

BBC

A5000 • A3000 • ARCHIMEDES • BBC •

THE BEST
SELLING ACORN
COMPUTER MAGAZINE

187 1

£3.65

ACORN USER

APRIL 1992

STILL ONLY
£1.60

TV SPECIAL

CELEBRATING A
DECADE OF THE
BBC MICRO



WIN A ROLAND KEYBOARD

TRY OUR EASY-TO-
ENTER CONTEST

ACORN REPLAY

THE FUTURE OF
MULTIMEDIA?



ART WORKS!

EXCITING
GRAPHICS FOR
THE A3000/ARC



PUBLIC DOMAIN • CHORDS PROGRAM • LATEST GAMES

The Complete Upgrade Solution



**Qualified
Dealer**

8Mb Memory

- Uses only eight RAM devices
- Suitable for A440, A400/1 & R140
- Fully RISC OS compatible
- Four layer printed circuit boards
- Courier collection & fitting included

8 Mb upgrade - £499

410/1 Memory

- 400 series RAM upgrade kits
- Supplied with full fitting instructions
- 410/1 to 420/1 requires 1Mb
- 420/1 to 440/1 requires 2Mb
- 410/1 to 440/1 requires 3Mb

1Mb - £35 2Mb - £64 3Mb - £98

A310 Memory

- Includes free MEMC10 upgrade
 - Four layer printed circuit boards
 - Courier collection & fitting included
 - Free MEMC10 while stocks last
- 2nd Mb - £99 4th Mb - £199
2nd to 4th Mb upgrade - £115**

A3000 Memory

- Uses only eight RAM devices
- User upgradeable from 1 to 4 Mb
- Four layer printed circuit board
- Low power consumption
- Available without RAM devices

Bare card - £35

2nd Mb Card - £56 4th Mb Card - £159

A540 Memory cards

- Uses only eight RAM devices
- Four layer printed circuit board
- Three cards may be fitted giving a total of 16Mb of memory

A540 4Mb upgrade - £275

Two memory cards - £520

Three memory cards - £749

ARM3 Upgrades

- 3 to 4 times performance increase
- Surface mount technology
- Four layer printed circuit board
- Suitable for all ARM2 based machines

25MHz ARM 3 upgrade - £199

Collection delivery and installation on all machines - £35

A5000 Memory & Drives

- Increases A5000 memory to 4Mb
- Upgradeable from 4 Mb to 8Mb
- 4Mb to 8Mb price includes installation
- High quality Four layer circuit board
- No special tools required

A5000 4Mb RAM - £110 4Mb to 8Mb RAM - £399

A5000 2nd 105Mb IDE drive - £299

VIDC Enhancers

- Increases resolution with all Multiscan monitors
- Doubles desktop work area
- Custom modes for Toxon and Elzo monitors
- Includes Mode designer software
- Free with any multiscan monitor from Atomwide

VIDC Enhancer - £25 A540 mode software £5

Syquest removable disk systems

- Including One cartridge, drive unit and all cables
- 42Mb removable cartridges
- High-flow fan fitted for improved cooling

Atomwide Syquest drive unit - £425

Drive unit with Oak SCSI card - £599

Spare 42Mb disks - £55

Quantum SCSI Hard disc's

- Including drive, metalwork and all cables
- Fast 16ms access 64K cache
- slim line disc two drives may be fitted in one frame
- Available as internal or external units

52Mb internal - £199 105Mb internal - £299

210Mb internal - £599 425Mb internal - £949

Oak 16bit card - £175 External unit add - £75

DTP & Monitors

- Impression II DTP package **£130**
- Impression junior DTP package **£70**
- LBP4 printer including sheet feeder **£1045**
- Elzo 9060 **£399** - Elzo 9070 **£599** - Elzo T5601 **£1025**
- Toxon 795 **£490** - Toxon 875 **£775**

All monitors come with a Free VIDC enhancer
Carriage on all monitors is £7

Acorn Machines

- A5000 & A5000LC - Free 4Mb upgrade
- A540 - Free 4Mb rom card giving 8Mb
- A3000 & A3000LC - Free 2nd Mb RAM
- A5000 - £1499 A5000LC - £1531**
- With Elzo 9060 monitor A5000 - £1699 A5000LC £1731**
- A3000 - £599 A3000LC - £642 A540 - £2495**



- All products are cross-compatible
- Combination deals available on all products
- Dealer enquires welcome
- Phone for full details on all products



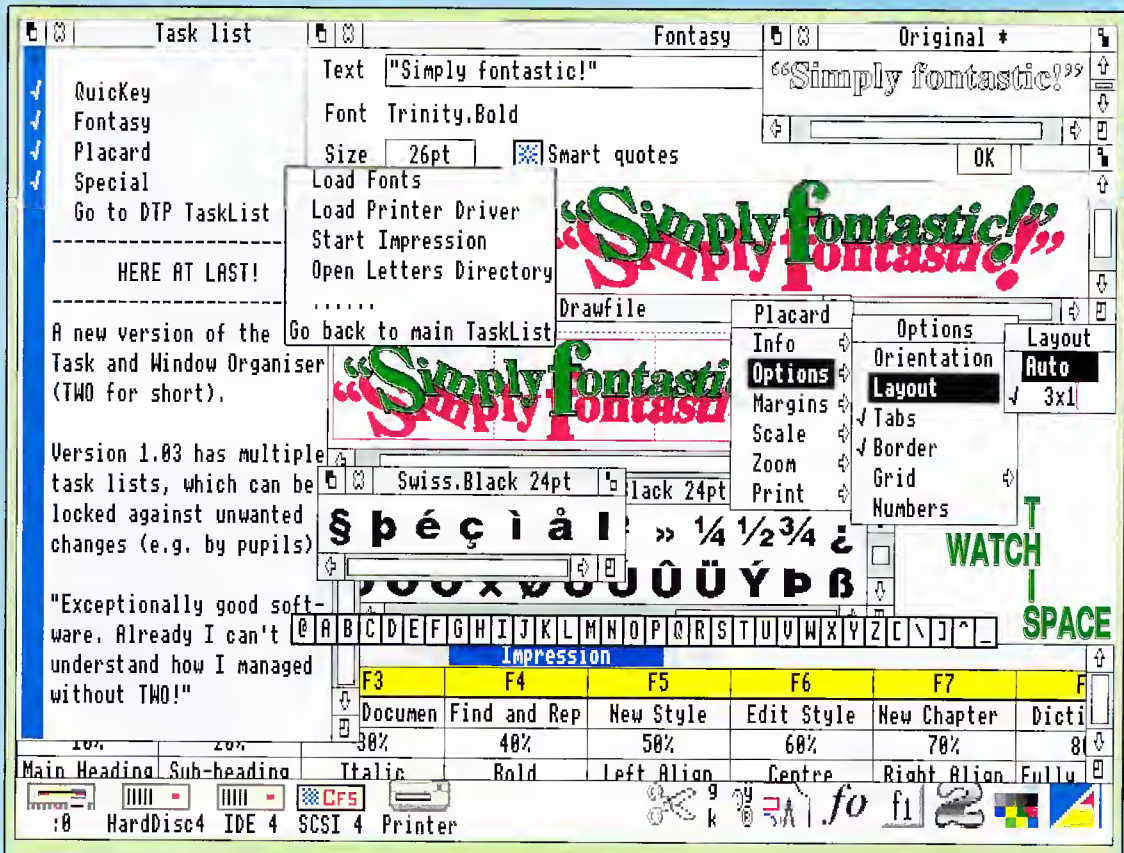
All prices exclude VAT at 17.5% but include delivery with the exception of monitors



ATOMWIDE

23 The Greenway Orpington Kent BR5 2AY Tel 0689 838852 Fax 0689 896088





Special

The simple answer when you need those funny characters. Also useful for viewing new fonts.

● **Only £10 (Site Licence £30)**

Fontasy

"Brilliant" – Micro User

"Very impressed with the ease of use and the control available." – Archimedes World

"Good value for money" – BBC Acorn User

Placard

The intelligent way to print draw files across several sheets of paper.

DrawBender

The genuinely flexible draw file moulder.

● **Buy Fontasy, DrawBender and Placard for only £45 (Combined Site Licence £80)**

QuickKey

"Just what you've always wanted ... so simple ... an essential utility." – Micro User

TWO

"Worth the asking price for the window tidying options alone. Something to offer everyone." – Archimedes World

"Really neat. Fontasy, QuickKey and TWO are so useful you wonder how you ever managed without them." – Micro User

Existing users please send disc and 12 first class stamps for update plus new manual.

● **Buy QuickKey + TWO for only £30 (Combined Site Licence £80)**

Please turn to our double-page price list for more information and ordering details. Or call our telephone number for friendly advice.

ICS

051-625-1006

PIPEDREAM4

Imagine a flexible word processor in which you can use fonts and pictures to give stunning presentation to your letters and reports. And a 93,000 word spelling checker and user dictionaries for letter-perfect writing.

Imagine the most powerful spreadsheet package on the Archimedes. Background recalculation so you carry on working while it computes. 160 built-in functions, plus a programming language for your own custom functions. Arrays within slots for easy manipulation of structured data.

Imagine dynamic charts straight from your data. Multiple scales to compare trends. Personalised Penguin Graphics with bars filled by your own draw files to dazzle your friends and colleagues.

Imagine a fast and compact database package with full sorting, searching and selection criteria. With links straight to the word processor for printing mailshots and labels.


Imagine user-friendly features such as configurable menus, template files to start new documents from, and automatic fitting of column widths to the data.

PipeDream 4
the works
Free your imagination.

RRP £196+VAT. Call for education prices and site licences. PipeDream 4 is ideal for any Archimedes, A3000 or A5000 with 2MB RAM or more.

COLTON software

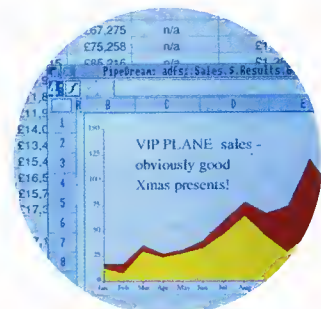
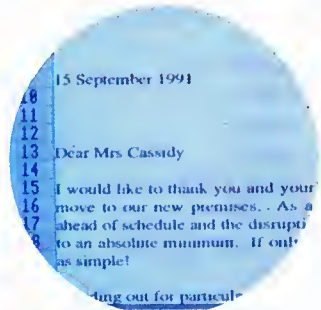
Coltonsoft Limited
2 Signet Court
Swanns Road
Cambridge
CB5 8LA
Tel: (0223) 311881
Fax: (0223) 312010

For a free  brochure, complete and return this coupon.

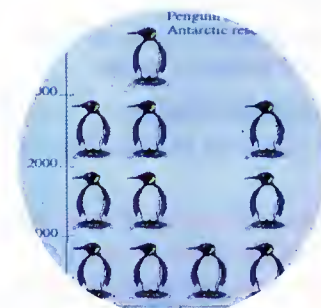
Name _____

Address _____

Postcode _____



Grid x	Grid y	Munro	Area	Chap	Pa
2265	7264	48	SH	13	12
2134	8345	45	WH	11	13
2970	7732	46	CG	7	17
2266	7263	44	SH	13	17
2418	7875	43	CH	14	
2212	7663	47	CH	8	
2144	8263	42	WH	10	
2470	7746	41	CH	15	





COVER ILLUSTRATION
DANNY JENKINS

Editor Barry Monk
 Assistant Editor Karen Donaghy
 Technical Assistant Paul James
 Art Editor Tony Judge
 Editorial Assistant Sarah Burns
 Advertisement Manager Duncan Pringle
 Deputy Advertisement Manager Richard Power
 Sales Executives Areef Vohra, Jack Manzoor
 Ad Production Fiona Andrews
 Production Manager Jennifer Jeffrey
 Publisher Seamus Geoghegan
 Publishing Director Michael Potter
 Editorial Director Christopher Ward

Published by Redwood Publishing, a BBC Enterprises Company, 20-26 Brunswick Place, London N1 6DJ. Tel. 071-490 1444 Telecom Gold 10081-RED001, Micronet 919992492. Bureau setting and ad typesetting by Bold Gray Design, 52 Rosebery Avenue, London, EC1R 4RP. Colour by Trumps Studio, Ware, Herts. Printed by Riverside Press, St Ives PLC, Gillingham. Distributed by BBC Frontline, Park House, 117 Park Road, Peterborough. © Redwood Publishing 1992. All rights reserved. Acorn is a registered trademark of Acorn Computers Ltd. Redwood Publishing is a registered data user. ISSN 0263 7456.



Members of the Audit Bureau of Circulation

PRODUCED ON THE ARCHIMEDES

All the editorial pages in BBC Acorn User are produced on a DTP system using Acorn Archimedes 440/1 and A540 computers, Computer Concepts' *Impression 2* with Laser Direct printers and Taxan monitors

NEWS	7
EDUCATION	13
COMMS COLUMN	15
GRAPHICS COLUMN	16
NEXT MONTH	18
LETTERS	22
QUESTIONS AND ANSWERS	24
SUBSCRIPTIONS	29
SPECIAL NEEDS	50

We look at a selection of hardware that can help in the classroom

FACE-BENDER	53
-------------	----

A BAU animation program to type in

TV PREVIEW	54
------------	----

Don't miss the special TV programme, to mark ten years of the BBC micro

ARC ASSEMBLY	57
--------------	----

More help with your programming prowess

CHORDS	62
--------	----

Learn to make music with our special BAU program

★INFO	65
-------	----

More advice and examples from our monthly selection

PUZZLE PAGE	84
-------------	----

SMALL ADS & ORDER FORM	85
------------------------	----

TRACE	89
-------	----

A software package to convert from sprite to Draw file

MEMORY UPGRADES	91
-----------------	----

Think your A310 needs more Ram? We look at four leading upgrades

ARTWORKS	95
----------	----

The exclusive review of an exciting new design program

HARD DISC COMPANION	101
---------------------	-----

Backups made easy? We test out the latest version of Hard Disc Companion

REPLAY	103
--------	-----

Moving video images on the Arc are finally a reality

FAX PODULE	106
------------	-----

Sending a fax can be as easy as printing a page. We examine the evidence

PUBLIC DOMAIN	109
---------------	-----

Check out the diverse range of free software

GAMES	112
-------	-----

The latest releases for all Acorn gamers

HELIX BASIC	115
-------------	-----

A new approach to programming put through its paces

COMPETITION	120
-------------	-----

Win a Roland music keyboard!

95 ARTWORKS



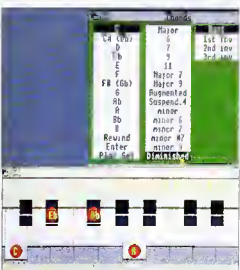
62 CHORDS



120 COMPETITION



103 REPLAY



U	Utility Disc 1	£18
	Utility Disc 2	£18
	Utility Disc 3	£18
	Utility Collection	£21
V	View-Mac 3	£85
	- Arc/Mac Cable	£24
	Vox Box	£47
W	Waterloo	£25
	White Magic	£14
	White Magic 2 + Designer	£14
	Wimp Game	£14
	Wonderland	£22
	Words and Pictures	£17
	World Championship Boxing Manager	£17
	World Geography Maps, drawfiles	£20
	World Map Study, age 7-16	£23
	WorldScape	£15
	World Wildlife, sprites	£16
	Worra Battle	£13
	WorraCAD	£75
	Worra Plot	£24
X	X-File	£17
Z	Z88, A Dabhand Guide	£15
	Z88 Pipe/Dream Guide	£15
	Zarch	£14
	Zelanifas	£14

Fan Filters (pack of 10)	ICS	£4
FaxPack	CC	£289
Monitor Stand for A3000	ICS	£18
*TouchWindow	Linds	£234
Whisper Fan Quietener	ICS	£15

HIGH QUALITY 3 1/2" FLOPPY DISCS		
Pack of 10		£10

PRINTERS		
ArdLaser	Calligraph	£895
ArcServer	Calligraph	£985
Bubble Jet BJ-10e	Canon	£205
Bubble Jet BJ-300	Canon	£360
Bubble Jet BJ-330	Canon	£405
Laser Direct HRes4 with 50-sheet tray	CC	£319
- 250-sheet Paper Cassette		£99
Laser Direct LBP-4	CC	£1280
Laser Direct LBP-4 Card	CC	£1280
Laser Direct Dume	CC	£749
LBP-4	Canon	£859
Refill toner cartridge for Canon EPS		£50
New toner cartridge for Canon LBP-4		£59

SCANNERS, DIGITISERS		
ArcScanner including Epson GT-4000		£1600
	Clares	£1600
FaxScan	Speccatch	£94
FX9600AT + Maintenance	Amstrad	£375
Hawk V9	Wild Vision	£199
- A3000 version	Wild Vision	£278
Image (colour)	Itam	£589
Image Scanner	lola	£389
- Colour upgrade	lola	£98
I-Scan 200	Itam	£339
I-Scan 400	Itam	£589
Pineapple Colour Video Digitiser	Pineapple	£195
- A3000 boxed	Pineapple	£230
Scan-Light A4	CC	£277
- with Sheet Feeder	CC	£370
Scan-Light Junior	CC	£128
- A3000 Internal	CC	£128
Scan-Light Junior 256	CC	£199
- A3000 Internal	CC	£199
Scan-Light Professional	CC	£255
- as above + SCSI Interface	CC	£910
*Snapshot Colour Video Digitiser	Lingunaty	£195
- A3000 version	Lingunaty	£275
Spectra	RISC	£545
- A3000 Internal	RISC	£545
- A3000 External	RISC	£565
*Video Digitiser	HCCS	£49

PC PRODUCTS		
Andi Oddule	Baldon	£49
PC Adaptor (needed unless you already have an PC socket)	Baldon	£10
PC SWI (enhanced IC Control)	Baldon	£15
- bought with Oddule		£5

KEYBOARD COVERS		
Seal 'n Type (self-proof)		
- Archimedes / A5000	Kador	£14
- A3000	Kador	£14

FUNCTION KEY STRIP ORGANISER		
Arckey	ICS	£0.23
- pack of 4		£0.92

Thinking IDE?

We've got a brand new



After 1 1/2 years' experience in selling IDE products for Acorn computers (more than twice that of any rival), we are pleased to announce a new release of the IDE Filing System by ICS. Completely rewritten in the UK, the new ICS IDEFS offers improved speed and added features such as password protection.

Existing idea users can upgrade for just £15 + VAT, returning the old eprom afterwards. Please specify your interface type.

New customers should telephone ICS or contact their local dealer for information on our complete range of IDE hard disc upgrades.

FREE Compression WORTH £57!

when you buy direct or from participating dealers.

You may well find cheaper suppliers (and less advanced products). But our advice is

Don't take risks -

Ask for **ICS**

It's where the idea came from!

HARDWARE

A5000 COMPUTERS

2Mb Hard Disc Colour System	Acorn	£1499
- as above + Learning Curve		£1530

(Finance & special purchase schemes available)

MEMORY

Fitting extra unless otherwise stated		
↑ Fitting easy	↑ Fitting needs expertise	
A3000 2 Mb Non-upgradeable	↑ IFEL	£55
A3000 2 Mb Upgradeable	↑ IFEL	£63
A3000 4 Mb	↑ Atomwide/IFEL	£149
A310 2 Mb Upgradeable soldered	↑ IFEL	£39
- as above + MEMC1a		£149
- as above + MEMC1a + fitting		£200
A310 4 Mb soldered + MEMC1a	↑ IFEL	£225
- as above + fitting		£277
- as above + fitting + OS3 carriers		£298
A5000 2 - 4 Mb Upgradeable	↑ Atomwide	£109
A5000 2 - 8 Mb including fitting	Atomwide	£500
A5000 - 8 Mb including fitting	Atomwide	£591
A540 4 Mb	↑	£288

MISCELLANEOUS

*386C PC Expansion Card	Alaph One	£489
4-slot 4-layer Backplane	IFEL	£59
9090S Monitor	Etzo	£450
9070S Monitor	Etzo	£360
A300/400 Fan kit	ICS	£15
A310 RISC OS Carrier Board	↑ IFEL	£25
*A5000 Fitting Kit for second hard disc	ICS	£15
ARM4		£249
Clares Micro Mouse	Clares	£26
Dangle Dangle with screw fittings	ICS	£6

HOW TO ORDER

VAT: UK customers please add 17.5% to the total price, except for the zero-rated items marked V0. Our VAT number is 995 7258 84.

CARRIAGE IS FREE WITHIN MAINLAND UK IF YOU PAY ON ORDERING. Remember this when you compare prices!

Overseas carriage: If you are paying by credit card we will add airmail and insurance at cost. Otherwise please add £6 (Europe) or at least £12 (elsewhere) for each software item and send a pounds sterling bank draft payable in England, or Eurocheques for not more than £100 each.

Credit cards are welcome. We do not charge your account until your order has been fulfilled. The name and address for delivery of goods should 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.

Official orders are welcome. Payment is due in 14 days. Invoices are subject to carriage and late payment charges.

Site licences: please enquire if no price is shown.

All products, prices and specifications are offered in good faith and are subject to change without notice. Your order will receive our attention immediately, but suppliers sometimes keep us waiting. Goods are guaranteed but we do not supply them on approval.



AUTHORISED ACORN DEALER

ICS (Ian Copestake Software)

Dept B29, 1 Kington road, West Kirby, WIRRAL, Merseyside, L48 5ET

Te: 051-625 1006

Fax: 051-625 1007

Sherston

Software presents a unique collection of clip art

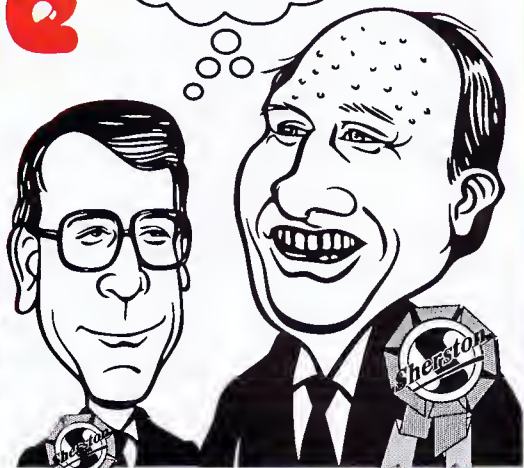
Split an Image

for the Archimedes, A5000 & A3000

THIS CLEVER CLIP ART GETS MY VOTE!

Now YOU can put words into the mouths of the rich & famous!

About 100 superb draw files of the best known people from politics, royalty, sport, pop music, TV & film! The mix and match bodies and locations included add to the fun and flexibility.



You've seen them all before but never like this!!



Only £19.95 + £3.49 VAT from Sherston Software Ltd, Swan Barton, Sherston, Malmesbury, Wiltshire. SN16 0LH Tel: 0666 840433



What our readers say

...I would like to congratulate the publishers of RISC User for producing an excellent journal, the presentation of which is neat and stylish and the content lively and informative...I think that now you have achieved a good balance between articles for the novice and advanced user...

K. Gomm

...I find your magazine to be the best available for the Archimedes range of computers, and I am sure I have obtained far more information about the workings of these machines than all the others I read.

D.A.Symes

...I must commend you on your most excellent publication that keeps my interest at all times.

N. Dennigan

...RISC User provides additional information not frequently covered in less specialised magazines.

M.Rozdoba

...Congratulations on your articles for beginners, we could certainly do with more of them.

J.H.Luxton

...I wish to congratulate you for the continued excellence and highly interesting nature of your magazine, and sincerely hope that you will be able to maintain these standards for a long time to come.

S.J.Hasleton

RISC User

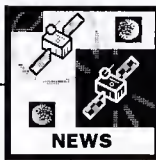
the most popular subscription magazine devoted to the Archimedes, A3000 and A5000 computers

For your subscription (£19.90 a year for UK) phone 0727 40303

or write to:

RISC Developments, 117 Hatfield Road, St. Albans Herts AL1 4JS

Quote reference M2 and save £1 off your subscription (subscribe for only £18.90)



BIGGER VENUE FOR 1992 BBC ACORN USER SHOW

WEMBLEY Exhibition Centre will once again be the venue for the *BBC Acorn User Show* this Autumn.

Following the success of last year's event at the Wembley Conference Centre, which attracted over 10,000 people, this year's show will be held in the larger hall three of the Wembley complex. This will enable visitors to be admitted more easily and help avoid the queuing problems which resulted from Wembley safety regulations last year.

The show dates are Friday October 16 to Sunday October 18 1992, although the organisers, Safesell Exhibitions, are also keeping options open on an extra day (possibly Thursday October 15) for a special educational preview.

Discussions are taking place with Acorn Computers concerning the company's involvement with the show. With



A bigger venue will cater for crowds expected at this year's show

Autumn being a key time for new products, it is likely that the company will once again use the show as a launchpad.

Meanwhile, a large number of exhibitors from the Acorn marketplace have already booked space and early indications are that the show will

be bigger and better than ever.

Watch *BAU* for more details in the near future – meanwhile, make a note in your diary for October 16 to 18.

Initial enquiries concerning stand space should be directed to Safesell Exhibitions. Tel: (0737) 814084.

NEWS IN BRIEF

● **THREE** Acorn A5000 computers are at the heart of a new in-store broadcasting system being used by Asda supermarkets. The superstore chain has set up its own AsdaFM radio station which broadcasts to its 150 outlets via the Astra TV satellite. The three A5000s control scheduling operations, CD jukeboxes and an ISDN (Integrated Services Digital Network) telephone line, which distributes signals to the satellite uploader. The system is provided by Norsat International subsidiary, In-Store Media. Norsat's European director, Tom Woodford, explained that A5000s were chosen because of their networking and multitasking abilities – which means any one machine could take over the functions of another, guaranteeing reliability. Archimedes are now controlling operations at four other independent local radio stations – two in the UK and two in Malaysia.

● **AROUND** 100 works of art created by sixth form students from the London Borough of Enfield are being displayed on an Archimedes computer, which has been loaned by Acorn to the Design Council in London. The computerised art exhibition is the culmination of a project run by the Borough of Enfield to provide students with some experience in computer graphics. Initial designs were drawn on paper or photographed and then transferred to computer by using Minerva Software's Atelier paint program on the Archimedes. The selection of resulting pictures was then installed on an Archimedes running an Acorn sprite slide show utility called Picture. The exhibition will be at the Design Council until the summer.

● **IN THE** March issue we stated that the price of the Aleph One PC card with 1Mb RAM was £595 plus VAT. It has since been reduced to £495 plus VAT.

● **ACE COMPUTING's** *Euclid* package was used to create and animate a ham sandwich for Central TV's series *People Who Count*. It will appear on April 1. Contact Ace Computing on (0223) 322559.

DIRECT COLOUR FOR THE ARC

AFTER the success of the Archimedes-dedicated LaserDirect printer range, Computer Concepts has turned its attention to the colour printing market. The result is ColourDirect, a 24-bit colour printing package based around Canon's brand-new BJC800 colour ink-jet printer. The BJC800 is a 360dpi (dots per inch) printer and, unlike some of the cheaper alternatives, the Canon is said to print true blacks resulting in superior contrast. ColourDirect print-outs seen by *BAU* were certainly impressive. Another advantage of the BJC800 is that it can print up to A3.

Rise OS only handles eight-bit colour palettes at present, which limits printed results to 256 colours, even though the Archimedes has a selection of 4096 colours. However, Computer Concepts' printer driver



The BJC800 used in the ColourDirect package from Computer Concepts

is 24-bit colour capable, to match the ability of the printer. This provision also anticipates future Archimedes video chip developments. CC also claims its printer driver code, which addresses the parallel port directly, is extremely fast and can work in the background.

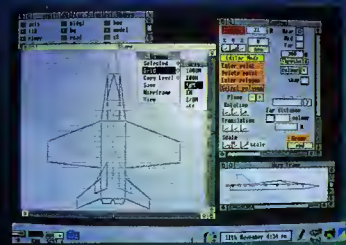
Computer Concepts sees

ColourDirect as a perfect match for the new *ArtWorks* package, as well as for existing *Impression* users. ColourDirect is due shortly and has a recommended price of £1995 plus VAT. At a later date, computer Concepts plans to sell the printer driver separately. Tel: (0442) 63933.

INCLUDES TWO FREE
GAMES CREATED USING
THE "FLIGHT SIM TOOLKIT"

FLIGHT SIM TOOLKIT

*The flight sim toolkit contains 5 Risc OS tools
which let you create your own flight simulator!*



!Shape – Design aircraft, building, runways, roads and rivers.



!Model – Aerodynamic a/c model editor.



!Cockpit – Design instrument panel and displays.
!World – Create your virtual world, set up enemy airfields, defences and supply lines.

RRP
£44.95





IDEAS FROM ANOTHER WORLD

KEEP an eye on the IBM PC-compatible market and, when a good idea comes along, make it work on the Archimedes. That is the strategy adopted by DT Software, which this month launches several new products.

First is a Floptical 21Mb floppy disc drive. This is a conventional looking 3.5in drive which has ultra-thin magnetic data tracks enabling a much greater recording density. Instead of the normal 135 tracks per inch (tpi) density, Floptical packs have over 1000tpi. A tiny LED optical sensor is used to guide the heads along laser etched grooves. It remains compatible with all existing 3.5in floppy disc media.

The Floptical drive is a SCSI device and DTS provides the necessary software for operation in the Archimedes environment. The drive is priced at £399.95 plus VAT and blank 21Mb discs will cost around £15 each.

Another new peripheral from DTS is Logitech's Fotoman camera. This is a black and white solid state camera which stores up to 32 pictures digitally in on-board Ram. Pictures are then downloaded to your machine via the serial port. DTS already sells an Archimedes camera system based around the Canon Ion



The Logitech Fotoman - digital image capture on the Archimedes

still-video camera. This system is colour whereas Fotoman is strictly monochrome, but the theory goes that Fotoman images will be considerably sharper, and of higher resolution because the image data is first-generation.

By comparison, analogue still-video images must first be digitised, a process which introduces a certain amount of distortion, and the luxury of colour must be paid for in lower resolution. The Fotoman camera can also take standard video camcorder lens attachments. An Arc Fotoman system is £553.15 plus VAT.

Finally, DTS has a new range of badged multiscan monitors sourced from Japan.

The range is made up of 14, 15, 17 and 21in displays. DTS points out that its monitors operate a scanning range of 15-38KHz, ideal for Archimedes screen modes, including modes 12 and 15. Other multiscan monitors often scan between 30-65KHz, which is not suitable for lower resolution screen modes.

The 15in and larger models also sport a four-setting video pre-set to minimise the need to constantly re-adjust the screen position when changing between certain screen modes. Prices are: 14in, £297.82; 15in, £485.17in, £680.80; and 21in, £1046.76 (plus VAT).

Contact DT Software on (0223) 841099.

NEWS IN BRIEF

● The Acorn Software Roadshow is to roll once more in May, with five venues between May 11 and 15, starting off in Aberdeen in Scotland and ending in London. The schedule is as follows:

May 11, Northern College, Aberdeen; May 12, Mid/South Scotland, (venue to be announced); May 13, Cleveland ECC, Morton College, Middlesbrough; May 14, Education Development Centre, Sandwell; May 15, ILEC Centre, London.

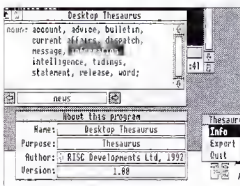
Another roadshow week is planned for November 23 to 27. For further information contact Acorn Computers on (0223) 245200.

● Dublin-based EMCEE Distribution Ltd has been appointed by Acorn as its sole distributor in the Republic of Ireland. EMCEE's task will be to build on Acorn's strength in Irish primary schools and increase the company's presence in secondary schools, where the main competition comes from Apple Macintosh computers.

Marketing director Mike O'Riordan said that he hoped Acorn Learning Curve packs would increase the number of Archimedes used by families at home, complementing those already used at schools. EMCEE will be flying the Acorn flag at Computex, Ireland's biggest computer exhibition, at the end of March. The Irish President, Mary Robinson, recently opened a new 20-Archimedes computer room at the Good Shepherd Primary School in Churchtown, Co Dublin.

● Sherston Software has just released Split an Image, a range of cartoon clip art in Draw file format featuring the likes of John Major and Frank Bruno. The cartoons were drawn by artist Paul Hutchinson and transferred to Draw format by Sherston who has ensured that the caricatures remain easy to edit in Draw. Also included are a range of bodies to attach the heads to, and a book on how to use Draw to make the most of them. The pack contains around 100 cartoons and costs £19.95 plus VAT. Contact Sherston Software on (0666) 840433.

