Moonlight Graphics – Shareware, PO Box 3569, Cape Town 8000, South Africa.
Naked PD, Fayence, Fulford Road, Fulford, Stoke-on-Trent ST11 9QT.
Ozone-Friendly PD, 180 Cumnor Hill, Oxford OX2 9PJ.
Power to the Programmers, 1st Floor, 23 Cooper Street, Nelson, Lancashire BB9 7XW.
Risc PD, Potteries House, Rannoch School, By Pitlochry, Perthshire PH17 2QQ.
RML PD, 24 Penryn Close, Norwich NR4 7LY.
Skyfall, PO Box 2220, Birmingham B43 5R2.
Spidersoft PD, 218 Saville Park Road, Halifax, West Yorkshire HX1 2XS.
The Demon DPD, 3 Marshall Close, Fishtoft, Boston, Lincs PE21 0RX
Westbourn Services, Westbourne House, 34 Bradley Street, Wooton-under-Edge GL12 6AR.

Clip Art Directory

A guide to the world of clip art

WHILE in the midst of a bit of DTP do you sometimes feel the need for just a simple line drawing to illustrate your point? Or while designing a card or letterhead do you wish you were a bit more artistic?

Enter clip art: Sprite or drawfiles which have been designed so you can pop them into any application from a multimedia database to a birthday card. And because they are in standard format you can change them yourself if you want. We have put together a list of many of the packages that are available for the Acorn 32-bit machines.

SUPPLIER	SUBJECT MATTER	NAME	PRICE
Anglia TV (0603 615151)	Animals of Australia and New Zealand	Clipart	£12
	Britain 1750-1900	Clipart	£12
	Britain since 1930	Clipart	£12
	Clothing through the ages	Clipart	£12
	Famous faces	Clipart	£12
	Invaders	Clipart	£12
	Medieval realms	Clipart	£12
	Music	Clipart	£12
	Natural history	Clipart	£12
	North American animals	Clipart	£12
	Prehistoric animals	Clipart	£12
	Second World War	Clipart	£12
	Ships	Clipart	£12
	Greeks	Clipart	£12
	Romans	Clipart	£12
	UK 1500-1750	Clipart	£12
ArmTech (0352 175840)	Egypt	Studio Graphics	£8
	Flags	Studio Graphics	£15
	Christmas	Studio Graphics	£8
	Cartoons	Studio Graphics	£8
	Borders	Studio Graphics	£8
	General	Studio Graphics	£8
Chrogem Designs Technology (0689 870758)	Electronic Human Parts	£15	
DEC_dATA (0392 221702)	DTP	Home Publisher	£4.95
	Geography	Europe Maps	£4.95
	Geography	UK Maps	£4.95
	Computers	Computer Technology	£4.95
	Transport	Steam Trains	£4.95
	Transport	Ships and Yachts	£4.95
	Transport	Aircraft Silhouettes	£4.95
	Dinosaurs	Extinct Animals	£4.95
	History	Columbus	£4.95
	Space	Constellations and Star Maps	£4.95
Desktop Projects (061-474 0778)	General	TopicArt 1	£8
	Transport	TopicArt 2	£8
	Costumes	TopicArt 3	£8
	Entertainment	TopicArt 4	£8
	Bugs 2 slugs	TopicArt 5	£8
	Road signs	TopicArt 6	£8
	Sports equip	TopicArt 7	£8
	Sports figures	TopicArt 8	£8
	Dinosaurs	TopicArt 9	£8
	Symbols	TopicArt 10	£8
	Tools	TopicArt 11	£8
Emerald Publishing (0223 840138)	Misc	Gallery Disks	£13.95
G A Herdman (0777 700918)	Military to road signs	DTP-images 1	£8.99
	Animals to maps	DTP-images 2	£8.99
	Scientific	DTP-images 3	£8.99
	Heraldry	DTP-images 4	£8.99
	Food	DTP-images 5	£8.99
	Insects	DTP-images 6	£8.99
	Trees	DTP-images 7	£8.99
	Historic	DTP-images 8	£8.99
	Flowers	DTP-images 9	£8.99
	Engineering	DTP-images 10	£8.99
	Organic chemistry	Form-Chem1-3	£39.99
	Organic chemistry	Math-Chem1	£14.99
	Inorganic chemistry	Math-Chem2	£14.99
Graphics Factory (0772 623000)	General	Clip Art Collection 2	£29.95
	Animals	Clip Art Collection 3	£29.95
	Sport	Clip Art Collection 4	£29.95
	Characters	Clip Art Collection 5	£29.95
Honormead (0332 510951)	Misc	Graphics Library Pack	£25
Media Design Interactive (0252 344454)	Misc	Image Warehouse CD-Rom	£59
Matt Black (0733 315439)	Fantasy	Vanguard	£29.95
	Misc	Image Club 1	£29.95
	Misc	Image Club 2	£29.95
	Misc	Image Club 3	£29.95
	Cartoon people	Image Club 4	£29.95
	Cartoon people	Image Club 5	£29.95
	Business	Image Club 6	£29.95
	World Maps	Image Club 7	£29.95
	Misc	Image Club 8	£29.95
	Design	Image Club 9	£29.95
	Cut and paste fonts	Image Club 10	£29.95
	Cut and paste fonts	Image Club 11	£29.95
	Symbols and headings	Image Club 12	£29.95
	Food and entertainment	Image Club 13	£29.95
	Occassions	Image Club 14	£29.95
	People in action	Image Club 15	£29.95
	Office and education	Image Club 16	£29.95
	Symbols	Image Club 17	£29.95
	Celebrity caricatures	Image Club 18	£29.95
	Simple silhouettes	Image Club 19	£29.95
	Backgrounds	Image Club 20	£29.95
	Fabulous Fifties	Image Club 21	£29.95
	Business cartoons	Image Club 22	£29.95
	Borders and ornaments	Image Club 23	£29.95
	Science and medicine	Image Club 24	£29.95
Micro Studio (0353 720433)	Toys	Children's Graphics Library Pack	£19.95
	Letters	Decorated Alphabet Pack	£19.95
	Misc	DTPLIB Colour	£19.95
	Misc	DTPLIB Mono	£17.25
	Historic costumes	History – Costume	£19.95
	Natural history	Nature GLP	£19.95
	Dinosaurs	Prehistoric Animals GLP	£19.95
	Christmas	Tools Christmas Pack	£19.95
	Tools	Tools GLP	£29.95
	Maps	World Geography Maps	£29.95
	Wildlife	World Wildlife GLP	£19.95
Midnight Graphics (061-766 8423)	Misc	Draw Format ClipArt Set One	£29.95
NW Semerc (061-627 4469)	Fruit and Veg	Just Pictures	£9
	Vehicles	Just Pictures	£9
	Home	Just Pictures	£9
	Actions	Just Pictures	£9
	Seaside	Just Pictures	£9
	Once Upon a Time	Just Pictures	£9
	Holidays	Just Pictures	£9
	Maths	Just Pictures	£9
	Percussion Instruments	Just Pictures	£9
	Farm	Just Pictures	£9
David Pilling (0253 852806)	Misc	Clip Art #2	£5.99
	Entertainment	Clip Art #3	£5.99
	Festivals	Clip Art #4	£5.99
	Cute and sport	Clip Art #5	£5.99
Primary Educational Services (0533 733063)	Misc	Image Disk	£5
RJH Enterprises (0756 794910)	France	French Clip Art	£6
Sherston Software (0666 840433)	Famous caricatures	Split an Image	£19.95
	Seasonal	Christmas Allsorts	£16.95
Smart DTP (0332 842803)	General	Smart Clipart 1	£4.95
	Animals	Smart Clipart 2	£4.95
	Flowers	Smart Clipart 3	£4.95
	UK	Smart Clipart 4	£4.95
	Sport	Smart Clipart 5	£4.95
SSERCSoft (031-668 4421)	Interfacing	SSERC Graphics Library	£10
	Physics	SSERC Graphics Library	£10
	Electronics	SSERC Graphics Library	£10
	Technology	SSERC Graphics Library	£10
	Utilities	SSERC Graphics Library	£10
	Alpha boards	SSERC Graphics Library	£10
	ENL boards	SSERC Graphics Library	£10
	Chemistry	SSERC Graphics Library	£10
	General scientific	SSERC Graphics Library	£10
	Cell Biology	SSERC Graphics Library	£10
	BodyBits	SSERC Graphics Library	£10
	Molecules	SSERC Graphics Library	£10

Super sampling

SOUND sampling software for the BBC Micro is pretty thin on the ground, to say the least. After seeing Armadeus on a friend's 32-bit machine I decided to write my own Beeb package.

It's called Uni-Sample and it's capable of reproducing some of the features of the Arc program. For example, it displays the sample as a waveform and allows you to make loops for playback.

However, there are some things that it cannot do, such as backwards play.

Unfortunately Uni-Sample needs shadow screen memory so won't work on most Model Bs. If you have shadow screen fitted on your Model B make sure you turn it on before running Uni-Sample. Or you could try replacing all the Mode commands in the main program that have numbers over 127, with the appropriate command for your system.

The first step is to type in the sample driver. The one supplied is for the Body Build Serial Sampler published in *The Micro User* from December 1991 to March 1992 and is a slightly modified version of Mike Cook's original routine. If you want to use a different sampler, see the panel on sample drivers below. The sample driver should be saved as *SampLDR*.

Now you should type in the main program. Again, if you want to use a different sampler to the standard one, see the sample driver panel. Save the main program as *SmpMAIN*.

If you're using ADFS – Master only, as it grabs too much memory on the B & B+ – you need to create two directories called S and L. Use *CDIR S and *CDIR L. Directory S will hold your samples, and directory L will hold the loops you make from your samples. On DFS the directories do not need creating.

You will also need a copy of Rafael Jay's X Play 8 sample playback operating system extension included on this month's subscription disk. It can be obtained from the February 1992 issue of *The Micro User*. When run it assembles a file called XP8 on disk. Make sure this program is also on your sample disk.

To run Uni-Sample, simply CHAIN the file *SampLDR*. This command can be put in a !Boot file if you want Uni-Sample to load from disk on Shift+Break.

Using the program

Once the driver has assembled, the main program will be chained. The screen will clear, and the message *Downloading Sample, Please Wait...* will appear. You will see a line trace its way across the screen. This is the current sample waveform.

Initially, as there is no sample, the line traced is flat. When the trace is complete, the menu will appear in the bottom half of the screen.

The top left of the screen shows the sample filename – what Uni-Sample will save the current sample as – the default is *UNTITLE*, but any name that sticks within the DFS rules can be used.

The program menus are accessed by single key presses and here's what they do:

S Allows you to record a sample from a microphone, or other audio source connected to your sampler. The screen will clear and then fill with sample data. When the screen is full of sample, the program will download the waveform, and return to the main menu.

Space Will play all of the current sample.

R Sets the playback rate for the current sample/marked section. The default is 45, as this is the correct speed for the default sample driver. You can set it to any number between 1 and 255, where 1 gives the fastest, and 255 the slowest playback speed.

C Prompts you for a filename for your sample. The program will only use the first seven letters of this, as the DFS will not allow any more.

D Saves your sample to disk, in the S directory with the filename set using the option.

K Catalogues all the files in the S directory.

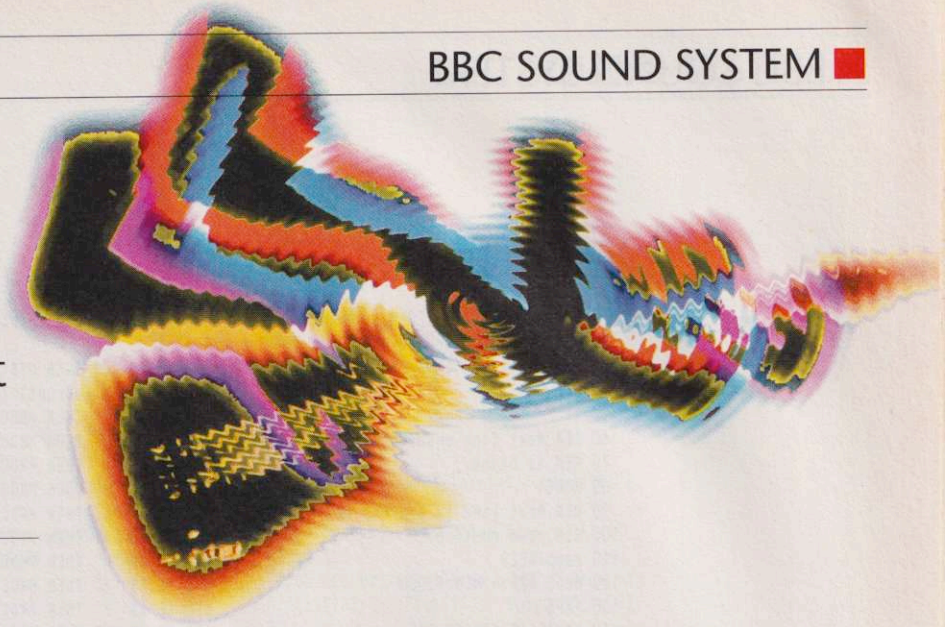
L Prompts you for a filename. This file will be loaded into the sample memory. The only files you can load are those in the S directory. If a loop is present on disk for the sample loaded this will be loaded as well.