WORDS AT YOUR FINGERTIPS



RISC DEVELOPMENTS has announced *Desktop Thesaurus*. Over 11,000 key words are linked to a dictionary of about 90,000 synonyms. All the user has to do is type a word into a window and suggested synonyms are listed in

grammatical groups. Risc Developments says *Desktop Thesaurus* will work with most applications which involve text editing, including *Impression* and *Ovation*, even though there is no standardised 'hot-linking' in Risc OS.

The dictionary can also be modified by the user. To save memory, data is accessed from disc where it is stored in compressed form. By the time this issue of *BAU* is out, *Desktop Thesaurus* should be on sale, at the very reasonable price of £19 plus VAT.

Computer Concepts is expected to release its thesaurus at a later date. *Word 4 Word* will be based on the *Collins Gems Thesaurus*. CC hope to make *Word 4 Word* work in the background, and with later versions of *Impression*, double clicking on a word will start the search through the thesaurus. The synonyms are then shown a window, and clicking on one will replace the selected word.

Contact Risc Developments on (0727) 40303 and Computer Concepts on (0442) 63933.



FASTER NETWORKING ON THE ARC

ETHERNET looks set to become a faster solution to networking on the Archimedes and BBC A3000. It can work up to 20-times faster than Econet and is rapidly becoming an industry standard for IBM PCs, Apple Macs and Unix machines.

Acorn first provided an Ethernet interface card for the Archimedes when the Unix-based R140 derivative was launched three years ago. Now Atomwide Ltd has joined in by releasing a pair of Ethernet cards: one is 16-bit version for the Archimedes' standard podule expansion bus, and the other a compact (eight-bit) version for the A3000's internal slot.

Ethernet on the Archimedes can be used as a faster alternative to the traditional but



The A3000 version of Atomwide's Ethernet card

ageing Econet system. Alternatively, it can be employed as a way of attaching Arcs to existing Ethernet networks. Acorn already provides TCP/IP connectivity protocols for the latter, and the forthcoming Acorn Universal Network

system will provide Ethernet networks with an extended Econet-style environment, compatible with level four file servers. Both versions of the new card cost £229 plus VAT. Contact Atomwide on (0689) 838852.

SOFTWARE SHOW

WHETHER you are a first-time buyer or an expert, choosing software for business and home use can be a challenge. Which is why you should tune in to *The Software Show*, a 90-minute programme covering all you need to know about choosing and using software for profit. Aimed at both business and home users, there will be plenty of advice on choosing software for a variety of platforms, including the Archimedes.

Helpful case studies featuring companies and individuals making software choices will be included. The programme will also cover training, data protection, viruses and piracy.

The programme will feature an Archimedes in the studio, which will be running popular software, such as *Pipedream* and *Impression*. There will also be a special competition to win the software featured.

The programme will be shown on BBC 1 at 10.30am on Sunday March 29. British Summertime falls on this day, so be sure to set your clocks back by one hour!

WATFORD TO LAUNCH A NEW PC PODULE

FOLLOWING hot on the heels of the first Archimedes PC podule from Aleph One, Watford Electronics has revealed details of a rival PC podule designed by prolific ex-Computer Concepts hardware expert, Chris Honey.

Apart from sharing the goal of providing a full-speed hardware-based PC environment on the Arc, it is interesting to note that the two competing designs differ in more than just minor details. The Watford card will feature a 25MHz AMD 386SX PC chip, claimed to be 25 percent faster than the 20MHz Intel 386SX processor used by Aleph One. While Aleph One decided to interface its card with Acorn's new *PC Emulator*, Watford Electronics has chosen to design what is effectively a stand-alone PC which can live inside the Archimedes. In other words, Watford's card could have an optional keyboard and monitor attached to it and two people could use a single machine at the same time – one using Risc OS and the other Dos.

However, the card is designed to work with Risc OS, complete with a multitasking PC window and access to existing Risc OS hard disc partitions.

Chris Honey says his design route avoids the display limitations of the PC Emulator, which can only partially emulate a full VGA screen. The Watford card will have 256K of video memory for a separate VGA monitor, which will also be able to display the Risc OS desktop. 2Mb of system memory will be provided as standard and there is a socket for an optional maths co-processor. Other options include high density (HD) 1.44Mb floppy drives, which are now standard on the new A5000, and an expander to accommodate up to two half-size PC bus expansion cards.

Availability of the Watford card has yet to be confirmed, but managing director Nazir Jessa hinted that pricing would be very competitive with Aleph One's PC cards, which are already on sale. Contact Watford Electronics on (0923) 37774.

NEWS IN BRIEF

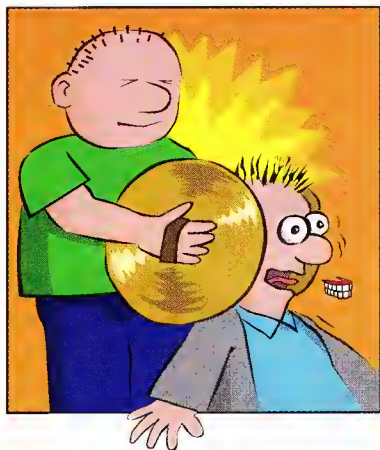
● **THERE** have been some changes in Acorn's marketing personnel line up. Most notable is the arrival of new education marketing manager, Peter Talbot, from Commodore (see education column page 13). Simon Woodward takes on some of departing Warwick Hirst's former responsibilities for valued added solutions, within a new professional solutions operation, covering initiatives such as the Professional DTP package.

Consumer division manager Bob Coates takes on wider responsibilities as general manager of consumer and international markets. Corporate affairs manager, Brian Salter, also gets more responsibilities and is now head of publications and events organisation.

The reshuffle took place after the Computer Shopper Show last December, which was not regarded as a success for Acorn. Although it had a presence at the show, Acorn's stand space was booked late and there was no time to capitalise on its presence.

● **CRADDOCK** Computer Systems (CCS) has revealed that it is designing a modular memory upgrade system which will enable A5000 users to plug in a total of 16Mb of Ram. The upgrade features a motherboard which brings total memory up to 8Mb. This involves de-soldering the A5000's surface-mount Memc1a controller chip, which is why CCS carries out this part of the fitting. Extra 4Mb upgrades, giving a potential maximum of 16Mb, are provided in the form of small 'daughter cards' which plug into the motherboard. Contact CCS on (0604) 760991.

● **HEWLETT-PACKARD** has introduced a double capacity inkjet cartridge for its Deskjet range of printers. The old version used a sponge to attract the ink to the business end of the cartridge. Ink reservoir space has been saved by eliminating the sponge and the cartridge case is now transparent so you can see clearly when the ink is getting low. The new cartridge has a typical life of about 1,000 A4 sheets. The cartridge is priced at £21 plus VAT.



COMPOSE YOURSELF!

Last week, Miss Brown was in a tangle. Her music class wasn't prepared in time. One group wanted to play the drums, but the music budget barely stretches to a tambourine. Another wanted to write its own music, but it all got rather messy. In the end, she got them all to sing a round song.

This week, Miss Brown is using *Notate*. Now composing music is easy — notes, rests etc. can be placed directly on the screen. Then the music can be played back immediately, and changes made to rhythm, tempo or pitch. When it's done, they're going to print out their piece — a nice neat copy for every musician in the class.

Next week Miss Brown is going to introduce 'Music of the World'. African rhythms, marches, rap, pentatonic scales — *Notate* can do the lot. It's even simple to move individual parts between tunes — ever heard the National anthem with a reggae percussion section?

Notate uses the standard Archimedes 'voices'. The computer can sound like anything from a cow bell to a trombone, from a melodic tom-tom to a hand clap. And up to eight of these 'instruments' can be played at once.

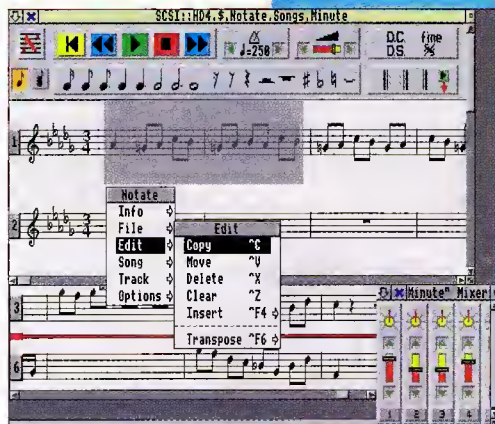
Miss Brown has a sound sampler attached to her Archimedes too, so she can record more of her own instruments. Including the human voice. So now three students are singing a barber shop quartet — the computer is humming the fourth part.

Whether you want to play percussion with seven year olds or think theory with seventeen year olds, **compose yourself — with *Notate*.**



Notate

DESIGNED IN THE CLASSROOM
FOR MUSICAL EDUCATION

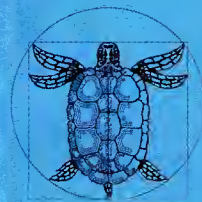


Notate offers the following features:

- ◆ Comprehensive support materials in the manual and on disk
- ◆ Up to eight individual staves
- ◆ A wide range of synthesised and sampled sounds
- ◆ Ability to use accidentals and repeats
- ◆ Full range of time and key signatures with control over tempo and volume
- ◆ Automatic checking of note length relative to the bar space remaining
- ◆ Easy-to-use tape recorder style control panel
- ◆ Chord facility
- ◆ Mixer controls to adjust stereo balance and volume of all tracks
- ◆ Configurable for different levels of musical skill
- ◆ Editing facilities which, like word processing, include cut, copy, move and delete within bars, staves or between compositions
- ◆ Up to four compositions editable simultaneously
- ◆ Ability to transpose single parts or whole compositions
- ◆ Export and import of MIDI format 1 files
- ◆ Ability to play via MIDI where a suitable interface is fitted.

Notate is available now, priced at £59.

A site licence for *Notate* costs £190 for a primary school and £330 for a secondary school.



LONGMAN
LOGOTRON

124 Cambridge Science
Park
Milton Road
Cambridge CB4 4ZS

Tel. (0223) 425558
Fax (0223) 425349

SQUIRREL

THE REVOLUTIONARY NEW
DATABASE FOR ARCHIMEDES COMPUTERS



FRIENDLY

Squirrel is the easiest to use database yet, allowing simple point and click database creation and queries.



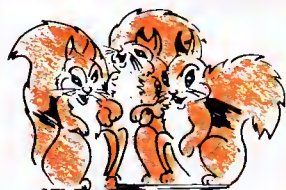
FAST

Modern indexing techniques mean superfast searches every time.



FLEXIBLE

Images, text and sound may be stored in the same database



NETWORK COMPATIBLE

Client/server design ensures that squirrel runs just as well on networks as standalone.



INTELLIGENT

Squirrel understands days of the week, months of the year and recognises files from other popular packages.



COMMUNICATIVE

Queries may be made onto other popular computers such as an IBM or Macintosh, even remotely over telephone lines.



REPORTING

Fully relational reporting with an entirely new graphic approach to data selection.



PROFESSIONAL

Quite simply, the most professional database for Archimedes users.

Single User Version
£129.00 + VAT

Econet/Site Licence
£516.00 + VAT

Suitable for Acorn A3000, A310 and A400 Series.

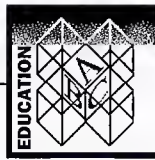
digital services

DIGITAL SERVICES LIMITED

9 WAYTE STREET, COSHAM, PORTSMOUTH, HANTS PO6 3BS

TEL (0705) 210600

AVAILABLE NOW



BULLETINS ON ECONET ROLLING IT

BULLETIN is a new software package from the Scottish-based company XOB, that will allow users to run a bulletin board on Econet-linked A3000/Archimedes machines.

One of the benefits of a computer network is the ability to send electronic messages. But while electronic mail is useful, it does not have the advantages of a bulletin board. With *Bulletin*, individual users may examine messages left by others and reply to them, or initiate discussion on various topics. These can range from examination answers to plans for a school trip.

Messages left on *Bulletin* can be replied to at any time and topics may be open to all users, or restricted to closed user groups.

Bulletin will operate on any Rise OS (A3000, Archimedes, A5000) computer connected to an Econet network. Clicking on the *Bulletin* icon bar will

open a window on the first board of messages. The user may then scroll the text up and down and read any messages, each of which has a date stamp, the name of the sender and the intended recipient. Using standard desktop techniques, the user may simply view the topics or contribute their own messages.

Bulletin supports up to 20 simultaneous 'boards' or topics, although it is possible to extend this number if required. All files are encrypted and may only be read by *Bulletin* and a special utility provided for the system manager - this allows closed user groups to be established on less sophisticated file-servers. Those using the SJ Research MDFS have extra levels of security available.

Bulletin costs £67 and is available from XOB, Balkeerie, Angus, DD8 1SR, tel: (0307) 84364.

MINERVA Software's *PrimeArt* package can now run rolling displays from pictures produced using the package.

The *PrimeArt Display Kit* utility allows pictures created using the primary art package to be displayed in sequence, making it ideal for classroom demonstrations.

The rolling displays are produced by dropping saved pictures on to the screens directory and clicking on the icon. It costs £12 plus VAT.

Also, a new version of *PrimeArt* has an option for use in high-resolution mode 21. Other new features include support for a Concept Keyboard, options for sticky menus and brush matching.

The new version of *PrimeArt* costs £79.95 plus VAT, including site licence. Existing users can upgrade for £10 plus VAT by returning their original discs. Contact Minerva on (0392) 437756.

NEWS IN BRIEF

● **ACCORDING** to a recent edition of *Private Eye*, junior education minister Tim Eggar caused some embarrassed giggles when he opened the BETT Show recently. During his tour he was introduced to Acorn's managing director Sam Wauchope and, considerably impressed by the power of the Acorn machines, suggested that it might be a good idea if they were, er, used in our schools. After a short silence, Eggar's guide informed him of Acorn's contribution to educational hardware (found in 85 percent of schools) before moving the minister on.

● **MEANWHILE**, as revealed in our news pages this month, Acorn has finally appointed ex-Commodore man, Peter Talbot, as the new manager of its education division. Talbot, 38, was national sales manager responsible for government and education business at Commodore Business Machines. A former teacher, he also spent a couple of years running Granada Business Centres in London. Acorn's sales and marketing director, Mike O'Riordan, said: 'With Peter's combination of experience of the education market, and of sales and marketing, I am sure he will bring to Acorn a wealth of benefits that will help us to continue our leading role within the education sector.'

● **A MAJOR** step forward in examination administration by schools has been developed using the Archimedes. Over 450 schools will be involved in the project for the submission of exam entries, managed by the University of Cambridge Local Examination Syndicate and Campus 2000, supplier of electronic information services to education. Most of the 'spade work' for the project was carried out on the Archimedes. The software was then ported over to PCs, on which the system will run, although there is the possibility of linking into the UCLES project with an Archimedes machine. Campus 2000 is jointly operated by BT and Times Network Systems, tel: 071-7B2 7143.

BIBLICAL EXPERIENCE

YOUNGSTERS can actually time-travel through biblical events, thanks to a new BBC A3000 audio-visual system. *Bibleworld* is a 20-minute journey put together by the National Bible Society of Scotland in Edinburgh.

It uses six A3000 computers, and has both sound and visual effects. Intrepid young 'time-travellers' can reconstruct a digitised picture from a 'visit' to Israel, test what they have learned from Bible characters, and set out on an adventure in Jerusalem at the time of Christ's birth.

The A3000 is also used by the society in the administration of *Bibleworld*, which includes keeping track of visitors, as well as developing new programs and ideas. Used in the system is HCCS's Hard Card, *Ovation* and *Impressio* DTP software, plus special fonts and graphics.

Contact David Cochrane on 031-337 9701.

PARTNERSHIP FUNDING

TIGHT budgets are not unusual in schools, but at least one school in the Wakefield area has been able to buy a BBC A3000 computer and software, thanks to a partnership between education and local business. Knottingley C of E primary school recently benefitted from a cash injection from Wakefield's Education Business Partnership to buy the equipment. The money was made available to schools

and colleges in the Wakefield area in the form of matched funding. Money donated by local industry was matched pound-for-pound by the partnership to enable the school to purchase the equipment.

Karen Rangleley, the partnership manager, and local haulage contractor Eddie Stobart are pictured below with the Knottingley headteacher Janet Taylor and some of her enthusiastic pupils.



The new computer funded by a school-business partnership

fax pack



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



Computer Concepts Ltd

Gaddesden Place, Hemel Hempstead,
Herts. HP2 6EX.

Tel: 0442 63933 Fax: 0442 231632

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

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

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

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

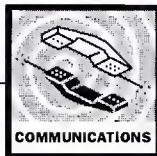
- Very high quality, pixel perfect faxes - try sending a fax of 8pt text from a conventional fax machine!
- Since there is no need to print, then re-scan a document, FaxPack saves time, paper and money when sending faxes.
- Rather than junk fax mail wasting your costly fax paper, you can decide to delete unwanted fax files before printing.
- By receiving and sending from the computer FaxPack offers a higher level of security than most conventional fax machines.
- FaxPack allows electronic archiving of fax messages and is one step towards the truly paperless office.
- FaxPack uses your standard Archimedes printer and so can print on plain paper rather than thermal paper.

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

FaxPack £299 + VAT (£351.32)

APPROVED for connection to telecommunication systems specified in the instructions for use subject to the conditions set out in them.

THE FAX EXPANSION BOARD FOR THE ARCHIMEDES



WHOSE LINE IS IT ANYWAY?

HOW many readers skip over the comms column, thinking that it's too complex for them. Maybe they have watched the film *Wargames* and imagine a whole sub-culture of boffins, hacking their way into hidden computer networks.

Well, nowadays it's not quite like that. Comms come into many aspects of life, from the cashpoint machine to ordering in a high street bookstore. At the home computer level, playing online games is a favourite comms pastime.

So, if you are a computer novice, how do you get

started? Well all you need is a modem, a computer and some suitable comms software. A modem is simply the box which plugs into your phone line and your computer. It converts your data into strange noises, sends them down the phone line into a modem at the other end, which then converts the strange noises back into computer data.

The comms software is simply a package that lets you choose the data to convert into strange noises, and send them whizzing down the phone line. You can pick up a modem for

as little as £50 nowadays and the comms software will cost about the same. To get started, you don't need to worry about speed and all that stuff – most systems that you dial up will adjust their speed to suit your modem. The only thing to remember is that the faster your modem, the cheaper your phone bill will be.

Comms software can often be bought at the same time as your modem but be warned – there are a lot to choose from. We will be looking at some over the coming months, to make your choice simpler.

ARCADE IN ACTION

FOR a newcomer, one of the best bulletin boards around has got to be Arcade. Based in Croydon, Arcade is probably the 'definitive' bulletin board for the Archimedes, and contains many celebrity names in the user log, including support from Acorn themselves via a comprehensive Acorn Support area and by a number of Acorn staff who log on regularly. If there is any new PD software or updates to existing software, you can generally be sure that it will go up on Arcade first.

The latest area on Arcade is Virus watch. This is a special area containing all the latest virus killers together with a run down of which viruses each will kill and any relevant

information to help keep your discs virus free.

If you're not on Acorn's mailing list, Arcade can also provide any new Acorn press releases, often before the magazines pick them up. A special download section contains text-only files of news stories updated the day they are released.

Arcade is run on a very friendly, club-like basis and users are always ready to help out newcomers, or anyone having problems with their system. In fact, every so often a number of users meet up for a drink, usually around the London area. Arcade are found on 081-654 2212 or 081-655 4412. Set your software to 8N1, ANSI.

OUT AND ABOUT

ONE bulletin board that has come to our attention has some rather unusual concerns. Wordsmith BB is designed to appeal to any scribes and other creative folk out there. It seems to be the UK home of writers and photographers and offers many bulletins and forums for budding writers to share ideas and comments.

The sysop is Marcus Harrison, and to contact Wordsmiths, set your software to 8N1 and call 071-603 3302

A completely new BB to try is available on (0795) 471515. Called Pettets Paradise, it is based in Sittingbourne and run by Graham Pettett. According to Graham, there's lots of messages, lots of games, lots of files and lots of fun! It also supports FidoNet and Worldnet, running at all speeds from 300 baud right up to 14.4k baud. However, this BB is currently only available from 10.00pm to 7.30pm.

The Blackcat BBs, based in Penarth, South Wales is another new BBS to come to our attention. Running at all speeds from V21 up to V42bis and boasting 300Mbytes of online storage it caters for most machine types. If you know of any bulletin boards that you feel deserve our attention, please drop us a line!

Paul Vigay

NEWS IN BRIEF

● If you want a huge selection of PD and Shareware software, with over 2500 programs available, you should try The Shareware 88s on (0424) 830654: (8N1, ANSI, 300/1200/2400/9600 HST). Although it is currently biased towards PC users, Acorn support may increase if lots of users log on. Echomail conferences also support worldwide Netmail and on-line games such as Tradewars.

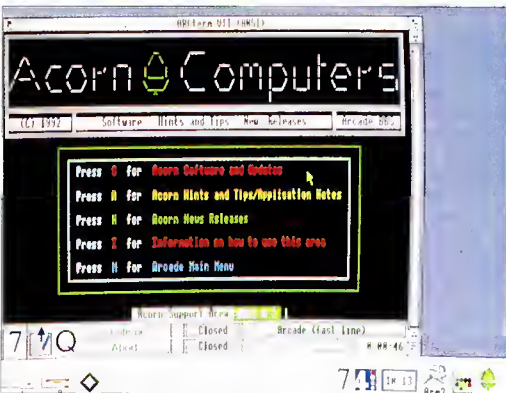
● Whoops! We would like to correct two errors that crept into our February column. The correct number for Silicon Village should be 081-759 6996. Also the price of the Computer Concepts Fax Pack is £299, not £200 as stated. Apologies to all concerned!

● Have you ever wished you could send Janet mail, via a bulletin board system? Well now you can. Sysop Edward Hobson of The Powerhouse BBS has just set up Janet E-Mail facilities on his board so that you can send messages to friends in universities around the country. The Powerhouse is on (0829) 782676.

● British Telecom has just extended its Telecom Gold system to link into the international Tymnet network. Use of the system will start at the beginning of March and allow access to over 20 countries, including the USA, Japan and most of Europe. For more information, call freephone customer helpline on (0800) 282444.

● Some AS000 users may be experiencing problems when using older style modems. This is because the serial port on the AS000 cannot support split baud rates such as 1200/75. If you want to log on to bulletin boards at this speed, you will need to upgrade to one that will buffer the computer speed for you.

● Ever wanted to run a bulletin board on your Arc but couldn't afford the cost of the software? Carl Declerck has developed the first public domain host system for Arc users. More details in a future column but meanwhile keep an eye out for *1Risc88s* on bulletin boards or in PD libraries.



Arcade: one of the friendliest bulletin boards around



ARCOL DESKTOP

EXPLAN'S *Arcol* graphics package has recently undergone a number of changes. The most important one is the ability to work in any 256 colour mode supported by the Archimedes. Up until now, it only worked in Mode 13 and it was restricted by the rather chunky 320x256 graphics.

The new *Arcol Desktop* installs itself on the menu bar like other Risc OS applications, but switches to full screen when run. A number of new tools have been added and existing ones upgraded and refined. The price is £50 for the single user version and £250 for a site license. Upgrading from the old version of *Arcol* to *Arcol Desktop* will cost £6.50. (All prices exclude VAT.)

For more details, contact Explain UK, St Catherine's House, 20 Plymouth Road, Tavistock, Devon, PL19, tel: (0822) 613868.



READER PIC OF THE MONTH

THIS month's special mention should go to S Goreham who at the grand young age of 75 has recently turned his hand to computer graphics. The ship

above is one that was produced using a friend's home-grown art package on an A3000 computer. Certainly an inspiring example!

NEWS IN BRIEF

● The recent BETT show at the Barbican saw the launch of a new A4, 300 dpi colour scanner. The price is remarkably cheap when compared to the competition, at £799. The German company responsible for the launch, called Cebas, can be contacted at Cebas, Landstrasse 21, W-6945 Hirschberg-Grossachsen, Germany. Tel: 010 49 6201 58130

● Readers of The Guardian's Computer section might have noticed Jack Schofield warning to an Acorn product!

To quote Mr Schofield, 'Acorn Replay was the highlight of last week's BETT exhibition at the Barbican, London.' He goes on to say that 'If anything, Replay looks better than QuickTime on the (Apple) Macintosh.'

Mr Schofield, we couldn't agree with you more! For those who didn't make it to the BETT show, both Replay and QuickTime are software packages that enable moving video to be shown on the desktop, without the need for any additional hardware. Possible uses for such a system include training via multimedia technology using hardware such as compact discs.

To find out more, turn to our review of the Acorn Replay system on page 103.

FREEBIE RAY TRACERS

RAY TRACING is becoming increasingly popular among Archimedes users, and many programs are being converted to the 32-bit format. Most of the best ray tracers are in fact in the public domain, a source of quality programs which is often overlooked by the average computer owner.

QRT (Quick Ray Tracer) has been around for some time now and has been responsible for many of the demos circulating on bulletin boards and PD libraries. It is fully Risc OS compatible and runs on the desktop alongside other applications. Pictures are created by describing scenes in special script files, in a similar way to the original *Render Bender* program by Clares.

Output can be in any mode, as a sprite, or as a straight-forward 24-bit clear file which can be displayed to full effect with the PCATS Graphics Enhancer from Serial Port. *MTV*, on the other hand, is

also a popular public domain ray tracer and has similar features to *QRT*.

A new addition to the *MTV* pack is *PVray* which supports a number of advanced features such as texture mapping (taking a scanned image of wood, for example, and using the texture of the wood to provide the surface of an object.)

Both of these programs can be obtained from many public domain libraries (see our public domain feature on page 109 for some general information.) You may also be able to obtain the programs from bulletin boards such as Arcade featured in this month's comms page.

If you know of any other ray tracing programs, or even if you have written your own ray tracer for the Arc, don't forget to let us know. Next month, this column will take a quick look at some of the painting packages that are available in the public domain.

Rob Miller

MIDNIGHT EXPRESS

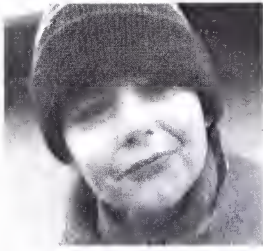
DABHAND computing is to release *Midnight Express* at the end of March 92.

This is a presentation package of the same ilk as *Type-Studio* reviewed last month. *Midnight Express* will allow text to be placed in envelopes or around curves, but remain editable. Arm code has been used throughout, and the package is said to be virtually instantaneous in operation.

Predefined palettes are used for colour adjustment, removing the need to fiddle around with colour sliders, as in *Draw*. Preset envelopes are also defined and they can be placed on the page for editing.

A potentially impressive feature is the ability to tile or scale any sprite within an object, allowing complex backgrounds to be built up very quickly.

For more details, contact Dabhand on 061-766 8423.



VISION £49 digitiser



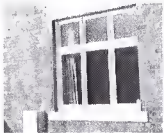
Time to invest in a Black And White Digitiser.



Available from HCCS at only £49 + VAT. It collects any video signal from a video

recorder, CamCorder, LaserDisc Player or Canon Ion etc. and turns it into a standard

sprite

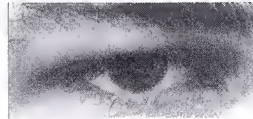


window. The high quality visuals enhance



any document; It has Contrast and Brightness controls which can be adjusted before or

after the video frame has been captured.



The Vision image

size is 640 pixels by 256 lines with 128 effective grey scales using ETT (Error Transfer

Technique)



A manual on disc, software and a lead are included in this

package. There is a Vision Digitiser to suit any Archimedes. The Vision Black and

White Digitiser is in stock now and a colour upgrade



will be

available in



June, with a discount to existing users. This

document was produced using a BBC A3000 and a Vision Digitiser:

A3000 Internal Vision	£49.00
A3000 External Vision	£62.00
Archimedes Vision (A300,A400,A500,A5000)	£49.00

ALL PRICES EXCLUDE VAT. E&OE.



HCCS ASSOCIATES LTD, 575-583 DURHAM ROAD, GATESHEAD, NE9 5JJ. TEL. (091) 4870760 FAX. (091) 491 0431



NEXT MONTH

ACORN
ACORN USER

SPECIAL SUPPLEMENT: **PLUS**

10 YEARS OF THE BBC MICRO

It's 10 years since the BBC micro first appeared on our TV screens. Our special supplement looks at the first decade of home computing and goes behind the scenes of a BBC TV programme marking the event

MAKE AN IMPRESSION

The BBC A3000 and Archimedes have emerged as useful desktop publishing platforms, thanks to DTP packages like Computer Concepts' *Impression*. We give you some tips on how to make the most of it



DON'T MISS
the May issue of BAU
available Monday April 6

TALKING TO PCs

The new PC Card from Aleph One will allow your Archimedes to tap into the world of PC software. We check it out

EXTRA MEMORY FOR YOUR A5000

Several companies have produced additional Ram upgrades for the latest Archimedes A5000. We look at what is on offer

PRO SCANNING

We test the latest professional black and white scanner from Computer Concepts – the Scanlight 256

REGULARS

- All the latest news and views from the world of Acorn
- ★INFO – helpful advice and ideas covering the BBC A3000, Archimedes, A5000, BBC B and Master
- Your letters and problems
- Programs galore on the yellow pages and much more

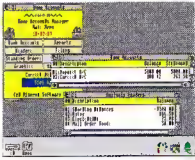
To be sure of your copy, please fill in the coupon below and hand it to your newsagent. Or why not take out a subscription, which includes a free monthly disc? See page 29 for details

DEAR NEWSAGENT, PLEASE ORDER MY REGULAR COPY OF BBC ACORN USER

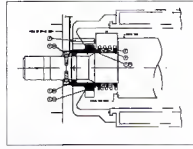
YOUR NAME _____

ADDRESS _____

BBC Acorn User is published by Redwood Publishing, 20-26 Brunswick Place, London N1 6DJ.
Distributed by BBC Frontline, Park House, 117 Park Road, Peterborough



HOME ACCOUNTS



CADET



DESKTOP OFFICE

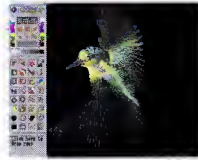


PRIMEART

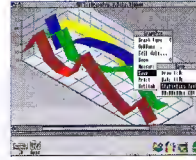


ATELIER

TAKE YOUR PICK!



PRIMEART



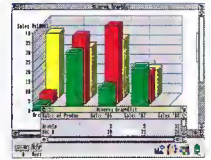
GRAPHBOX PROFESSIONAL



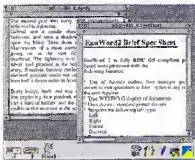
ANCESTRY



TIMETABLER



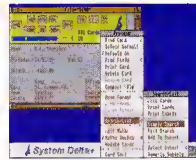
GRAPHBOX



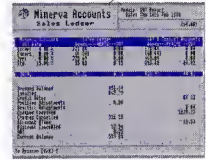
EASISWORD v2



ATELIER



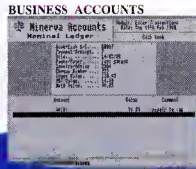
SYSTEM DELTAPLUS



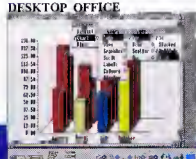
BUSINESS ACCOUNTS



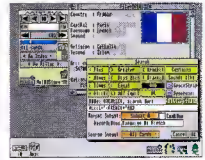
FLEXIFILE



BUSINESS ACCOUNTS



DESKTOP OFFICE



MULTISTORE v2



QUALITY SOFTWARE

1992 CATALOGUE
AVAILABLE NOW!



MINERVA
SOFTWARE

MINERVA HOUSE, BARING CRESCENT, EXETER, EX1 1TL
Fax. (0392) 421762

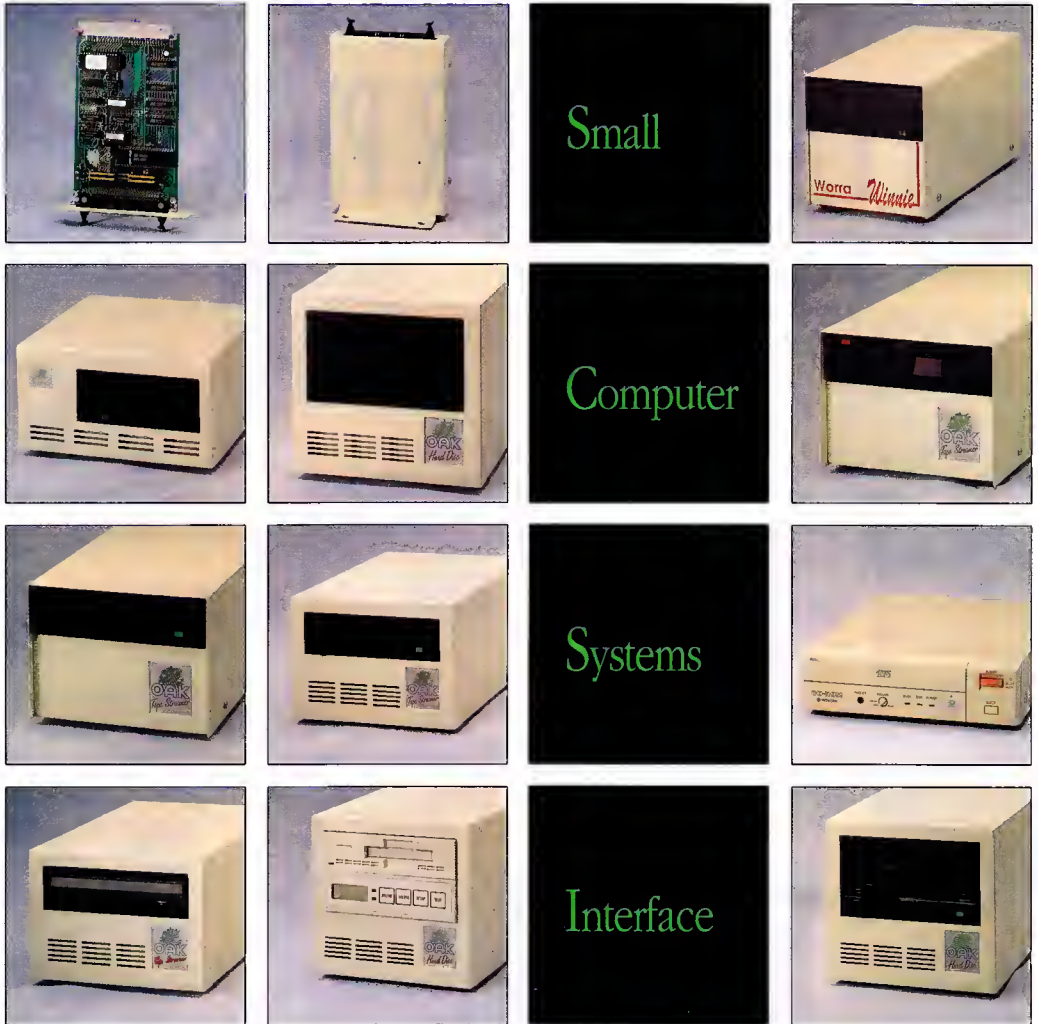


TELEPHONE ORDERS

Tel. (0392) 437756



If it's got to work...