M Sets the markers for taking sections of sample for use in loops. The numbers you should enter range between &30 and &80 (hexadecimal). These correspond to the numbers on the waveform display (and the memory where the sample is stored divided by &100). The currently marked section of

Sample drivers

The default driver for Uni-Sample is a modified version of Mike Cook's sample read routine for the Body Build Serial Sampler only. To change the driver for another sampler, write a machine code program that reads a sample into memory between locations &3000 and &8000.

The code should reside at &E00 on a Master and &1100 on a B or B+ and not go past &1500. When your driver has assembled it's code, it should CHAIN the file *SmpMAIN*. You should also change the variable *samp* in *SmpMAIN* to point to your code's entry point. If your sampler uses a different speed to the default, change the starting value of variable *R%*.



Matt Kneebone squeezes the sound capabilities of 32-bit programs into his BBC Micro

a sample is displayed under the menu.

P Plays the marked section at the current speed.

A Adds the current marked section and speed to the loop of samples. The loop is just sections of the current sample played at different speeds, one after another. The number of items (sections) in the current sample loop is displayed under the menu.

Q Plays the loop.

T Deletes the last item in the loop.

I Wipes the entire loop.

W Saves the current loop under the same name as the current sample, but in directory L. Therefore you can only have one loop per sample.

E Loads the loop for the current sample.

X Lists all the sections in the current loop to the screen or printer.

Z Allows you to edit a section of loop. Enter number of the item you wish to edit. Then enter the new values at the prompts.

V Prints a copy of the waveform display to an Epson-compatible.

Adding more features

If you find that you want to add another feature, it should be quite simple. Just add an extra PRINT statement to the menu – if you can find room – and add:

```
IF A$= .... THEN <line number>
```

pointing to your routine. If your routine overwrites the waveform display, you should set *corrupt%* to TRUE before exiting your procedure.

Using this package, I have found it possible to create some interesting and amusing loops, using very little equipment, in which sounds and speech are mixed together.

The demo loop, saved as Demo, shows what can be achieved with very little – a biro, aerosol can and silly noises.

I hope you have lots of fun exploring the effects that it's possible to create and I'd be very interested to hear some of your loops and samples.

> Using this package, I have found it possible to create some interesting and amusing loops

```
  10 REM Sample Driver
  20 REM For Body Build Sampler Mk 2
  30 REM
  40 REM Sample Read By Mike Cook
  50 REM Modified By Matt Kneebone
  60 REM
  70 REM (c) Acorn Computing
  80 :
  90 IF PAGE<&1500 THEN PAGE=&1500:CHAI
N"SampLDR"
 100  PROC_Cinit
 110  CHAIN"SmpMAIN"
 120  END
 130  :
 140  DEF PROC_Cinit
 150  FOR N%=0 TO 2 STEP 2
 160  P%=&E00
 170  [
 180  OPT N%
 190  .PINT \ PORT INITILISATION
 200  LDA #&06
 210  STA &FE62
 220  STA &FE60
 230  RTS
 240  .SAMP1
 250  LDX #10 \ NUMBER OF PULSES
 260  LDA #&0
 270  STA &FE60 \ CS AND CLOCK LOW
 280  .SLOOP
 290  LDA &FE60 \ GET DATA
 300  LSR A:ROL &70 \ MOVE BIT INTO MEM
ORY
 310  LDA #&2 \ CLOCK HIGH
 320  STA &FE60
 330  LDA #0 \ CLOCK LOW
 340  STA &FE60
 350  DEX
 360  BNE SLOOP
 370  LDA #&6
 380  STA &FE60
 390  RTS
 400  .SBUF
 410  SEI \ STOP INTERRUPTS
 420  LDA #0 \ SAMPLE BUFFER ADDRESS
 430  STA &72
 440  LDA #&30
 450  STA &73
 460  .SBL
 470  JSR SAMP1
 480  LDX #0
 490  LDA &70 \ GET SAMPLE
 500  STA (&72,X)
 510  INC &72
 520  BNE NC1
 530  INC &73
 540  .NC1 LDA &73
 550  CMP #&80
 560  BNE SBL
 570  CLI \ ENABLE INTERRUPTS
 580  RTS
 590  ]
 600  NEXT
 610  CALL PINT
 620  ENDPROC
```

GET IT RIGHT

```
 10 =    0 0     100 = A038 7    190 = DDC7 7    280 = 197E 5    370 = 4A02 8    460 = 706C 5    550 = 53F8 E
 20 =    0 0     110 = E1A1 E    200 = 17BD E    290 = 7F7E 3    380 = 56E6 E    470 = 98D5 D    560 = B7B5 D
 30 =    0 0     120 = FD2E B    210 = 76A4 2    300 = F560 E    390 = 9843 1    480 = EA45 E    570 =  EBA 7
 40 =    0 0     130 = 9719 F    220 = 56E6 4    310 =  328 B    400 = 837E 2    490 = AD5C C    580 = 9843 B
 50 =    0 0     140 = 36F6 3    230 = 9843 E    320 = 56E6 0    410 = 8B8C F    500 = C3CA 6    590 = 8B58 7
 60 =    0 0     150 = AC53 B    240 = 2152 A    330 = 9120 4    420 = 9120 1    510 = 6A12 4    600 = 2C83 1
 70 =    0 0     160 = 6446 D    250 = F1DF 0    340 = 56E6 1    430 = 7622 A    520 = 2A8C 3    610 = E354 9
 80 = 9719 9     170 = EB9E 9    260 = 2AC4 E    350 = E8A9 8    440 = 2228 6    530 = 7A33 F    620 = ED0F B
 90 = 8663 4     180 = D929 7    270 = F851 D    360 = CCE9 5    450 = 6603 C    540 =  F10 9
```

```
  10 REM Uni-Sample 6.20 Main Program
  20 REM By Matt Kneebone
  30 REM (c) Acorn Computing
  40 REM
  50 :
  60 REM Next line ensures sample area
  70 REM is blank.
  80 MODE1
  90 REM Next line is address of sample
 100 REM read routine.
 110 samp=&E29
 120 MODE 129:HIMEM=&3000
 130 *XP8
 140 R%=45:S%=&30:E%=&80:lmax%=50
 150 DIM ls%(lmax%),le%(lmax%),lr%(lmax
%)
 160 lptr%=-1:corrupt%=TRUE
 170 F$="UNTITLE"
 180 REPEAT
 190 IF corrupt%=FALSE THEN GOTO 260
 200 ON ERROR MODE7:REPORT:PRINT " at l
ine ";ERL:END
 210 MODE129:HIMEM=&3000
 220 VDU23;8202;0;0;0;19,1,4;0;0;0;
 230 VDU19,2,6;0;0;0;
 240 PRINTTAB(0,15);"Please wait, downl
oading sample..."
 250 PROCplot
 260 REPEAT
 270 VDU26
 280 COLOUR1:PRINTTAB(0,0);"Sample :- S
.";:COLOUR2:PRINT;F$;
 290 IF LEN(F$)<7 THEN PRINT;SPC(7-LEN(
F$))
 300 COLOUR3:PRINTTAB(20,0);"Uni-Sample
 (C)1992"
 310 corrupt%=FALSE
 320 VDU28,0,30,39,15
 330 CLS
 340  PRINT TAB(0,0);
 350 COLOUR3
 360  PRINT"S  - Sample.       A  - Add
 to loop."
 370  PRINT"sp - Play sample.  Q  - Pla
y loop."
 380  PRINT"D  - Save to disc. I  - Wip
e loop."
 390  PRINT"L  - Load Sample.  E  - Loa
d loop."
 400  PRINT"M  - Mark section. W  - Sav
e loop."
 410  PRINT"P  - Play marks.   T  - Del
ete item."
 420  PRINT"R  - Play Rate.    X  - Lis
t loop."
 430  PRINT"K  - Sample CAT.   Z  - Edi
t loop."
 440  PRINT"C  - Change Name.  V  - Pri
nt Sample."
 450 COLOUR2
 460 PRINT'"Playback rate : ";R%
 470 PRINT"Marked from &";~S%;" to &";~
E%
 480 PRINT;lptr%+1;" items in loop."
 490 ON ERROR MODE7:REPORT:PRINT " at l
ine ";ERL:END
 500 A$=GET$
 510 IF A$=" " THEN OE%=E%:OS%=S%:S%=&3
0:E%=&80:PROC_CONV:E%=OE%:S%=OS%
 520 REM Change 'CALL samp' on line
 530 REM 550 to the command to read
 540 REM a sample on your system.
 550 IF A$="S" THEN MODE1:CALL samp:cor
rupt%=TRUE
 560 IF A$="P" THEN PROC_CONV
 570 IF A$="T" AND lptr%+1>0 THEN lptr%
=lptr%-1
 580 IF A$="L" THEN OF$=F$:PROCchange:I
F F$<>OF$ THEN corrupt%=TRUE:PROCldlp
 590 IF A$="D" THEN PROCsave
 600 IF A$="M" THEN PROCplayset
 610 IF A$="R" THEN PROCrate
 620 IF A$="K" THEN PROCcat
 630 IF A$="C" THEN PROCnewsample
 640 IF A$="A" THEN PROCloop
 650 IF A$="Q" THEN PROCplay
 660 IF A$="I" THEN PROClpwp
 670 IF A$="E" THEN PROCldlp
 680 IF A$="W" THEN PROCsvlp
 690 IF A$="V" THEN PROCdump
 700 IF A$="X" THEN PROClloop
 710 IF A$="Z" AND lptr%+1>0 THEN PROCl
edit ELSE IF A$="Z" VDU7
 720 UNTIL corrupt%
 730 UNTIL FALSE
 740 END
 750  DEF PROC_CONV
 760 OSCLI"*FX161,0,"+STR$(R%)
 770 *FX161,1,64
 780 OSCLI"*FX162,"+STR$(S%)+","+STR$(E
%)
 790 *FX163
 800 ENDPROC
 810 :
 820 DEFPROCsave
 830 ON ERROR VDU7:GOTO 180
 840 OSCLI"*SAVE S."+F$+" 3000 8000"
 850 ENDPROC
 860 :
 870 DEFPROCload
 880 ON ERROR VDU7:F$=OF$:GOTO 180
 890 OSCLI"*LOAD S."+F$+" 3000"
 900 ENDPROC
 910 :
 920 DEFPROCrate
 930 CLS
 940 COLOUR1
 950 COLOUR1:PRINT"Playback Rate...":C
OLOUR1
 960 PRINT'"Current Playback Rate is :
";R%
 970 COLOUR2
 980 INPUT'"New Rate (0-255) :- "R%
 990 IF R%<1 THEN R%=1
1000 IF R%>255 THEN R%=255
1010 ENDPROC
1020 :
1030 DEFPROCplayset
1040 CLS:COLOUR3:PRINT"Markers...":COL
OUR1:PRINT"Current start :- &";~S%
1050 PRINT"Current end   :- &";~E%
1060 COLOUR2
1070 INPUT'"Start at (&30-&80) :- &"S$
1080 INPUT'"End at (&30-&80) :- &"E$
1090  IF E$="" OR S$="" THEN ENDPROC
1100 ON ERROR ENDPROC
1110 S1%=EVAL("&"+S$):E1%=EVAL("&"+E$)
1120 IF S1%<&30 OR S1%>&80 THEN GOTO104
0
1130 IF E1%<&30 OR E1%>&80 THEN GOTO104
0
1140 E%=E1%:S%=S1%
1150 IF E%<=S% GOTO 1040
1160 ENDPROC
1170 :
1180 DEFPROCplot
1190 S1%=&3000:E1%=&8000
1200 x%=0:ad%=S1%
1210 oy%=700+?ad%
1220 cn%=0
1230 REPEAT
1240 GCOL0,3
1250 MOVE x%-1,oy%:DRAW x%,700+?ad%
1260 oy%=700+?ad%
1270 IF cn%=0 THEN GCOL0,2:MOVE x%,700:
DRAW x%+40,650:VDU5:MOVE x%,625:GCOL0,1:
PRINT"&";~(ad%/&100):GCOL0,3
1280 x%=x%+2:ad%=ad%+40
1290 cn%=cn%+1:IF cn%>50 THEN cn%=0
1300 UNTIL ad%>=E1% OR x%>=1279
1310 VDU4
1320 ENDPROC
1330 :
1340 :
1350 DEFPROCdump
1360 VDU 2,1,27,1,65,1,8
1370 FOR Y%=1023 TO 550 STEP -16
1380 VDU1,9,1,19,1,27,1,90,1,0,1,5
1390 FOR X%=0 TO 1276 STEP 4
1400 A%=0:B%=128
1410 FOR C%=0 TO 14 STEP 2
1420 IF POINT(X%,Y%-C%) A%=A%+B%
1430 B%=B% DIV 2
1440 NEXT
1450 FOR N=0TO3
1460 VDU 1,A%
1470 NEXT
1480 NEXT
1490 VDU1,10
1500 NEXT
1510 VDU3
1520 ENDPROC
1530 :
1540 DEFPROCprint
1550 PRINTTAB(0,15);"Dump to printer? (
Y/N) :-";:G$=GET$:PRINT G$
1560 IF G$<>"Y" AND G$<>"y" AND G$<>"N"
 AND G$<>"n" THEN VDU7:GOTO 1550
1570 IF G$="Y" OR G$="y" THEN PROCdump
1580 ENDPROC
1590 :
1600 DEFPROCcat
1610 CLS:COLOUR1:PRINT"Press SHIFT to s
croll";CHR$(14);
1620 *.
1630 PRINT "Press a key..."
1640 G=GET
1650 ENDPROC
1660 :
1670 DEFPROCnewsample
1680 CLS
1690 COLOUR2
1700 PRINT"Current name :- S."F$
1710 COLOUR1
1720 INPUT"New name :- S."NF$
1730 IF NF$="" THEN ENDPROC
1740 NF$=LEFT$(NF$,7)
1750 F$=NF$
1760 ENDPROC
1770 :
1780 DEFPROCloop
1790 lptr%=lptr%+1:IF lptr%>=lmax% THEN
lptr%=lmax%:VDU7:ENDPROC
1800 ls%(lptr%)=S%
1810 le%(lptr%)=E%
1820 lr%(lptr%)=R%
1830 ENDPROC
1840 :
1850 DEFPROClplay
1860 IF lptr%<0 THEN ENDPROC
1870 temp1%=S%:temp2%=E%:temp3%=R%
1880 FOR loop%=0 TO lptr%
1890 S%=ls%(loop%):E%=le%(loop%):R%=lr%
(loop%)
1900 PROC_CONV
```

```
1910 NEXT loop%
1920 S%=temp1%:E%=temp2%:R%=temp3%
1930 ENDPROC
1940 :
1950 DEFPROClpwp
1960 FOR F%=0 TO lmax%:ls%(F%)=0:le%(F%
)=0:lr%(F%)=0:NEXT
1970 lptr%=-1
1980 ENDPROC
1990 :
2000 DEFPROCldlp
2010 ON ERROR VDU7:CLOSE#0:GOTO 180
2020 X=OPENIN ("L."+F$)
2030 INPUT#X,lptr%
2040 FOR F%=0 TO lmax%
2050 INPUT#X,ls%(F%)
2060 INPUT#X,le%(F%)
2070 INPUT#X,lr%(F%)
2080 NEXT
2090 CLOSE#X
2100 ENDPROC
2110 :
2120 DEFPROCsvlp
2130 IF lptr%<0 THEN ENDPROC
2140 ON ERROR VDU7:CLOSE#0:GOTO 180
2150 X=OPENOUT ("L."+F$)
2160 PRINT#X,lptr%
2170 FOR F%=0 TO lmax%
2180 PRINT#X,ls%(F%)
2190 PRINT#X,le%(F%)
2200 PRINT#X,lr%(F%)
2210 NEXT
2220 CLOSE#X
2230 ENDPROC
2240 :
2250 DEFPROCchange
2260 REM loading errors.
2270 CLS:COLOUR1
2280 INPUT "Load :- S."L$
2290 OF$=F$
2300 IF L$="" THEN ENDPROC
2310 L$=LEFT$(L$,7)
2320 F$=L$
2330 PROCload
2340 ENDPROC
2350 :
2360 DEFPROCLloop
2370 CLS
2380 IF lptr%<0 THEN PRINT"No loop."'"P
ress a key..":G$=GET$:ENDPROC
2390 CLS:COLOUR3:INPUT"Print? (Y/N) :"A
$:IF A$="Y" OR A$="y" THEN VDU2
2400 COLOUR3:PRINT"Press SHIFT to scrol
l"
2410 VDU 14
2420 COLOUR2:PRINT'"Uni-Sample Loop fro
m Sample S."+F$'
2430 FOR f%=1 TO lptr%+1
2440 PRINT"Item :";f%;" From :&";~ls%(f
%);"-&";~le%(f%);" Speed :";lr%(f%)
2450 NEXT
2460 VDU 3
2470 VDU15
2480 COLOUR3:PRINT'"Press a key...":G$=
GET$
2490 ENDPROC
2500 :
2510 DEFPROCledit
2520 CLS
2530 COLOUR2:PRINT;lptr%+1;" items in l
oop."
2540 COLOUR3:INPUT"Which Item : "I%
2550 CLS
2560 COLOUR3:PRINT"Item :";I%;" From :&
";~ls%(I%);"-";~le%(I%);" Speed :";lr%(I
%)
2570 COLOUR2:PRINT
2580 INPUT"New start (&30-&80) : &"ns$
2590 IF ns$="" THEN ENDPROC
2600 ns%=EVAL("&"+ns$)
2610 IF ns%<&30 OR ns%>&80 THEN GOTO 25
20
2620 INPUT"New start (&30-&80) : &"ne$
2630 IF ne$="" THEN ENDPROC
2640 ne%=EVAL("&"+ne$)
2650 IF ne%<&30 OR ne%>&80 OR ne%<ns% T
HEN GOTO 2520
2660 INPUT"New rate (1-255) : "nr%
2670 IF nr%<1 OR nr%>255 THEN GOTO 2520
2680 ls%(I%)=ns%:le%(I%)=ne%:lr%(I%)=nr
%
2690 ENDPROC
```

GET IT RIGHT

```
  10 =    0 0
  20 =    0 0
  30 =    0 0
  40 =    0 0
  50 = 9719 9
  60 =    0 9
  70 =    0 9
  80 = EA3A E
  90 =    0 E
 100 =    0 E
 110 = 5FEB 6
 120 = A162 8
 130 = 116E 5
 140 = 9151 3
 150 = A2CC 0
 160 = 905D 5
 170 = EBF8 A
 180 = BFBA E
 190 = EB8C F
 200 =   6F 7
 210 = CE53 8
 220 = 9B47 8
 230 = FD87 8
 240 = 6AB6 9
 250 = F2AD 8
 260 = BFBA 6
 270 = B962 3
 280 = E6EB 5
 290 = 4A7C 6
 300 = C80E 0
 310 = 4968 B
 320 = 187D 8
 330 = 7A16 0
 340 = BCFB 9
 350 = C90B 2
 360 = 4B63 F
 370 = 8652 A
 380 = B707 F
 390 = 297E 8
 400 = 18BE C
 410 = 81F0 9
 420 = 141D 2
 430 = 2709 B
 440 = 81C7 7
 450 = D92A 0
 460 = B21A F
 470 = B6DB 4
 480 = 9E84 A
 490 =   6F E
 500 = 77F2 B
 510 = EAE2 9
 520 =    0 9
 530 =    0 9
 540 =    0 9
 550 = CF3B C
 560 = 1561 1
 570 = A03D 3
 580 = 7EE5 1
 590 = 9070 2
 600 = D417 6
 610 = 678F 5
 620 = E9EB A
 630 = 4859 6
 640 = 7D37 4
 650 = 84E2 B
 660 = D2F4 A
 670 = 75A0 4
 680 = DDF6 6
 690 = 9258 1
 700 = 41C6 D
 710 = 67B7 5
 720 = 69F7 4
 730 = 226C 1
 740 = FD2E B
 750 = B46C 2
 760 = 4A1A 9
 770 = EC30 7
 780 = EBA5 F
 790 = C489 0
 800 = EDOF 4
 810 = 9719 F
 820 = 7A2C 3
 830 = 4946 4
 840 = 569E 7
 850 = EDOF 4
 860 = 9719 C
 870 = 24A1 0
 880 = DD4B 3
 890 = 2C86 B
 900 = EDOF A
 910 = 9719 5
 920 = 6AFA 9
 930 = 7A16 9
 940 = E949 6
 950 = 135F 0
 960 = EC07 C
 970 = D92A 7
 980 = 8165 9
 990 = 75D4 5
1000 = 9C87 3
1010 = EDOF F
1020 = 9719 3
1030 = B60C C
1040 = 8600 A
1050 = CF7A 3
1060 = D92A 4
1070 = 184F C
1080 = 5D49 8
1090 = 151B A
1100 = F8A9 0
1110 = F2E5 9
1120 = B7B2 7
1130 = B90E 7
1140 = 5D83 2
1150 = 89E7 4
1160 = EDOF D
1170 = 9719 C
1180 = 185A 7
1190 = BB14 4
1200 = 93DD 0
1210 = C4E1 9
1220 = 242A 6
1230 = BFBA E
1240 = 236D 0
1250 = EB07 B
1260 = C4E1 5
1270 = C8BB 8
1280 = F86E 2
1290 = 4ECA 6
1300 = 9804 9
1310 = 765B A
1320 = EDOF 4
1330 = 9719 D
1340 = 9719 7
1350 = 3218 6
1360 = 2687 8
1370 = B251 F
1380 = AB7B D
1390 = 7768 0
1400 = D82A 3
1410 = 27C6 4
1420 = 3365 9
1430 = F88F 5
1440 = 2C83 F
1450 = 6AF7 F
1460 = A54F E
1470 = 2C83 8
1480 = 2C83 B
1490 = F7F8 B
1500 = 2C83 C
1510 =  6BC B
1520 = EDOF 5
1530 = 9719 4
1540 = 10CF 2
1550 = 50AE F
1560 = EEC7 9
1570 = F8FE 9
1580 = EDOF B
1590 = 9719 9
1600 = A08E 6
1610 =  557 D
1620 = 2C81 6
1630 = 6FB6 5
1640 =  EBB 2
1650 = EDOF B
1660 = 9719 A
1670 = 7765 9
1680 = 7A16 5
1690 = D92A 9
1700 =  9B9 1
1710 = E949 6
1720 = D305 4
1730 = 52AE 6
1740 = 5ABB 7
1750 = B60C 5
1760 = EDOF A
1770 = 9719 D
1780 = 551B 9
1790 = 3F76 5
1800 = 9915 1
1810 =  CAE C
1820 = A951 2
1830 = EDOF 9
1840 = 9719 5
1850 = 58B5 5
1860 =  185 F
1870 = 98D1 B
1880 = C448 7
1890 = 6F38 E
1900 = BA1B 0
1910 = 13EE A
1920 = 1914 7
1930 = EDOF 3
1940 = 9719 1
1950 = B093 2
1960 = 5729 F
1970 = 5861 8
1980 = EDOF D
1990 = 9719 5
2000 = F0B9 8
2010 = A9ED F
2020 = 1DF9 C
2030 = 5412 B
2040 = E11B 6
2050 = 1278 4
2060 = 851D 8
2070 = 57D8 0
2080 = 2C83 8
2090 = 734D B
2100 = EDOF 7
2110 = 9719 0
2120 = 12F3 5
2130 =  185 3
2140 = A9ED 3
2150 = B783 1
2160 = C530 6
2170 = E11B B
2180 = 3D82 B
2190 = AAE7 E
2200 = 7822 3
2210 = 2C83 5
2220 = 734D 3
2230 = EDOF E
2240 = 9719 8
2250 = A441 2
2260 =    0 2
2270 = 5D31 D
2280 = 6A8C 3
2290 = CA39 A
2300 = 3A1D 4
2310 = 2E69 5
2320 = 8AE1 B
2330 = CE56 4
2340 = EDOF E
2350 = 9719 A
2360 = E756 8
2370 = 7A16 3
2380 = 8FA3 1
2390 = 2F22 3
2400 = 916F C
2410 = 96B1 6
2420 = 3F74 C
2430 = 2250 8
2440 = 9A66 8
2450 = 2C83 B
2460 = 8CD6 6
2470 = DC52 4
2480 = BC0E 6
2490 = EDOF 0
2500 = 9719 6
2510 =  EF2 5
2520 = 7A16 7
2530 = E018 E
2540 = D104 8
2550 = 7A16 0
2560 = 8C86 C
2570 = 3FF7 2
2580 = F4ED F
2590 = E86D B
2600 = 7B8E 7
2610 = CBE1 F
2620 = 5D38 C
2630 = E11B 7
2640 = 1392 6
2650 = 33A9 C
2660 =  898 5
2670 = C6AA 0
2680 = E527 D
2690 = EDOF 0
```

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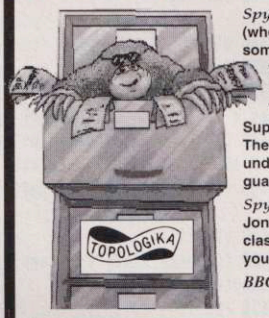

SpySnatcher challenges you to identify and catch the *Mole* (whose premises are known as *The Zoo*). This person, last night sometime, removed the plans of the *Sonic Macrothrodule* from the chief's safe, and is preparing to leak them to a hostile power (Ruritania).

The chief, Sir Arthur Cayley, in co-operation with Superintendent Hardy of Special Branch, leaves you to explore The Zoo to see what evidence you can find. Because everyone is under suspicion, there will be trouble if you run into the security guard, or any personnel who happen to be working late!

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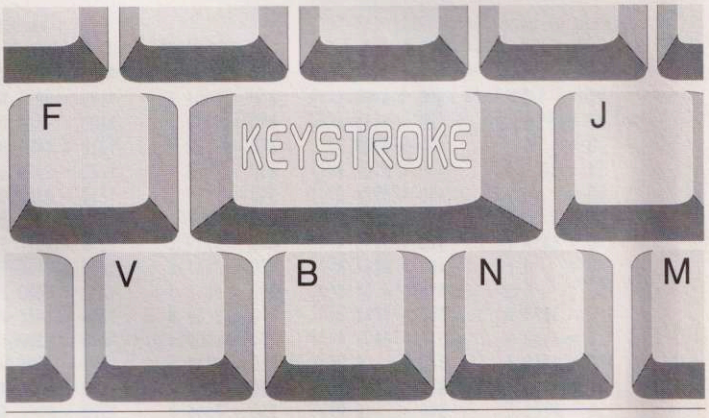

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KEYSTROKE is currently available for £29.95 fully inclusive. (A reasonably priced site licence is also available). Cheques, etc to be made payable to QUANTUM SOFTWARE.