...it's got to be one of ours

Each hard disc comes complete with the following FREE software:
Euclid, Disc Tree, RISC OS Companion, Remote Logon, Worra Battle

Oak Solutions Suite 25 Robin Enterprise Centre Leeds Road
Idle West Riding of Yorkshire BD10 9TE
Tel: 0274 620423 Fax: 0274 620419

QUALITY

RELIABILITY

NEW LOW SCSI PRICES

16-bit SCSI Interfaces	
A3000	£98.00
A300/400/500/5000	£98.00

Worra Winnie Internal Hard Discs A300/400/500/5000	
50 Mb	£299.00
100 Mb	£449.00
200 Mb	£735.00

Worra Winnie External Hard Discs A300/A300/400/500/5000	
50 Mb	£345.00
100 Mb	£495.00
200 Mb	£780.00

High Speed Internal Hard Discs A300/400/500/5000	
50 Mb	£339.00
100 Mb	£489.00
200 Mb	£775.00

High Speed External Hard Discs A300/300/400/500/5000	
50 Mb	£389.00
100 Mb	£539.00
200 Mb	£825.00

Elite External Hard Discs A3000/300/400/500/5000	
50 Mb	£489.00
100 Mb	£639.00
200 Mb	£925.00
300 Mb	£1345.00
680 Mb	£1795.00

Worra Tape Streamer	
60 Mb	£595.00
150 Mb	£795.00

High Speed Tape Streamer	
60 Mb	£765.00
150 Mb	£895.00

Elite Tape Streamer (DAT)	
1 Gb	£1750.00

Magneto Optical R/W Drive	
560 Mb	£3650.00

Prices shown include SCSI interface.
Always state computer type when ordering

Prices exclude £10.00 p&p
and VAT



Telephone for
Education Prices

(and we'll knock off the cost of your call!)

Oak Solutions SCSI

First for Quality First for Performance and now First for Price too!

When we launched the Oak 16 Bit SCSI card and a range of hard disc drives in 1989, they quickly became the market leader. As with all our products, they were manufactured under a 'Zero Defect' quality control regime and enjoyed an enviable reputation for both quality and reliability.

Now we have turned our attention to the COST of our products so that they continue to be the best all round value for money. Our new pricing structure has been made possible by our bulk buying power and our recent move to much larger premises to keep pace with the demand for all our SCSI products.

Not only have we addressed the question of price but we have taken steps to enhance our reputation for quality and reliability by introducing the Quantum hard disc mechanism and the low noise Papst fan into our low cost Worra Winnie Range of hard disc drives.

With several newcomers to the hard disc marketplace, the issue of performance has become a little clouded of late, so to set things straight, we offer the assurance that size for size, you cannot buy a faster hard disc drive system from any other manufacturer.

Oak SCSI software is Acorn compatible, and allows hard discs to be partitioned into several logical partitions, which may be write protected if required. This feature can prove invaluable in the classroom situation where applications can be stored on a write protected partition - safe from accidental or malicious tinkering - whilst still allowing a read/write partition for data and scrap files.

Every Oak Solutions hard disc comes complete with over £250 worth of FREE software: the original Genesis hypermedia software, Disc Tree hard disc management software which allows easy backup of your drive to floppy disc, Euclid, the de facto standard for Archimedes 3D software, RISC OS Companion, Remote Logon, and the addictive Worra Battle tank game.

For professional security of data under RISC OS, our tape systems provide an unrivalled solution to your backup problems for any type of hard disc or network file server.

All our tape backup systems include !OakTape, a comprehensive and widely acclaimed RISC OS backup software program. Backups are done on a file by file basis with versatile control over backup criteria. Automatic backups may be triggered at pre-determined times, and printouts of tape contents can be automatically generated. Restoring from tape is simple and intuitive. Files and directories can simply be dragged from a tree viewer or directory viewers, either to disc, network or even directly into an application!

This advertisement could not hope to mention in detail all the SCSI products we manufacture, so for further details please write or telephone.



COMPATIBILITY

PERFORMANCE



STAR LETTER £15

I would like to make a suggestion to all hardware and software publishers. I have used a variety of Acorn computers, from the Electron, through the Model B and Master to the BBC A3000. Overall I have found that Acorn has been pretty good in its documentation, as have most third parties. My suggestion is not about the actual text, but the way it is presented.

It seems that there is no standard style in which information is published. Also some software is published in cardboard 'books' which fall apart easily, and in thin cardboard boxes which have no strength at all, leading to a messy shelf.

It appears that a lot of Acorn-related merchandise is purchased through mail order, so eye-catching packaging is not really necessary. Why not adopt the simple idea that many computer companies have of using a loose-leaf binder? Computer Concepts DTP package, *Impression*, uses one. Any upgrades to software would only need a few pages, or a file for printing, rather than a new book, or some hastily printed sheets.

Since most DTP software supports various page sizes and formats, it is quite feasible that Public Domain and less expensive software instructions can be provided as text files, which could be printed out if desired. Already a lot of PD software is only documented on disc.

While such a system may not be immediately implemented, I hope publishers think about what they are producing.

Richard Brookes
Dunvant
Swansea

The packaging supplied with *Impression* is perhaps the best example of an updatable manual, although CC does not keep this standard throughout their range. The ideal situation would be for all software to be supplied in a standard box - The Fourth Dimension uses a multi-purpose box for all of its games.



The Train Game - a classic Beeb program which we transferred to the Arc

The problem with having the entire tutorial on the disc is that unfamiliar users may not know where to start. Many prefer to read the instructions first.

MODULE MADNESS

As suggested in the article *Hard'N'Easy* (BAU March 92), a quick way to update the modules in the System directory in the absence of Sysmerge is to select Full Info from the directory viewer and look at the date stamps of each module. But this method can be hit-and-miss if someone has re-stamped the file with a different date to that of the version date of the module, as I have found out the hard way. I believe Sysmerge also looks at the date stamps - if this is so, then surely it must be used with caution?

The only way to ensure you have the latest modules is to load each one and type `o?help` Modules from the command line, and then have a look at the version number and date. I keep a text file called Versions in my System directory and every time I get a new module I load it and compare it with my version file.

David Madge
London

VIEW TO A KILL

I use *View* quite a lot and I find your Printer Driver Generator extremely useful for my BBC Model B and printer. To increase presentation even further, are there any extensions that can be made to the pro-

gram so that it can support micro spacing? I would greatly appreciate it if you tell me if this is possible.

Also, what has happened to your series on classic Beeb programs, *Pieces of Eight*? That was one of the main reasons I purchased the magazine, and I was surprised when the February and March editions did not include it. When is it coming back?

R Keeble
Epsom
Surrey

We felt that *Pieces of Eight* had served its purpose of revisiting the best eight-bit programs published in the BAU. But if anybody has a special request for a specific program, then let us know. But we would also be interested to hear if there are any programs that you would like to see updated or transferred to the Archimedes. Meanwhile, look out for a *Pieces of Eight* special on View printer drivers.

SECONDHAND HAPPY

I have a BBC A3000 with monitor and 2Mb of memory which I bought along with a monitor stand for £400. Although it was secondhand, it hasn't given me any problems so far.

On the other hand my friend bought an Amiga 500 base unit with a bit of bundled software and 512K of memory for the same price. He then spent another £250 on a monitor and another £65 on a second drive - most of his games were unplayable without one. He

would buy a printer, but is scared that it would be incompatible with his software.

So, the Amiga is great for games, but most of them come on two or more discs, take a long time to load and hog the whole machine. Archimedes games are usually fast loading, are desktop friendly in the main (sometimes even multi-tasking) and disc swaps can be kept to a minimum.

Looking at the graphics side of the Amiga, you do have a lot of colours, but these are only used in ray tracing. Incidentally, has anyone ever heard of outline fonts, or an easy-access version of Basic for the Amiga?

The arguments for the Arc are numerous. I would urge anybody thinking of buying a brand new Amiga to check out the secondhand Arc market before they part with their valuable cash.

A Ashby
Smithills
Bolton

Take a look at our free ads on p85 for secondhand equipment this month.

PRESSING ERROR

I would like to raise a point regarding the review of *ArcFS* and *Spark* (BAU February). This review gives the impression that *Spark* and *ArcFS* are public domain programs, or perhaps Shareware. They are not and I would not wish anybody to gain the idea that they are.

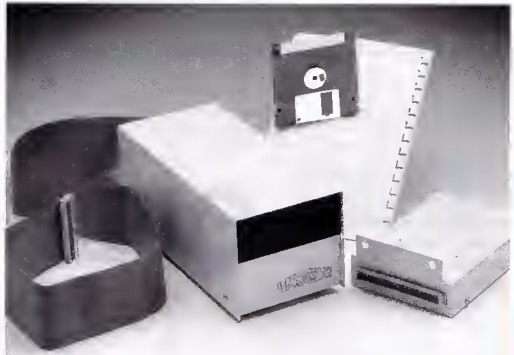
At the end of the review, while the correct information is given about *Compression*, for *ArcFS* it is simply stated that '*ArcFS*... is available from most public domain libraries'. As for *Spark*, there is just the statement: 'Anyone who uses bulletin boards or obtains software from PD libraries is probably familiar with an application called *Spark*'.

Spark and *ArcFS* are not Shareware. They are available from the address below, priced £5.99 each, including postage packaging and VAT.

David Pilling
PO Box 22
Thornton Cleveleys
Blackpool
FY5 1LR

Hard Disc Drives

Where else can you buy a superb SCSI hard disc and an Oak 16 bit controller for these prices? Drives are supplied fully tested and ready to use with a 12 month warranty PLUS our money back guarantee if you are not fully satisfied.



Internal Drives

300/400/500/5000

20Mb	£199.00
45Mb	£245.00
80Mb	£345.00
100Mb	£439.00
200Mb	£729.00

External Drives

300/400/500/3000/5000

20Mb	£279.00
45Mb	£325.00
80Mb	£425.00
100Mb	£519.00
200Mb	£809.00

Bits and Bobs

We have managed to procure a selection of useful bits and bobs which would come in useful for people wanting to assemble their own equipment. All equipment is new unless otherwise stated, and cases are typically 'end of line' stock from large manufacturers.

Metal Cases Suitable for:

3½" Hard Disc/Fan/PSU	£22.50
5¼" Hard Disc/Fan/PSU	£28.75
3½" Floppy Disc Drive	£12.00
3½" Dual Floppy Drive	£16.00
5¼" Floppy Disc Drive	£17.50
5¼" Dual Floppy Drive	£21.00
3½" Floppy Drive/PSU	£22.50
3½" Dual Floppy/PSU	£26.50
5¼" Floppy Drive/PSU	£25.00
5¼" Dual Floppy/PSU	£29.00

Floppy Discs

3½" Unbranded 10 off £3.50,
25 off £7.83 100 off £25.00

A3000 Monitor Stand	£12.00
BBC B Plastic Case	£15.00
BBC Master Plastic Case	£25.00
Master Power Supply	£42.00
Master Keyboard	£45.00
3½" Citizen Floppy (A3000/A400)	£45.00
5¼" Switchable Floppy	£55.00
40Mb IDE Hard Disc Drive	£125.00
60Mb IDE Hard Disc Drive	£175.00
100Mb IDE Hard Disc Drive	£199.00
42Mb Syquest Removable	£199.00
Refurbished Viglen Hard Disc for BBC/Master (3 Month Warranty)	
20Mb	£175.00
40Mb	£195.00

Prices exclude carriage
(£10) and VAT (17.5%)
Access and Visa
welcome.



Where else

68 Green Street
Great Gonerby
Grantham
Lincolnshire
NG31 8LE
Tel/Fax 0476 593110



QUESTIONS AND ANSWERS

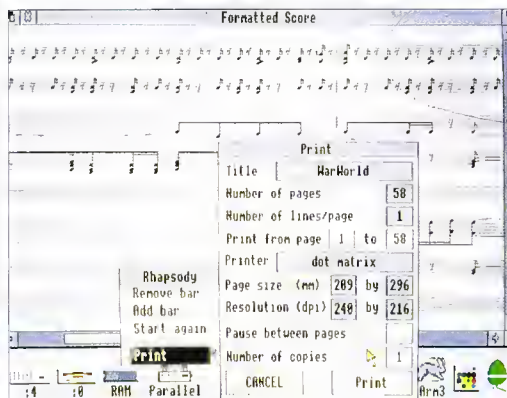
Q Paul Sandford of Sheffield wants to extend his knowledge of assembly language programming on his BBC B computer.

Having read Joe Telford's *BBC Micro Advanced Programming*, which covers many programming techniques not explained in the user guide, he would now like a more advanced book that covers topics such as interrupt handling and writing faster games in machine code.

A There are a number of good books available for the BBC computer, although you could find that many dealers don't hold much stock now, so you may have to hunt around. One to keep a look out for is *Cracking the Code* by Benni Notarianni. It is published by Pan (ISBN 0-330-28666-8) and explains many programming problems such as animated graphics, interrupts, writing maths routines in machine code and how to start writing games. It is aimed at the slightly more competent programmer, although does provide an easy to understand introduction to assembly code programming.

Q A common problem, aired by R Kendall of London is that of saving machine code programs so that they reload and execute at a specific memory location. He asks if there is a way of saving a portion of memory so that it loads at &900 automatically when you reload it.

A The answer to this question depends upon the syntax of the keyword *SAVE when you originally save the object code. Firstly, ensure that you compile your code to assemble at the address you want it to reload it. For example, to get your code to load at &900, set P% to &900 as you compile it and then use the command *SAVE prog 900 A00 90A which will save the portion of memory between 900 and A00, setting the execution address to &90A. When you load and run the program by



Rhapsody can be used to print out musical scores

typing *RUN prog, it will automatically load at &900 and then jump to &90A and start executing the code.

Q Teacher, Susan Chapman from the Netherlands is trying to computerise her school library records using an Archimedes computer. She wonders if there is any suitable database software that will allow her to keep book titles, authors, classification numbers and topics, and to update them as required. Another primary consideration is easy use by young children.

A There are a growing number of databases available for the Archimedes range of computers, ranging from traditional style databases which consist of many 'record card' type entries to the more recent 'multi-media' style of database where the entry data can be of a variety of formats including pictures and data from other applications. For

your type of use I would recommend *Flexfile* by Minerva Software, (0392) 437756, which is reasonably easy to set up for the data you require. Once set up, young children and old can interrogate the data by using simple icons for forward, backwards and search commands, similar to those on a video recorder.

For more advanced use it will also allow you to create reports and search for entries when you do not know the exact spelling.

Q Problems are often encountered using the outline font system on the Archimedes. David Cooper of Glasgow asks if there is any way to load text into *Draw* with the aim of printing it out using a printer driver.

He repeatedly gets two error messages - either, 'Text area must end with a newline character' or, 'Warning: text area font Trinity.Medium could not be loaded'.

A The first error is reasonably easy to rectify and is usually caused by using *Edit* to compose the original text. When you finish typing your text in, remember to press RETURN at the end of the document, thus leaving a blank line at the bottom. When you subsequently load your saved text back into *Draw*, it will then know where the bottom of the text is.

The second error is caused by *Draw* not being able to find your fonts directory. *Draw* looks for Trinity.Medium by default so you should double click on *Fonts* before you load *Draw*.

Q A quick question next from Freddy Hutton of Oxon. He is currently using *Maestro* in order to compose music on his Archimedes A410/1 but wants to produce a hard copy of his composition on a printer. He asks if there is an application to enable him to do this.

A Your best option here is to upgrade to *Rhapsody* by Clares Micro Supplies, (0606) 48511, which is basically an enhanced version of *Maestro*. As such it will load your existing *Maestro* tunes and convert them to the new *Rhapsody* format. It not only contains support for Risc OS printer drivers, enabling you to print out your finished tune, but also has a host of additional features not supported by *Maestro*. For a professional output you can get an additional package called *ScoreDraw* which will produce printed results just like genuine manuscript sheet music.

Q Mr Baker of the West Midlands has just purchased an ATPL sideways Rom/Ram expansion board for his BBC B computer but unfortunately he didn't get any fitting instructions and is now at something of a loss.

A To fit the board, you will first need to remove the cover of your BBC and unplug the keyboard. Next

remove the OS Rom (IC51) and the A/D Converter (IC73, if fitted) and plug them both into the corresponding sockets on the ATPL board. Carefully remove the power connectors adjacent to IC32, hend them at 90 degrees and replace them. Next, remove the shorting link from the lower half of S21 and connect the two flying leads from the ATPL board to the vacant pins, ensuring that the wire marked E1 is to the right. Position the ATPL board pins directly over the empty sockets of IC51 and IC73 and carefully insert the board into the vacated sockets. The machine can now be re-assembled.

If you want to plug Ram chips into socket 15, you can connect a small switch between the contacts of S6, in order to give you a write protect facility.

Q One often voiced question concerns recovery of deleted files on Risc OS discs. Mr G Sheridan of Bedfordshire echos many peoples' thoughts when he admits to accidentally deleting some files from his discs. He wants to know if there is any way of retrieving the lost data.

A Restoring deleted data can be an arduous task, even for the most experienced of users, so I would recommend a program to automate the task. *Look-Systems* (0603) 764114 have produced just such a utility, which will repair broken directories, restore disc errors and retrieve deleted files. It works on both hard and floppy discs and supports any filing system.

Q David Hartburn of Tyne & Wear has a problem with his Archimedes internal clock. He finds that it often forgets the time, despite resetting the machine and using *Alarm* to set the clock.

A This sounds like a symptom of a flat battery inside the computer. Have you noticed any of the

computers' other settings becoming corrupted or changed? It is a good policy to replace the Cmos Ram battery every year, as a weak hattery can quite often give confusing or unpredictable results during use of your computer. If replacing the battery does not cure the fault, it is possible that you have a faulty clock chip inside the machine, which will need checking by an official dealer.

Q Another Archimedes disc error is often encountered by M. Dunkin of Lincoln. He reports getting a 'Filecore in Use' error from time to time when using a lot of discs such as DTP, Font and work discs. He asks if there is a simple solution to avoid this.

A Every time you click on a new disc, its name is added to a list of disc names currently held inside the computer. This is kept until you either turn off the machine or dismount the disc. Unfortunately, Risc OS has a limit, beyond which the 'Filecore in Use' error is generated. The easiest way to avoid this is to dismount discs as you finish using them. Just click the middle mouse button on the disc icon and select the 'dismount' option. It is good practice to remember this and also ensures that you don't have too many filer windows open on the screen.

Q Mrs Coop of Stroud is the proud new owner of a second hand Acorn Electron, and would like to buy some educational software for her seven year old daughter. However, Mrs Coop only has a cassette recorder and wonders if there is any software available on tape.

A You can quite often find cassette-based software at bargain computer shows, such as the All Formats Computer Fair that is held every few months at London's Horticultural Halls. However, MicroPower in Leeds still stock quite a few



Whoever heard of Amiga emulation on the Archimedes?

of their educational titles on tape format. You can phone then on (0532) 621111 for a catalogue.

Q A commonly asked question was that posed by D Green of Sunderland. Being a beginner, he asks how to save Basic programs, having just typed them in from listings such as the yellow pages.

A First, ensure that there is a tape or disc inserted and then, from the Basic prompt type `SAVE prog` and press RETURN. You can substitute your own program name for the word 'prog', but ensure that it is no longer than seven characters on the BBC or ten characters when using ADFS on the Archimedes.

When using discs, you can find out what is already on a disc by typing `*CAT` from the Basic prompt. For Archi-

medes owners this has the same effect as clicking on the disc icon from the desktop.

Q W Calderbank from Bolton has an Archimedes computer armed with a few games but wonders if there is such a thing as an Amiga emulator in order to extend the range of games available.

A The Amiga has a very elaborate operating system which would be difficult to emulate with any amount of speed. However, this being the April issue, I was tempted to 'play along' with this one, but the last laugh may be on me, as I have heard that a couple of people are in fact working on one. Arxe systems, 081-534 1198, are actively working on Spectrum and Atari emulators but admit that an Amiga one may be a little bit tricky. Still, you never know!

HELP US TO HELP YOU

The Questions and Answers page is your chance to have your problems solved. It can be on any topic - you name it and we'll try to solve it. Please send your questions, whether technical or otherwise, to:

Questions and Answers
BBC Acorn User
20-26 Brunswick Place
London, N1 6DJ.

We are happy to answer your queries on these pages, but regret that we are unable to send personal replies to questions sent in. If you send a disc, please put your name and address on the disc itself. It is also useful if you could include full details of your machine. Please enclose an SAE where necessary and mark on your envelope whether you use a BBC eight-bit micro or 32-bit Acorn A3000/A5000/Archimedes/A5000.

TELETEXT ADAPTOR

ADD TELETEXT TO YOUR COMPUTER

- Computer controlled tuning
- Download and save pages
- Unique composite video & audio output
- High performance T.V. front end
- Fully mains powered unit in metal case
- Upgrades available for existing users
- RISC-OS version multitasks
- User programmable via SWIs & OS calls

The ARC/3000 version contains many powerful features making it very easy to use, i.e. point and click at page numbers. 5AE for details



FURTHER DETAILS ON REQUEST

A3000/ARC. PRICE INCLUDES:

- Podule socket lead
- User notes
- TTX V2.13 Software

£94.00 Inc. P&P

BBC B & MASTER. PRICE INCLUDES:

- User port lead
- SATS Software
- User notes

£94.00 Inc. P&P

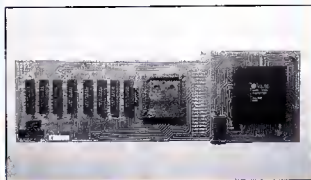
A305/310 4 MEG MEMORY UPGRADES

- Low power 8 chip design
- DIY fitting, just plug in
- Accepts our ARM 3 processor

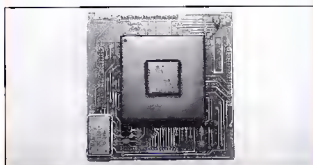
£243.00 Inc. P&P

SPECIAL OFFER: Fitted with ARM 3
(as illustrated below)

£420.00 Inc. P&P



ARM 3 PROCESSOR



- Cache operation at 25 MHz
- RISC-OS Armspeed software
- DIY plug in design
- Fits A300/400 series
- 3-6 times speed increase

£185.00 Inc. P&P

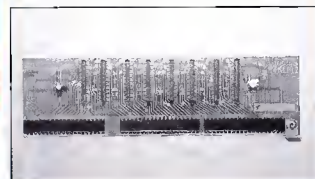
A3000 MEMORY UPGRADES

- Low power design, only 8 chips
- Bare Board, 1Mb or 4Mb
- Easy to fit just plugs in
- Screw fixed for reliability
- PCB size only 175x50mm

BARE BOARD £23.00 Inc. P&P

1 MEG **£135.00** Inc. P&P (Gives 2 Meg total memory)

4 MEG **£135.00** Inc. P&P (Gives 4 Meg total memory)



UVIPAC EPROM ERASER

- Mains Powered
- Cost effective way to erase Eproms
- Up to three Eproms can be erased at any one time
- Available with or without automatic timer

EPROM ERASER **£23.00** Inc. P&P

WITH TIMER **£27.00** Inc. P&P

MEMC1A

MEMORY CONTROL UPGRADE
(2 CHIP SET)

- Boost speed by 10% on A310/440
- Recommended for ARM3 use
- Essential for SCSI & floating point users

£38.00 Inc. P&P

UVIPROM EPROM PROGRAMMER

- For BBC B and Master
- Programs 2764, 27128 & 27256 (Inc. CMOS)
- 21 or 12.5 volt programming
- High quality ZIF socket
- Fast or slow algorithm

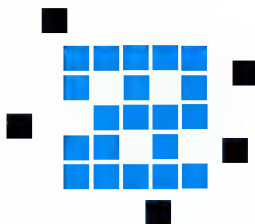
£33.00 Inc. P&P

FOR FURTHER INFORMATION TELEPHONE 0635 524008 OR 0622 747416
HOURS OF BUSINESS: 9.00 AM - 5.30 PM (24 HOUR ORDERING FACILITY)

Prices exclude VAT, but include carriage charges (UK mainland), packaging and insurance



DEALER
ENQUIRIES
WELCOME



QUANTITY
DISCOUNT
AVAILABLE

GROUND CONTROL

ELECTRONICS LIMITED

FREE MONTHLY DISCS

WHEN YOU SUBSCRIBE TO BBC ACORN USER



**SUBSCRIBE
NOW AND
SAVE
POUNDS!!**

Every month, *BBC Acorn User* is packed full of useful features and programs for all the Acorn machines. That's why *BAU* is renowned as the leading magazine for Acorn computer users. Now, as an additional service to new subscribers we are offering *FREE* monthly discs with every 12 month subscription to the magazine.

THE MONTHLY DISC

Each monthly disc contains all of the programs listed on the yellow pages in each issue, so you can save yourself the time, frustration and effort of typing them in by subscribing today.

If you purchased each monthly disc separately, it would cost you up to £5.95 per disc. So, with a 12 month subscription to *BAU*, you could receive discs worth over £70 absolutely *FREE!*

COMPATIBILITY

The 3.5in disc is compatible with the A3000/Archimedes, BBC model B, BBC Master and Master Compact with 3.5in drive and ADFS.

The 5.25in disc is 40/80-track DFS and is suitable for use with BBC B/B+ and Master computers with a 5.25in, 40 or 80-track drive. So, no matter which Acorn machine you have, you can take advantage of this fabulous offer now.

WHAT DO I DO?

Simply fill in the coupon below and send it to:

BAU Subscriptions, PO Box 66, Wetherby LS23 7HL.
Or ring the credit card hotline number: (0937) 842489

NB: offer applies to UK subscriptions only, for details of overseas subscriptions see order form on page 89



I would like to subscribe to *BBC Acorn User* for 12 months at the cost of £22.95 and receive my *FREE* monthly discs. (Discs are only sent from the beginning of a subscription period).

NAME.....SIGNATURE.....

ADDRESS.....

.....

Disc size required (please tick) - 3.5in Renewal

5.25in New Subscription

I enclose a cheque/PO made payable to Redwood Publishing Ltd.

I wish to pay by Access/Visa

Card Number..... Expiry Date

**ESSENTIAL
READING
MATERIAL
FOR THE
ACORN
ARCHIMEDES**

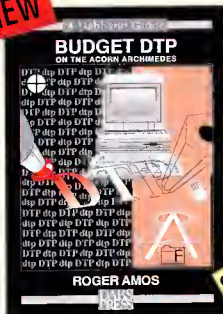
from

**DABS
PRESS**

THE PREMIER ACORN BOOK PUBLISHER
061-773 8632

Office: 22 Warwick St, Prestwich, Manchester
M25 7HN. Tel: 061-773 8632. Fax: 061-773
8290. Proprietor: David Atherton. All prices
include VAT (0% on books), and UK postage.
Access/Visa accepted. Foreign add £2.50
surface, £12 air.

NEW



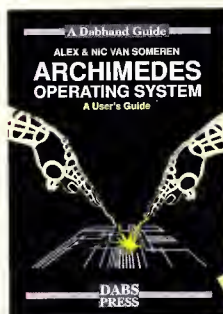
£12.95

An invaluable guide to the free software on your Archimedes, and how to get the best desktop publishing results for very little cost.



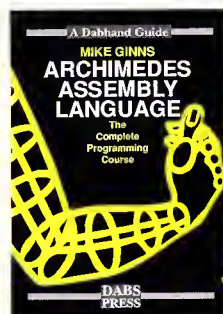
£9.95

Introductory book for the Arc, covering the basic operations and use of iEdit, iDraw, 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.)

BBC SOFTWARE

Hyperdriver

The ultimate printer driver ROM, with over 80 commands, a built-in N.L.O character set, WYSIWIG previewing, access from View, Wordwise, Interword or BASIC. 100 page manual. For B/B+/E/M/C. Price £29.95 RDM, £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 12Bs only fixing EDIT and CLOSE#0 bugs, ADFS format, verify and backup in RDM, backup/compacting in SRAM, alarm clock and configurable startup facility and much more. Price £12.95 RDM, £7.95 SRAM.

Sidewriter

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

Assembler Bundle

Two Bruce Smith books on 6502 assembler with discs and Master Series update booklet. For B/B+/E/M/C/ RRP over £30, yours for £4.95!

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 wordprocessor. "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 User Guide

Full instruction for using the 512 and DDS Plus, with tips on software 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.

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 BOOK discs in each. Each collection normally £29.95, special offer £25 for both.

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.

ARCDFS

Very popular program to provide full DFS facilities on desktop or i65Host/i65Tube. Price £29.95

ARCHIMEDES/BBC BOOKS

Basic V Guide

BASIC V guide covering differences between earlier BBC BASICs and the superior version for the Archimedes. £9.95

C: A Dabhand Guide

Massive 512-page complete guide to C programming. No previous experience required. Arc & BBC sections £14.95 or £21.95 with disc.

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 DPL Guide

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

To Dabs Press,
FREEPOST (MRB400)
Prestwich, Manchester M25 6LZ
(Phone 061-773 8632)

Please send me:

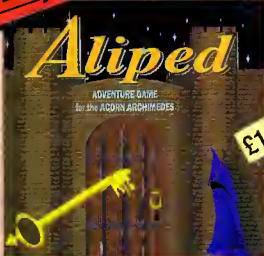
Amount £ _____ Cheque/PO enclosed.

Access/Visa No. _____

Name _____

Address _____

NEW Games Action



£14.95

'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.



£14.95

The date is 2143 A.D. The universe has started to contract, causing the most minor 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.



£14.95

'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 management of characters. Needs 1MB. RISC OS compatible.

MORE ARC GAMES

ALERION Classic shoot-em-up arcade. Most level. RISC OS compatible. Not postcard £14.95

ARCHIUMDROPPS Backgrounders. Reverse and Gaudline. Now RISC OS compatible. £14.95

ALIEN INVASION Classic Space Invaders with notable invaders, waves etc. £14.95

ALL-IN BOXING Realistic boxing game with digitised sound etc. 1 or 2 player. £14.95

COLOURJET 2000

COLOUR INK JET PRINTER

Compatible with:-
IBM pc
Archimedes
Nimbus
BBC Micro

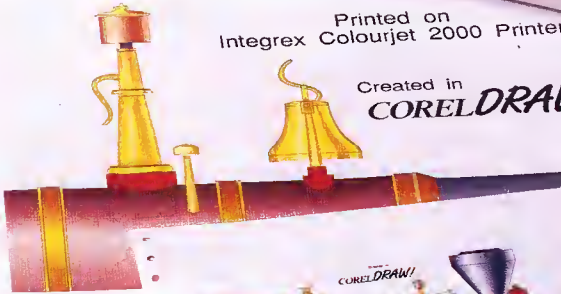
NEW
UP TO 200 CHAR/SEC
Emulates Colourjet 132
100% compatible with HP PAINTJET
and Windows 3
Prints overhead transparencies



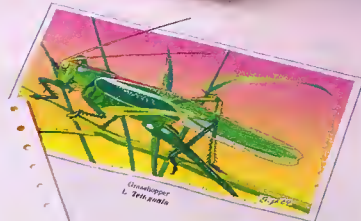
LOW COST

Printed on
Integrex Colourjet 2000 Printer.

Created in
CORELDRAW!



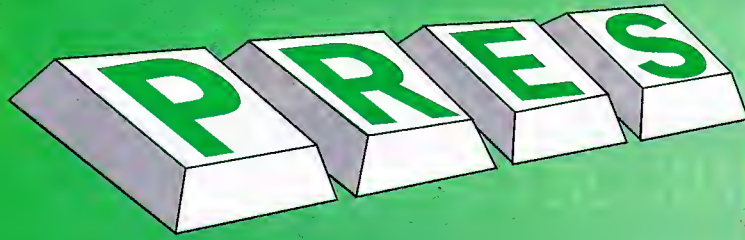
Printed on Integrex Colourjet 2000 Printer.



EDUCATIONAL DISCOUNTS AVAILABLE

INTEGREX LTD., CHURCH GRESLEY, SWADLINCOTE
DERBYS DE11 9PT
Tel (0283) 551551
Fax (0283) 550325
Tlx 341727 INTEGEX

AT THE FOREFRONT OF A3000 UPGRADES



Monitor Stand £24.95
Probably the best monitor stand available for the A3000 and the sturdy basis of your modular system.

System Housing £69.50
When you are ready to expand the A3000 this system housing is placed over the monitor stand, allowing two floppy drives and hard drives to be added with ease.

Expansion Card Case £14.95
If you're adding an expansion card (or podule) to your A3000 then you will need this case to connect and protect it.

Podule Expansion System £54.90
Allows two podules to be added to your A3000, and be working alongside each other simultaneously.

Disc Buffer £49.95
The definitive expansion for people that wish to add extra floppy drives. Support for 40 and 80 tracks. Will also allow you to add SCSI. We are continuously working on other options.

65Host 1770 DFS and DFS Filer £19.95
A Rom upgrade for the Disc Buffer that provides a DFS drive icon on the icon bar and 1770 DFS in 65Host, the BBC Emulator.

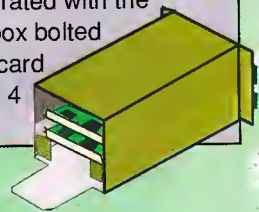
Various disc options 3½" & 5¼" floppy drives, 20 & 40 MB hard drives and 40, 60, 100MB ... SCSI drives. Do not be baffled by products with 'go faster stripes' ... call us for some honest advice.



FEATURED PRODUCT

NEW PRODUCT A3K4 DOUBLE PODULE EXPANSION

Now you can add a second standard eurocard podule to your A3000. Fully integrated with the PRES expansion system - no soldering required, no timing problems, no large box bolted around your computer, simply 'plug in and expand'... (requires A3K3 expansion card case). Remember A3K6 also allows for an extra internal card; giving a total of ... 4 expansion cards in your A3000



HOW TO INCREASE THE NUMBER OF A3000 EXPANSION CARDS

1. FIT A3K5 - THE IO ADAPTOR. This is a plug in board to provide the necessary lines for podule nos. 2 & 3. It is a custom made connector that does not rely on test clips and even has an LED to test for the correct fitting.
2. Now you can fit a second expansion card (standard size) in A3K4 - the double podule expansion for our standard podule case A3K3.
3. Or you could decide to add an extra internal card onto our disc buffer (A3K6) such as a SCSI interface card.
4. Or you could decide to fit both and have FOUR cards on your A3000! . . . 2 internal cards plus 2 standard external cards.

OTHER QUALITY PRODUCTS FROM PRES

'Micro-Trader' BUSINESS SYSTEM'

'Micro-Trader' consists of a powerful range of computer programs to meet the many needs of the small to medium sized business. 'Micro-Trader' provides professional integrated accounts that have been designed by a businessman to meet the needs of the businessman. 'Micro-Trader' has been specially developed for multi-tasking operation under RISC-OS on the A3000, A5000 and Archimedes computers.

'MICRO-TRADER' FEATURES

- ★ Integrated SALES, PURCHASE and NOMINAL LEDGERS
- ★ The system can be extended as the needs of the business grow
- ★ Quick entry of information and easy error correction
- ★ Fully Integrated System avoids repetitive entries
- ★ Prints INVOICE, CREDIT NOTE, STATEMENT, REMITTANCE ADVICE
- ★ Prints PROFIT & LOSS ACCOUNT and BALANCE SHEET
- ★ User defined layouts of all printed documents
- ★ All reports can be sent to the screen, disc or printer
- ★ Automatic entry date - comprehensive Batch Number system
- ★ Unique 'CASHUP' facility for Retail businesses
- ★ Full VAT facilities and printout of VAT Return
- ★ Double Entry accounts with Audit Trail and Trial Balance
- ★ Integrated STOCK CONTROL program records stock holdings & values
- ★ MAILING prints labels and letters

The 'Micro-Trader' Business System is easy to use and offers a complete powerful and flexible business system for only £79.95 + VAT for each program module. Please call for more information - demo disc available.

SPACE KIT allows A400 users to add a second hard disc drive internally. Occupies the two left podule positions, supplied with all necessary cables & instructions £32.95 + vat

Complete upgrades with 40mb hard drive available. Call for details

YOU CAN ORDER FROM PRES WITH COMPLETE CONFIDENCE - WE ARE A REPUTABLE COMPANY WITH THOUSANDS OF SATISFIED CUSTOMERS - PRICES INCLUDE UK DELIVERY & NORMALLY PAYMENTS ARE ONLY COMPLETED ON DELIVERY

WE ARE A SPECIALIST ACORN SUPPLIER FROM COMPUTERS TO MONITORS, PRINTERS TO HARD DRIVES, GAMES TO BUSINESS SOFTWARE - IF YOU REQUIRE ANYTHING FOR YOUR ACORN MACHINE WHETHER IT BE A BBC OR ELECTRON, MASTER OR ARCHIMEDES CALL P.R.E.S.

**A3000 WITH AN EXTRA 1MB RAM
LEARNING CURVE OR ENTRY LEVEL
FROM ONLY £599 + VAT
INCLUDING THE PRES MONITOR STAND
COMPLETE SYSTEMS AND
PACKAGE PRICES AVAILABLE.
PLEASE CALL FOR DETAILS**

**THE NEW A5000
THE COMPUTER THAT SOLD OUT ON
THE FIRST DAY OF ITS LAUNCH
ORDER YOUR A5000 NOW
SUPPLIES HAVE BEEN VERY LIMITED
BUT WE WILL DO OUR BEST FOR AN
EARLY DELIVERY.
CALL FOR ADVICE ON AVAILABILITY.**



**PRES Ltd, Box 319, Lightwater, Surrey, GU18 5PW
Tel. 0276 72046 • Fax 0276 51427**



**EDUCATION ORDERS AND
ENQUIRIES WELCOME**

WE ARE AN



**FAST MAIL ORDER SERVICE
(SUBJECT TO AVAILABILITY)**

APPROVED DEALER AND SERVICE CENTRE, OFFERING A FRIENDLY SERVICE AT COMPETITIVE RATES.

Watford Electronics

(A member of the Jessa group of Companies - Established 1972)



Jessa House, 250 Lower High Street, Watford WD1 2AN, England
Tel: Watford (0923) 237774 Tlx: 8956095 Fax: (0923) 233642



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.

The choice
of Experience

Archimedes micro

System	Basic	Mono	Colour	Multiscan
A410/1	£899	£965	£1059	£1224
A540/1	£2495	£2555	£2655	£2815
A3000	£599	£665	£759	£924
A3000/LC	£642	£708	£802	£967
A5000	£999	£1065	£1159	£1324
A5000/H/D	-	-	-	£1499
A5000/LC	-	-	-	£1531

Unbeatable Sale Offers on Archimedes Micro

When you purchase an Archimedes Micro from Watford, look what you get FREE with it

Micro	Free Offer
A410/1	ARM 3 Turbo Card upgrade fitted
A540/1	Multiscan monitor with VIDC enhancer and LC20 Printer
A3000	2Mb RAM; Monitor plinth and Acorn's A3000 Shoulder Bag (carrying case)

Plus of course our no quibble 12 months FREE On-Site Maintenance on all Archimedes Micros.

Archi Accessories

• 3.5" 800K 2nd Floppy Drive (305/310)	£118
• 5.25" 800K external Floppy Drive	£85
• I/O Podule (Analogue/User/1MHz bus)	£79
• I/O Podule (Analogue/User)	£49
• MEMC 1A Upgrade	£42
• MIDI add-on to I/O Podule	£27
• MIDI Expansion Card	£65
• Sound Sampler Mono (Armadillo)	£129
• Sound Sampler Stereo /Midi (Armadillo)	£186
• Chromalock Podule (Wild Vision)	£275
• Econet Network Board	£42
• Archimedes IEEE Interface Adaptor	£269
• Dual RS232 Podule	£195
• 16 bit parallel I/O Card	£195
• Archi replacement mouse - New design	£32
• PC Emulator v1.7	£85
• Software Developers Toolbox	£149
• Floating Point Unit	£455
• SCSI Adaptor Expansion Card	£156
• Keyboard Extension Lead	£5
• 2 Podule Backplane	£25
• 4 Podule Backplane	£38
• Fan for above backplanes	£8
• Risc Os Extras Software Disc	£5
• Ethernet Card	£220
• SCSI Card 8 bit	£129
• A5000 - 2 to 4Mb RAM Upgrade	£122

A3000 Accessories

• 3.5" External Drive	£95	• Monitor Stand	£15
• Technical Manual	£39	• Serial Upgrade	£17
• A3000 Dust Cover	£5		
• A3000 plus Monitor Dust Cover			£9
• A3000 User Port/Midi Upgrade Card			£44
• A3000 User/Analogue/IIC I/O Card			£42
• A3000 External Podule Case			£13



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

Staff Vacancy

Watford Electronics are inviting Hardware and Software engineers to apply for positions in their new R & D team. Hardware engineers must be familiar with the Archimedes architecture and able to follow a project from conception to production. Software engineers should be proficient in ARM assembler or Acorn C, and able to write RISC OS applications and module code. Applicants should be well motivated and show experience in relevant areas. Qualifications are not as essential as your ability to produce innovative solutions to challenging problems. As a new member of the team you will be in a unique position to develop your career in a rewarding environment. In the first instance forward your CV to Shiraz Jessa or Chris Honey

Archimedes A3000 Desk Top Publishing (DTP) Sale Offer

A3000 BBC Archimedes Micro with 3.5" Floppy Disc Drive and a mouse, upgraded to 2Mb RAM, COLOUR Monitor + Lead, 20Mb fast IDE Hard Disc Drive, 'Compression' Utility to increase the Hard Drive capacity to Typically 40Mb, The highly acclaimed Computer Concepts' Impression Junior DTP software package.

RRP: £1299

Sale Offer Price: £849

Above Package plus Acorn's Learning Curve £892

Special Education discounts
available on above package, micros,
RAM upgrades, ARM 3 Turbo Card,
etc. Please write in or telephone:
(0923) 237774/250335

Archimedes RAM Upgrade

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

• R302-A3000 - to 2MB RAM Upgrade	£39
• R303-A3000 - to 2MB RAM Upgrade (expandable to 4MB)	£65
• R304-A3000 - to 4MB RAM Upgrade	£139
• R311-A305 - to 1MB RAM Upgrade	£30
• R312-A305/310 - to 2MB RAM Upgrade	£149
• R314-A305/310 - to 4MB RAM Upgrade	£265
• R412-A410/1 - to 2MB RAM Upgrade	£30
• R413-A420/1 - to 4MB RAM Upgrade	£60
• R414-A410/1 - to 4MB RAM Upgrade	£90
• R810-A410/1 - to 8MB RAM Upgrade	£599
• R820-A420/1 - to 8MB RAM Upgrade	£569
• R840-A440/1 - to 8MB RAM Upgrade	£499
• R814-R140 - to 8MB RAM Upgrade	£499
• A5000 - to 2MB additional RAM Upgrade	£123

0% Finance & Special

Teachers/Academics' prices
Now available on A3000/LC
and A5000 L/C Micro Systems

Convert your Archi 410 to a 420 or 440 with Watford's unique Upgrade Kits

UP10 - to 2MB RAM + 20MB Hard Disc	£159
UP15 - to 2MB RAM + 40MB Hard Disc	£245
UP20 - to 4MB RAM + 20MB Hard Disc	£225
UP30 - to 4MB RAM + 40MB Hard Disc	£309
UP40 - to 4MB RAM + 53MB Hard Disc	£429

Graphics, Art, Design & Games

GRAPHICS		Pysanki	
ARCtist	£19	Quazer	£10
ARCtulate	£19	Real McCoy	£22
Atelier	£65	Real McCoy 2	£23
Artisan II	£45	Redshift	£14
Artisan Gallery	£16	Return to Doom	£16
Autosketch II	£65	Revelation	£54
Craftshop 1 & 2	£28	Repton 3	£14
Euclid 2	£50	Rotor	£19
Graph Box	£59	Saloon Cars	£18
Graphbox Professional	£107	Splice	£25
HotLink Presenter	£40	Sporting Triangles	£24
Kermit	£46	Star Trader	£14
Mogul	£17	Superior Golf	£14
Poster	£79	Super Pool	£19
Pro Artisan	£70	Swin	£22
Prime Art	£69	Tailsman	£12
Render Bender 2	£95	The Pawn	£19
Snipper	£21	Thundermonk	£11
Tween	£21	Timewatch	£24
		Trivial Pursuit	£22
		Twin World	£15

GAMES		U.I.M.	
Air Supremacy	£14	White Magic	£15
Apocalypse	£14	White Magic 2	£15
Arcade Soccer	£14	Wimp Game	£13
Avante Game Fonts	£23	Worldscape	£16
Boogie Buggy	£18	XFire	£18
Break 147	£13		
Bug Hunter	£13		

Miscellaneous		Miscellaneous	
Caverns	£13	Chess 3D	£14
Chess 3D	£14	Chocks Away 2	£38
Chocks Away 2	£14	Chocks Away Extra	£64
Chocks Away Extra	£15	Conqueror	£15
Conqueror	£14	Cops	£18
Cops	£18	Corruption	£18
Corruption	£21	Crisis	£33
Crisis	£23	Elite	£90
Elite	£19	Enter the Realms	£21
Enter the Realms	£14	Enthar Seven	£14
Enthar Seven	£13	E-Type	£13
E-Type	£13	E-Type Designer	£13
E-Type Designer	£13	Family Favourites	£19
Family Favourites	£13	Fireball 2	£19
Fireball 2	£13	Holed Out Designer	£13
Holed Out Designer	£13	Holed Out Golf	£14
Holed Out Golf	£13	Hostages	£14
Hostages	£13	Ibix the Viking	£26
Ibix the Viking	£15	Inter Dector 2	£15
Inter Dector 2	£25	Iron Lord	£27
Iron Lord	£25	Jigsaw	£20
Jigsaw	£27	Lemmings	£16
Lemmings	£20	Masterbreak	£39
Masterbreak	£16	Maggie	£14
Maggie	£39	Man at Arms	£15
Man at Arms	£14	MahJong Patience	£15
MahJong Patience	£15	Manchester United	£127
Manchester United	£15	Europe	£19
Europe	£14	Nevron	£17
Nevron	£14	Olympics	£549
Olympics	£18	Pandoras Box	£25
Pandoras Box	£17	Pipe Mania	£40
Pipe Mania	£16	Pirate	£46
Pirate	£14	Power Band	£39
Power Band	£16	Puncman 1 & 2	£47
Puncman 1 & 2	£16	Puncman 3 & 4	£17
Puncman 3 & 4	£16	WorldScope	£17

Archimedes Hard Disc

Watford's ST506 Hard Disc drives for A310 & A410 series fit internally into the space provided. P.S. A310 upgrades require a backplane and a fan.

• 3HDP – Hard Disc Podule only	£135
• 3HD20 – 20Meg H' Disc + Podule for 310	£235
• 3HD40 – 40Meg H' Disc + Podule for 310	£345
• 3HD50 – 53Meg H' Disc + Podule for 310	£474
• 4HD20 – 20Meg Hard Disc for 410	£129
• 4HD40 – 40Meg Hard Disc for 410	£215
• 4HD50 – 53Meg Hard Disc for 410	£335
• A3000 20Meg Hard Disc + Podule	£299
• A3000 40Meg Hard Disc + Podule	£429

For Archimedes IDE Hard Disc turn to page 14

Desk Top Publisher

Acorn's Archi DTP Package	£108
Equasor	£39
Impression 2 DTP Pack	£125
Impression Junior	£69
Impression Business Supplement	£39
Expression-PS	£19
Tempest DTP Package	£90

Archi Wordprocessors

Pendown Archi	£48	1st Word Plus – 2	£63
Pendown Outline		Archie Spell Master	£25
Fonts	£18	PD Spellchecker	£40
Wordwise + Disc	£24	Graphic Writer	£19
Image Writer	£25	EasiWord	£18
Interword Disc	£24		

Databases

AlphaBase	£36	Maggie	£40
Knowledge Organiser	£42	Multistore v2.01	£176

Spreadsheets

Intersheet Disc	£24	Schema	£89
Viewsheet	£45		

Business Graphics

GammaPlot	£39	Sigmapiot	£39
Interchart Disc	£17		

Integrated Packages

- Logistix £79 • Pipedream 4 £149
- Desktop Office – Database, Graphics & Charts, Wordprocessor Spreadsheet, Communications £98
- Desktop Folio – Wordprocessor, Desktop & Interactive Publishing. Ideal for school environment. £75

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.

The card is provided with an extensive manual explaining installation, all software commands, connector pin outs, hardware addresses and example programs.

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.

£42

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

Silicon Vision

Gerber Plot	£95	Solids Render	£120
Solid CAD	£120	Solid Tools	£279
Super Plot	£28	Data Vision	£110
Super Dump	£22	Share Holder	£135
Arc PCB Professional			£275
Realtime Solids Modeller			£136

Archimedes 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 Only £15

Archimedes External Disc Drive Interface

With this interface it is possible to connect almost any 5.25/7.5" disc drive with its own power supply to the Archimedes. Up to 4 disc drives can be connected. Fully Buffered Board. NO SOLDERING is involved. Supplied complete with necessary lead. • A300/A3000 £21 • A400 £25

More Archimedes Products See Pages 3, 5, 6, 8, 10, 14

LANGUAGES (Archimedes)

ISO-PASCAL; FORTRAN 77	£77 each
Assembler; LISP; Prolog X	£149 each
ANSI C Rel. 3	£125
BASIC Compiler	£77
Cambridge Pascal	£60
Logotron Logo	£45
Macro Assembler	£40
Risc Basic	£120
Robo Logo	£69
Risc FORTH	£110

NEW

256 Grey-Scale Scanner

Watford proudly introduces its new innovative 256 grey-level hand scanner for the Archimedes range of micros. It offers up to 400 dpi scanning resolution, complete with software.

256 Grey-Scale Scanner is ideal for incorporating pre-drawn logos, artwork, photographs and sketches into desktop publishing documents and other graphics programs. Designed by our own R & D team, it offers the best overall scanning solution for Archimedes micro. Just compare the competition on our price and these outstanding features:

- Full 105mm 400dpi scanning operation in just 3ms per line! (Twice as fast as most scanners.)
- Selectable 256/16/4 grey levels
- Full scan preview, scale to fit windows
- Complete set of image enhancement tools
- Single width podule
- True brightness and contrast control
- Fast RISC OS printing
- Five-function edge detection software, Laplace convolution matrix image enhancement, image smoothing, etc.

Special Launch Price

£185

ULTIMUM – Archimedes A3000 Podule Racking System



THE ONLY LOGICAL WAY TO EXPAND YOUR A3000 COMPUTER

Price: £149

Minerva's Archimedes Software

EasyWord	£18	Mailsnot*	£27
Home Accounts	£35	Reporter*	£27
Time Tabler	£549	School Admin*	£65
System Delta	£59		

System Delta Program Reference Manual £29
* Requires System Delta to operate

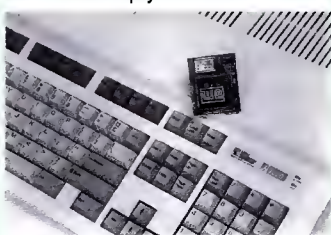
Stand alone Business Accounts Packages
Sales; Purchase; Order Processing and Invoicing;
Nominal; Stock management

£79 per module

or Complete Business Package £325

ARM 3 Turbo Card

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 £199. 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 £18. (A300 and old A440 series owners please note – you will need to upgrade to MEMC1A for ARM3 to work.)

RRP £249

Offer Price £185

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.

Continued → → → → → → → → →

BBC MASTER

MASTER 128K Micro incl. Acorn's View, Viewsheet, ADFS, BASIC Editor & TERMINAL plus **FREE OFFER** (see below) **£399**

FREE OFFER

A 5.25" Double Sided, 40/80 track switchable 400K Disc Drive complete with cables and a Utilities disc incl. 2 games, plus

Gemini's OFFICE MATE & OFFICE MASTER packages on Disc consisting of: Database, Spreadsheet, Beebplot graphics, Accounts packs: Cashbook, Final Accounts, Mailist, Easyledger, Invoice & Statements, Stock Control.

FREE with every BBC Master purchased from us during March

Add-Ons & Accessories

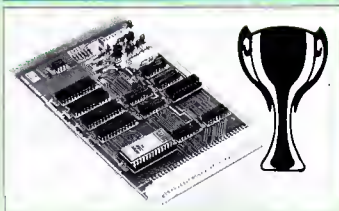
Econet Module for the Master	£45
Twin ROM Cartridge for Master	£9
Quad ROM Cartridge for Master	£14
Master Reference Manual I	(No VAT) £14
Master Reference Manual II	(No VAT) £14
Master Advance Ref Manual	(No VAT) £17
64K Upgrade Kit for B+	£32
Acorn 1772 DFS Kit complete	£49
ECONET Upgrade Kit for BBC B	£42
ALL ECONET UPGRADES Available	
ARIES' IEEE Interface for BBC B & Master	£238
Morley Teletext Adaptor with AT5 Rom	£99
Ecolink	£270

Z88 Portable Micro**£179****FREE**

With every Z88 purchased from us, we are giving away absolutely FREE, a Z88 to BBC Interface Link, 4 rechargeable batteries and a compact Mains Battery Charger worth £38.

Z88 ACCESSORIES

• 32K RAM Pack or 32K EPROM Pack	£16
• 128K RAM Pack or 128K EPROM Pack	£32
• 512K RAM Pack	£86
• Z88 Eprom Eraser Unit	£38
• Z88 Spellmaster for Pipdream	£40
• Z88 Carrying Case	£8
• Z88 Computing Book	£9.95
• 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
• Z88 to PC Link II	£27
• Z88 to Macintosh	£32
• Z88 Mains Adaptor	£9
• Z BASE	£56
• Z TAPE	£42
• Z TERM	£42
• Z88 Modem	£114

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 television signals may also be digitised via a video recorder or TV tuner. Please write for further details.

Price £139

A Set of Colour Filters for colour image grabbing using a video camera **£16**

Archi Graphic Tablet

The Archi Graphic Tablet offers performance and accuracy comparable to other tablets priced at well over £400, and has the useful addition of a liftable cover, which can hold tracing material or menu templates securely. The package is supplied complete with sophisticated Archi software. (Now, fully LinCAD compatible. Recommended by Linear Graphic for use in Education).

(FREE this month, PC Mouse Drivers & Art package)

Special Price £175

(Price includes Tablet, Leads, Software & Puck) Stylus Optional Extra £15

Archi Graphic Tablet Junior, Working area 9" x 6". Price includes Stylus **£110**

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**

Acorn & Watford DFSs

• Watford sophisticated DFS ROM	£16.00
• Watford DFS Kit complete	£69.00
• We will exchange your existing ROM for Watford's ultimate DFS ROM at only	£12.00
• DFS Manual (comprehensive)	£6.95
• Acorn DNFS ROM	£17.00
• Acorn ADFS ROM only	£25.00
• Acorn 1772 DFS ROM Kit	£49.00

(The single Density DFS system is now old technology. Like Acorn, Watford too have decided to replace it with the their more up-to-date 1770 DDFS interface. We have informed most of the software houses of this decision in order that they can ensure compatibility with our highly sophisticated and fully Acorn compatible DDFS).

Watford's MkII 1772**Single/Double Density DFS**

Many of our customers have wanted to use our superior DDFS and Acorn ADFS together. Now our Mk II DDFS Board with its 1770 Disc Controller, has been adapted to allow the use of Acorn ADFS as well. It also has all the commands of the Acorn's 1770 DFS, plus the added features.

- Added features include:
- Acorn ADFS compatible – Use ADFS on our DDFS board.
 - Tube host Code – No longer any need to have the DNFS in your machine to use Co-Processors, even the CoPro and Master 512.
 - Auto 40-80 Track sensing – no need to fuss with 40/80 track switches (even works with protected disks).
 - An extremely powerful 8271 emulation – ensuring compatibility with almost all software.
 - Low new profile – small footprint board.
 - Fits with all third party ROM boards.
 - Option to double the speed of file handling operations – BPUT and BGET.
 - Operates in both single and double density modes.
 - OSGBP has been recoded, increasing still further the speed of file handling.

Please note that not all DDFS's are capable of providing either the full 80% storage increase or of allowing a file the full size of the disk – Ours allows both of these!

If you already have a DDFS (any manufacturer), and wish to upgrade to our MkII version, then simply return your existing ROM and DDFS board and we will supply the new DDFS for only **£39.00**.

- SPECIAL PRICE **£44.00**
- DDFS Manual (No VAT) **£6.95**
- We will exchange your existing DFS Kit for our sophisticated DDFS for only **£30.00**

Please note, as the MkII DDFS is a hardware and software upgrade, it is not possible for existing Watford DDFS users to simply exchange the ROM for the new version.

**3M – Diskettes**

3M – SCOTCH Diskettes with Lifetime warranty from Watford Electronics your 3M Appointed Distributor

- 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) **£7**
- 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 **£9**
- 10 x 3.5" S/S D/D 40/80 Track **£7**
- 10 x 3.5" D/S D/D 40/80 Track **£7**
- 10 x 3.5" Double Sided High Density **£13**

**Top Quality 3.5" & 5.25" Diskettes**

To complement our range of Quality Discs and Disc Drives. We are now supplying SPECIAL OFFER packs of 10 Lifetime guaranteed discs. Each disc has a reinforced hub ring. Supplied complete with selfstick labels and a Plastic Library Disc Box.

- 10 x M3 3.5" D/S D/D 80 Track **£7**
- 10 x M9 3.5" D/S High Density **£12**
- 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 **£7**
- 10 x M8 5.25" D/S H/D Hi-Density **£9**
- M2 3" Double Sided **£2.50 each**



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

Quality Disc Drives from Watford

All our Disc Drives are Double Sided and will operate in both Single and Double Density modes. All 5.25" Disc Drives are 40/80 track switchable. For ease of use, the switches are front mounted. Various UK "manufacturers" of disc drives for the BBC Micro (more accurately, "packagers" label other manufacturers drives with their own name). We buy the high quality NEC and Mitsubishi drives in large quantities directly from the manufacturers, package them and sell them at "dealer" prices direct to the public.

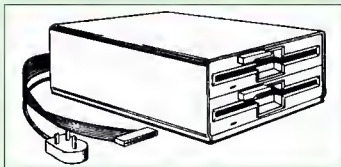
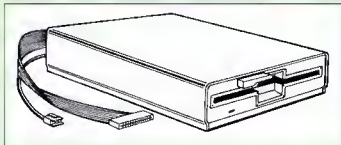
If you look around the popular BBC Micro press, you will find that the prices we quote for the top quality, new slimline disc drives are, virtually without exception, the best around. These prices, coupled with the backup of one of the country's largest distributors of BBC peripherals provides a superb deal.

Unless you anticipate using dual drives in a fully expanded BBC system for long periods of time with little ventilation, then we suggest that our range of "CL" disc drives without the PSU (Power Supply Unit) would be quite adequate (extensive tests within our workshops have confirmed this). All drives are supplied complete with a SPECIAL UTILITIES Disc, Cables and Plugs. The Drives with power supply have a mains moulded plug for safety purposes. **Ideal for Schools & Colleges.**

When using a BBC Micro, most people find themselves short of desk space. The Watford's BBC Micro plinths form an ideal way of recovering some of this precious space. Your BBC Disc Drive and Monitor can all occupy the same vertical footprint and still be comfortably situated. With the Watford Double Plinth, your Disc Drive is mounted vertically at one side, leaving a very valuable area directly in front of you for such useful items as spare discs, pen, paper, reference manuals, etc. Follow the trend with a Watford plinth. (Turn to the 6th page of our advert for the Plinths).

P.S. All our 5.25" Disc Drives with PSU are compatible with the Compact Micro. All you require is our special Compact Disc Drive cables designed by us.

"Test Bureau Approved for Use in Education"



Our Disc Drives conform to BS415

Type	Description	
	Disc Drive without PSU	
• CLS400S:	Single, 40/80 track 400K Double sided Drive	£70
• CLD800S:	Twin, 40/80 track, 800K Double sided Drives	£138
	Disc Drive with PSU	
• CS400S:	Single, 40/80 track, 400K Double sided Drive	£80
• CD800S:	Twin, 40/80 track, 800K Double sided Drives	£153

Special Cable to connect both 3.5" and 5.25" Disc Drives simultaneously to the BBC Compact £13

3.5" DISC DRIVE

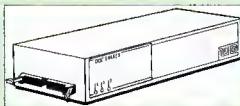


These top quality 3.5" Double sided, 80 track, are attractively finished in BBC beige. They are supplied complete with all cables and a Utilities Disc.

Type	Description	
	Disc Drive without PSU	
• CLS35:	Single Disc Drive, 400K	£62
• CLD400S:	Twin Disc Drives, 800K	£109
	Disc Drive with PSU	
• CS35:	Single Disc Drive, 400K	£83
• 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 Drive Sharer



(Ideal for educational establishments)

A low cost alternative to the Econet system. Watford's Intelligent Disc Drive Sharer allows you to connect 3 BBC Micros (model B, B+ and Master series) to a single or double disc drive. Running under any DFS or DDFS, this intelligent unit will automatically queue the computers. Each computer has a status light dedicated to it. If it is green you will get immediate access to the disk, and red means that you are next in line. The unit plugs directly into the disc drive socket on each computer and is powered by the mains. (N.B. Not for use with ADFS.)

Price includes 3 Cables £55

Disc Drives in Monitor Stand



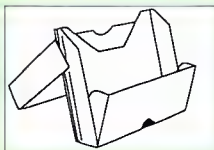
• **CDPM 800S** – Twin 5.25", 800K Double sided 40-80 track switchable disc drives mounted in an attractively finished Beige colour plinth for the BBC B & Master 128K micros. Supplied complete with integral power supply, cables and Utilities disc. The mains switch with neon On/Off light indicator, and 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



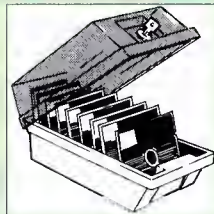
DL1	– Holds 5 x 3.5" Discs.	£150
DL2	– Holds 10 x 3.5" Discs.	£190
DL3	– Holds 5 x 5.25" Discs.	£160
DL4	– Holds 10 x 5.25" Discs.	£200

Floppy Head Cleaner Kit

The heads in floppy drives are precision made and very sensitive to dirt. The use of Cleaner Kit is a sensible precaution against losing valuable data. It is recommended to clean the drive head once a week. It is very simple to use. Available in 3.5" & 5.25", please specify.

Price £4

Antistatic Lockable Disc Storage Units



Gives double protection – Strong plastic case that affords real protection to your discs. Antistatic helps avoid data corruption whilst in storage. The smoked top locks down. Dividers and adhesive title strips are supplied for efficient filing of discs.