Or write to : Quantum Software, 35 Pinewood Park, Livingston, EH54 8NN for more information on this truly original utility!

The short list

Keith Martin takes a look at half a dozen unusual and useful programs

LabelPrint: Out with the rubber stamp

LABELPRINT is a utility to design and print labels easily. If you need to produce a lot of labels this program can make the design work quicker and the results more professional.

LabelPrint works mainly through two windows, the Page Layout Window and the Label Design Window. Page Layout involves defining the number, size and shape of the labels to be printed on a single page.

● *Wanted: Copies of this label*

Labels are assumed to be in some form of rectangular shape and in a rectangular layout on the page. A border shows how much of the page will be printed by your current driver. Label Design means designing the layout of the label itself.

The window appears in the shape and size of the labels in your page layout. Into this space you can place text objects, of up to 40 characters, or drawfiles from any package, sprite files or text from other programs. Clip art is useful here.

Each object can be moved around and rescaled. Any text object can also be altered in font, size and colour. This allows you quite a bit of flexibility in design while always being aware of the size and shape of the final output.

If you regularly need to create labels this program can be useful for reducing the time and effort involved.

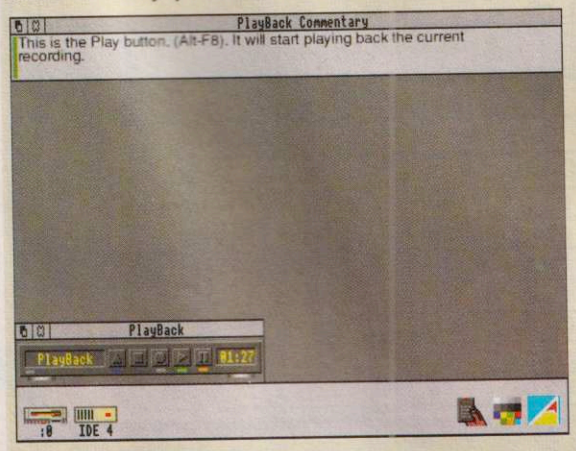
PRODUCT SPOTLIGHT

Price: £15
Supplier: Software 42, 109 Ferry Road, Hullbridge, Hockley, Essex SS5 6EL.

PlayBack: Mousing about again

THIS is a recorded announcement. I'm afraid we're all out at the moment, but in the meantime ... PlayBack is a utility program that can record a session of activity on your computer, including mouse movements, mouse clicks and key presses, and then replay (re-enter) them later.

PlayBack's main use is for demonstrations and tutorials. It comes with a commentary facility that can display three line descriptions of what is currently going on in the recording.



● *Using Playback to explain Playback*

Recording and playback are handled through a control panel window which is designed to look very much like the controls on a tape or video recorder, complete with Play, Record, Stop and Pause buttons.

The program comes with a few examples, including demonstrations of some of the facilities of Draw and Edit. These give a good idea of PlayBack's potential while the commentary window describes what is happening as the cursor points at things, text is entered and deleted and so on.

The chief problem with the utility – and one the designers are well aware of – is the inherent flexibility of the Desktop and that a playback needs windows in the same position as those present during recording. The Filer can be a particular pain in this respect, with its tendency to open windows wherever it likes.

The best approach is to clear the desktop, load playback, then open a window for the application to be used in the recording. Then make sure the same situation applies on playback. As long as the same positioning – and preferably screen mode – is used then the recording should repeat properly.

PRODUCT SPOTLIGHT

Price: £19
Supplier: Risc Developments, 117 Hatfield Road, St Albans, Herts AL1 4JS.
Tel: 0727 40303

LandBuild: Will the earth move for you?

FRACTAL geometry is one of those bits of science that occasionally catch on so that suddenly everyone has heard of it.

At the same time that we were told that weather is inherently unpredictable – this is supposed to be a surprise? – we also learnt that complex shapes, like clouds and coastlines, can be built up from simple patterns and equations.

If fractals can make up natural forms they can also be used to reproduce them.

Landbuild is a fractal generator that lets you build up landscapes, including coastlines, hills and mountains, from a random seed number and a set of parameters. The result can be a highly detailed and natural-looking view – or something weirder and less likely if you prefer.

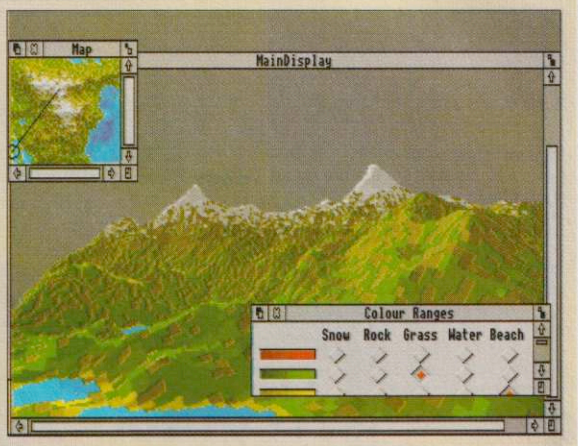
Landbuild is a memory-hungry program, necessarily so because of the number of calculations it does so you'll need at least 2Mb of ram for more detailed images.

To create a landscape you set a number of parameters, including the random seed number, land and water heights, colours and direction of light. Some defaults and recommendations are given but the only way to be sure what some combinations will do is to try them out.

Generating a landscape can take a number of minutes, especially if your processor is slow and you are using high levels of detail.

Once the landscape is formed you can display it as a map, a 3D image or as the view from any point in the landscape in any direction.

Some really quite impressive results are possible. The shapes of mountains and coasts look particularly good, though I did find a tendency for rock and grass areas to develop slightly angular forms on the ground at some settings.



● *A view of the mountains from the sea*

PRODUCT SPOTLIGHT

Price: £15
Supplier: Software 42, 109 Ferry Road, Hullbridge, Hockley, Essex SS5 6EL.

TableMate: Easy cross-referencing

TABLEMATE is a utility that tries to simplify the production and amending of tables. You know, the old problem where you've got the whole thing set up but you just need to tweak the third column a little bit – which means deleting half the table and starting again.

You can use this program to create a new table from scratch or from imported data. TableMate can read files in its own or Comma Separated Value (CSV) format, which lets you bring in data from spreadsheets and databases. Software Independent Data (SID) files can also be used.

After processing with TableMate a completed table can be saved as a drawfile or in Data Definition Format (DDF) which can be used by Impression – very useful too.

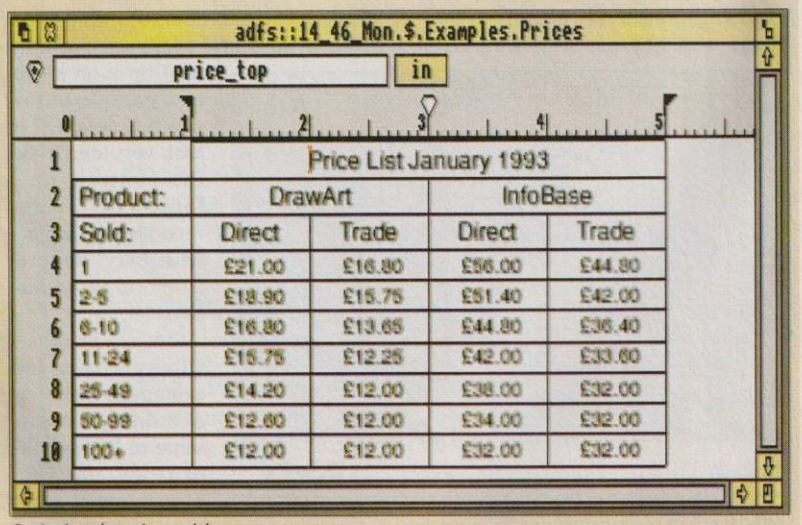
However, TableMate uses features of Impression which are not supported in early versions. You'll need Impression II version 2.17 or higher, or at least Impression Junior 1.14.

It takes a little while to become familiar with the conventions of this program, including its ruler system and the way it handles blocks. This is not really a problem however.

The strengths lie in the way it lets you make changes to parts of the table while preserving the rest, including tab settings and relative column positions. You can move data around and change the width and position of columns with relative ease.

You can set or change tabs for left, right or centre justification in a column or for decimal point position. You can also change font and size for some or all text.

I did have a problem with the program crashing at times when doing complex move operations but DDT reckon to have fixed the known bugs in the final version. Another restriction, at least in the current version, is that the whole table cannot be scaled. However, overall this is a useful utility.



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● *A simple price table*

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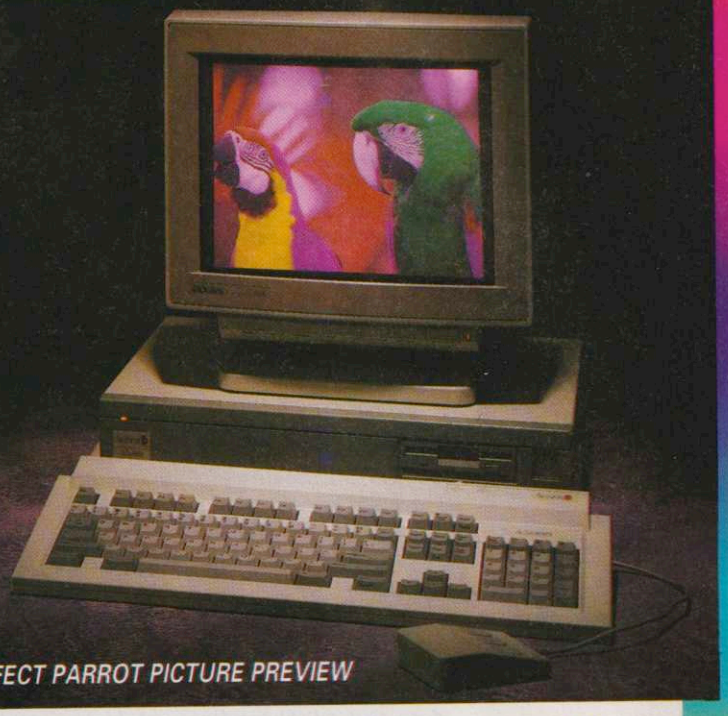

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In 16 and 256 colour screen modes all the colours are selectable from 16 million hues. This means scanned pictures can be seen with 256 true grey-levels on screen and that you are no longer restricted to the preset Acorn palette. Some applications, such as ArtWorks, can provide better screen colouring using the new palettes.

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In addition, the ColourCard offers 15 bit-per-pixel true colour screen modes having over 32,000 colours on screen at once. Although these screen modes are not yet desktop software compatible, it is expected that programs will become available that take advantage of the modes. The ColourCard is supplied with a 24-bit preview utility to show 24-bit Clear files in stunning full colour.

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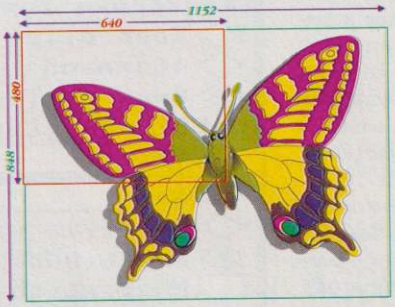

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Hanzi: It's all Chinese

Of the earliest civilisations, China's was the last to develop a system of writing – around 1500BC. By then spoken Chinese used tone to convey much of its meaning, so no phonetic alphabet could accurately represent it, only the ancient system of thousands of pictograms that so baffles foreigners.

Intensive education, plus pruning thousands of little-used characters from the alphabet, have increased literacy in China but have not solved some sheer logistical problems. Until recently, almost all one-off documents in China – and indeed in Japan – were hand-written. Computer technology has finally started to change that.

Hanzi is the first Chinese text system available for Risc OS computers and a handy one it is. It is aimed at users who are already familiar with the language but who need to produce text quickly and accurately. In the current version, you should also know one of the standard methods of romanisation – representing a Chinese character as a syllable in Roman letters.

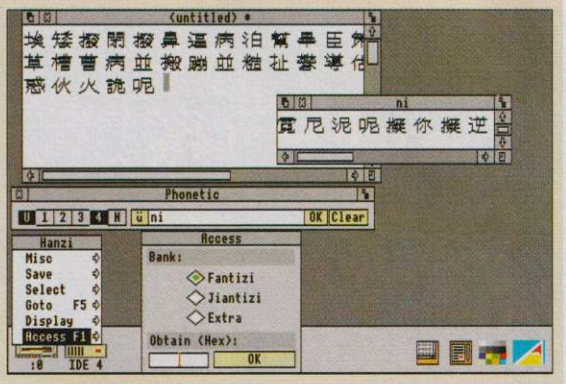
Hanzi makes good use of the windows to let you select the character you want. In the normal method you type in a syllable in one of the systems of romanisation: Pin-Yin or Wade-Giles, with the Cantonese system to be implemented in later versions. The methods differ and the standard has changed, which is why Peking is Beijing these days.

For each syllable, you select the tone or tones you want and Hanzi then shows you the characters that fit. Selecting one brings it into your document window.

The alternative browsing method brings up a full window of characters, usually 4,000 of them, in either full or simplified form. A further selection of 10,000 little-used characters is available.

Once characters are in a file they can be edited by copying, moving or deleting. Printing is done by saving your document as a drawfile.

Hanzi is designed with flexibility in mind and I was easily able to build up a page of text and will be chiefly of use to those who are knowledgeable in the Chinese languages and who need a means of producing text quickly and precisely.