• 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

Dust Covers (For our Disc Drives)

Single CLS (without PSU)	£3.20
Single CS (with PSU)	£3.25
Twin CLD (without PSU)	£3.85
Twin CD (with PSU)	£3.90

Disc Albums

Attractively finished leather-look Vinyl. PVC Vinyl	
DW1 – Holds 6 x 3.5" Discs	£2.50
DW2 – Holds 6 x 5.25" Discs	£3.00
DW3 – Holds 20 x 5.25" Discs	£3.50
DW4 – Holds 40 x 3.5" Discs or 5.25" Discs	£4.50

Special Bulk Offer on Discs

(Supplied packed in Anti-Static Lockable Storage Units)
(Lifetime warranty on Discs)



PRICES SLASHED

BULK PACK DISCS in lots of 100

Type	S/S	D/S	D/S
• Without Sleeves 5.25"	40T	40T	80T
• With Sleeves 5.25"	£30	£35	£40
• 3.5" D/S/D/D	£27 for 50	£38	£43
		£27 for 50	£49 for 100



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

Continued → → → → → → → →



Microvitec Monitors

- 1431 - Standard Resolution Monitor £169
- 1451 - Medium Resolution Monitor £209
- Cub3000 Medium Res for A3000 £189
- 1441 - High Resolution Monitor £359
- Dust Cover for Microvitecs £5.50
- Touchtec 501 Touch Screen £239

Now 3 years Parts & Labour warranty on all Microvitec Monitors

Multiscan Colour

- Eizo 9060S £389
- NEC 6FG £1525
- Eizo 9070S £579
- Taxan 770LR £362
- NEC 3FG £370
- Taxan 775 £362
- NEC 4FG £465
- Taxan 795 £402
- NEC 5FG £850
- Taxan 875 £685
- VIDC Enhancer Board £25

(We will supply the Watford's superior Multiscan VIDC Enhancer for Archimedes micro at only £10, if purchased with any Eizo or Taxan monitor.)

(P.S. Taxan 795 monitor is supplied with a FREE VIDC enhancer board)

Aries AlphaScan Monitor

Pound for Pound, the AlphaScan VGA Multiscan monitor provides the maximum performance and greatest flexibility of any 14" colour monitor for the Archimedes micro.

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 Multivideo VIDC Adaptor supplied (free) with the monitor allows high resolution operation in all screen modes.

£325

Philips Monitors

- BM7502 12" Hi-res Green Monitor £67
- CM8833 14" Med. Res Colour Monitor £167
- Dust Cover for Philips Monitors £6

STAR BUY

- PHILIPS 14" Medium Res, dark glass, attractively finished Colour Monitor. A push-button switch toggles between Hi-Res monochrome green text mode and full colour display. (Please state the type of Connecting Lead you require).

ONLY £166

Spare Monitor Leads

- BNC Lead for Zenith or Philips £3
- Skart Monitor Lead £5
- RGB lead for TAXAN Monitors £3
- Archimedes Colour Monitor Lead £7.50

Anti Glare VDU Screen

These extremely effective, easy to install, 12" & 14" VDU screens eliminate harmful glare, improves contrast on colour monitors. Increases productivity in offices. A must for wordprocessor users.

£12

Aries 2000 Colour Monitor

This attractively finished, etched screen medium res monitor is supplied complete with built-in speaker, volume control and video output. All controls are located on the front panel for ease of use. Ideal for BBC, BBC Master, Archimedes and Amiga.

A bargain at £159

Watford 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 WIMP application supplied on disc, allows new modes to be designed and existing modes to be modified for particular monitors.

Super VGA VIDC Card: This provides support for both VGA and Multiscan monitors. A unique electronic 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

Panasonic Printers



- KX-P1123 £129
- KX-P1654 *£335
- KX-P1124i £173
- KX-P1695 £272
- KX-P1170 £100
- KX-P2624 *£295
- KX-P1624 £272
- KX-P2180 £POA

* Price includes 12 months On-site warranty

Cut Sheet Feeders

- P36 - 1124/24i £79
- P37 - 1123/70/80 £69
- P38 - P1624/95; P2624 £129

Buffers

- P12 4K Buffer Board for KX-P1081 £55
- P14 32K Buffer P1123/24/70/80 £16
- P1540/92/95; P1624/54/95

Serial Interfaces

- P19 for P1123/24/24i/70/80/1624/54/95/2624 £49

Citizen Printers

- 120D Plus £100
- Swift 9 £129
- 124D £145
- Swift 24E# £249
- 224 £185
- Swift 24X £299
- PN-48 £209
- PN48 Ribbon £4

FREE Colour Option with Swift 24E

- Swift 9 Colour Option £19
- Swift 24 Colour Option £29
- Swift 24 Ribbons Black £4 Colour £13
- Citizen/Archimedes Colour Printer Driver £15

Integrex Colour Jet

- Colour Jet 132 Printer £449
- 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 £POA

Star Printers

- LC15 £173
- SJ48 Inkjet £174
- LC20 £100
- XB24-200 Colour £295
- LC24-10 £133
- XB24-250 Colour £355
- LC24-15 £240
- XB24 Colour kit £29
- LC24-200 £164
- ZA200 Colour £234
- LC24-200 Colour £203
- ZA250 £297
- LC200 Colour £143
- Star/Archimedes Colour Printer Driver £15

Star Accessories

Cut Sheet Feeder

- LC10/200/24-10 £65
- LC15/LC24-15 £125
- XB24-10 £80
- XB24-15 £139

Serial Interfaces

- 8K Ser LC-200; LC24-200; FR10; FR15; XB24-10; XB24-15 £52

Paper Roll Holders

- LC-200; LC24-200; LC24-200 colour £29

Buffers

- 32K Ram Card for LC/XB24-10, 15; LC200 £55

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

Laser Printers

All Laser Printers include 12 months On-site maintenance

- Canon LBP-4+ 4ppm £575
- Canon LBP-8 III 8ppm £970
- Canon LBP-8 III R 8ppm £1440
- Canon LBP-8 III T 8ppm £1340
- Epson EPL4100 6ppm £620
- Epson EPL7500 6ppm £1159
- Epson EPL8100 £965
- HP Laserjet IIP+ £625
- HP Laserjet III 8ppm £1015
- HP Laserjet IIID 8ppm £1499
- HP Laserjet IIIP 4ppm £695
- HP Laserjet IIISI 16ppm £2525
- Panasonic KX-P4420 8ppm* £620
- Panasonic KX-P4450i* 11ppm* £925
- Panasonic KX-4455 Postscript 11ppm* £1450
- Panasonic KX-P4430 Satin Print* £299
- Star LP-8 III 2 8ppm £1249
- Star LP-8 III 8ppm £910
- Star LP-8 Star(post)script 8ppm £1140
- Star LP-4 4ppm £565
- Star LP-4PS Postscript 4ppm £779

* Now with 2 years On-site warranty

Laser Toners

- Canon 2, 3 & 4 £46
- KX-P4420/50 £19
- Epson GQ £13
- Laserjet HP IIP & IIIP £42
- EPL 4100 £59
- Laserjet II/D, III/D £48
- EPL7100 £82
- Qume Crystal (3) £58
- Star LP-8 £56

Laser RAM Upgrades

- IIP & III 1MB £51
- EPL7100 256K £39
- IIP & III 2MB £88
- GO5000 512K £42
- II & IID 1MB £64
- KX4420/50 1M £75
- II & IID 2MB £99
- KX4420/50 2M £115
- II & IID 4MB £146
- KX4420/50 4M £135
- Canon LBP4 1M £105
- Star LP8 1M £199
- Canon LBP8 2M £125
- Star LP8 2M £275

Laser Drum & Developer

- Epson Drum GQ5000 £93
- EPL7100 £129
- Panasonic 4420 Drum £60
- Developer £59
- Panasonic 4450 Drum £93
- Developer £80
- Qume Drum £76
- Developer £56

Jetpage Postscript Cartridge

- HP IIP/III £225
- IID & IIID £227

Various Add-Ons

- Laserjet Appletalk Interface £135
- HP Adobe Postscript £399
- Pacific Page Postscript £259
- HP Premier Font Collection £28
- Laserjet various Font cartridges from £45

Hewlett-Packard Printers

- # Desk Jet 500 £285 • Paintjet XL £1045
- Desk Jet 500 Col. £475 • Quiet Jet Plus £384
- Paint Jet Colour £430 • HP Think Jet £265
- # Now 3 years extended Parts & Labour warranty
- DeskJet 500 Cart. Black £15; Colour £27
- Paintjet Cartridges Black £19; Colour £25
- Desk Jet 500 256K RAM cartridge £99
- HP Epson FX Emulation Cartridge for Desk Jet £59
- Desk Jet Unlimited (Book No VAT) £19.75

Canon Bubblejet Printers

- | | Printer | CSF | Dble Bin | Ink Cart |
|---------|---------|------|----------|----------|
| BJ10EX | £183 | £43 | | £16 |
| BJ300 | £289 | £88 | £65 | £12 |
| BJ300 | £380 | £110 | £79 | £12 |
| BJC800C | £1549 | | | |
- Spare Battery pack for BJ10E £33

NEC Pinwriter Printers

- P20 £180 • P70 £419
 - P30 £240 • P90 £635
 - P60 £330
 - P60/70 Colour Option Kit £59
 - Ribbons Black for P20/30 £6 for P60/70/90 £7
 - Ribbons for P60/70/90 Black £9 Colour £13.50
- Cut Sheet Feeders**
- P20 £59; P30 £85; P60 £89; P70/90 £80

Epson Printers

- | | | | |
|--------------|-------|---------------|------|
| DFX5000 | £1079 | LQ1060 Colour | £595 |
| DFX8000 | £1979 | LQ1070 | £315 |
| FX850 | £264 | LQ1170 | £437 |
| FX1050 | £336 | LQ2550+ | £675 |
| LQ100 | £159 | LX400 | £101 |
| LQ200 | £162 | LX850+ | £140 |
| LQ450 | £165 | LX1050 | £206 |
| LQ570 | £205 | SQ850 | £432 |
| LQ860 Colour | £444 | SQ2550 | £625 |
| LQ870 | £368 | | |

Cut Sheet Feeders for

- | | |
|-----------------------------|------------------|
| LX400/800/850/LQ400/500/550 | £69 |
| EX800/FX800/850/LQ800/850 | £130 |
| FX/LQ 1000/1050/SQ850 | £159 |
| LQ 2550 | £390 SQ2550 £390 |

Tractor Feed for

- 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

All these interfaces fit inside the printer

- RS232 £28 RS232 + 2K Buffer £52

Printer Leads

- | | |
|--|--------|
| BBC Centronics 4' long | £5 |
| BBC Centronics 6' extra long | £7 |
| Compact's Special Centronics Lead | £7 |
| Nimbus Centronics Lead | £6 |
| IBM/Archimedes Parallel Lead 6' | £4 |
| IBM/Archimedes Parallel Lead 5 metres | £10 |
| IBM/Archimedes Parallel Lead 10 metres | £15 |
| Double Ended 36 way Centronics Lead 4' | £7 |
| Double Ended 36 way Centronics Lead 6' | £9 |
| MSX Centronics Parallel Lead 4' | £12 |
| RS232 Leads (Various) | P.O.A. |
| IBM Keyboard extension lead coiled | £5 |

Concept Keyboards

- | | |
|--|------|
| Standard A3 Keyboard with BBC Software | £138 |
| Standard A4 Keyboard with BBC Software | £109 |
| Archi A3 Keyboard | £139 |
| Archi A4 Keyboard | £110 |

Plotters

- HP7440AU £525 • HP7475AU £715
- Roland Plotters
- DXY1100 £490 • DXY1200 £520
- DXY1300 £825 • DXY2500 £2345
- DXY3500 £2955 • Sketchmate £310
- Roland plotter Pens, Fibre tip £7.50

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
- Teleprinter Roll (Econo paper) £4

(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 90 x 36mm (Single Row) | £6.00 |
| 1,000 90 x 36mm (Twin Row) | £6.25 |
| 1,000 90 x 49mm (Twin Row) | £7.50 |
| 1,000 102 x 36mm (Twin Row) | £6.75 |

Laser Printer Labels on A4 Sheets

- | | |
|-------------------------|--------|
| 3750 70 x 29mm (3 Rows) | £13.50 |
| 3000 70 x 37mm (3 Rows) | £13.25 |
| 2625 70 x 42mm (3 Rows) | £13.00 |

Printer Ribbons & Various Dust Covers

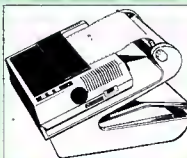
- | Type | Ribbons | Dust Covers |
|--|---------|-------------|
| BBC Micro | — | £3.50 |
| BBC Master | — | £4.00 |
| Archimedes Micro pair | — | £9.00 |
| Citizen 120D | £2.75 | £4.50 |
| DMP2000 | £2.75 | £4.75 |
| DMP4000 | £3.75 | £4.85 |
| EX800/1000 | £3.50 | £5.00 |
| RX/FX/80/85/800/MX80 | £2.95 | — |
| 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 | £4.00 | — |
| LX80/86/800/850 | £2.75 | £4.50 |
| LX400 | £3.50 | £5.00 |
| M1009/GLP | £2.95 | £3.75 |
| NEC P2200 | £4.50 | £5.00 |
| Panasonic KX1080/81 | £3.25 | £4.75 |
| Panasonic KX-P1124 | £7.00 | £5.00 |
| Star LC24-10 | £2.95 | £6.00 |
| Olivetti Ink Jet Cartridges (set of 4) | £6 | |

Original Panasonic Ribbons

Guaranteed to last 3 million characters

- | | |
|--------------------------------|----------------------|
| P110 for KX-P1081, 1592 & 1595 | £6 |
| P115 for KX-P1180 £7 | P145 for KX-P1124 £7 |
| P140 for KX-P1540 £8 | P155 for KX-P1624 £8 |
- Colour Ribbons for KX-P1081, 1592 & 1595
Brown, Blue or Red £9 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 i.e. one above the other, the desk space required for your printer functions is effectively halved. Its ergonomic design ensures smooth paper flow and automatic reloading.

- 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	£11
• 3 to 1	£13	£14
• 4 to 1	£16	£17

Professional Type

Connects	Serial	Parallel
• 2 to 1	£17	£18
• 3 to 1	£22	£25
• 5 to 1	£34	£38

Cables extra at £6 each

2 Way Compact Printer Switch

A handy 2 way printer switch can be attached to the micro or monitor for ease of use.

- Centronics £18; • Serial £17
- (Cables extra at £6 each)

Auto Printer Sharer Switch

Connects	Serial	Parallel
2 to 1	£40	£45
4 to 1	£62	£49
8 to 1	—	£89

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 £135
- 8 In/1 out £199
- 4 In/2 out £169

Compact Converter Units

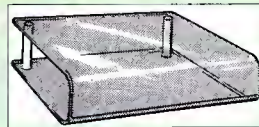
Serial to Parallel £36 Parallel to Serial £37

Laser Direct



- Laser Direct Qume 6ppm complete £749
- Special High Res Card 600 DPI for Canon LPB 4 & LPB 8 Laser Printers £315
- LPB 4 Printer plus High Res Card £875
- LPB 8 III Printer plus High Res Card £1275

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 £59
- Quest Mouse III, Quest Paint, AMX Stop Press & Pagefont £89
- Quest Mouse III only £30
- Quest Paint Software only £34
- Quest Font Disc (22 Text Fonts) £15
- Quest Mouse Mat (Red or Blue or Green please specify) £3
- 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

ConQuest

Quest combined with ConQuest and Acornsoft GXR ROM make up THE MOST POWERFUL drawing packages available for the BBC range. Quest Paint is able to take advantage of almost any additions to your machine, such as Shadow or Sideways RAM. ConQuest takes this principle even further, by utilising the otherwise normally incompatible Sideways RAM facility by holding pictures in them.

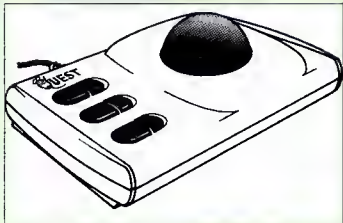
ConQuest ROM Package £30
(Price includes software in ROM and a comprehensive Manual).
(Not Compatible with BBC Compact)

ARCHI Mk II MOUSE

An extremely reliable replacement mouse for Archimedes Micro £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

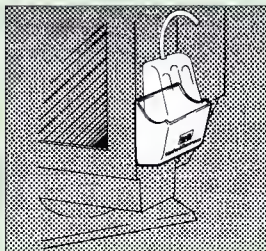
RB2 Marconi TRACKER BALL

RB2 (AMX/Quest compatible) £36
RB2 including Quest Paint £69
RB2-A for Archimedes £37

THE NEW Mk III AMX MOUSE

- **AMX Mouse plus Super Art** £54
(Please specify for BBC, Master or Compact)
- **AMX MOUSE ONLY** £29
- **AMX SUPERART Package** £29
- **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)** £34
- **AMX XAM Educational** £15
- **AMX EXTRA EXTRA** £16
- **AMX MAX A gem of desktop (ROM)** £20
- **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 or desk.

It protects it from damage when not in use, yet within easy reach when you need it again. At £4 it does not cost a rodent's ransom.

Price £3

Mouse Cleaning Kit

To obtain trouble free operation and prolong the life of your mouse, it requires regular cleaning. Our deluxe mouse cleaning kit is ideal for the purpose £3



Our Mark II Light Pen is the very latest in light pen technology. It is totally insensitive to local lighting conditions and works with many different monitors. The pen only responds to the High Frequency light produced by your monitor/TV. An LED indicates when valid video data is being produced. A conveniently located switch is also fitted. (Price includes FREE software Disc and Operating Manual)

Only £19

BEEB VIDEO DIGITISER



"Test Bureau Approved for Use in Education"

Using any source of composite video (colour or monochrome) and the Watford Beeb Video Digitiser, you can convert an image from your camera into a graphics screen on the BBC Micro. This uses the full graphics capacity of the BBC micro in modes 0, 1 or 2. The video source may be a camera, video recorder or television, and is connected via the video output socket. The software supplied includes a sophisticated, fast screen dump routine.

Images produced can be compressed, stored to disc, printed on an Epson compatible printer, directly used to generate graphics, analysed for scientific and educational use or converted to other formats e.g. Slow Scan TV or receiving a picture from a remote camera using a modem. The output from the digitiser exactly matches the graphics capability in each mode, with up to 8 levels of grey in mode 2. The unit connects into the User Port and automatically scans a complete picture in 1.6 seconds.

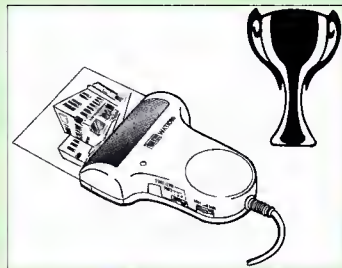
£99

(BBC B+ and Master compatible, except Master with Econet)

(Price includes) Digitiser Unit, Software in ROM & a Comprehensive Manual)

Beeb Hand Scanner

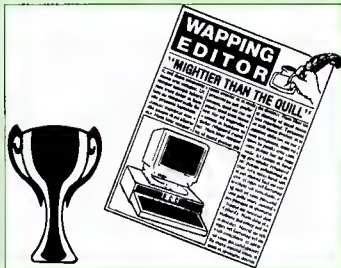
Hand-held Scanner for the BBC Micro



Watford Electronics are pleased to announce the launch of the first hand held scanner for the BBC Micro. 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! These useful devices have been available for faster and more expensive micros for some time, but only now is Watford Electronics able to offer the BBC Micro computer. The HandScan plugs directly into the 1MHz bus on the BBC while a comprehensive set of utilities provided by the sophisticated ROM firmware. The scanner has a resolution of either 100 DPI or 200 DPI when accuracy is essential. Pictures as wide as 4" may be scanned in mode 0 and various types of dithering may be selected to simulate the grey levels of a scanned picture.

All necessary software has been included in the firmware to allow the scanner to read images directly into our Wapping Editor with little more than the click of the mouse. The digitised picture may then be incorporated into your magazine, newsletter, report or any other document.

Beeb HandScan & Firmware £115



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.

Included with the system is a utility disc containing several high quality fonts, various utilities and a ROM image of a Support ROM. A comprehensive 100 page manual completes the package. The Support ROM contains routines to allow an area to be rotated to any angle or distorted to any four-sided shape. Also included are facilities to draw ellipses at any angle and sectors, segments and arcs (in Master or BBC B with Acorn GFX). Another of the features of the Support ROM is a 'Turbo DFS' which gives DFS access times comparable with those of ADFS.

Page Layout Section

The Wapping Editor may be used to create pages of any size from an A6 to a full A3 page. If none of the eight default page types suit your purpose, the stand-alone page creation program may be used to create pages to your own requirements. By using proportionally spaced fonts and genuine microspacing it is possible to print over 150 characters across an A4 page. A unique feature of the Wapping Editor is the 'A5 x 2' page size allowing two A5 pages to be printed side by side onto a single A4 sheet.

The graphics module incorporates the facilities like: pencil, brush, airbrush, polygon, circle, eclipse, fill, cut & paste, etc.

Text may be typeset, either justified or unjustified, in any font anywhere on the page. Simply select which font and text document you wish to use, and pull out a rectangle on the page where you want the text to be - it's as simple as that! Multiple columns may be printed just as easily and a special 'expand' feature may be used to expand the microspacing so that the document exactly fits the space defined.

Word-Processor

The integral word processor is the ideal tool for producing your text documents, although text can of course be read in from any of the other popular word processors such as View, Wordwise etc.

The Font Editor

The font editor module will allow you to design your own typefaces or to modify the ones provided on the utility disc. This sophisticated editor has numerous functions designed to take the tedium and frustration out of producing good looking, well balanced fonts. Each character may be individually proportionally spaced and characters of any size up to 16 x 16 pixels may be defined.

Pictures may also be 'grabbed' from a video source by using the Watford BEEB Video Digitser.

Wapping Editor Software Pack £59
Wapping Editor plus Mouse £79

(Wapping Editor only works with Master Compact if a Mercet 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.

Music writing symbols in the form of pattern and brush for quick production of manuscripts are included together with staves.

There are two prepared hi-res pages laid out for printing labels, both single and double width. Ready made label designs are included but these can be easily replaced with your own designs.

A Mode 0 screen dump routine is also included. To pack such a large amount of data onto the discs the screens have been compressed and routines to compress and expand Mode 0 screens are included on both discs. Using the packing routine you can archive large numbers of screens onto a single disc.

£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 three 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



This most advanced Archi A4 image scanner is supplied complete with ROM based podule software. Features provided include facilities for zooming in on an image and inverting the image in X and Y directions, saving and printing of the sprite created. Interactive help is supplied using the IHELP application on the Acorn applications discs. 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.

All these features and facilities combine to make the Archi Page Scanner the fast and convenient way in which to add that extra impact, interest and clarity to documents, reports, instruction sheets, manuals, news letters, etc., from your Archimedes DTP package.

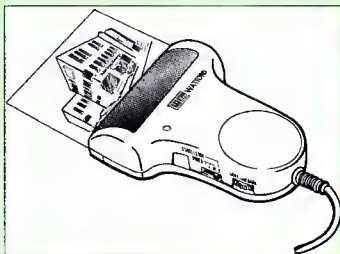
New Low Prices:

Archi A4 Scanner	£269
Sheet Feeder for above	£75
Scanner + Sheet Feeder	£359

Computer Concept Scanlight

• Scan-Light A4	£275
• Scan-Light A4 + Sheet Feeder	£368
• Scan-Light Junior mono	£130
• Scan-Light Junior 256	£197

Archi Mk II Hand Scanner



Watford Electronics is now able to offer a complete hand held scanning package, possibly the most essential addition to any desk top publishing system, for only £149. The package includes the most comprehensive utility software available for the Archimedes, a high quality hand held scanner, and all necessary documentation to get you going straight away.

SCANNER

The scanner is capable of scanning up to an amazing 400 dots per inch (DPI) The scanning area is 4" wide, and the height is only limited by the maximum amount of memory available. The dot resolution may be switched to 100, 200, 300 or the maximum 400 dpi. One of four operating modes may be selected offering either pure monochrome scanning, or one of three grey level modes. The grey level modes use different size dither patterns to represent up to 16 shades of grey. There is also a dial to allow the "brightness" to be adjusted over a wide range, in order to optimise the quality for any specific image. The scanner interface is a standard, single width, expansion card (podule) which plugs into the Archimedes' backplane. The socket on the rear panel connects the scanner by 1.8 metres of cable.

SCANNER SOFTWARE

Full use is made of the windowing and the multi-tasking facilities of RiscOS. The software is supplied in a 64KByte ROM located on the interface board. The scanner appears as a small icon on the desktop icon bar, and the software is retrieved from the ROM simply by clicking on that icon. As you scan a page, the image appears in the scanning window on the screen, scrolling up in real time. The other facilities included in the software are:

Cropping and scaling to any size including stretching and squashing in X and Y direction separately.

Colour tinting.
X and Y flip.

Edge detection which turns solid objects into outlines.

Selective directional copying which allows features (i.e. lines or text) to be made thicker or thinner.

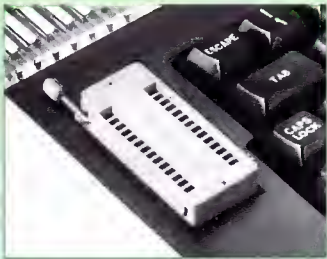
Scanned images may be saved as sprite files or transferred directly into other RiscOS applications (DTP, Draw, Paint) simply by dragging the sprite file into the application's window. Sprites may also be generated using anti-aliasing. This greatly improves picture quality and is particularly effective when scanning material with a range of grey tones, such as photographs. Images can be printed on any printer that is supported by a RiscOS printer driver, with optional settings for portrait or landscape modes, image scale and positioning. Images are printed using the full resolution of the printer and are not limited to the screen resolution.

On-screen help is provided via the RiscOS interactive help facility. Calls are also provided in the ROM for users wishing to write their own software, incorporating the use of the scanner.

AHS-4 Archi 300/400 Version	£119
AHS-3 Archi A3000 Version	£129

Continued → → → → → → → →

Sideways ROM ZIF Socket System



Allows you to change your ROMs quickly and efficiently, without opening the lid. The ZERO INSERTION FORCE (ZIF) socket is located into the ROM Cartridge's position.

- Very simple to install. NO SOLDERING required. The ZIF (Zero Insertion Force) eliminates the possibility of damage to your ROM pins when inserting & extracting.
- The low profile of the socket allows unrestricted access to the Keyboard.
- All data and address lines are correctly terminated to ensure correct operation of suitable ROMs with the BBC micro. We also supply a purpose designed see-through storage container with anti-static lining, allowing you to store up to 12 ROMs, protecting them from mechanical and static damage.
- This versatile hardware solves the problem of running out of socket space. Simply lift the ROM from the ZIF & insert a different one (No pulling or pushing of Cartridges. It is a must for professionals and Hobbyists alike.)
- BBC, B and B+ compatible.

ONLY £18

BBC B Low Profile Cartridge System

Complete System consists of: Low profile ROM Cartridge, Socket housing, Cable assembly, 5 labels and a library storage rack for the BBC B.

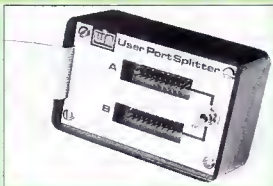
- Complete System **£11**
- Spare Cartridges **£2.75**
- Spare Rack **£1.65**

ROM Cartridges for the BBC Master

Will also accept the new larger Piggy Back ROMs like: Interword, Interbase, Quest, Conquest, etc

Twin **£8**; Quad **£13**

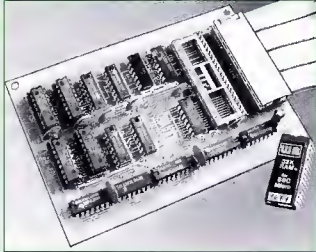
User Port Splitter Unit



Gone are the days when you had to plug and unplug devices from the User Port. This extremely useful little device allows two units to be connected to the User Port simultaneously, and select between them simply by toggling a switch. This device is particularly useful for those people using Quest Mouse and the Watford Video Digitiser or any similar combination

Excellent Value at £22

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.

- While word processing, you don't wait for a slow printer, type in text while printing and save on expensive printer buffers.
- "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.
- Combine GOOD GRAPHICS and LONG PROGRAMS. Use the top 20k of the expansion RAM as the screen display memory, leaving all the standard BBC RAM free for programs. Benefit from MODE 0/1/2 graphics and 28k of program space.
- Use the full 32k or the bottom 12K of the expansion RAM as a printer Buffer. (P.S. Only 12K printer buffer can be used with Wordwise & WW+, due to the way they are written).
- Unique facility to turn ROMs off and on again.

Only £54

(Price includes a comprehensive manual and the ROM)



Commander Joystick



Watford Electronics' new Commander Joystick for the BBC B and Master 128K has a unique dual mode of operation giving selective free floating or self centring fully variable control in both X and Y axis directions. Commander is particularly good for flight simulation and drawing programs.

Features:

- Direct connection to BBC Analogue input port – no 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



ARIES CORNER

B-32 Shadow RAM Card

Like the BBC B+, the B32 provides 20k of shadow screen RAM and 12k of sideways RAM. Unlike the B+, the B32 has simple software commands which allow the user to reconfigure the RAM as 16k of shadow RAM and 16k of sideways RAM, or all 32k as sideways RAM.

With the B32, the programmer gets up to 28k of RAM available for Basic, Logo, Cobal, Forth, Lisp and BCPL programs in any screen mode. The business user gets extra memory for View, ViewSheet, Wordwise Plus, Interword and many other applications. For advanced applications, the scientific user gets access to a massive 47k of data storage using the Acorn approved *FX call.

Sideways RAM enables you to load sideways ROM images from disc, allowing you to have a large library of sideways ROMs (subject to the copyright holder's permission) stored on disc. The B32's sideways RAM can also be used to extend any operating system buffer (such as the printer buffer) or to load tape programs into a disc system.

The B32 simply plugs into the 6502 processor socket on your BBC micro – no flying leads to connect and no soldering. Provision of the onboard ROM socket means that the Aries-B32 control ROM does not use up one of your existing ROM sockets.

- Recommended by Computer Concepts for use with their Inter series of ROMs.

Price: **£59**

Aries B-12 Sideways ROM Board

The B-12 provides a total of twelve sideways ROM sockets (the four in the original machine are replaced by the twelve on the board), all fully accessible by the MOS sideways ROM system. In addition, there are two sockets for sideways RAM, giving up to 16K of RAM using 6264 static RAM chips.

If you do not have a B32 or B20, a small adaptor module (the Aries-B12C) is available at a nominal cost

Price: Aries B-12 **£36**
Aries B-12C **£5**

Aries B-488 IEEE-488 Interface Unit

The Aries-B488 is an interface unit to enable the BBC micro to control and monitor IEEE-488 bus systems. The IEEE-488 bus (also known as the 'GPIB' or 'HP IB') is the standard method of interconnecting programmable laboratory instruments and control equipment. Using the B488, up to 15 devices may be connected in a single high-speed data network.

£238

Voltmace Joysticks

Delta 3B Single Joystick **£10**
Delta 3B Twin Joysticks **£15**
Delta 3C Joystick for Compact **£10**
Delta 14B Single Joystick **£11**
Delta 14B/1 Adaptor Module **£12**
Transfer Software Disc-Tape **£7**
Delta-Cat A mouse eliminator Joystick for the Archimedes **£24**

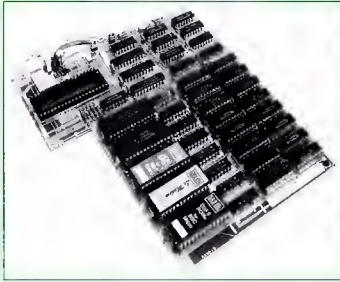
Delta Base B



Analogue aircraft style yoke joystick to run in the analogue port of the BBC B & Master 128

£25

ROM/RAM Card



Watford Electronics announced the first ever commercial ROM board for the BBC micro, the Watford Electronics 13 ROM Socket Board 9 years ago. Following the success of this board, we have designed what probably represents the ultimate in expansion boards, Watford's ROM/RAM card.

- **NO SOLDERING** required to fit the board.
- **NO User Port Corruption** (avoids problems with the mouse, modems, Epram Programmers, etc.)
- Fully buffered for peace of mind.
- **Compatible** with BBC micros (not BBC+ or Master).
- Total number of ROMs increased from 4 to 8.
- **Up to 8 banks** of sideways RAM (dynamic).
- Option for 16k of battery backed CMOS RAM (CMOS RAM needs one ROM socket).
- Software Write protect for ALL RAM.
- Read protect for CMOS RAM (ALLEVIATES crashes during ROM development).
- Separate RAM write register (&FF30 to &FF3F).
- Automatic write to currently selected RAM socket for convenience.
- **FREE** utilities disc packed with software.
- **Compatible** with our DDFS board, 32k RAM Card, Delta Card, sideways ZIF, etc.
- Large printer buffer.
- **UNIQUE** fully implemented RAM FILING SYSTEM (similar to the popular Watford DFS).
- ROM to RAM load and save facilities.

The SFS (Silicon Filing System) can utilise up to the full 128k of RAM (with the SFS in any paged RAM) as a SILICON DISC. This behaves as a disc drive, with all the normal Watford DFS features (including OSWORD &7F for ROMSPELL, etc.) to provide an environment that looks like a disc but loads and saves MUCH faster.

The ROM-RAM Board plugs into the 6502 CPU socket. This leaves free all the existing ROM sockets, which can still be used normally.

Any ROM that can be plugged into the BBC micro's own ROM sockets may be used in the ROM-RAM Board.

The ROM-RAM Board is supplied with all ordered options fitted as standard. Upgrade kits (with full instructions) are available for all of the options, for later.

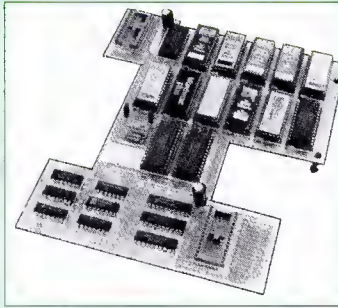
PRICES:

- ROM/RAM card with 32k DRAM £45
- ROM/RAM card with 64k DRAM £59
- ROM/RAM card with a massive 128k DRAM £99

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 £109

Solderless Sideways ROM Socket Board



The key features of this no fuss, easy to install card are:

- Increases your BBC Micro's ROM capacity from 4 to 16.
- **No soldering required.**
- Very low power consumption.
- Compatible with Torch, DDFS, RAM Card, 2nd Processor, etc.
- 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 £35
Battery Backup fitted £39
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

BBC Educational Software

- Maths with a Story 1 (Disc). 4 primary level maths programs £20.00
- Maths with a Story 2 (Disc). 4 further maths programs £20.00
- Picture Craft (Disc) 6-14 age group. Pack consists of flexible geometrical design & colouring programs. £17.00
- ECOLOGY O-Level program. £20.00
- POLYMERS O-Level program. £20.00
- Classification & Periodic Table O-Level. The suite is supplied with its own database of chemical elements which can be classified according to your own rule. £20.00
- **ADVANCED TELETXT SYSTEM** £8.65
- **PERIOD TABLE SOFTWARE** £20.00
- Computers at Work - Primary £17.35
- Electric Fields 6-14 years £11.25
- Espana Viva - 3 Discs £19.95
- **WHITE KNIGHT Chess game** £16.00
- A Vous La France £29.00
- **FUN SCHOOL 2 - Red: Under 6 yrs** £12.00
- **FUN SCHOOL 2 - Green: 6-8 yrs** £12.25
- **FUN SCHOOL 2 - Blue: 8 yrs+ .** £12.50
- **FUN SCHOOL 3 - Red** £18.50
- **FUN SCHOOL 3 - Blue** £18.50
- **FUN SCHOOL 3 - Green** £18.50
- Six French Games - Aimed at pupils in their first year of French, but also useful as revision for more advanced students 11 years+ £26
- More French Games - Another 6 games 12 years+ £26
- Au Restaurant and Accident de Route 12 years+ £26
- Boulogne and Oh-Les - 2 programs for beginners £26

- Letters to French Penpals - 11 years+ £26
- French Programs with Henri Beret - The programs in this series present vocabulary, grammar and role-play phrases in the form of animated games. 11-16 £22
- Six German Games - Aimed at pupils in their first year, but useful as revision for more advanced student of German. 12 years+ £22
- More German Games - Aimed at pupils in their 2nd year of learning German. 12 years+ £22
- The Cloze Program - Using context clues to predict is much more than a gap filling exercise. All ages £26
- An Introduction to Electronics - Brings together all the basic electronics required for a GCSE Physics or CDT course. 14-16 years £26
- Computer Control - This is a package of 3 programs simulating control of a greenhouse, a robotic arm & a chemical plant. 14-16 years £26
- The Nuclear Reactor - An interactive, menu driven program for GCSE pupils. Demonstrates & explains nuclear fission & the chain reaction. 14-16 years £22
- PUNCMAN Learning punctuation
Punman 1 & 2 for 7 - 13 years £15
Punman 3 & 4 for 8 - 14 years £15
Punman 5 & 6 for 8 - 15 years £15
- Yes Chancellor - A chance to take over number 11 at Downing Street. 12 years+ £18
- Letters & Pictures - Introduces phonic skills to Infants 6-8 years £15
- Numbers & Pictures - Early number learning is a great fun (4-6 years) £15
- Note Invaders - Budding musicians can learn the notes on the Clef with this elegant game 3 programs (7 to Adults) £15
- Maps & landscapes No. 1 (9-14 years) £18
- Help Your Child learn Basic Map work No. 2 (9-14 years) £18
- Pirate - Educational Adventure (8-14 years) £15
- Spelling Week by Week (6-14 years) £18

Archimedes 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
- Christmas Allsorts - Clip Art (6-16 yrs) £16
- Converta-Key £16
- Data Word £16
- Desktop Stories £35
- DigISim £35
- Dream Time (5-7 yrs) £23
- Droom £19
- Farm (5-7 yrs) £19
- Fleet Street Phantom (9-13 yrs) £25
- Fun School 2A Red (up to 6 years) £12
- Fun School 2A Green (6-8 years) £14
- Fun School 2A Blue (8 years +) £14
- Gate Array Teaching System £68
- Glimpse Clip Art Utility (7-16 yrs) £8
- Highlighter (6-16 yrs) £42
- Jiglet £27
- 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
- Selladore 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



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

Continued → → → → → → → →

Computer Concept's ROMS

Communicator	£49
Disc Doctor	£18
Inter BASE	£49
Inter CHART	£25
Inter SHEET	£37
Inter WORD	£36
Mega-3 ROM	£76
Spell Master	£42
Wordwise	£24

Wordwise plus

£40

We are giving away absolutely FREE, the superb Word-Aid ROM worth £24, with every WORDWISE PLUS package bought from us.

Word-Aid

The most comprehensive utilities ROM for Wordwise-Plus

Extend the power of your Wordwise Plus word processor with this most advanced ROM from Watford. By utilising the powerful Wordwise Plus programming language, WordAid provides a whole host of extra features, all accessed via a special new menu option. This ROM is being personally approved by Mr Charles Moir, the author of WORDWISE PLUS.

- Alphabetical sorting of names and addresses.
- Text transfer options.
- Chapter marker.
- Epson printer codes function key option.
- Search and display in preview mode.
- Embedded command removal.
- Print Multiple copies of a document.
- Multiple file options for print and preview.
- Address finder.
- Label printer.
- Mail-merger.
- Number/delete/renumber.
- Clear test-segment area.
- BBC B, B+ and Master compatible.

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 with 80 track disc	£25
Viewplot Disc	£20
(Please specify for Master 128 or Compact)	
View-Index	£12
Overview packs 1 & 2	£65
Hi-View	£38

MINI OFFICE II

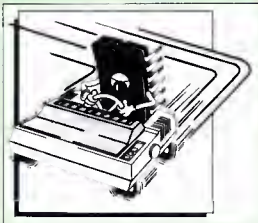
DISC Version for BBC B & B+	£14.00
DISC Version for BBC Master	£16.00
DISC Version for the Compact	£18.00

(When ordering please specify for which Micro & 40 or 80 track Disc)

View Printer Driver Discs

Epson FX & RX 80	£10
Juki & Brother HR	£10

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.

The VPD extends View's printer command with a series of mnemonic commands. All standard highlight sequences are also supported. A large range of printers are supported by drivers contained within the ROM (the drivers can be downloaded and customised). Printers supported include: Epson's MX, RX, FX, LX, JX80 range, Hi80, KP810/910, PW1080, JP101, HR15, M1009, GLP, Panasonic KX-P1081/2, JUKI 6100, etc.

Other printers are readily supported by defining a Printer Driver using the built-in Printer Driver Generator. The features mentioned below are available to both the built in Printer Drivers and user defined drivers (assuming the printer supports the features).

NLQ control, Underline, Bold, Proportional Spacing, Microspacing, Italic, Superscript, Subscript, Condensed, Enlarged, Double Strike, Set lines per inch numerically (e.g. LPI 6), Set characters per inch numerically (e.g. CPI 5), Select printer font, Select printer ribbon colour, Translation sequences, Emulation of BBC Character Set, Simple numeric expressions for certain operations, Full printer setup, Send control codes, Print prompt on screen, Redefinable Pad character, Pause for key press, Prompt to change daisywheel, and Execute * command when printing.

Other features include a very powerful on-screen preview, with bold, italic, underline, super/subscript, enlarged highlights, and a special printer driver to allow memory-based text to be previewed by View 1.4. Of course, View 1.4, 2.1 and 3.0 are all supported, as is Shadow RAM and 6502 Second Processors. The BBC B series and Master series of micros are supported. A comprehensive manual is supplied. All in all, a very professional product for the discerning user who wants power at their finger tips.

Price: Only £29



CREDIT CARD

24 HOUR



Ansaphone Hot Lines
(0923) 50234 or 33383

OFFICE MASTER



CASHBOOK - A complete "Stand Alone" accounting software package for the cash based sole trader/partnership business. It is designed to replace your existing cashbook system and will provide you with a computerised system complete to trial balance.

FINAL ACCOUNTS - Will take data prepared by the Cashbook module and produce a complete set of accounts as following: Trial Balance with inbuilt rounding routine; Notes to the accounts; VAT Summary; Profit & Loss A/C; Balance Sheet.

MAILIST - A very versatile program. Enables you to keep records of names and addresses and then print, examine, sort and find them, all with special selection techniques.

EASILEDGER - A management aid software tool designed to run alongside an existing accounting system. Essentially a Debit/Credit ledger system which can handle sales, purchase and nominal ledger routines to provide instant management information.

INVOICES & STATEMENTS - Greatly reduces the time and cost of preparing Invoices and Statements by storing essential information like customer names, addresses and account numbers. Has VAT routines and footer messages facility.

STOCK CONTROL - Allows you to enter stock received, stock out, summary of stock items and current holdings together with details of total cost, total stock to minimum level, units in stock ordering, quantity and supplier detail.

All this for only £21 (Disc)

OFFICE MATE



- DATABASE
- BEEBCALC SPREADSHEET
- BEEBPLOT GRAPHICS

DATABASE - Set up a computerised card index system with powerful search facilities.

SPREADSHEET - Offers many calculation and editing features

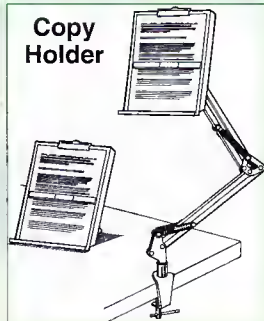
BEEBPLOT - Provides visual representation from Spreadsheet data.

Only £10 (Disc)

Acorn Speech Synthesizer package complete, for the BBC B Microcomputer

Special Offer £14

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 by means of a plastic retaining ruler and a clip grip.

Desk Top £8

Angle poise £12



Copy holders as above but with a battery operated, remote controlled cursor/ruler. (By hand or foot pedal.) (Batteries 2 x AA not included.) These units are extremely handy.

The Epson RX/FX/KAGA Printer Commands Revealed Handbook

So you bought yourself a new printer, because the salesman in the shop showed you how clever it is and impressed you with all sorts of printouts to show its capabilities - he may even have offered you a special price.

However, now that you have got it home and connected it to your BBC microcomputer, you are wondering how to make it perform these magical tasks. The manual seems to give no clues, and when you type in the example programs, the computer throws the LPRINT statements back in your face.

Now what do you do, when this £400 piece of high technology refuses even to move its head, and you have stayed up until 2 in the morning with copious supplies of coffee, desperately trying to print something out? Once again, Watford Electronics comes to your help with our new book entitled 'THE EPSON FX-KAGA PRINTER COMMANDS REVEALED'.

This book describes in plain, easy to understand English, how to use and make the most of your KP810, PW1080A or any other Epson FX80 compatible printers like Panasonic KX-P1080/1, etc., with the BBC Micro, both from Basic and Wordwise.

It describes in detail how to obtain the maximum in graphics capability from your printer and includes full indexes allowing you to cross index the numerous commands. Every command is explained in detail, with an accompanying BBC Basic program and an example of its use from Wordwise.

£5.95 (No VAT)

BOOKS (No VAT on Books)

15 Hr Wordprocessing BBC/View	£6.95
15 Hr Wordprocessing BBC/AVW & WWV	£6.95
30 Hour BASIC (BBC Micro)	£12.95
1st Word Plus Rel. 2 Manual	£10.00
A3000 Technical Reference Manual	£29.00
Acorn DTP A Guide to	£17.00
Advanced User Guide for BBC	£10.95
Archimedes 1st Step - Beginners Guide	£9.95
Archimedes Assembly Language	£14.95
Archimedes BBC Basic Guide	£20
Archimedes OTP Manual	£10.00
Archimedes Operating System	£14.95
Archimedes Risc-Os Programmers Reference Manual	£79.00
Assembly Language Quick Ref.	£21.95
BASIC 2 - User Guide	£2
Basic V - A Oahband Guide	£9.95
BBC Basic Guide (Archimedes)	£19.95
BBC Micro - Within the	£11.95
BCPL User Guide	£9
C Big Red Book of	£8.95
C - A Oahband Guide to	£14.95
C Programming Lang. 2nd Edition	£24.95
COMAL - Introduction to	£9.50
Deutsch Direkt! (Book only)	£5.95
DISC FILING SYSTEM (DFS)	
Operating Manual for BBC	£6.95
FORTH on the BBC Micro	£9.95
ISO-PASCAL Reference Manual	£9.95
Master 512 Guide - Dabs Press	£9.95
Master Operating System	£12.95
Master Reference Manual Part 1	£14
Master Reference Manual Part 2	£14
Master Reference Manual - Advanced	£17
MINI OFFICE II - A Dabhand Guide	£9.95
Mouse User Guide to BBC Micro - the Complete	£5.95
Example Programs on Disc for above	£4.95
PASCAL Programming	£10.95
Risc OS Style Guide	£9.95
RISC Technical Manual 260 pg	£14.95
The Epson FX-KAGA PRINTER	
Commands REVEALED	£5.95
Understanding Interword - A Beginners Guide	£4.95
View 3.0 User Guide	£10
View Guide (View 2.1)	£5.00
View, Viewsheet & Viewstore - Mastering	£12.95
VIEW Oahband Guide	£12.95
Viewsheet User Guide	£10
Viewstore User Guide	£10
Z88 - A Oahband Guide	£14.95
Z88 Computing	£9.95
Z88 Magic	£14.95

BOOKS for IBM PC & Compatibles

1-2-3 For Business	£25.95
1-2-3 Mastering Release 3	£22.95
1-2-3 Mastering - 2nd Ed.	£22.95
1-2-3 Quick Reference	£8.45
1-2-3 Using - Rel. 3	£25.95
8086/8088 Ass. Language Quick Ref	£8.45
8086/8088 Programming the	£17.95
Accountancy software in Business - Using	£14.95
Agenda - Using	£21.95
Aldus Pagemaker 4	£21.95
Aldus Pagemaker - Using	£21.45
Amstrad 9512 - Using the	£10.95
Amstrad Basic 2 User Guide	£9.95
Assembly Language Quick Ref	£8.45
Autocad 4th Ed - Mastering	£31.50
Autocad - Mastering Through Rel. 10	£28.95
Autocad - Inside Release 11	£32.45
Autocad - Inside 6th Ed	£36.95
Autocad - Mastering Through Rel II	£28.95
C Introducing	£12.95
C Programming Language 2nd Ed	£26.95
C - Teach Yourself	£19.95
Clipper - Using 2nd Ed	£22.95
Computer Users Oratory	£9.95
Corel Draw 2nd Ed Mastering	£26.50

Corel Draw Quick Ref Thro V1.2	£7.95
Corel Draw made easy	£19.95
Corel Draw v2 Quick Ref	£8.45
dBase 3/4 Complete Ref	£27.45
dBase III Plus - Complete Reference	£19.95
dBase III Plus Handbook 2nd Edition	£22.95
dBase Instant Reference (III & III+)	£10.95
dBase 4 - Handbook	£21.95
Desk Jet Unlimited	£19.95
DOS & BIOS Function - Quick Ref Guide	£7.95
DOS Instant Ref.	£9.75
DOS Instant Reference (up to 3.3)	£6.95
DOS Power Tools	£46.45
DOS - Programmers Ref. Manual 2nd Ed	£25.95
Excel for Windows - Quick Ref.	£8.95
Fax - Management with	£7.95
FAX - Managing with	£12.95
Framework III - Mastering	£24.50
GW Basic Users Guide & Ref	£12.95
Hard Disc Instant Ref	£10.95
Hard Disc Management - Quick Reference Guide	£4.95
Hard Disc - Using Your	£27.45
IBM PC & PS/2 - Inside the 3rd Ed	£21.70
Microsoft GW BASIC	£17.95
Microsoft Windows 3 - Using 2nd Ed	£20.95
Microsoft Windows Illustrated	£21.95
Microsoft Word 5.5 - Using	£20.45
MS-DOS - ABC's of 2nd Ed.	£17.95
MS-DOS Bible 3rd Edition	£22.95
MS-DOS First Book	£15.50
MS DOS for Beginners	£17.45
MS-DOS Quick Ref Guide 5	£8.95
MS-DOS - Running 4th edition	£19.95
MS-DOS - Supercalching 2nd Edition	£17.95
MS-DOS Users Guide 3rd Edition	£27.95
MS-DOS - Using	£21.95
MS-DOS 5 - Quick Start	£18.45
MS-DOS 5 User Hand Book	£19.95
MS-DOS 5 - Upgrading to	£14.95
MS-DOS 5 Using	£29.95
MS-DOS Tricks & Tips	£16.45
Network User Guide	£23.95
Networking Personal Computers 3rd Ed.	£20.95
Norton Utilities - Inside the	£21.75
Novell Network - Mastering	£27.95
Novell Network - The ABC of	£21.95
Novell Network - Using	£27.45
PageMaker on IBM PC - Using	£22.95
PageMaker - Using	£22.95
PCs & Compatible Computers for Beginners	£17.95
PC Crash Course 2.0 2nd Edition	£19.95
PC Tools - Quick Ref	£8.45
Programming Guide to EGA & VGA Cards	£25.95
Quattro - Mastering Pro 3	£21.95
Quattro Pro III - Using	£25.95
Quattro Pro Quick Ref.	£8.45
Smart - Using	£21.45
Smartware II - Mastering	£22.95
Smartware II - Using	£22.45
Smart, tips, tricks and traps (OUE)	£22.95
Supercalc 5 - Using	£27.45
Supercalc Professional	£17.95
Symphony Made Easy	£15.95
Symphony - Using Special Ed.	£27.45
Symphony 4th Edition - Mastering	£24.95
Turbo C Bible	£27.95
Turbo C++	£22.95
Turbo Pascal 5 - Using	£22.95
Turbo Pascal Using	£27.45
Unix - Using	£27.45
Upgrading & Repairing PC's	£27.45
Ventura Mastering - 2nd Ed.	£22.95
Ventura Publisher - Using	£22.95
Ventura - Instant Reference	£10.95
Ventura - 3rd Edition	£24.95
Window Programming 2nd Ed	£27.95
Window 3.0 Programming	£27.95
Window 3.0 Quick Ref.	£7.95
Word for Windows made easy	£15.95
WORD for Windows - Using	£22.95
Wordperfect - Illustrated	£21.95
Wordperfect 5 - Using	£22.95
Wordperfect - Quick Reference V5	£8.45
Wordperfect 5.1 - ABC's of	£18.95
Wordperfect 5.1 - 1st Book of	£15.95
Wordperfect 5.1 - Mastering	£24.95
Wordperfect 5.1 Quick Start	£18.45
Wordperfect 5.1 - Using Special Ed	£25.95
Wordperfect for Beginners	£17.45
Wordstar & CPM Made Easy	£15.75
Wordstar Using 5.5 & 6 3rd Ed	£25.95
Wordstar 6.0 Made Easy	£15.95

Carriage on Books vary between £2 to £4.00, depending on their weight

New Release ACORN TO PC

Stop the Confusion!

Do you have to use both Acorn computers and PC's? Would you like to use your Archimedes or A3000 in PC-emulation mode but are unsure of the new commands?

Although Acorn machines (such as the BBC B, the Master, the Archimedes and the BBC A3000) are mainly used in education, most commercial computers use other operating systems, particularly MS-DOS. As a result school computer users are at a disadvantage when moving into 'business' computing. PCs and other commercial computers use MS-DOS as the operating system, so commands for formatting, copying, backing up, printing and the modem are not the same. Even file names are written differently! And did you know that there is one Acorn command which, if used in MS-DOS, wipes everything in the current directory?

'ACORN TO PC' enables you to change over painlessly. It shows clearly and quickly how, why and where the two systems (Acorn and MS-DOS) differ. As with a foreign language dictionary, you can use the book to transfer either way - from Acorn to MS-DOS, or from MS-DOS to Acorn. 'ACORN TO PC' also acts as a handy reference guide to all Acorn star commands and their MS-DOS equivalents. It also has an extensive and readable explanation of the directory tree and hierarchical filing systems in general. Both DFS and ADFS Acorn systems are covered.

'ACORN TO PC' is written clearly and concisely by Dr. John Lockley, who has wide experience of writing and broadcasting. He is currently appearing as a regular contributor on Radio 5, and is co-author of 'The Complete BBC Computer User Handbook'.

Price: £12.95 (No VAT)

The Complete BBC Computer User Handbook

If you own a BBC B, B+, Electron, Master 128 or Compact, or Archimedes, then this is the book for you. It shows how to get the best from your machine, how to get to make it work for you. The general style and level of presentation means that both the expert and beginner alike will feel comfortable with the quality and quantity of the material.

Subjects covered include the general use of computers, hardware design and peripheral devices like printers, disc drives, etc, and Networking. Programming hints and tips and various disciplines for making a better program are discussed in some detail, including debugging of specific errors. Standard programs are covered, such as wordprocessors, spreadsheets, databases, graphics, communications, etc., which brings you neatly on to the subject of using computers in the office or at work - even giving advice on writing and marketing your own programs.

A book you will enjoy to use as a reference, or read from cover to cover, over and over.

Only: £14.95 (No VAT)

The Complete Mouse User Guide to BBC Micro

This manual has been written to reveal the secrets of the mouse. It explains all the principles required by the hardware and associated software, and also example listings for inclusion into custom programs. The manual first details the basic principles of the mouse and a simple program which uses these principles. This information should be adequate for most applications. However, it is possible to improve the performance of the mouse by expanding on the principles already used in the software. This is again fully explained and an example program given.

It is possible to gain a full understanding of the mouse from this manual. For those not interested in exactly how the mouse functions, complete example programs are also included. These may be typed directly into the micro, without the need for any understanding of the hardware or software involved, enabling the mouse to be used for custom applications.

Price £5.95 (No VAT)

Example programs on Disc £4.95

Beeb PC (BASIC)

Beeb PC Basic is designed for program authors wishing to convert programs so that they will run on IBM personal computers. To convert BBC BASIC programs manually can waste days of valuable time with every occurrence of common statements such as PROC, DEFPROC, TAB, having to be changed.

Beeb PC (BASIC) automates many of these changes, and will convert majority of BBC statements that are invalid for IBM BASIC into equivalent acceptable statements. In addition BBC BASIC data files can be converted to IBM BASIC format, with support provided for all BBC data formats - INTEGER, REAL & STRING.

Price: £38

Beeb DOS 3.0

(Now reads Archimedes Discs)

The BBC and IBM PC's are the most popular micros in the UK. The BBC is firmly established in the education sector and the IBM is the industry standard in the business world. The pools of information and applications held on these computers are immense, yet the means of passing information between them are very limited. Beeb DOS provides a practical method of transferring information between these two micros.

Beeb DOS is a collection of utilities which run on the PC's and enable it to read and write information on BBC discs. You can transfer files between your PC's 360K floppy, high density floppy or hard disc and your BBC discs. In addition Beeb DOS allows you to catalogue, format and compact BBC discs and delete, re-name, lock and unlock BBC files, all on PC's. Each Beeb DOS utility is written in IBM assembler and is run directly from PC or MS-DOS. The Beeb DOS utility can be run from floppy disc, hard disc or RAM drive.

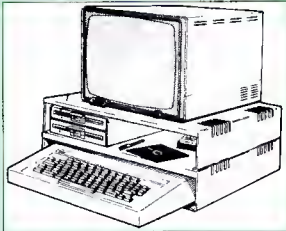
Beeb DOS is supplied on an IBM 5.25", 360K disc complete with a comprehensive operating manual. (Will only work on 360K Disk Drives & read only ADFS and Watford DDFS - not DFS).

Price: £39

(Please write in for technical literature)

Continued → → → → →

Plinths for the BBC B & Master 128K Micros



Protect your computer from the heat of your VDU. Our micro plinths have slots for maximum ventilation. The single plinth is suitable for a BBC and VDU, whilst the double height version provides enough room for our stacked disc drive and other peripherals like, EPROM programmer, music unit or simply discs & stationery. The computer slides neatly in the lower section allowing easy access to remove the lid. Colour: Matching BBC Beige.

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

(Carr. Single plinth £2; double plinth £3)

ADDER

Features:

- Two ultra fast programming algorithms or standard slow algorithm.
- Supports standard 21V programming and newer 12.5 volt EPROMs. (Software switched).
- The RAM image to be programmed can be built up in many ways. Sections of image can be loaded separately. Part programming. Read EPROM. Edit data in memory.
- Automatic processing to handle a list of files to program into the EPROM.
- Automatic disc buffering to allow programming of 32K 27256 devices from a 32K file without extra effort.
- Verification gives detailed error list and checksums are maintained. There is also a blank check facility.
- Works with all standard filing systems. Generates header code for RFS ROMs to allow Basic programs etc. to be stored in EPROM. More than one file per ROM permitted.
- Programs the following EPROMs: 2516, 2716, 2532, 2732, 2764, 27128, & 27256.

£55 (£5 Carr)

TEX EPROM ERASERS

EPROMs need careful treatment if they are to survive their expected lifetime. 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 EB** - Standard version erases up to 16 chips. **£34**
- **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. **£2**

Metal Chip Extractor **£3**



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

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**

PC Cleaning Kit

To avoid data corruption and trouble free use of your PCs, it is advisable to clean your PC System once a week. Our Kit 14 is ideal for the purpose.

Kit 14 - 1 each, 3.5" & 5.25" Cleaning Disk, 20pcs cleaning pads, Drive head cleaning fluid; 20pcs general purpose wipes, Anti-static screen cleaning fluid; General surface cleaning fluid and a transparent plastic case which can hold ten 5.25" Disks when empty. **£12**

Spares for BBC Micro

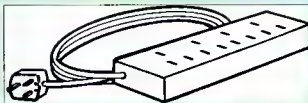
UHF Modulator	£4	16MHz Crystal	£2
Speaker Grill	£1	17.734 MHz Xtal	£2
Speaker	£3	32.768MHz Xtal	£1
Keyswitch	£1.50	BBC B Refurbish	
Master PSU	£59	Casing	£25
Master Keyboard	£62	Keyboard	£46
Master Casing	£19	Power Supply	£59
Replacement Flexible 147 Way Keyboard Connector			£4

Surge Protector Plug

Fitted in place of your normal mains plug, this device protects your equipment (and data from corruption), against mains high voltage transient 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**

28pin DIL Header Plug

SOLDER type **£1.50** IDC CRIMP type **£1.95**

8 Way DIP Switch

Increase the speed of your Disc Drives by soldering this switch to your BBC B or B+ keyboard

Only **£1.00**

28 pin ZIF SOCKET (Textool) **£6.95**

SIMs & SIPs

• 256 x 9-8	£11	• 1Mb x 9-10	£28
• 1Mb x 9-8	£39		

Connecting Leads

(All ready made and tested)

CASSETTE LEADS 7 pin DIN Plug	
to 3 pin DIN Plug + 1 Jack Plug	£2.50
to 7 pin DIN Plug	£3.00
to 3 Jack Plugs	£2.50
6 pin DIN to 6 pin DIN Plug (RGB)	£3.00

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 **£8**

Miscellaneous Connectors

	Plugs	Sockets
RGB (6 PIN DIN)	50p	75p
RS423 (5 pin Domino)	70p	80p
Cassette (7 pin DIN)	40p	95p
ECNET (5 pin DIN)	35p	50p
Paddles (15 pin 'D')	150p	250p
Disc Drive Power 4 way	100p	-
6 way Power Connector	120p	150p

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

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
DS3681	£4.50
DS89LS120	£5.25
LM324	£0.45
SN76489	£5.50
SAA5050	£8.75
UPD7002	£6.00
2764-250N	£3.00
27128A-250N	
(12V5)	£2.50
27128-250N	
(21V)	£4.00
27256-2	£3.00
27512-2	£4.50
27C101G (1 Meg)	£7.00
4013	75p
4020	£1.00
4164-10	£1.55
4464-10	£3.50
4816 RAM	£2.00
41256-8	£2.00
41256-10	£1.50
6264LP-8K	£4.00
6502A CPU	£5.00
65C02 3M	£9.75
65122	£9.00
65C12	£10.00
6522	£4.00
6522A	£5.00
62256ALS-15	£10.00
62256P-12	£8.50
6818	£3.00
6845SP	£6.00
68B50	£2.95
68B54	£7.50
7438	50p
74LS00	50p
74LS04	50p
74LS10	50p
74LS123	£1.00
74LS163	£1.00
74LS244	£1.00
74LS245	£1.00
74ALS245	£2.75
74LS373	£1.00
74LS393	£1.00
75453	£1.00
75159	£3.00
8271	£49
9637	£2.00
ICL7673PA	£3.00

Assorted ROMS



ACORN ADFS	£25
ACORN BASIC 2 plus	
User Guide	£22
Acorn BCPL	£42
Acorn DNFS	£17
Acorn FORTH	£32
Acorn Graphics	£25
Acornsoft C Disc	£36
Acorn LISP	£19
Acorn OS B+	£25
Acorn OS 1.2	£14
Basic Editor	£24
BBC PCB Designer	£49
Beebom	£22
Buffer & Backup	£20
Communicator	£49
Dump Out 3	£25
EPROM NLQ ROM	£25
Graphics Extension Rom	
GXR-B	£21
GXR-B+	£22
ICON Master	£28
Logotron LOGO	£43
MASTER OS ROM	£38
Master ULA (47)	£15
Master ULA (60)	£10
Micro Prolog	£25
Microtext Disc	£46
Microtext Rom	£199
NLO DESIGNER	£25
Numerator - Archi	£69
Numerator - BBC	£39
Pendown ROM	£32
Rom Manager	£20
SERIAL ULA	£13
TED	£35
Terminator B, B+	£28
Terminator Master	£32
Video ULA	£14
ULTRACALC II	£26
1Mb OS ROM	£39

Hi-Speed, Low Cost Archi Hard Disc Drive

Watford's advanced interface allows IOE 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 IOEFS, 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 IFonts application.

A powerful security feature has been provided with the two unique commands *IOELock 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 *IOELock 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 (IOE) specification
- Fast 16 bit MEMC interface interrupt driven to support background disc operations
- 5 Mbytes per second peak transfer rate
- Built in Non Volatile RAM to hold configuration
- LEO activity indicator
- 37 way O type socket for external drives
- 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 IOE Specification
- All software supplied in ROM
- Filing system 'IOEFS'
- Desktop filer with drive ready detection and disc name under icon
- IOEForm, 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
- IOEFSdisk, creates PC emulator hard discs

Prices

Part No.	Capacity	Access Speed	Price
ADA 0520	44Mb	28mS	£249
ADA 0530	100Mb	18mS	£379
ADA 0570	200Mb	15mS	£499
ADA 0580	330Mb	15mS	£695

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.

For A3000 users an additional external Case and PSU will be required.

AAA 0300 External Case & PSU for A3000 £85

Internal Hard Disc Drives for A3000

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

ADA 0700	21Mb	23mS	£185
ADA 0720	44Mb	19mS	£385
ADA 0750	60Mb	18mS	£425
ADA 0730	89Mb	18mS	£685

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

Archi IDE Hard Cards

"Simply plug
and play"



Watford's NEW low cost, high performance revolutionary IDE Hard Cards for the A300 and A400 series Archimedes are unbelievably easy to install - you simply slot one into any vacant podule backplane slot in the rear of your computer. These stunningly engineered, light weight but fast, 2.5" miniature hard drives are mounted onto the professionally designed cards, and are supplied with the fully Acorn-conformant IDE Filing System ready installed and ready to run. A novel feature of the hard cards is that they can be easily removed and transported to another Archimedes, for example to make a hard disc backup, or to transfer saved files from work to home etc. Security of files on the hard disc is ensured by our unique security password lock, which allows files to be read only, but not overwritten or deleted - ideal for use in school applications where the integrity of your master software needs to be retained.