● *When you want to say ni*

PRODUCT SPOTLIGHT

Price: £50
Supplier: Emerald Publishing, PO Box 324, Cambridge CB2 2TP.
Tel: 0223 840138

Keystroke: Hot key shuffle

A LONG time ago we all operated our computers by typing commands at the keyboard. This was all very well but tiring on the fingers and far from organised.

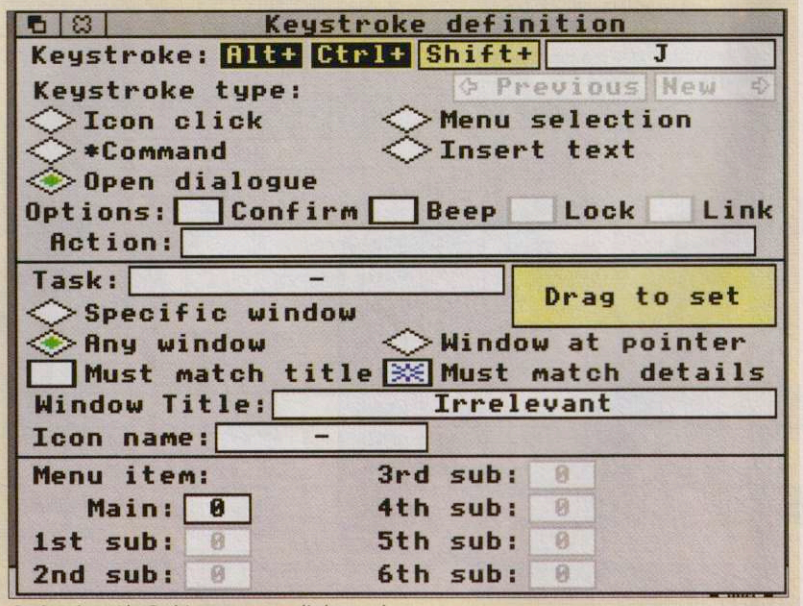
Then along came menus and windows where we can select an action with a few clicks of the mouse. But then as applications get more complicated this can become a lot of clicking and menu scanning.

Keystroke is a utility that brings frequently-used actions or combinations of actions down to simple key presses. It lets you customise any keystroke, or combination of a key with Shift, Alt or Control, to activate any function of a program. This means simulating key presses, mouse clicks and menu selections to perform a predefined task.

You set up a particular keystroke action through a definition window. The possibilities are many and the system is designed for flexibility. You can nest multiple actions from the same keystroke, so that you can call up a particular action from a particular application. Once the keystroke action is set, any future press of the key or keys will initiate the action. You can include a confirmation box if you wish.

This is potentially a rather useful utility, particularly if you have a number of complex actions that you do often and that would be the better for shortcuts. Some caution is in order though. Try not to use any key combinations that have meaning to your other applications. Also it might be advisable to keep a note of what you have set up, or to keep the number of actions to those you can remember.

An interesting note for the future is that Quantum Software are working on incorporating the same principles in a voice-controlled system.



● *Getting Alt Ctrl J to open a dialogue box*

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A soft touch

Mike Cook puts his micro behind glass

THE inspiration for Body Build articles comes from many places – occasionally it is a plea for help that arrives in the Problem Solved department and that's just what has happened for this month.

I got a letter from Sheringham High School in Norfolk. They wanted a touch pad or strip so that they could operate a computer from behind glass. I think they did not mean literally behind glass but I took them at their word – what was needed was some sort of weather-proof interaction with the machine

I think what they have in mind is using the computer on some sort of open day or even in a shop window at night. Imagine an estate agents shop where you could summon pictures and details of houses when it is closed. Or a toy shop where you could activate a train set and other toys from the front window.

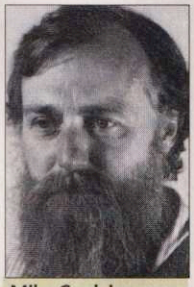
There are various ways of going about this. I am sure that you have all seen those membrane switches with a flexible covering – those can be made weather proof.

However, they don't stand up to too much pressing and I've always found the action needed to make a contact is not always easy to perform.

So I decided a contactless switch would fit the bill. Again there are many forms of these: Capacitive, optical and inductive. However, I decided to design something rather different.

If you have ever used an oscilloscope you will be aware of mains pickup on an open channel. That is, if you don't connect the oscilloscope to anything you will see a slightly distorted sine wave and if you touch the oscilloscope probe you will get a very large signal.

What is happening is that your body is acting as an aerial for all the 50Hz mains signals that are about and you are feeding these into the oscilloscope. I wondered if this effect could be used to make a contactless switch, so I set about a little experimentation.



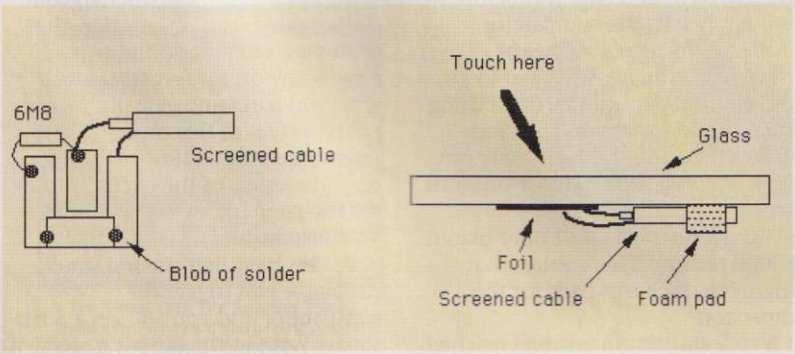
Mike Cook is a senior lecturer in Maths and Physics at Metropolitan University of Manchester. He has written over 100 articles and is the only person to have had something published in every issue of *The Micro User/Acorn Computing.*

High impedance

An oscilloscope probe consists of a very high impedance amplifier, so that is the first thing we have to simulate. The TL064 quad operational amplifier I have used in many of the more recent projects is high impedance as it has a FET (field effect transistor) front end, so that seemed suited to the job.

Next I got a small sheet of glass, to prevent any accidents during development I wrapped the edge around with insulation tape. Finally I set to work with some self-adhesive copper strip. This material is used in stained-glass work and should be available from most hobby shops.

At first I experimented with single pickup strips, but the problem with this was that there was a pickup effect from quite a distance away, getting larger the closer you got. This would cause a problem if you ➤



● *Figure I: The touch pad*

➤

had several pickups so I decided to surround the contact strip on three sides with an earthing shield.

This was made easy using the copper foil, as once I had arranged the strips a small spot of solder over the joins ensured I had electrical contact.

This was connected up with a length of screened cable, the outer sheath going to the earth shield and the inner core going to the pickup probe.

The screened cable was secured on the back of the glass with a sticky foam pad. Finally, a 6M8 (6.8 Meg Ohm) resistor was placed across the back of the switch. This is to prevent any damage to the input of the amplifier in the event of a large static pickup.

The general arrangement is shown in Figure I. The probe can be any size but I made mine just big enough to fit over the pad of my index finger.

> The probe can be any size but I made mine just big enough to fit over the pad of my index finger

The electronics

Now for the electronics – shown in Figure II. The touch pad is first fed into a high gain differential operational amplifier – this only amplifies the difference between two inputs.

This is what we really need here, we don't want to amplify any mains pickup made on the connecting lead, only that which is injected at the touch pad.

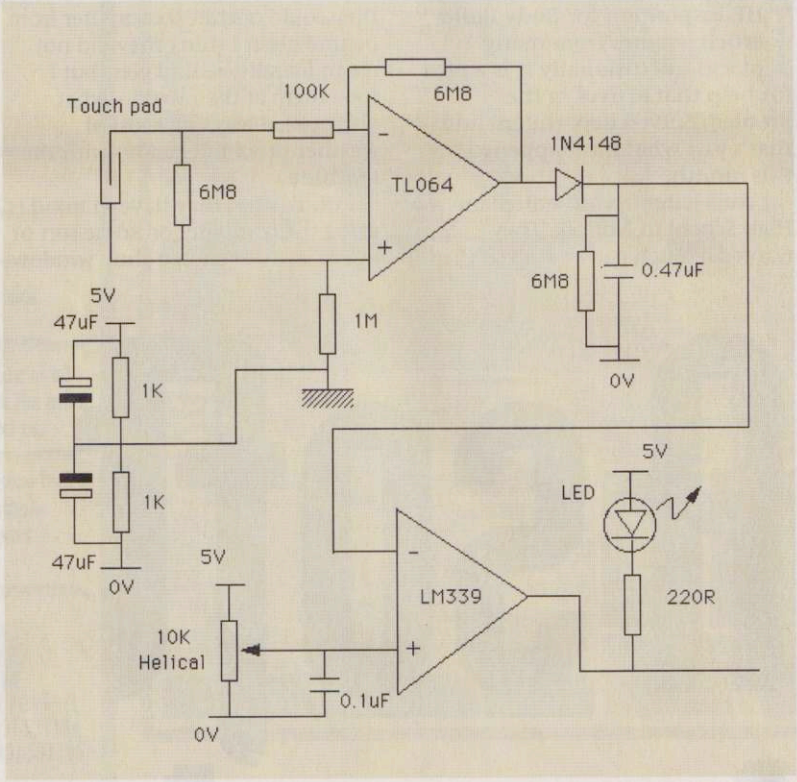
Therefore the screen of the connecting cable can be considered as the source of one signal and the core as the other. You can make a much better differential amplifier using three operational amplifiers but we don't need that here.

At the output of this amplifier we have a signal of about one volt, and this increases slightly when the glass is touched.

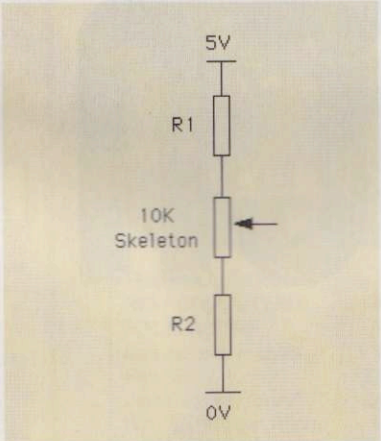
What we need to do is to turn this slight increase into a logic level switch.

Voltage comparator

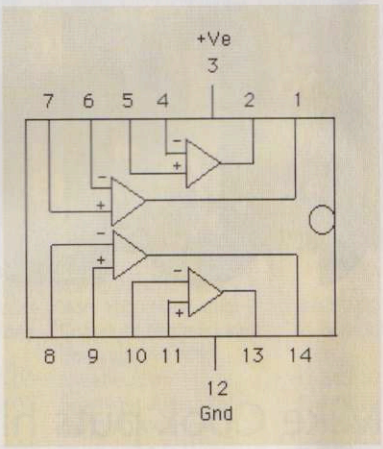
One way is to use a voltage comparator. This circuit, as the name suggests, takes two voltages and compares them, giving a logic one if the voltage on the non-inverting input (+ input) is higher than the inverting input (- input). However, as the output from our amplifier is a simple 50Hz sine wave



● *Figure II: The electronics to drive the touch pad*



● *Figure III: An alternative to the helical pot*



● *Figure IV: Pinout of the LM339 quad comparator*

we will have to rectify this before we can apply it to the comparator.

Rectifying a voltage means turning it from an AC signal to a DC one, and this can be done using a diode and capacitor. The diode makes the current flow in only one direction and the capacitor smooths any ripple.

Across the capacitor I have placed a 6M8 resistor. This ensures that there is a discharge path for the capacitor.

Without this, once it had reached a peak voltage, it would hold this until internal leakage discharged it. This would mean, in practice, that once you had pressed the switch it would stay on for several seconds after you had removed your finger.

The values of this capacitor and resistor determine the responsiveness of the circuit. If they are too large the switch will not be very responsive.

If, however, they are too small, the ripple will trigger the comparator and you will get a 50Hz square wave at the output instead of

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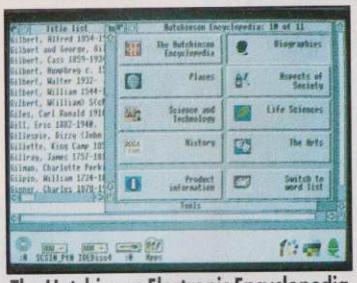

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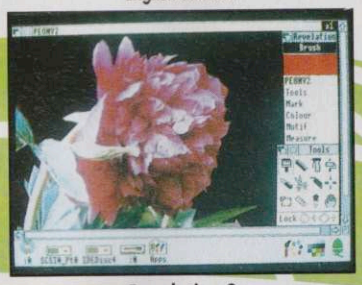

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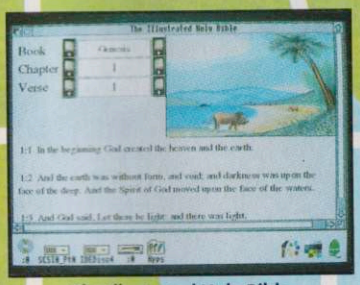

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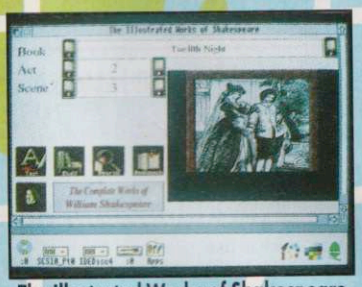

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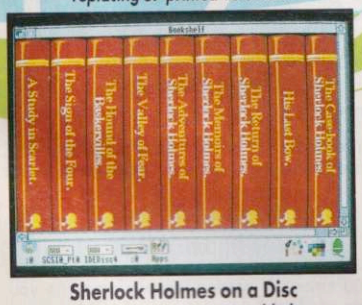

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the steady logic level you require.