ADA 0650	21Mb	23mS	£199
ADA 0660	44Mb	28mS	£375
ADA 0670	89Mb	18mS	£675

(Can be used as a Removable Hard Drive)

NEW

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

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

RRP: £999

Offer Price: £399

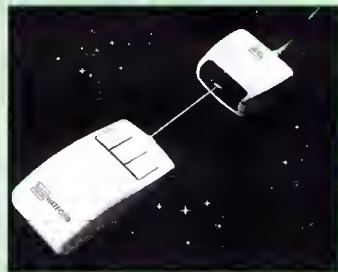
Syquest Removable Disc Units

These Hard Drive units are supplied complete with a cartridge 42Mb removable, cables and a high flow fan for cooling.

• Syquest Drive Unit pack	£399
• As above + SCSI Card	£535
• Spare 42Mb Disc	£55

NEW

Archimedes Cordless Mouse



Ever found that using a mouse on a busy desktop has its problems? The cable is always being caught up in papers, tangled round equipment and other cables etc, and what about that cup of coffee spilled over your work!

Watford Electronics' new Cordless Mouse solves these problems by removing the cause for concern - replacing the cable with a simple infra red link. It still provides all the speed and easy control of a conventional mouse, but with complete freedom. In use, there are no operating differences between the standard mouse and the new cordless mouse so all mouse functions and mouse driven RISC software will be fully compatible. Pinpoint accuracy is ensured by a unique Accelerator button, which, when pressed, moves the pointer by just a tiny amount for a large slow movement of the mouse, but by a large amount for a quick wizz of the 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 £59

Watford Electronics are:

- Acorn Qualified Dealer & Econet Referral Centre
- ARIES PC Dealer/Distributor
- Canon Authorised Printer Dealer
- Cambridge Computer Dealer
- Citizen Printers Special Dealer
- Computer Concept Premier Dealer
- EIZO Monitor Dealer
- Fujitsu Printers Premier Dealer
- Microvitec Appointed Dealer
- NEC Appointed Dealer
- Panasonic Premier Dealer
- Roland Plotter Official Dealer
- Star Printer Premier Dealer
- Taxan Appointed Monitor Dealer
- 3M Media Premier Distributor



Watford Electronics

250 Lower High Street, Watford WD1 2AN, England

Tel: 0923 237774/240588 Fax: (0923) 233642 Telex: 8956095



Prices subject to change without notice and available on request. ALL OFFERS subject to availability. Mail Order and RETAIL SHOP Trade and Export enquiries welcome. Government and Educational Establishments' OFFICIAL ORDERS Accepted. Shop Hours: 9.00am to 8.00pm, Monday to Saturday, Thursdays 9am to 8pm. (Free Customer's Car Park). VAT UK customers please add 17.5% VAT to cost incl. Carriage. CARRIAGE: Unless stated otherwise, minimum £3 on all orders. £4 on Larger items. On bulkier items, £7 Securicor charge applies (UK mainland only). Overseas orders, carriage is charged at cost. Specifications of all products are given in good faith but are subject to change without notice. Some items vary in their availability. Watford Electronics Terms and Conditions are available upon request. Please ring for latest delivery situation.

We Don't Sell Computers We Sell Solutions!

We have changed our name but not our service. Broad Oak Computers have been giving a superb service to Acorn Users for over a year. But we don't just sell computers, we offer a complete service to the computer user and buyer which includes FREE local delivery and training, and full after sales support with a good choice of software always available.

Our superb training facilities offer courses for all levels of experience including complete beginners. Our new correspondence courses are perfect for those with a busy lifestyle. Courses are also available for IBM PC compatible users.

Whatever your computing needs, phone us on 0279 718767, or fax 0279 718596



High Street
Hatfield Broad Oak
Bishops Stortford
Herts CM22 7HE
Phone 0279 718767
Fax 0279 718596

APOLOGIES TO ALL THOSE WHO DON'T LIVE NEAR BROMLEY

You probably won't be able to pop in to our newly refurbished showroom, browse through our 250+ software titles for the Archimedes/A3000/A5000 (or 100+ titles for the trusty old BBC Micro and Master Series), sit down and use one of our seven demonstration systems (including the new A5000), chat with our knowledgeable staff, make use of our high-quality repair workshop, or even just sit down for a cup of coffee!

BUT....

at least you can use our speedy mail-order service, even for repairs, and we also accept telephone orders by Access/MasterCard and Visa, so all is not lost!

THE DATA STORE

6 CHATTERTON ROAD, BROMLEY, KENT, BR2 9QN
Tel: 081-460 8991 Fax: 081-313 0400
(Closed Wednesdays)



AVP

From Britain's largest Supplier of
Educational Software

2 Comprehensive Guides to over 2500
Educational Programs for the
BBC, Archimedes, A3000, A5000,
RM Nimbus and IBM PC

All in Stock for Immediate Delivery

- 1 For 5-11 age group
- 2 11-Adult

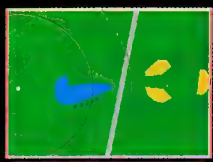
For Your Free Copy Contact
AVP School Hill Centre
Chepstow Gwent NP6 5PH

Telephone 0291 625439
Fax 0291 629671

THE BIG BLACK CAT ALOGUE

The Fourth Dimension Archimedes Specialists

The following software is compatible with the Acorn A3000, A5000 and ALL Archimedes computers



COLLECTOR PREVIEW TOUR *MARCH TO LOCK *HOLERS* TO GO!
HOLE SELECTED

CHUCKER CIRCLE • HOLEMAN FLIGHT, HOLEY CIRCLE • HOLEMAN RESTRICTIONS
Holed Out Compendium £24.95



Enter The Realm £24.95



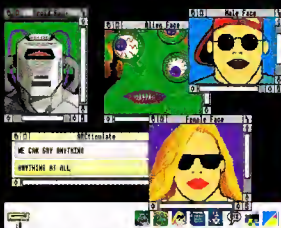
Break 147 & Superpool £24.95



Grievous Bodily ARM £24.95



E-Type Compendium £24.95



ARCtulate £24.95



Chucks Away £24.95
Extra Missions £19.95 Compendium £39.95



Saloon Cars £24.95



The Exotic Adventures of Sylvia Lain £24.95
Hopefully Feb '92



Special Offer How to Order

If you buy 2 or more products directly from us you may deduct £10 from the total cost.

Simply send us a quick letter or give us a ring telling us the software you would like, your name and address, and payment via cheque, postal order or ACCESS or VISA card details.

FREE SAME DAY despatch by 1ST CLASS POST

PLUS FREE EXCITING MYSTERY 4D GAMES DEMO DISC SENT WITH ALL MAIL ORDERS

The Fourth Dimension, 1 Percy Street, Sheffield, S3 8AU.



X-Fire £24.95



Pandora's Box £24.95



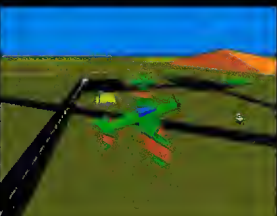
Chopper Force £29.95 Hopefully March '92



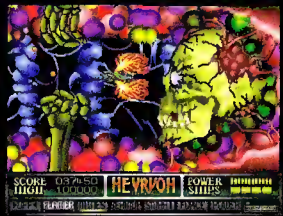
Cataclysm £24.95



ARCtist £24.95



Spitfire Fury £29.95 Hopefully Mar '92



Nevryon £19.95

In the first of a two-part series on special needs, **CHRIS DRAGE** looks at some hardware options



WITHIN REACH

The hardware options for special needs computing have been growing steadily in recent year. This is especially true for the RiscOS machines which, until recently, were overshadowed by the Beeb.

Acorn has now put together a BBC A3000 Special Access System (see above) in two guises: the first includes the computer, a serial upgrade, Morley Electronics' User/Analogue card and seven utility programs; the second also includes a monitor and Pres monitor stand.

The upgrades allow access to overlay keyboards, touch screens, modems and switches, but it is the utilities provided which are at the heart of the package. One of the utilities provided is *ASP*, switch interface software which allows disabled users to access Risc OS applications, by using a single switch device.

The others included are: *SpecialKB* which allows the numeric keypad to emulate mouse functions with a very useful 'sticky keys' option to emulate multiple key presses. *BigPtr* offers an enlarged and visible pointer whereas *Closeup* presents a small magnified window which can move around the screen. *Flasher* gives a more visible flashing caret and a cursor-homing device. With *Chars*, typing can be achieved, using the mouse to select characters from a screen display. *Bigscreen* (Mode 36 & 37) and *ScreenV* (Mode 43) are both large screen modes to display text, icons and menus in larger sizes. The Acorn package also allows you to use Midi (musical instrument digital interface) equipment.

There are many other interfaces and upgrades

that can be used to connect up external devices (the Morley Electronics User/Analogue podule is good value for money) but Access 1000 from Hybrid Technology enables overlay keyboards, touch windows, joysticks, switch units and the company's *Arc Recorder* to be connected to a BBC A3000/Archimedes computer without using the standard podule user port.

Indeed, the Access 1000 combines the functions of the user port and a switch access box forming the basis of Hybrid's Access Link, which permits add-ons to be daisy-chained on to the computer's printer port. These avoids the need for the serial port upgrade so leaving it free for other add-ons. The interface has four jack sockets designed to take switches and a familiar BBC-style user port connector and also provides a small through-connector with the printer connected at the end of the queue.

To input information into the computer without relying on the keyboard, the Concept



Touch screens encourage improved dexterity



Northwest SEMERC's Overlay Keyboard

Keyboard is the mainstay, with over 120 overlay keyboard programs. The overlay keyboard is extremely versatile, since it is simply a piece of paper. Basically, it provides a choice of icons which the user presses instead of the normal keys. They consist of 128 programmable cells, but you don't need to know that since you usually only load a program and use it. *Concept Designer* and *Conform* make programming the device easy, if you want to create overlays for a specific purpose. *Touch Explorer Plus*, *Folio*, *Concept Kids* are also impressive programs.

The Overlay Keyboard is made from high-impact plastic, which makes it both light and sturdy, meeting educational safety and design criteria extremely well. It works with the BBC B/Master and the BBC A3000/Archimedes if a user port or Access 1000 is present. A single switch interface is built in as standard and is used by inserting the switch jack-plug into a socket which automatically disables the keyboard and selects the switch. Most importantly, the Overlay Keyboard is completely compatible with all existing software.

Other input devices include touch screens (see *BAU* February 92 issue), alternative keyboards, mice, trackerballs, switches and voice input devices. Two leading TouchWindow systems (Keyboard Technology and Lingenuty) are made up of the same hardware, with differing software drivers. They are accurate, responsive and can be adapted to fit almost any monitor. Their high resolution, coupled with the ability to be removed from the monitor to be used as a 'tracing window', add to their versatility.

One successful alternative to the mouse is the Delta Cat which can prove very useful in specific circumstances, especially if the joystick is firmly mounted and an extension tube is fitted over the stumpy control stick. It can offer control via foot (buttons) and mouth (stick). If you require a better mouse than the standard one provided with the Archimedes, then I recommend Clares' rodent, which nestles comfortably in the palm of the hand, allowing the fingers to rest more naturally over the buttons.

For a trackerball (literally an upside-down mouse) the sturdy Marconi unit has performed well over the years, but is shortly to be eclipsed by the new Ark Tracker. Not only is this tracker ball extremely rugged but it has all the mouse operations on separate buttons. A perspex overlay can be added to help with locating the

buttons and a separate switch provides control over the pointer speed. As the unit remains stationary, pointer operation is controlled, with the fingers alone negating the need to move the whole arm – useful for a disabled person who has fine motor control but finds larger arm movement more difficult.

For those whose only means of communication with a Beeb is their voice, the MicroMike has proven successful, giving voice-volume control over a variety of activities. It can promote vocal play, control of volume and timing of vocalisation. In order to use the device with an A3000/Archimedes, a user port must be installed. The popular *Sid and Mike* software has now been converted to Archimedes use.

Alternatives to the standard keyboard are available from Special Access Systems, starting with a metal keyguard which fastens on to the keyboard. Holes on the keyguard permit hands to rest on the guard, while fingers can access individual key holes. The company's Programmable Expanded Keyboard should also prove valuable to those who are restricted to using a toe, mouthstick, headpointer or a single finger. Users can also perform multikey presses as one operation and four programmable delays can cope with uncertain or over-long key presses. Furthermore, bright LEDs or programmable sounds can help those with sensory disabilities to know when a key has been pressed.

Contact Keyboards (Keyboard Technology) clip on over the existing keyboard, keeping unused keys hidden from prying fingers and making programs highly resistant to accidental crashes. Obviously such a device is tied to specific software applications and as yet, only two models are available: the Matchbox Keyboard (for matching games) and Moneybox Keyboard to accompany the Moneybox suite of software. One advantage of these devices is that they provide sensory feedback to the user.

Incidentally, the Matchmaker interface can be used to connect virtually any input device (switch, joystick, trackerball, overlay keyboard, and so on.) Next month, we will look at the software options for special needs.

THE LAST WORD

It always makes sense to see hardware in action before you rush out and buy it. The good news is that all of the hardware mentioned here will be on show at the Northwest SEMERC's Micros for Special Needs Exhibition in Oldham in October.

Northwest SEMERC, under director Martin Littler (right) is a fountain of information, help and advice. If you are involved in special education, then the exhibition is worth a visit. Northwest SEMERC also publishes a special needs newsletter entitled *Copy* which is full of interesting case studies and reviews of how people are coping with the BBC, A3000, Archimedes and other machines. Contact Northwest SEMERC on 061-627 4469.



PRODUCT DETAILS

Product: BBC A3000 Special Access System
Suppliers: Acorn Computers
Tel: (0223) 245200
Prices: £679 without monitor, £B99 complete. Educational establishments and home users registered as disabled pay £579 without monitor, £765 complete

Product: Overlay Keyboard
Suppliers: Northwest SEMERC
Tel: 061-627 4469
Price: £120 (education discounts)

Product: Access 1000
Suppliers: Hybrid Technology
Tel: (0223) 861522
Price: £49 (£58 with Access Link power supply)

Product: Touchwindow and Contact Keyboards
Suppliers: Keyboard Technology
Tel: (0509) 610706
Price: Touchwindow – £244, 8BC driver £25. The Contact Keyboard: £29.95 – £37.50 (BBC B), £47.50 (BBC A3000/Archimedes)

Product: Touchwindow
Supplier: Lindis International
Tel: (0986) 85477
Price: £248

Product: Alternative mouse
Supplier: Clares Micro Supplies
Tel: (0968) 85477
Price: £27.24

Product: Delta Cat
Supplier: Voltmace
Tel: (0462) 894410
Price: £29.74

Product: Marconi Trackerball
Supplier: Technomatic
Tel: 081-205 9558
Price: £30

Product: Micromike
Supplier: Daco Software
Tel: 021-7068933
Price: Standard Micromike, £43.50
 Desktop Micromike, £52.50

Product: Keyguards and Programmable Expanded Keyboard
Supplier: Special Access Systems
Tel: (0203) 711861
Price: £470

Product: Matchmaker
Supplier: SRS Systems
Tel: 021-643-2877
Price: £850

All prices exclude VAT

THREE REASONS TO CELEBRATE

IMPRESSION II



Impression II was awarded the Computer Shopper award for the best non-PC business software.

Given the prestigious nature of the other nominees, this award is particularly satisfying.

Amongst the other nominees were Adobe Illustrator for the Mac, Cloris Works for the Mac and WordPerfect also for the Mac.



As of the end 1991 sales of Impression topped 15,000 copies, making this the most successful Archimedes product to date.



Impression II now forms part of the Acorn Publishing system, a complete top end DTP solution based on the A540, released by Acorn.



Computer Concepts Ltd

GADDESSEN PLACE HEMEL HEMPSTEAD HERTS HP2 6EX TEL: 0442 63933 0442 FAX: 0442 231632

CHANGING FACES

JAN VIBE presents a new look at animation on Acorn machines

Is there anybody who has not seen Michael Jackson's video, *Dangerous*? In the video there is an fascinating sequence of faces which change softly from one to another. This made me wonder if it was possible to do something similar on my trusty Acorn machine. Well, it was, and here it is...

The program draws a face on the screen. Then slowly the face undergoes a metamorphosis, changing into another and another. It is a great showpiece, and has an almost hypnotic effect on people. Part of the inspiration came from an excellent book by A Dewdney called *The Armchair Universe*. In fact, the data for the face is based on an example within the book.

THE THEORY

The program initialises by setting up two screens, an active and a shadow screen. It then generates two completely different faces, let's call them face1 and face2. These faces are stored as PLOT commands in arrays.

In the main loop, the co-ordinates for face1 and face2 are being averaged by a formula which, at the start of the loop is weighted solely towards face1 but, at the end of the loop is weighted solely towards face2. By using this formula, a face which lies somewhere in between can be generated.

This face is drawn on the shadow screen. When the drawing is finished, the active and shadow screens are switched, the weight is changed a little towards face2 and the main loop is entered again. The face is eventually changed totally into face2, then face2 is made into face1, a new face2 is generated and the changing process starts again.

THE PRACTICE

To run the program, type in *Face1* and *Face2*. (see our yellow pages box). When you run *Face1* some data will be created, then you can run *Face2*, the main animation routine.

The program consists of three parts: an initialisation, a face generator and a main loop, which makes the face slowly change from one to another. The most complex part of the program is the procedure PROCdistort. It takes the array distort and returns it distorted by the required amount. Two arrays, refx and refy, are the coordinates for face1 and face2. The original coordinates are not changed at all by the distortion of the face and are these are therefore stored in a single array.

The distortion method is mainly a simple multiplication around a point. It works like this: $X_dist = (X_face - X_ref) * Z_dist + X_ref$ where X_dist is the distorted x value, X_face is the original value of x, X_ref is the reference point and Z_dist is the distortion factor. The same calculation is of



course being done for Y_dist . In the procedure, the distortion factors (facewidth etc...) are generated by the random number function FNrnd(min,max). Then the nine reference points are read into the arrays drefx and drefy.

These points are used in combination with the distortion factors when changing certain parts of the face. The first of the reference points is a global point, used for distorting the entire face. Reference points two to nine also go through the distortion calculation. Incidentally, line 1230 in this loop contains the calculation that makes the face egg shaped, with the point either at the top or the bottom.

In the main loop (1290-1650) the points of the face are distorted. The general distortion of the entire face is being handled by lines 1300 to 1320. This calculation is exactly the same as the one shown in lines 1220 to 1260. Most of the distortion of various parts of the face are made by multiplication around a point, but some require that the parts are moved too - such as in the case of the eyebrows. This happens at lines 1370 and 1410 (the distance between the eyes) and also at line 1590 (which produces the raising of the eyebrows).

The part of the face to be distorted by certain factors is controlled by counting the points in the face-drawing and by testing the counter. This is what happens in the various WHEN blocks. When the counter has reached 186, the face drawing is complete. The distorted face is then stored in arrays, which takes place at lines 1630 and 1640.

EIGHT-BIT BONUS

BAU programming guru, David Lawrence has also written a version of *Face* for eight-bit owners. To use it, type in *Face3*, *Face4* and *Face5* (see our yellow pages box) and then run them in sequence. If PAGE is greater than &1100, you need to lower it to this value before running. The program works by calculating the in-between stages (this will take 20 or so seconds) and then the animation takes place.

MODIFICATIONS

There are lots of ways that this program could be extended. Colour is the obvious one, although it might make the program too slow. Or how about user control to make an interactive id-kit. Indeed, why stop at the face? The program could be used on the entire human body!

YELLOW PAGES

The program shown here can be obtained in one of two ways. Either turn to our yellow pages section and type the program in, or if you are a subscriber, simply load it from your free monthly disc.

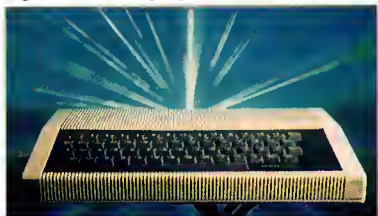
THE BBC MICRO

A forthcoming BBC programme will chart the progress of home computing

Computer technology has taken a quantum leap in the past 10 years or so and now personal computers can now be found in many homes and offices. Yet in the late 70s this was the faraway dream of a few electronics boffins, who were putting together boards and switches on kitchen tables and calling them 'computers'. Personal computing started to gain momentum just over a decade ago, courtesy of the BBC's computer literacy project which set out to explain the principles of computing to a wider audience.

The literacy project was based around various television programmes, the first in 1982 also marked the television debut of the BBC micro computer. *And the rest, as they say, is history...*

It is that history which the BBC is celebrating in a special 30-minute programme, *The Trojan Mouse*, due to be screened on Sunday April 5 (see box for details). This programme will examine the effects of the computer literacy project and the BBC micro on personal computing, as well as highlight the key developments



Humble beginnings with the Acorn Atom

of the past decade. To coincide with the programme, we have put together a special supplement which you can find in next month's *BBC Acorn User*. The magazine was actually launched in response to the success of both the TV computer literacy programmes and the Acorn-produced BBC micro - and we have been around ever since, charting the ups and downs of the Acorn market.

This month, as a 'taster' to the programme, we look back through our archives at some of the key milestones, from the Acorn Atom right up to the launch of the latest Archimedes A5000. For the full story, be sure not to miss our special supplement next month.

ATOMIC

Founded in 1979 by Hermann Hauser and Chris Curry, Acorn Computers launched the System One, followed by the Acorn Atom. Roger Wilson joined the company straight from university to help design the Atom and remains with the company today, developing new projects.

TROJAN MOUSE

The Trojan Mouse is a 30-minute programme charting the introduction of the BBC computer literacy project, the various series on home computing which it launched and the introduction of the first BBC micro computer. Produced by Dave Thomas, who was responsible for producing previous computer programmes, the programme is hosted by Ian MacNaught Davis, who appeared in the first series.

The programme traces the evolution of the project, the related hardware and software achievements, and talks to many of the people who were involved along the way - from Cambridge graduates putting together the earliest prototypes, to teachers whose lives were completely changed by the introduction of the first BBC micros.

Innovators from Acorn, including Hermann Hauser (co-founder of Acorn) and Roger Wilson and Steve Furber (who helped design the first BBC micro and later developed the Arm chip) are interviewed. But the programme isn't just about the past - it brings you up to date with current developments and poses some questions about the future.

So be sure to tune in to Trojan Mouse on BBC1, Sunday April 5, 10.30am. (The programme will be repeated on Monday April 13).

THE BRIEF

To support the computer literacy project, the BBC was looking for a partner to produce and market a home computer, which would be featured in the first series. Richard Russell at the BBC produced a detailed specification for the



required machine. Hermann Hauser and Chris Curry put forward the Acorn Proton design, which was to more than match the specification. In April 1981, Acorn was contracted to supply 12,000 machines that the BBC expected to sell by mail order...

ONE YEAR ON

'Where do we go from here?' asked John Radcliffe, executive producer of the computer literacy project, one year after it was launched. The figure of 12,000 machines was cautious - in fact, more than that were ordered before the first series was even screened.

The result? A runaway success for the BBC and Acorn with further series in the pipeline. Also the Micros in Schools scheme was launched - the brainchild of Kenneth Baker, the education secretary at that time. The scheme was to subsidise the purchase of BBC micros and other approved machines.

THE ELECTRON

Chris Curry wanted to lead Acorn further into the fast-expanding mass market for cheap computers and Acorn launched the Electron in 1983, timed for the Christmas rush and priced at £199. While popular, it was to be dogged by production problems and by Christmas 1984 public enthusiasm had waned and one-third of the Electrons built were apparently never sold.



: TEN YEARS ON

since the BBC micro made its TV debut 10 years ago. **BARRY MONK** reports

JUST THE BUSINESS

The Acorn Business Computer was launched in 1984, but it was large and unwieldy and never recouped the huge resources expended on its development.



The BBC Master-driven Domesday machine

Following a disastrous Christmas 1984 sales period, newspaper articles, particularly in *The Sunday Times*, suggested all was not well with the company.

The share price fell and finally the Italian computer giant, Olivetti, stepped in to save the company. Curry and Hauser signed away their controlling interests to Olivetti, but both stayed on as board directors.

MASTER STROKE

Launched in 1986, the Master series seemed to some observers as an anomaly. It was refinement of the original BBC micro at a time when there was a mass migration, by other cheap computers, to the 16-bit, MS-Dos standard of the successful IBM PC.

While cheaper to manufacture, the Master was more expensive to buy and, outside the Acorn education stronghold, it did not achieve the same level of sales as the original BBC micro. The Master Compact followed, but offered little that was new, except that it was packaged in three boxes rather than the customary two.

THE DOMESDAY PROJECT

The BBC Domesday Project was launched in 1986. It was meant to be a modern equivalent of *The Domesday Book*, using modern technology (notably a laser video disc system) to store and retrieve a massive amount of information about general life in Britain.

SPECIAL SUPPLEMENT NEXT MONTH

To coincide with the programme, BBC Acorn User is producing a special supplement which will appear in next month's issue. It will be packed with interesting facts and figures, charting the ups and downs of the Acorn market and looking at some of the key people who have helped to shape home computing.

Producers involved with the early series will give their assessment of what has taken place over the past decade and we will trace the history of Acorn in detail, with a machine 'family tree' and profile the key people involved.

There will also be an overview of the impact of computing on education, how the BBC micro changed some people's lives, and we'll be doing some crystal ball gazing into the future.

So, whether you are an avid BBC micro fan, or you are just interested in finding out why this machine has had such an impact on personal computing, be sure not to miss our special supplement.

Place an order with your newsagent now - you can use the special coupon on page B5 of this issue. Or to subscribe to the magazine turn to page 29 for details of our special subscription offer.



TAKING RISKS

The advanced research and development team, under Roger Wilson and Steve Furber, developed the Arm chip and its companions that eventually became the Archimedes 300 and 400 series computers. Based on Risc technology, the original machines carried the BBC tag, but this was to cause much controversy as the Corporation was seen to be endorsing untried technology. The original (stop-gap) Arthur operating system was later to become Risc OS.

HAIL THE A3000

The new BBC micro, which was viewed as the logical 32-bit successor to the Master series, was the A3000. More affordable than the Archi-



medes, the neat single-box design encased a machine which was 10 percent faster than the Arc, and represented a more keenly priced BBC micro which would appeal to both education and home users. The Learning Curve package, including an A3000 and supporting software, was the next marketing step to encourage more home computer sales.

UP TO DATE

Acorn has updated the Archimedes with the 440/1 and top-of-the-range A540, as well as the R140 Unix machine. The Archimedes A5000 is the latest Acorn machine.

Revealed at the BBC Acorn User show last October, it is a three-box solution (machine, keyboard and multi-screen monitor) featuring the fast Arm3 chip and new operating system, Risc OS 3, PC-like in appearance, it retains Acorn's philosophy of advanced technology within a marketable package. But what of the future? Find out in next month's special issue of *BAU*.

REMOVABLE, PORTABLE, EXPANDABLE AND SECURE



Sounds too good to be true. Morley Electronics new removable cartridge hard disc systems can work on the A3000 through to the A540 (including the new A5000) as well as on BBC Master computers.

The secret lies in the hard disc cartridge which after dismounting can be taken out and stored, or be replaced by another cartridge within a few seconds. Security is so easy with these discs because you can simply take them home or lock them away.

The unit can also be used as a backup system for internal hard drives as well. Once you have looked at the prices you will see that they are significantly cheaper than tape streamer systems. You also have virtually instant access to the information stored on them because

they are a hard disc and therefore it is simply a matter of copying files from one disc to another instead of having to run lengthy restore programs to recover information from tape.

Perhaps the biggest advantage of these units is that when one cartridge is full then all you have to do is purchase a new cartridge and not a whole mechanism saving you a small fortune in the process. The mechanisms can be either 44MB or 90MB, however please note that the cartridges are not interchangeable between the two.

The mechanisms are true SCSI devices. Therefore, the interface card we can supply with the drives can have up to seven* devices attached such as CD-ROM drives, standard hard discs, flatbed scanners etc. giving you maximum expandability for the future.

A3000, **300, 400, 5000, 540 & Master

44MB Inc Interface Card £575.00
90MB Inc Interface Card £775.00

44MB Excl Interface Card £499.00
90MB Excl Interface Card £699.00

44 MB Cartridge £69.00
90 MB Cartridge £109.00

*Please state computer type when ordering.
Prices exclude VAT and carriage.*

*Prices include mechanism, case, one cartridge,
all necessary cables and software.
Prices excluding interface card do not include
software.*

** Master can only have one device attached.
** Please note that the 300 series machines
require a MEMC1A upgrade and a backplane to
be fitted, both available from Morley. Please call
for prices.*

**Morley Electronics Ltd,
Morley House
West Chirton, North Shields
Tyne & Wear, NE29 7TY**

VISA & ACCESS WELCOME

MORLEY
E · L · E · C · T · R · O · N · I · C · S · L · T · D



091 257 6355

If you've been following this series, you will know I promised to start this month with some more information about negative numbers. I've already introduced the concept of the *twos complement* method of representing negative numbers, and all that remains is to tell you how you can directly load registers with negative numbers. Unfortunately you cannot use the obvious: `MOV R0,#-4`.

The instruction that we use is `MVN` or `MoVe Not, but`, to be even more awkward, you cannot simply say: `MVN R0,#-4` or even: `MVN R0,#4`.

For some reason best known to Acorn, you have to supply the *ones complement* of the number. Remember with twos complement you change all the 0s to 1s and 1s to 0s and then add 1. Well, with ones complement, you simply don't add the 1. The easiest way to do it with the Basic assembler is to use the Basic keyword `NOT`. This is more commonly used to provide the 'opposite' case in an `IF` statement, such as `IF NOT flag THEN...` In fact, `NOT` actually performs the ones complement of its parameter – very handy! You can therefore load a negative number simply with `MVN R0,#NOT -4`.

Some other assemblers, such as Acorn's own macro-assembler *Aasm*, actually allow `MOV` with negative numbers, and simply perform the necessary bit-shuffling on the constant and assemble a `MVN` instruction instead. Although you might have typed `MOV R0,#-1`, if you have a look at the actual machine code the assembler has created, it will say `MVN R0,#0`.

It is not possible to supply negative numbers as parameters to other instructions. It's a silly example, but you cannot say, `ADD R0,R1,#-56` as some assemblers may translate instructions such as these into more appropriate ones. You might like to try typing in listing one in the yellow pages, which demonstrates the use of simple arithmetic on negative numbers. Try following through the stages by 'hand' first to make sure you understand everything as it happens.

HEXADECIMAL

Before moving on, I'd like to outline the basics of the hexadecimal number system. Clearly, referring to numbers in binary is quite contrived, not to say time consuming: 'Pardon? Was that 1001101001 or 1001011001?'

Because binary is all based on powers of two, and 10 isn't a power of two, you cannot directly use decimal, which is a shame, since most of you will be used to that already! Some computer systems use base eight, or *octal*, which uses the decimal digits 0 to 7. Converting from binary to octal is relatively easy – you simply take your binary number and chop it into three-bit chunks, which are then converted to octal (effectively decimal in this case).

For example, 923 in decimal is:

```
1110011011
001110011011
1 6 3 3
```

The number 923 in octal is therefore 1633. Note this should be read 1,6,3,3 octal, to avoid confusion with one thousand six hundred and thirty three. The disadvantage of octal is the chunks of three – not a nice power of two! Quadral could be used (with two-bit chunks) but then you're almost back to binary.

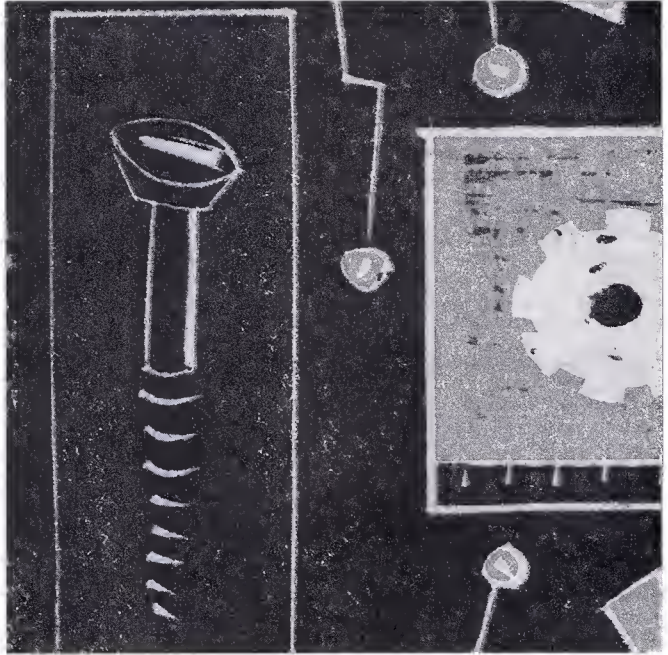


ILLUSTRATION BY PAUL SCHOFIELD

ASSEMBLY LINE

DAVE LAWRENCE

continues his series

on Arm

programming

with a look at

negative numbers

So, hexadecimal is the most common notation. This is base 16 and uses four-bit chunks of data, and is often abbreviated to 'hex'.