Now we need to compare this voltage against something and this is provided by the potentiometer or pot – by adjusting this you can set the trigger level. This is a very fine adjustment and I found that I needed to use a 10 turn pot to give me the control I needed.

It should be possible to use the cheaper skeleton pots. In this case you will have to put a resistor in both legs to make the adjustment fine enough, as shown in Figure III. As the voltage level in your setup is likely to be different from that in mine, you will have to experiment with the resistor values.

Finally the comparator's output is fed to an LED before being sent to the computer. This serves two purposes: First of all the output of the comparators is open collector, which means that it is in effect a switch that shorts to earth.

Therefore, to get a logic one out of it you need to pull it up. This is done by the LED. Secondly it acts as a good form of feedback to the user, giving assurance that the switch has indeed been pressed. I suggest that this is mounted behind the glass close to the switch.

High quality finish?

You could use some transparent silicon rubber to keep it in place and for a really high quality finish you could use a flat faced LED. You can also paint around the glass or put a laminated sheet over the top to label the switch. Finally I would give the copper strip a quick squirt of clear varnish to protect it from long-term corrosion.

When the circuit is set up you should adjust the pot so that the LED lights, then wind it back until it just goes out. At that point it will trigger when the glass is touched. You may have to repeat this as the capacitor across the reference voltage can make the response a little sluggish. When you have your final set up in place it is likely that you will need to adjust the voltage again as the pickup signals are likely to change.

As your individual requirements are likely to be different I have not produced a kit this month. However, if you have difficulty in finding any of the parts drop a line to Musbury Consultants.

As there are four comparators in

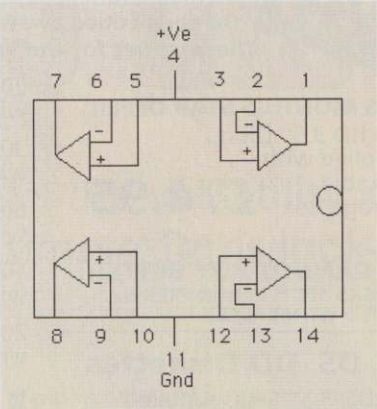

Figure V: Pinout of the TL064 quad op-amp

the LM339 and also four operational amplifiers in the TL064 then you can make up to four touch switches with each pair.

Note that the voltage splitter of two 1K resistors and 47uF capacitors does not need to be reproduced for each circuit, one can simply be connected to all the amplifiers.

As this circuit uses mains pickup to operate it is not surprising that it can be susceptible to mains interference.

For example, I found the LED lit whenever I turned on my soldering iron. In practice, however, this should not pose too much of a problem as you can write your software to be forgiving of brief spurious inputs.

That brings me to the consideration of the software and connection to the computer. The touch inputs should be connected to the computer's digital input. This normally means a user port, on the 32-bit computers, but this is an optional extra.

If you have not got one fitted you might like to use an alternative like the I^2C interface in the May 91 issue. These are still available, as is the serial User Port from the February 90 issue.

If you have one of the new range of machines, the A3010 and the like, you can use the joystick inputs. You can label the touch switches any way you like according to your application but for interaction with the public I would suggest that you have as few as possible.

Choices

A *Yes* and a *No* coupled with a few labelled A, B, C and so on for choices should suffice. Remember when writing the software that members of the public are often apt to simply walk away from an exhibit.

So don't let the software get stuck waiting for a certain response. Always make sure that there is a time-out of about 10 seconds on each input and then let it reset to something interesting.

Remember, too, that the general public are often very reluctant to touch anything in case they break it so give simple and precise instructions.

● *Well, I hope you find this useful in extending your computer's influence without letting anyone actually touch it.*

> Always make sure that there is a time-out of about 10 seconds on each input and then let it reset to something interesting

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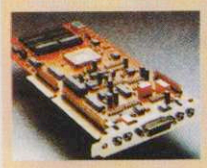

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Blocks away

Mike Goldberg shows the versatility of the Archimedes by programming a simple Tetris look-alike

ONE of the most useful things about computers is their versatility – you can make it add your accounts up one day and save the universe the next if you should so desire.

With the current crop of fast processors and enormous memory capacities Acorn computers have become, in some respects, more obliging to the ordinary user.

From the personal programming point of view there is now no need to write your own machine code routines for fast screen output as most of these are taken care of by the built-in software and hardware, enabling us mere ordinary mortals to write very impressive software indeed.

Of course harnessing the full speed capabilities of these beasts is not our prime concern – but utilising what there is from Basic is. Combined with what we have looked at before we shall see how easy it is to create a complete game tailored to your own requirements.

Back in the good old BBC Micro days you may well have had a great idea for a game only to find that coding it produced the world's slowest, and therefore unplayable, junk. The solution then was assembly language and machine code, which to some of us was not as intuitive to use as Basic, but very rewarding if persevered with.

Lack of memory

If that was not prohibitive enough for you, lack of memory certainly was – the compromises were always between that and different sprites and game levels.

Yet you can still hear the continued whining about the lack of memory on a 1Mb Acorn machine – how life preservingly essential it must be to create your own sprite handler, only necessary if you want to make a career out of software and own the company.

What nonsense! Tetris carried off all the trophies because it was a brilliantly original, simple, playable game requiring only a good grounding in writing Basic programs.

To prove it we will look at how easy it is to produce a version of our own, only adding extras to the game to identify it personally rather than improve it. This version is called CATtris, to keep my cat happy, and is on the cover disk.

Everyone on *this* planet must have seen one version or another of Tetris. Briefly, you fit different shapes together in a bucket forming lines which disappear but don't spill over the top. Succinct I think.

Each of the seven shapes is made up from four blocks – Figure I – and can be rotated through the four points of the compass.

When a shape is dropped from the top of the bucket, the computer needs to know if it has hit an already occupied space or the bottom of the bucket.

We can see if something is going to strike another, but how do you tell the computer that something is there?

Hip, hip, array

If you divide up the bucket area into squares the same size as the blocks from which the shapes are made, you can represent vacant squares as 0s and occupied squares as 1s, see Figure II. Store this data in an array:

```
G%(rows%,column%) = 0 or 1
```

To start with, all the squares are empty and have a value of 0. Note that the bucket is included in the grid system as this is the boundary ➤

● *Interesting graphics add new flavours to the Tetris classic*

➤

and, therefore, all grid values are set to 1.

The idea is that when the shape lands, the grid squares it occupies become 1s. Subsequent shapes will now have to weave past, interconnect or land on this – but how does the computer know which shape and its orientation?

To print the correct shape on screen we must identify it and its orientation. Use a two-dimensional array thus:

```
S%(6,3)
  | |                 0
  | Orientation >  3 -+- 1
  |                   2
  Which Shape
```

For example, S%(2,1) indicates shape 2 facing direction 1. The position of the shape within the grid is a simple matter of X, Y coordinates but this is most important.

Collision detection

Without knowing exactly where the shape is, none of the rest can be worked out. As the shape descends, the Y coordinate alters by 1.

Similarly, moving left or right alters the X coordinate by 1. But these are peculiar shapes with odd blocks here and there – how do you test for a collision like the one shown in Figure III?

Create a three-dimensional array which contains this information:

```
H%(6,3,3) = Y offset
  | | |
  | | the 4 blocks (left to
  | |   right)  0 1 2 3
  | |
  | shape orientation
  |
  Which shape
```

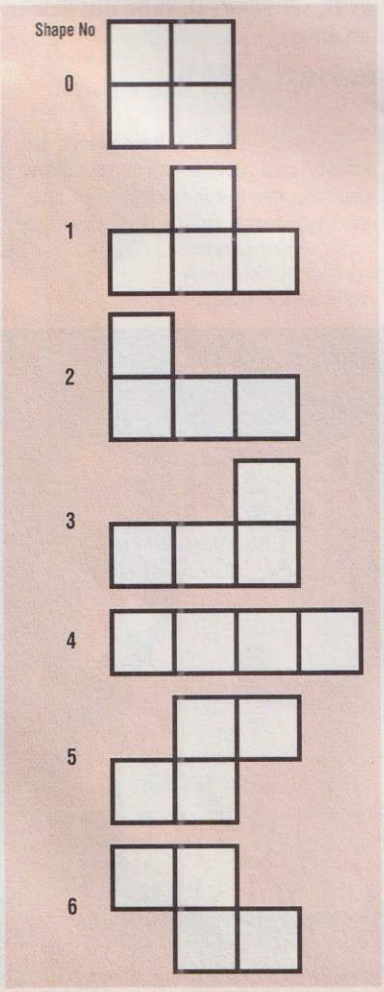
Look at Figure IV. The X, Y coordinate of the shape is always the bottom left and when testing for a collision below the shape we work across the shape left to right, block by block. The figures below each block tell you how far to look in the Y direction from the present Y coordinate.

A 0 would mean look at the grid the same Y coordinate as the shape, a 1 would mean look at the grid Y+1, that is the line below and so on. The -9 is indicates there is no block to check but any minus figure below -2 would have done.

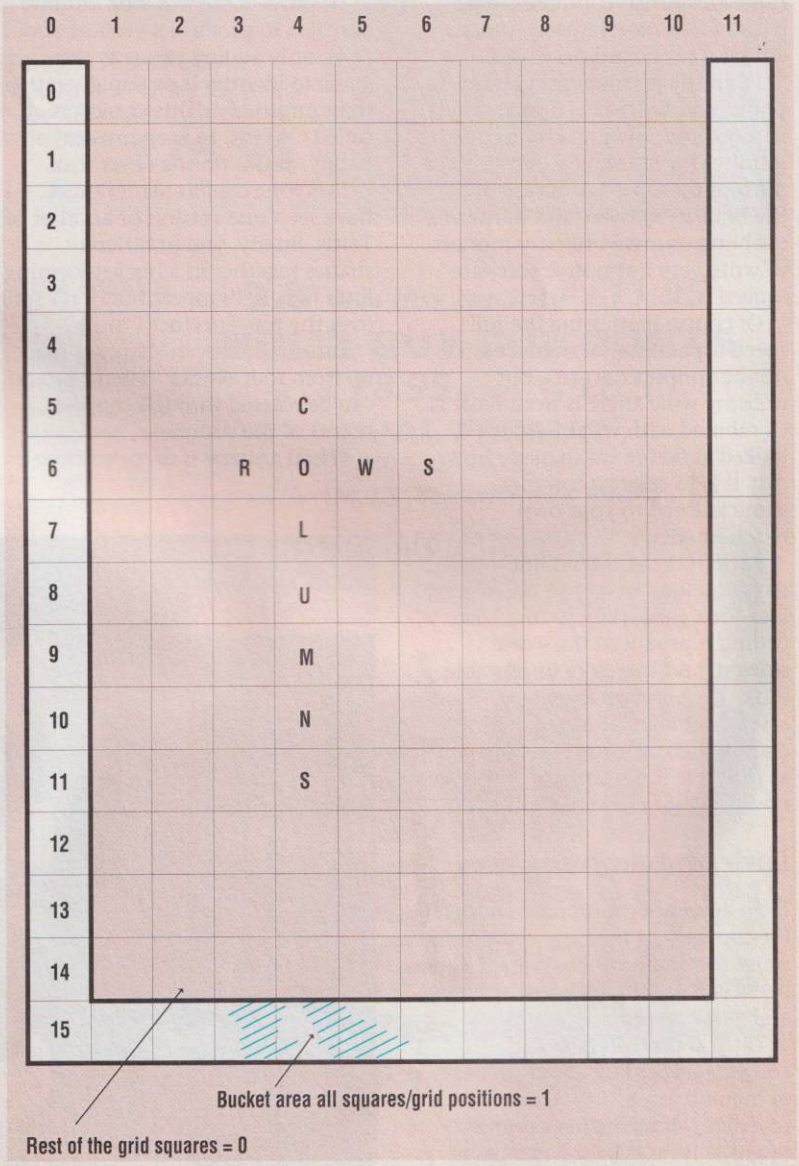
So this checks underneath each of the four blocks to see if the grid has a block (stored as a 1) in it. If it has, there has been a collision and the shape stops. Obviously if no blocks (or 1s) are found, the shape continues to descend.

Left and right motion and rotation are dealt with separately as I felt that the shape always descends automatically but you move the shape in other directions. By treating each shape as a 4x4 grid

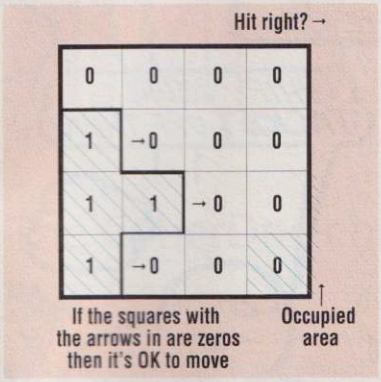
There is now no need to write your own machine code routines



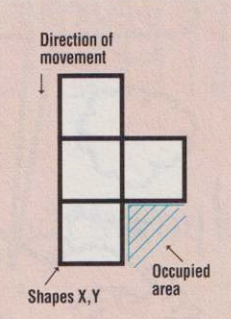
● *Figure I: The shapes used in the game*



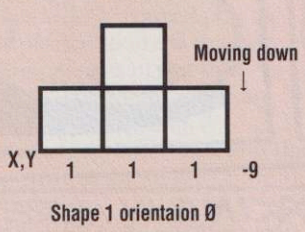
● *Figure II: How the bucket grid goes together*



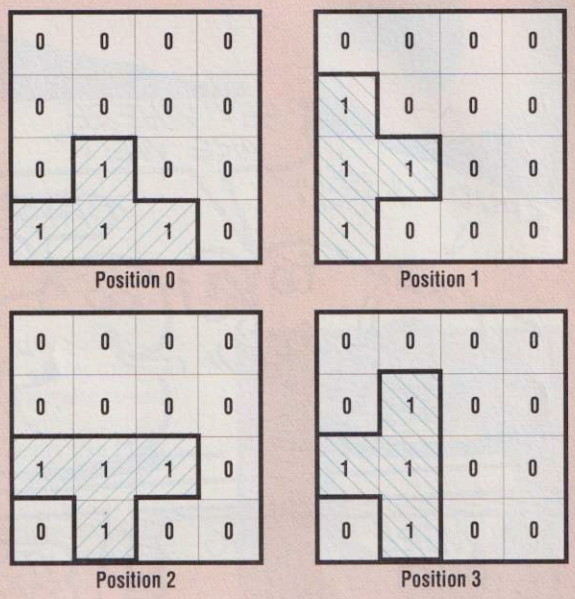
● *Figure VI: Checking for a right move*



● *Figure III: Testing for collisions*



● *Figure IV: Where to check for a collision*



● *Figure V: The various grids for shape 1*

with the blocks represented by 1s and the spaces as 0s it is easy to check what is moving where.

```
Q%(6,3,15)                    0  1  2  3
  | |  |                      4  5  6  7
  | |  4x4 grid number >      8  9 10 11
  | orientation              12 13 14 15
  shape
```

For example, if you hit the key for moving right, the collision routine checks through all 16 parts of the 4x4 grid row by row checking each column, Figure VI. The position the shape is to move to is checked for occupation by other blocks as is the edge of the bucket.

If a 1 is found where a corresponding 1 of your shape is, the move is cancelled. Again, checking is done left to right and much more simply than my other routine now I think about it – this inevitably occurs as you progress through a program. More elegant and efficient routines naturally evolve as understanding sets in.

The eagle has landed

Once a shape has landed, the grid information needs to be updated to accommodate the new state of affairs. Where the shape's blocks reside determine which part of the grid array is altered to 1s and is simply a matter of comparing the shape's X, Y and 4x4 grid 1s and 0s with the X, Y of the bucket grid's rows and columns.

Checking for a complete line is now easy as all lines are tested for a complete row of 1s stored in the grid array. If a 0 is found, the rest of a line need not be tested as the 0 indicates a hole in it.

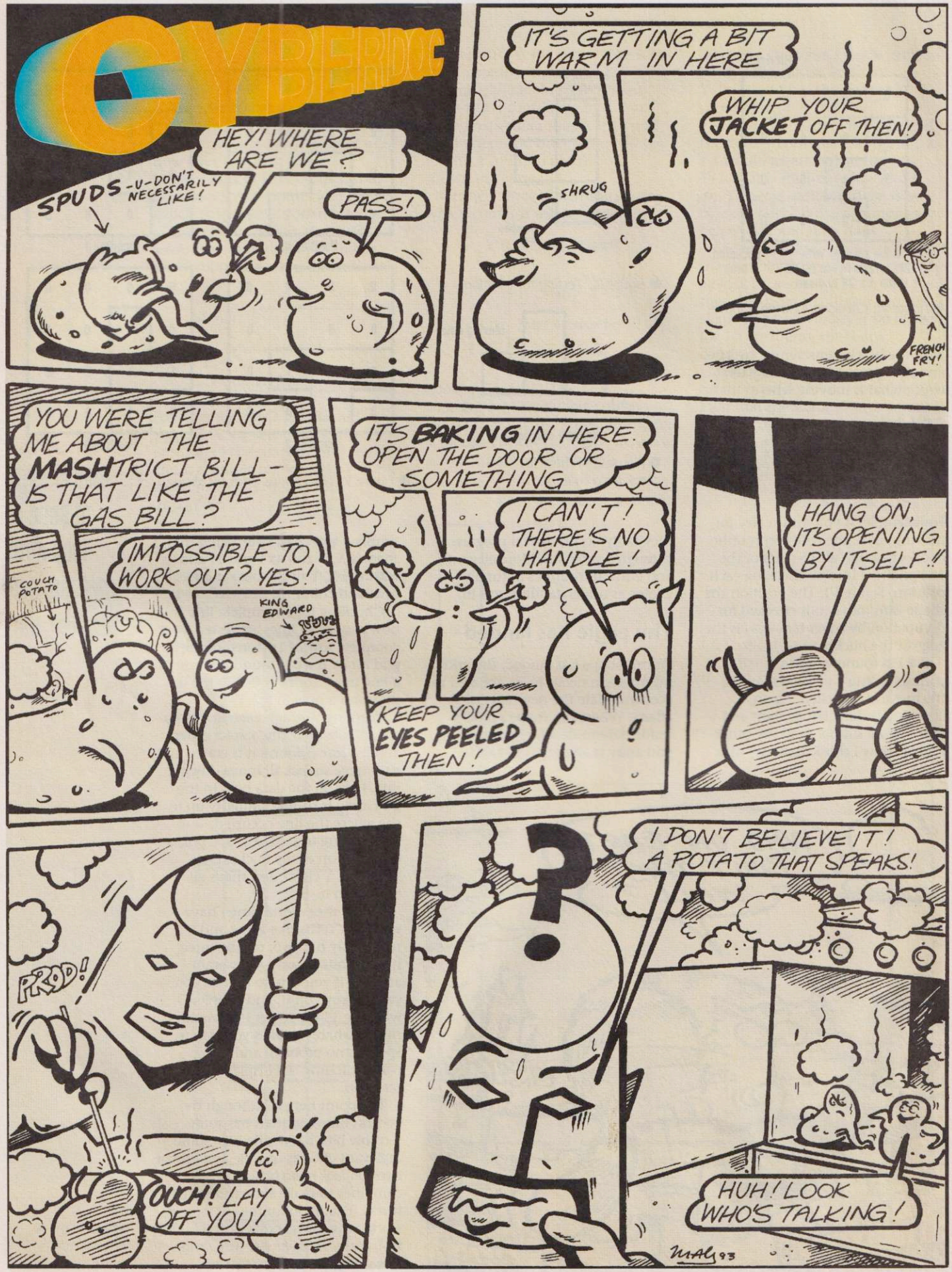
Working through each line from top to bottom is the correct order and if a line is found it is erased and the above shapes all move down a line. Here all the data held in the grid array is shifted similarly up to the where the line occurred.

Checking to see if a shape pokes over the top of the bucket is a simple X, Y check and that's all there is to it.

This is the second time I have written a Tetris-like game and it really only has two, maybe three, hardish bits to wrap your brain around. If you can do it once you can improve on it, and coupled with the 32-bit power the graphics can be whatever takes your fancy. Speed is no problem and using bankswitching the display can be seamless.

The point here is although the version I have written has some sensible bits, a few silly bits, some inelegant chunks of code and one or two *ooh look mum* bits, it all combines to make something that works. That'll do for me – if it works why mess about with it?

● *Anyway, someone else will always come along and do that for you!*


CYBERDOC
HEY! WHERE ARE WE?
SPUDS -U-DON'T NECESSARILY LIKE!
PASS!
IT'S GETTING A BIT WARM IN HERE
SHRUG
WHIP YOUR JACKET OFF THEN!
FRENCH FRY!
YOU WERE TELLING ME ABOUT THE MASHTRICT BILL- IS THAT LIKE THE GAS BILL?
IMPOSSIBLE TO WORK OUT? YES!
COUCH POTATO
KING EDWARD
IT'S BAKING IN HERE. OPEN THE DOOR OR SOMETHING
I CAN'T! THERE'S NO HANDLE!
KEEP YOUR EYES PEELED THEN!
HANG ON, IT'S OPENING BY ITSELF!!
PROD!
OUCH! LAY OFF YOU!
I DON'T BELIEVE IT! A POTATO THAT SPEAKS!
HUH! LOOK WHO'S TALKING!
MAL 93

What's cookin'?

The CyberDoc checks out some baked tatties

BAKING potatoes? What's it got to do with science? It's just cooking! That couldn't be further from the truth as this simple simulation has a huge amount of science in it, all stemming from baking potatoes.

Baked spuds are just put into a hot oven and left there. In this version the oven is at 200 degrees Celsius and the potato starts at a typical room temperature of 20 degrees.

Now I'm no cook, but I've decided to say that a potato is cooked when the middle has reached a temperature of 150 degrees. The question is: How long will it take?

You can decide on the size of your spud from a totally tiny 2 by 1 centimetres up to an exceptionally enormous 19 by 18 centimetres. The tuber – a simplified oval affair – is put in the oven and timing begins.

People who've cooked potatoes will be pleased to know that the program operates in fast time. Otherwise, you might sit for an hour and a half waiting. A continuous display of time and the temperature at the centre of the spud is shown.

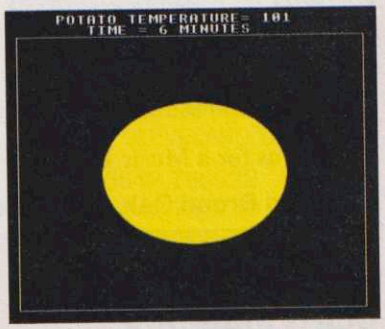
The task for good scientists is to find out what factors affect how long it takes to cook the potato. This probably means you'll need to use a note pad to record what you've done.

Mind you, there are other factors which haven't been considered. Different varieties of potato might need different times and I hope you all remember to pierce the skins on the spuds. It's a messy job to clear up if you don't.

Any experts out there who can give me help on all the factors which affect cooking time are welcome to send them in as I'd really like to enhance this simulation to be more realistic.

Anyway you're welcome to modify my program: Why not improve the graphics or add a little sound – perhaps an alarm bell to sound when the spud is ready? Or how about a graphic explosion if a skin is not pierced?

● *Now a lousy joke about potatoes from my part of the world. Why do they eat baked spuds in Calne? Because they haven't got the Devizes for Chippenham. And that's it for this month. Next time we'll have a look at another fascinating science topic.*



● *Our tuber is a simplified affair*

```
  10 REM SPUD COOKING
  20 REM by the CYBERDOC
  30 REM (c) Acorn Computing
  40 MODE1
  50 REPEAT
  60 PROCinputs
  70 PROCdraw
  80 PROCcalc
  90 PROCdisplay
 100 UNTIL0
 110 DEFPROCinputs
 120 OT%=200:PT%=20
 130 REPEAT
 140 INPUT''"How long is the potato ",L
%
 150 UNTILL%>1 AND L%<20
 160 REPEAT
 170 INPUT''"How wide is the potato ",W
%
 180 UNTILW%>0 AND W%< L%
 190 PRINT'''"PRESS SPACE TO START"
 200 REPEATUNTILINKEY-99
 210 CLS
 220 ENDPROC
 230 DEFPROCdraw
 240 MOVE100,100:DRAW 1180,100:DRAW1180
,924:DRAW100,924:DRAW100,100
 250 VDU29,640;512;
 260 GCOL0,2
 270 MOVE0,0:MOVE0,W%*20
 280 FORN=0TO360
 290 MOVE0,0:PLOT85,SINRADN*L%*20,COSRA
DN*W%*20
 300 NEXT
 310 VDU29,0;0;
 320 ENDPROC
 330 DEFPROCcalc
 340 T%=0
 350 REPEAT
 360 PRINTTAB(7,1)"POTATO TEMPERATURE=
";PT%
 370 PRINTTAB(10,2)"TIME = ";T%;" MINUT
ES"
 380 PT%=PT%+OT%/(W%*5)*100/PT%
 390 IF PT%>150 PT%=150
 400 TIME=0:REPEATUNTILTIME>100
 410 PRINTTAB(7,1)"
    "
 420 T%=T%+3
 430 UNTILPT%=150
 440 PRINTTAB(7,1)"POTATO TEMPERATURE=
";PT%
 450 ENDPROC
 460 DEFPROCdisplay
 470 CLS
 480 PRINT''"POTATO SIZE = ";L%;" BY ";
W%;" CENTIMETRES"
 490 PRINT''"TIME TO COOK = ";T%;" MINU
TES"
 500 PRINT'''''"PRESS SPACE TO START AG
AIN"
 510 REPEATUNTILINKEY-99
 520 CLS
 530 ENDPROC
```

GET IT RIGHT

```
 10 =    0 0
 20 =    0 0
 30 =    0 0
 40 = EA3A A
 50 = BFBA E
 60 = 7511 4
 70 = 68F5 3
 80 =  702 5
 90 = 2F83 5
100 = 53CE 0
110 = 1590 E
120 = 932A 8
130 = BFBA A
140 = F42A B
150 = ED8F C
160 = BFBA 5
170 = CFDF D
180 = D35B 7
190 = A1C9 6
200 = DD9E 7
210 = 7A16 1
220 = EDOF 5
230 = 8202 2
240 = 5436 6
250 = D818 A
260 = 334C B
270 = 910B A
280 = 4B8E C
290 = CF97 1
300 = 2C83 C
310 = EF74 F
320 = EDOF 2
330 = EDF5 7
340 = 9766 F
350 = BFBA 8
360 =  4C0 0
370 = A0A3 5
380 = 15F8 B
390 = 8B1D E
400 =  CF2 B
410 = 9D8E D
420 = 7E1C 4
430 = 8761 5
440 =  4C0 F
450 = EDOF E
460 = C225 F
470 = 7A16 F
480 = 2211 B
490 = 82C9 7
500 = 76BB A
510 = DD9E 3
520 = 7A16 E
530 = EDOF 4
```

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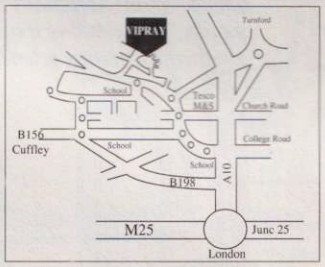

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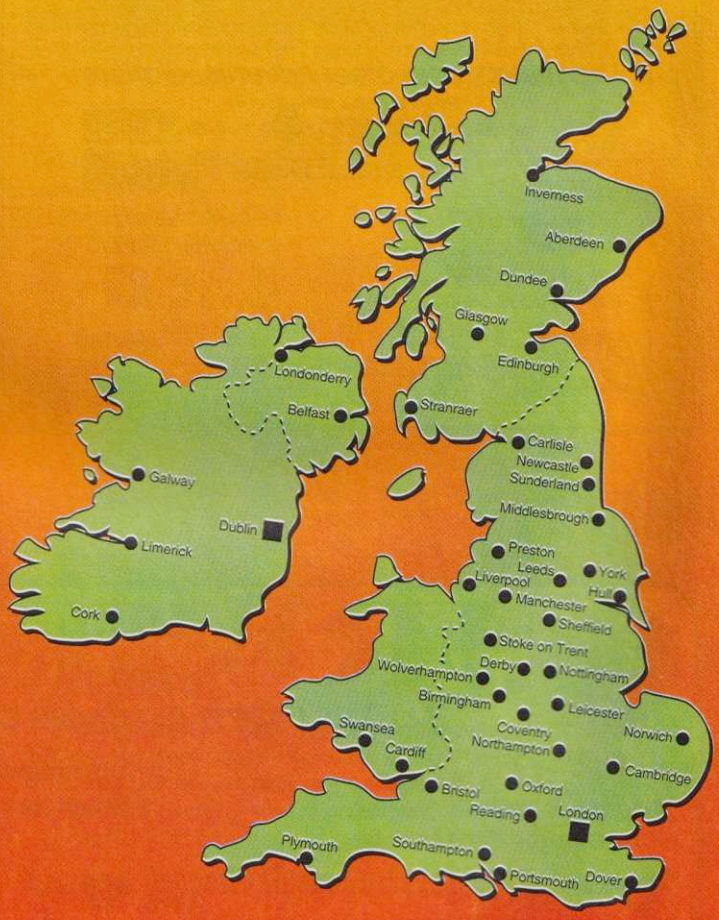

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CAD questions

I AM a student on an HND Product, design and manufacture course which involves producing a lot of technical drawings. Also I have just purchased the high density disk interface from Arxe Systems so that I can transfer files between the PCs at college and my A3000.

What I need is a CAD package to either load AutoCAD files directly or load DXF files. I have contacted several companies (Oak Systems and Minerva) but Graphics Ltd and Autodesk Ltd seem unwilling to send me specifications so I do not know what they have to offer.

Are there any other companies that do packages that might fit the bill and would be willing to send me details? I am willing to spend up to £200 (I cannot afford £400 for ProCAD). Finally a comparative test of such packages (in a not too distant issue) would be appreciated. **– Peter Holland, High Wycombe, Bucks.**

● *Hopefully you will now have seen the CADet demonstration on our January 1993 Megadisk and our review in the February issue. Though we don't have plans for a comparative review at present.*

Eprom problem erased

I HAVE been a reader of *Electron User, The Micro User* and the new *Acorn Computing* from about 1986 and have enjoyed them all. During that time I have handled many types of Acorn machine but love the BBC B the best of all and will not part with it.

In November's issue a letter from Roy McAllen asked about DIY Eproms. The book he needs is *The BBC Micro ROM Book* by Bruce Smith and printed by Collins. This gives circuit and instructions, plus a 136-line listing. All components are available from Maplin. Both 8K and 16K eproms (21 Volt) are covered. **– G.B. Patchett MBE, Stamford, Lincs.**

Worlds apart

AT the moment I have the desktop and I have Basic but ne'er the twain doth meet. I can't even print out any graphics I may draw in Basic let alone persuade DrawPlus to have anything to do with them.

Or am I expecting too much of my machine? **– M.T. Webb, Durbanville, S. Africa.**

● *It is not impossible to use Basic to create draw files but I suspect that is not really your problem. All you have to do is have your Basic program issue:*

```
*SCREENSAVE filename
```

This will create a Sprite file of the screen on the disk you have saved to. You can then load the file into !Paint or !Draw and print them out – you get better printing from !Draw.

Interesting characters

I RECENTLY discovered a routine, written for the BBC B which rotated letters of text by 90 degrees so that labels can be written on graph axes. I thought it would be a good idea, and good exercise for my brain, to produce a similar routine for my Master 128 and to extend this so that 180 degree rotation was possible. My efforts have failed and so I am seeking your help and advice.

I am aware that the characters are formed by an 8x8 matrix (in all but Mode 7 or 135) and that the numerical value of each line is then stored as a byte in eight consecutive memory locations. Examination of the character set suggests that a large number of the letters are formed with the eighth byte being zero.

For the BBC B characters are stored in locations starting at &C00 – this was clear from the routine found. My Master manual suggests that locations starting at &B900 in rom and &8900 in ram are used for storage of default and current character sets.

However if I print out the contents of successive locations starting at &B900 and &8900 using PRINT ?(&B900) I find that what I might expect to be comparable locations contain different contents and that I do not get a regular pattern of zeroes. In fact there seem to be very few zeroes. Searching for the byte pattern for the A (60, 102, 102, 162, 102, 102, 102, 0) also failed. **– C.W.G. Spencer, Loughton, Essex.**

● *There are two problems here. First of all, even on the BBC B the character definitions are not stored at &C00, the single page &C00-&CFF only has enough room for 32 characters. This is, in fact, used to store characters that are being redefined.*

However, the reason you can't find it on the Master is that it has a rather complicated memory map and two separate parts of memory are mapped on to the same address area. This is all incidental because it's best not to access memory directly anyway.

In order to acquire a character definition you can use an operating system call that will work on any 8-bit BBC Micro, Osword 10. Here's a procedure that gets the information you want:

```
DEF PROCreadchar(C%,B%)
LOCAL A%,X%,Y%
X%=B%MOD256:Y%=B%DIV256
A%=10:?B%=C%:CALL&FFF1
ENDPROC
```

The entry parameters are C% which is the Ascii code of the character you want to find and B% which is the address of a buffer to store the information – it needs to be at least nine bytes long. On exit the first byte of the buffer equals C% and the character

Train spotting

PRIZE LETTER

IN Problem Solved Barry Tabrah inquired about controlling a model railway from a computer. When I had a Beeb I had a similar interest and I used a couple of books which may be useful to him.

They are: *Electronic Circuits for the Computer Control of Model Railways* by R.A.Penfold, published by Bernard Babani (Code BP180) ISBN 0-85934-154-2, priced £2.95, and *Computer Projects for Railway Modellers* by Roger Amos and Martin Cock, published by Patrick Stevens Ltd ISBN 0-85059-796-X, priced £4.99.

On a recent subscription disk there was a Rhapsody 2 demo and a Rhapsody file, PoulencI+ in the ScoreDraw directory. According to the ReadMe file this could only be played with the full Rhapsody 2.

However there is a way round this: First copy !Rhapsody on to a disk with about 300k free. Open it by Shift+double-clicking on its icon. Delete one of the four music files, copy PoulencI+ (or any other Rhapsody file) into !Rhapsody and rename it with the name of the deleted file. Then launch !Rhapsody, making sure the Filer has seen !System. **– Theo Markettos, Liphook, Hants.**

definition is in ?(B%+1) *to* ?(B%+8).

For example to find out the character definition of the letter A, you could use:

```
PROCreadchar(ASC"A",&70)
```

The definition will be located in &71 to &78.

Shut the window

My A5000 mouse developed a fault where the pointer would not always move when the mouse moved. This had all the symptoms of a cable fault, especially as the problem disappeared when I reached my hand to the back of the mouse and held the cable. With a new cable, all seemed well – for a while.

The problem returned and I got fed up. A friend suggested trying a Clares mouse and I was very pleased with it until the problem reared its ugly head again. Two different makes of meeces with the same fault? Most unlikely.

It then occurred to me that it was only really bad in hot weather. Then it dawned: An optical mouse and infra-red light from the sun shining through the gaps between the keys. Close the curtains, problem gone. Not really the manufacturers' fault but I let them know anyway. **– Alan K. Baker, Hove, Sussex.**

The rare breed

I AM 10 years old and have been programming since I was seven. My dad, now a computer network manager, taught me BBC Basic. Now he has moved on to a PC but I still like programming on the BBC Master.

Computer programming is my main interest but I know no one who shares it. A few people I know can program but either not very well or in a different computer language. Could you please help me?

I would be grateful for the names and addresses of children my age who have roughly the same knowledge of BBC Basic as myself. It doesn't matter where they live and, although I would prefer someone in my area, another country would be all right. Please reply to my plea. **–Matthew Jack, Fareham, Hants.**

● *Enjoying programming for its own sake is rare, though our Editor is one of that breed. But there are more who like it in our market because the Acorn machines are so easy to work with.*

If anyone would like to respond to Matthew they can do so via the magazine. We will forward your letter to him.

Speaking to PCs

I FOUND your review of the Aleph One 386PC board useful and informative. I hope that in due course you will do a similar job for the Watford equivalent which promises to be slightly faster.

The point of my letter, however, is to ask about the whereabouts of a product called PC Link. This was announced by a company called DT Software around September of last year with a quoted price of £169.95 plus VAT. I cannot recall seeing anything of it since. The promise was of a system comprising two expansion boards, one to be plugged into the Arc, one into a PC, linked by cable. The advantages of such a system would be twofold: Price and expandability.

If it is available and if it works a linking system such as PC Link would be my preferred option to linking with the PC world I do hope that you can find your way to producing a review. **– A. Swindells, Preston, Lancashire.**

● *PC Link is not yet available however Acorn-PC connectivity is not much of a problem nowadays even without it. Using the appropriate software a Risc OS 2 machine can easily read and write PC disks, and Risc OS 3 computers have the software built-in. If you PC emulator or PC board data can be copied directly into the hard disk partition.*

With the PC board you could also use LapLink to communicate with other PCs.

Damaging preconceptions

THE comments made by Geoff Brown in his review of Cascade in the September '92 *Micro User* will probably reverse the current tide of new games and game producers entering the Archimedes marketplace. I, like many others, am currently coding several games and hope to set up my own company to market them.

It is disheartening to think that when games from new companies arrive at your and other magazines' offices you treat them with an attitude of utter contempt. The *people who think they can write good games* are the future of the Archimedes game market.

Archimedes owners cannot simply wait for Atari and Amiga games companies to timidly venture into the Arc world: That way we will be waiting forever. We have to encourage smaller, Archimedes-only companies, to produce superior Archimedes-only games.

So please don't ignore the disk in an envelope with hand-written instructions and go straight for the latest from 4th Dimension or Krisalis in the shiny full-colour box, because you could be condemning the future of the Archimedes. **– Ben Jefferys, Billericay, Essex.**

Geoff Brown replies: *The difficulty that games writers have on the Acorn 32-bit machines is that they have very often emerged from the isolated world of the 8-bit BBC Micro.*

In this world a single person could sit down and knock out a great game in a few weeks. The graphics weren't great so you could get away with it if you couldn't draw. And music could be ignored if you didn't have skill in that area.

But in the big bad world of 32-bit games you just can't get away with inferior products, you need quality graphics, quality sound, smooth programming and excellent design. And it is extremely rare to find all these skills in one person. Break 147 is a superb piece of programming and an excellent game but the title screens are terrible.

If we get a game from a known manufacturer we have a good idea what to expect, if it's unknown, nine times out of ten it will be poor.

But we always look and we're always pleased to be wrong.

All programs printed in this magazine are exact reproductions of listings taken from the running programs which have been thoroughly tested.

However, on the rare occasions when mistakes occur, corrections are published as a matter of urgency.

Should you encounter error messages when you type in the program, they will almost certainly be the result of your own typing mistakes.

Unfortunately we cannot answer personal programming queries concerning mistakes. Of course letters about suggested errors will be investigated without delay, but any replies found necessary will only appear in these pages

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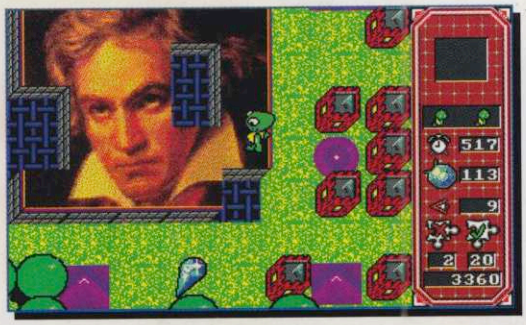

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