Of course, decimal only has 10 digits, so the letters A to F are used to represent the decimal numbers 10 to 15. Conversion to hex proceeds as for octal, except in four-bit chunks:

```
1110011011 (923)
001110011011
3 9 B
```

Hex numbers are often written with a preceding '&' to avoid confusion with decimal numbers – so 923=&39B. As mentioned before, one binary digit is called a bit. Historically, eight bits are called a *byte*. This is derived from early computers which were eight-bit machines (like the

6502), with *byte* being a corruption of *bite*, being a shortened form of BIT eight.

So 32 bits are often called a *word*, although some computer systems, such as the 68000, call this a *long word* and use *word* to mean 16 bits. *Words* are 32 bits long in the Arm. Going the other way, half a byte (four bits, one hex digit) is, of course, a *nibble*. And no, I'm not joking!

LARGER NUMBERS

Next on the list of things to explain is larger numbers. Until now, I've told you to keep the numbers that you load into registers under 256, but not to worry about the size of intermediate results. Last month I mentioned that the Arm is a 32-bit processor and can therefore deal with 32 bits at a time. So, why can you not say `MOV R0,#987`? After all, 987 in binary is only a 10-bit binary number.

The problem lies in the way Arm instructions are stored in memory and also explains why you have to use the ones complement notation for specifying numbers. In the first article in this series, I explained that it is the job of the assembler to translate the 'human' words `MOV`, `ADD`, `MUL` and so on, into the appropriate sequences of bits that the Arm understands.

One of the good features of the Arm is that all its instructions are encoded to the same length, namely 32 bits (one word). It is a coincidence that the processor is a 32-bit processor. Many other processors (such as the 6502, 68000 or 80x86) have variable length instructions. In 6502, `PHA` is only eight bits 'long', whereas `LDA &3D00,X` is 24 bits. In such cases it is common for the first byte (or whatever) to be the base instruction and, if necessary, subsequent bytes to form parameters for the operation.

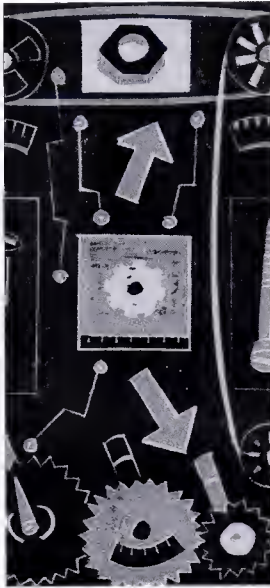
Anyway, back to the Arm. When it processes an instruction, it grabs a whole 'word' instruction and examines certain bits (in both senses of the word) to see what sort of instruction it is dealing with. For example, if bits 26 and 27 are clear (0), then the instruction is a simple data processing instruction such as `MOV`, `ADD` or `RSB`.

With this in mind, the Arm can then make sense of the rest of the bits. Certain bits have a fixed meaning: bits 28 to 31 are the condition code (more about these later in the series) but others will vary according to the initial 'class' of instruction. The important upshot of all this is that all parameters for instructions have to fit within these 32 bits, hence you cannot supply a full 32-bit number to `MOV` and so on.

In fact, as you are allowed to supply a constant on the end of an addition: `ADD R0,R4,#64`. As well as the '64', those 32 bits have to store the fact that: you have specified `ADD`; you are using `R0` and `R4` and condition code mentioned earlier, as well as a couple of other twiddles which I will come to later.

From the grand total of 32, this leaves only 12 bits to specify the constant. Rather than doing the obvious, and making these 12 bits bits 0 to 11 of a 12-bit constant (which would only allow the numbers 0 to 4095), Acorn splits the 12 bits into two fields, one eight-bit constant and one four-bit 'shift'.

The shift is how many bits the eight-bit constant is offset. This is the computer's way of thinking about it – mathematically, the value



YELLOW PAGES

To find the programs mentioned in this article, please turn to the yellow pages, under the section entitled *Acorn Assembler*. They can also be found on the subscribers' monthly disc.

represented is: $value \times 2^{(2 \times shift)}$. So, with a shift of zero, you can represent the numbers 0 to 255; with a shift of one: the numbers, 0, 4, 8, 12... 1020; with a shift of two, the numbers 0, 16, 32... 4080 and so on.

Unfortunately, I have to admit that this is a bit of fib – the shift value doesn't really work in this way. It is actually an offset in the opposite direction, so my shift of one above is actually stored internally as 15, two is represented by 14, and so on. A 'real' shift of one moves the value right and off the bottom of the 32 bits available.

But it doesn't just fall into hyperspace – bits 0 and 1 'wrap round' and become bits 30 and 31. A shift of four moves the value eight bits to the right, thus all the bits wrap round, allowing you to access the 'top byte' of the 32-bit word. Luckily you never need to worry about the way constants are stored within the instructions, since the assembler does all the work of converting your number into the necessary eight-bit value and four-bit shift.

If a constant you give cannot be converted, you will get an error such as 'Bad immediate constant'. Therefore all values 0 to 255 are fine (they are all eight-bit numbers anyway), 256 is fine because only bit eight is set (to 1) so it can be converted, however 257 cannot. Both bits 8 and 0 are set, so the 'value' cannot be represent by an eight-bit number.

The more astute of you may have noticed that because only four bits are available for the shift, only 16 'positions' are available for the value field. Because of this, numbers such as 258 cannot be represented.

Although the 'width' of the number is only eight, (so bit 8 and bit 1 are set) only one position of shift is needed, which cannot be represented with one of 16 positions available. However, 516 is allowable since an actual shift of two (shift field=15, remember) can be used with a value field of 129.

Although this system of value and shift offers a more limited range of 'small' numbers, it has the major advantage of allowing a reasonable range of 'large' numbers to be represented as well. Powers of two are often used within programs for a number of reasons and, as these have only one bit set, all 32 of them can be represented.

BENEFITS

The even more astute of you will have realised that numbers less than eight bits 'wide' can be represented in a number of ways: two, for example, could be two with a shift of zero or one with a shift of 15 – this is the inevitable redundancy of this system, but I think you'll agree the benefits far outweigh the problems. Listing two shows some examples of larger numbers. You won't be able to run this program as one of the lines causes an error – can you guess which one?

One final point relating to negative numbers, '-1' in binary is represented by all 1s (see last month's article). Fairly obviously, this is 32 bits 'wide' and therefore cannot fit into an eight-bit value field. By using the ones complement method, -1 becomes 0 which, as we all know, will easily fit into eight bits.

Next month I will look at the final instalment of `MOV` and explain what you do if you really *do* want to load 258!

The Custom McCoy

EXCLUSIVE Mail Order Promotion Ends 30th April '92

The following Fourth Dimension software is compatible with the Acorn A3000, A5000 and ALL Archimedes computers



White Magic 1 or 2 £19.95



The Olympics £19.95



Boogie Buggy £24.95

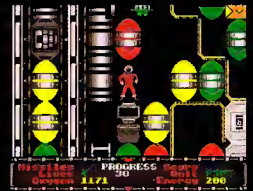


Chocks Away Extra Missions £19.95



Arcade Soccer £19.95

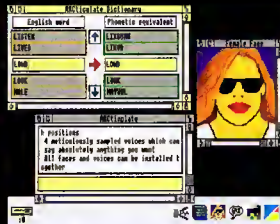
**Choose ANY Four
Of These 18 Top Products
For ONLY £34.50!
Less Than £9 Each!!**



Pysanki £19.95



Powerband £24.95



ARC'ticulate £24.95



ARC'tist £24.95



Apocalypse £29.95



U.L.M. £29.95

**Limited EXCLUSIVE Direct
Mail Order PROMOTION**

Unbeatable Value

The Real McCoy compilations are terrific value for money. Unfortunately if you've already got 1 or 2 of the products you miss out. Now that's all changed. You can choose ANY 4 from these 18 great titles for yourself!! Each such "Custom McCoy" will be individually packaged in 1 attractive video-style box complete with ALL original discs and manuals. PLUS a unique 4D games demo disc will be sent FREE with all orders.

HOW TO ORDER...Ends 30th April

Simply send us a quick letter or give us a ring telling us the 4 products you would like, your name and address, and payment via cheque, postal order or ACCESS or VISA card details.

The Fourth Dimension, 1 Percy Street, Sheffield, S3 8AU.

Tel. (0742) 700661 or 769950

FREE SAME DAY despatch by 1ST CLASS POST



The Wimp Game £19.95



Man-At-Arms £19.95



Holed Out £19.95



Inertia £19.95



Nevryon £19.95



E-Type £19.95



Dropship £19.95

TELEPHONE:
081-205 9558
FACSIMILE:
081-205 0190

TECHNOMATIC

TECHNO HOUSE,
468 CHURCH LANE,
LONDON
NW9 8UF

Archimedes Computers

Carriage £8/computer £12/system

A3000

A3000 with 2Mb RAM (no monitor) £599
A3000 with 2Mb RAM Acom monitor £798
A3000 with 2Mb RAM CUB 3000 monitor £788

Learning Curve Packages

A3000LC with 2Mb RAM (no monitor) £639
A3000LC with 2Mb RAM and
Cub 3000 monitor £830
A3000LC + Acom monitor
Acom 300 dpi inkjet printer £1089
A420/1 LC with 4Mb and Cub 3000 £1259
A420/1 LC with 4Mb and
Taxan 7700 + LR £1419

NEW A5000 Learning Curve

2Mb RAM, expandable to 4Mb + 40Mb HD
with Acom multiscan monitor £1531
A5000 LC with 300 dpi inkjet printer £1765

A540

ARM3 + 100Mb SCSI HD, fitted with 8Mb
RAM (upgradable to 16Mb)
A540 plus Taxan 795 £2855

0% Finance on Learning Curves

Subject to Status. Ring for personal quotation

techno Tablet

Now 3 models to choose from:

technoTablet 9 £109(b)
6" x 9" tablet with captive 3 button stylus,
perfect for sketching and for special needs
applications.

technoTablet 12 £179(a)
The original 12" x 12" technoTablet with 4
button puck.

Optional Stylus for technoTablet 12 £15(c)

technoTablet 18 £329(a)
A new 18" x 12" tablet which will allow tracing
of drawings up to A3. 3 button stylus as
standard.

technoSCSI Packages

300/400

Single width card for internal or external
drives.

Internal are complete with all fittings, external
feature compact, professional cases and
screened cables.

47 Mb internal + card £249(a)
105 Mb internal + card £389(a)
Optional External terminator £12(d)
47 Mb External + card £339(a)
105 Mb External + card £469(a)

A3000

8 bit internal card with User Port. External
drives are housed in compact, professional
cases with screened cables.

47 Mb External + card £339(a)
105 Mb External + card £469(a)
Optional External terminator £12(d)

techno-I

The techno-I Real-Time Colour Video Digitiser for Archimedes computers is one of the most advanced video digitisers available, with features usually found only on top-of-the-range models for the IBM PC.

The techno-I card, with RISC OS multitasking software, allows you to grab a picture from a video source (TV, Video recorder, etc.) and convert it into a sprite. This can then be dragged to RISC OS applications such as art or DTP packages.

Unlike simple RGB video digitisers, techno-I handles colour in 25 bits with 7 bits luminance and 18 bits chrominance. By manipulating the image using hue, saturation and luminance, it mimics the human visual system. The colours are therefore truly WYSIWYG. techno-I will also give true monochrome representation of colour images.

The on-screen viewfinder displays live colour or monochrome in real-time. The viewfinder can be either 1/16 or 1/4 screen area, and can be offset vertically and horizontally under user control.

The frame buffer resolution is up to 512 by 512, with programmable vertical and horizontal resolution. Complex frame manipulation features are built into the hardware including options to grab the current frame or previous frame and grab the last completed frame.

All viewing, video and digitising parameters are software controlled, there are no presets, no setting up, simply connect to a video signal, load the software and digitise!

techno-I features include:

- ★ 25 bits resolution, 7 bits luminance and 18 bits chrominance
 - ★ Contrast, colour and brightness set from Desktop
 - ★ Image scaling up to 1280 by 1024
 - ★ Selectable or automatic monochrome/colour digitising
 - ★ Auto detection of video signal, field frequency and colour
 - ★ Single width module using surface mount technology
 - ★ Zero wait state 16 bit MEMC module
 - ★ Low chip count (13 chips) utilising the latest technology
 - ★ 40% of chips Brainsoftware designed
 - ★ Uses a single 5v supply only
 - ★ Compatible with international TV standards
 - ★ Chrominance comb filter for studio quality CVBS colour
 - ★ CTI sharpens edges of coloured objects
 - ★ Picture signal improver enhances the luminance content
 - ★ Automatic black level and gain control
 - ★ Hardware programmable noise filtering
 - ★ SVHS input upgrade available "a big improvement on the best available from previous digitisers"
- Trevor Atwell, Archimedes World**
"...surprisingly good value compared to the rest of the field" **Rob Millar, Acorn User**
"using techno-i is a doddle ... an excellent and easy to use product"
Steve Bruntlett, The Micro User

techno-I for 300/400, 540, etc £249(b)
techno-I for A3000 £279(b)
(Securely boxed for external fitting)
SVHS Upgrade £100(d)

NO PRINTED PICTURE CAN DO IT JUSTICE - Send for FREE Demo Disc

Archimedes Expansion

Acorn I/O card £80(b)
16 bit Parallel I/O card £195(b)
MIDI Add-on to Acorn I/O £37(c)
MIDI Expansion Card £66(c)
Archimedes Tracker Ball £30(c)

Wild Vision Chroma Genlock CG2 £215(b)
ADC 1208 A to D Converter £495(b)
Dual RS232 Serial Card £195(b)
IEEE Interface £283(b)
ARC Prototyping board £35(c)

Master Series Systems

Master 128 £379(a)
Microvitec 1431 14" Std. Res.
Colour £169(a)
Philips CM8833/II 14" Med.
Res. Colour £209(a)
ROM Cartridge £13(d)
32K RAM Cartridge and
utilities £12(d)
PS50 5.25" 40/80 drive with
PSU £90(b)

A3000 Expansion

Acorn MIDI/User Port £49(b)
Wild Vision Chroma Genlock
CGI £215(b)
Serial Port Upgrade £19(c)
A3000 Monitor Stand £17(b)

Tel: 081-205 9558 Fax: 081-205 0190

technoSCAN II

Probably the definitive monochrome scanning package!

The all NEW technoSCAN II package provides full monochrome operation at 400 dpi as well as 8 and 16 level grey scale scanning and provides the following features:

Suitable for all Archimedes micros and integrates fully with the multitasking RISC OS environment.

Advanced memory management system releases memory when not required allowing scanning and DTP in a 1MB computer.

Flexible zoom control allows palettes to be imported, tailored and resaved with more powerful tone and tinting features than most painting packages.

Interactive help and a superb manual.

Direct printing with RISC OS drivers.

Saves sprites direct into PAINT and DTP or to disc.

Saves sections and palettes into any graphics mode.

At the same low price as the well tested original.

technoSCAN II complete with interface card and manual **£149(b)**
 technoSCAN II for A3000 **£175(b)**
 technoSCAN II upgrade for techno SCAN **£22.50(c)**

What we can offer in addition to efficient sales, service and professional backup!

We not only offer professional advice when you are purchasing your system but we will also provide friendly assistance afterwards. All our products carry a 12 month full warranty for parts and labour.

techno-ION Bundle

- ★ techno-I Real Time Colour Digitiser
- ★ Canon ION CCD Camera
- ★ SVHS Upgrade to techno-I
- ★ SVHS and RF cables

Capture 3-D objects in full colour on the Canon ION camera. With rechargeable batteries you can take up to 50 pictures, storing them on its floppy disc. They can then be digitised using techno-I to provide the best images available on Archimedes computers.

techno-ION for 300/400/540/5000 £699(a)

techno-ION for A3000 £729(b)

Archimedes Monitors

- Acorn 14" Medium Resolution, Colour with Stereo Sound **£209(a)**
- Philips CM8833/II Med. Res. Colour, Stereo Sound, 1 year's on-site maintenance **£209(a)**
- Taxan 770+LR Multisync High Res. Low Radiation Colour **£365(a)**
- Taxan 795 Flatscreen Multisync. Hi. Res. Colour with VIDC Enhancer **£399(a)**

Archimedes Printers

- Dot Matrix**
- Epson LX400 9 pin 150 cps **£110(a)**
 - Epson LQ200 24 pin 150 cps **£179(a)**
 - Star LC200 Colour 9 pin **£159(a)**
 - Star LC24-200 Colour 24 pin **£225(a)**
- Inkjet**
- HP Deskjet 500 B/W 80 column 300dpi **£295(a)**
 - Canon BJ10ex 80 column portable 360dpi **£199(a)**
 - Canon BJ300 80 column 360dpi **£349(a)**
 - Canon BJ330 132 column 360dpi **£395(a)**
- Colour Inkjets**
- HP Deskjet 500C Colour 80 column 300dpi **£299(a)**
 - HP Paintjet Colour 80 column 180dpi **£439(a)**
 - HP Paintjet XL Colour 132 column 180dpi **£1059(a)**
 - Integrex 132 80 column **£499(a)**
- Laser Printers**
- HP Laserjet IIIP 1 Mb RAM **£699(a)**
 - 1 Mb RAM Upgrade for IIIP **£56(b)**
 - Canon LBP4 0.5Mb for LaserDirect HiRes **£585(a)**
 - LaserDirect HiRes4 **£350(b)**

1 year on-site maintenance on laser printers

Send for our free catalogue and price list

SPECIAL OFFERS

★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★

A305/310

- Acorn Hard Disc Controller **£79(b)**
- techno Hard Disc Controller **£79(b)**
- Brainsoftware 4 slot backplane **£25(b)**
- Cooling Fan for A310 **£13(c)**

400/1 Series

- 2nd Floppy Disc Drive **£75(b)**
- Replacement PSU **£75(b)**

300/400 Series

- technoSCSI card **£99(b)**
- ROM MODULE **£10(c)**
- AKA20 Floating Point Unit **£350(b)**
- AEDA External Floppy adapter **£10(d)**

A3000

- 3Mb RAM Upgrade **£119(c)**
- AEDA External floppy adapter **£10(d)**
- Technical Reference Manual **£25(c)**
- Techno SCSI card (with User Port) **£79(b)**

RAM Upgrades

- A310 1Mb **£99(b)**
- A310 3Mb **£199(b)**
- A3000 1Mb **£49(c)**
- A3000 3Mb **£119(c)**
- A400/1 per Mb **£45(c)**
- A440/1 4Mb **£599(*)**
- A540 4Mb **£275(c)**
- A5000 2Mb **£110(*)**
- ARM 3 Fitted by us **£375(*)**

This is only a selection of our range, please send for our free Acorn catalogue

Name _____

Address _____

Return to:

**Technomatic Ltd, Techno House
 468 Church Lane, London NW9 8UF**

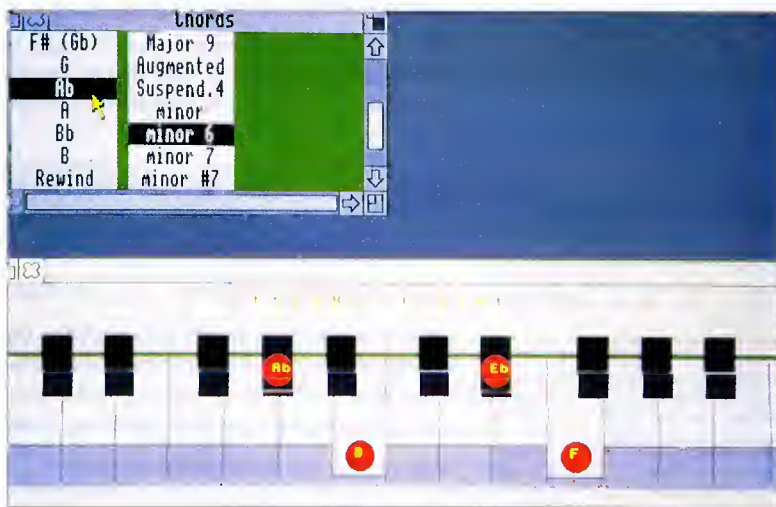
Send for our new comprehensive ACORN CATALOGUE

TECHNOMATIC

All prices ex VAT. Prices and specification are subject to change without notice. Please add carriage (a) £8.00 (Courier, 2 days) (b) £5.00 (c) £2.50 (d) £2 Next day delivery at extra charge

WIN
A MUSIC
KEYBOARD
SEE PAGE 120

Learn all about
musical harmony,
with **PAUL
MARSHALL's**
chord dictionary



STRIKE A CHORD

It is common knowledge that playing a one-fingered tune on a piano sounds pretty boring. To make a tune come alive you need to play a few well-chosen notes at the same time – notes which harmonise with the main theme.

Anyone who plays the piano will know that certain notes, when played together, form a chord. In published sheet music the accompaniment harmony is often shown using chord symbols. Guitar players are lucky – they sometimes even get a little drawing which shows them where to put their fingers.

Some years ago, when I felt that the world badly needed another guitar player, I learnt all the chords I needed using songbooks and diagrams in a chord dictionary. More recently, when I wanted to learn chords on a musical keyboard, I decided to enlist the help of my computer. Hence the birth of *Chords*.

The application *Chords* is a chord dictionary with built-in sound, but it also has a simple sequencing feature. Even if you are not learning to play, just listening to the different chords and the way they work together can be fascinating.

USING THE PROGRAM

The program installs on the icon bar in the usual way. Clicking select over the icon brings up two windows: one contains the music keyboard, the other the selection menus.

On the left are the 12 basic chord names from C through to B, plus control of the sequencing. In the centre there are 15 chord forms: the basic major and minor triads – triad means three notes – and a selection of higher forms. (If you are a bit hazy about your harmonies, then take a look at our box called natural progressions.)

Select the chord name, form and position from the menus, and the keyboard window will show which keys to press and what the notes are called. Meanwhile, the chord is played through the computer sound system and through a Midi interface and keyboard, if one is connected. Pressing Adjust makes a selection without running the demonstration.

Notes played on a Midi keyboard are also shown on the display so the player can confirm the correct fingering. However, don't play lots of notes very fast as this may leave the program behind and fill up the Midi buffer.

Each time the mouse is clicked on Play seq, the next chord in a predetermined sequence is played. To enter a sequence, click over enter to reveal a line of text which can be edited in the usual way. Rewind puts the sequence pointer back to the start and Help displays a reminder of the sequence notation.

When the Arpeggio option is ticked, chords are played with a delay between each note. This is not a true arpeggio but it makes the individual notes easier to hear. Delay sets the delay in centi-seconds – from five to 100 is reasonable.

THE LISTING

In the 32-bit version, the Wimp routines are fairly straightforward, with windows and menus defined within the program. The keyboard graphics are drawn by PROCdraw_screen and PROCplot (which draws one key only), by first calling PROCbackgnd to direct all VDU driver output to a background sprite. The usual drawing commands are then used without having to refer to window co-ordinates. PROCforegnd then directs output back to the normal screen. When the

YELLOW PAGES

As usual, this program is free to subscribers on the monthly disc, in both eight-bit and 32-bit versions. If you do not subscribe, you can still type in the program by turning to the Chords section in yellow pages.

The 32-bit user should type in listing one and save it as !Runimage in a directory called !Chords. Then create a Mode 12 sprite in Paint called !Chords, with the dimensions 34x17 and save it inside the !Chords directory as !Sprites. Using Edit create an Obey file and enter the following text. !!RUN for Chords WimpSlot -min 80K -max 80K RUN <ObeySDir>.!RunImage Save this Obey file as !RUN inside the !Chords directory. Now double clicking on the !Chords icon in the directory viewer will run the application. Eight-bit users should type in listings three and four and save them as Chords1 and Chords2. Then CHAIN "Chords1".

window manager calls for a re-draw, the whole sprite can be quickly plotted at the appropriate screen co-ordinates. If the user decides to changes desktop mode, while the program is running, then PROCdraw_screen redefines and re-draws the sprite.

The selection window is constructed entirely from icons (this method allows faster access than Wimp menus). The window manager numbers the icons in the order that they are defined, so there is no need to save the icon handle returned by SYS"Wimp_CreateIcon". To determine what name, form or inversion has been selected, PROCprocess_icons merely checks icon% against a range and subtracts an offset.

The presence of an Acorn-compatible Midi interface is detected in FNmidi by setting a local error trap and then attempting to make a Midi SWI call. The note number to send to Midi is K%+59, where K% is the key from 1 to 24. Change 59 to 47 to drop the sound one octave.

The data defining each chord is stored at the end of the program. For each form the root position is given first, then the three inversions, then the name for use in the menu. Our 24-note keyboard is numbered from one to nine then A to N, where 1 represents low C, 2 is C# and so on. Only chords in the key of C are stored; other keys are derived by adding an offset.

A more elegant approach would be to take the basic triad and alter or add to it, according to a formula. A whole range of altered chords could then be produced quite easily. Some notes have different names but sound the same, for instance C# and Db. Logic in PROCplay determines the appropriate name to print on the keys but it is not always grammatically accurate - another reason why the chord data would be better derived from a formula.

FNtoo_high checks if any note would be beyond the top range of the keyboard, in which case the whole chord is moved down by an octave. PROCplay_sequence processes the sequence text using INSTR to match the letters entered with those valid. No error checking is performed here. An unrecognised entry will default to a C or a major chord, depending on where the error is. You may need to alter *TUNING 80 in PROCinit_prog to adjust the pitch of your micro.

EIGHT-BIT VERSION

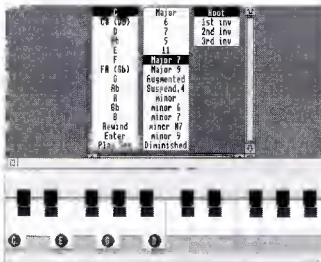
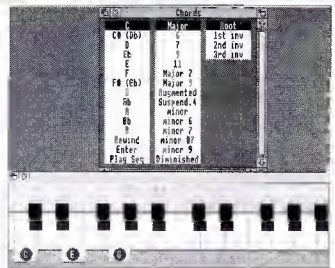
The eight-bit version works in a similar fashion. Selection is made using the cursor keys, a tick indicating the selected item. RETURN plays the chord and SPACE steps through the sequence.

Pressing F0 allows the sequence to be edited. Insert editing is provided, using CURSOR LEFT/RIGHT, and DELETE. Press RETURN when it is finished. As there are only three sound voices and many chords have four notes, notes are played one-at-a-time in arpeggio style.

The program is in two parts. Chords contains instructions and sets PAGE to &1300 ready for Chords2. Data format is the same as for the 32-bit version, but there is only room on the screen for 14 chord forms, so the minor#7 has been omitted. To save space, the sequence string is indrected by seq% to &A00. No Midi output is provided but could be added as indicated in PROCplay. Midi input is not included but a routine similar to PROCmidi_in could be added.

NATURAL PROGRESSION

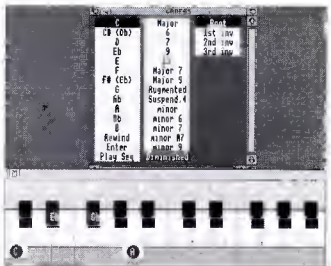
The chord table below describes how to enter the traditional chord symbols into the program. (It uses the key of C as an example.) You can see that on the right of the program menu there are four positions: the root plus the first, second and third inversions. The note that the chord is named after is known as the root of the chord. (Moreover, in a root chord - shown on the right - this note is also the lowest note in the chord.) Inversions are a re-arrangement using the same notes, but where the root is not the lowest note. To try out progressions, in other words a sequence of chords that lead naturally from one to another, the sequence option can be used. Chords built on F and G follow on from C pretty well. Numerous songs have been written with just C, F and G, known as the three chord trick, and some rock groups, such as Status Quo, have built whole careers playing little else.



The tricky bit is to find a sequence which progresses smoothly and at the same time harmonizes with a complex melody. Each chord form brings a different quality or feel to the music. A major chord has an air of finality: indeed, most tunes end on the major chord of the key. A chord like C7, however - shown on the left - lends a feeling that there is more to come and so this type of chord is often found in songs at the end of a phrase or sentence. Play C7 and hold on to it for several seconds. The ear feels uncomfortable. Something should

happen. Now play F Major. The ear is satisfied. The C7 chord has resolved on to the F Major. Sharpening the fifth (that is, the fifth note up from the root) of a major chord gives an augmented triad, which tends to resolve on to a chord with a root a fourth above it's own, (try C plus F). Any note of the augmented can be the root and this applies also to the diminished chord. Compare Co Ebo F#o Ao with Co 1c2 Co 3c3o.

To hear a diminished chord at work, try C Co Dm7 G. Here, the diminished (see right) resolves into a minor, and the minor to G Major. Notice how it sounds unfinished. Following on with the reverse, G Dm7 Co C gives a complete progression, but the two Gs together sound dull. Would Gsus4 be better than the second G? The minor sharpened seventh (m#7 for short) is an example of an altered chord that definitely belongs in a mystery movie! Inversions, although containing the same notes, don't always have precisely the same effect. C major in the 1st inversion doesn't sound quite as final as the root position. Play C Major seventh (Cm7) in the root position and the notes look evenly spaced. Move to any of the inversions, and B and C pop up next to each other. Being adjacent, they sound discordant on their own, but in harmony with E and G, the sound is, well... judge for yourself!



CHORD TABLE

FORM	CHORD SYMBOL	ENTERED AS
Major	C	C
Minor	Cm or CMI	Cm
Seventh	C7	C7
Major seventh	Cmaj7 or CMA7	CM7
Minor seventh	Cm7 or CMI7	Cm7
Minor sharpened 7th	m#7 or m(+7)	Cm#7
Augmented	Caug or C+	C+
Diminished	Cdim or Cdim7 or C°	Co
Suspended fourth	Csus or Csus4	Cs or Csus
(substitute 6,9,11 for 7 as required)		

Innovative upgrades for Acorn computers

High spec IDE hard discs

- MEMC podule for high speed transfer - 8MB/sec peak
- Compatible with all drives tested
- Up to four drives driven from a single card
- Acorn IDE specification conformant software
- Supplied with complete mounting kit, cables, manual, etc.
- Available now.

Capacity	Internal Kit	External Kit	A5000
44MB	£ 199.95	£ 259.95	£ 169.95
100MB	£ 319.95	£ 379.95	£ 289.95
130MB	£ 389.95	£ 449.95	£ 359.95
210MB	£ 579.95	£ 639.95	£ 549.95
425MB	£ 939.95	£ 999.95	£ 909.95

All of these prices INCLUDE VAT, carriage, etc!

Internal kits include drive, controller etc. for A300/A400/A500

External kits include above plus case and PSU for A3000

A5000 kits include drive and cables for mounting in A5000

Trade-ins on your old hard disc drive available

Full refund of cost of card on trade-up to Multi I/O

Unsure? We offer a 14-day no quibble money-back guarantee

Fitting service available

Logitech FotoMan Camera

- Still image capture system with hand-held camera
- Stores 32 pictures at 376x284 in 256 levels of grey
- Fully portable with built-in flash
- Serial data transfer does not require a podule slot
- Telephoto, wide angle lenses, filters, etc. available
- RISC OS compliant driver software
- Sample disc of photos available
- Available now. £ 649.95 inc VAT

Floating-point Accelerator

- Dramatic increase in speed of maths on Arcs and A3000s
- Compatible with all machines, including ARM 3s.
- IEEE 80-bit floating-point as per Acorn spec
- Single width podule fits in any slot
- Compatible with all applications tested
- Typical performance increases attained:
- Simple ops 2-5x speed of ARM 3, 5-10x speed of ARM 2
- Trig functions 15x speed of ARM 3, 50x speed of ARM 2
- Available now. £ 174.95 inc VAT

Aleph-One

80386SX Card

- Speeds P.C. software by 10-20 times
- Runs in a window under RISC OS
- Fully P.C. compatible
- Available now. £ 579.95 inc VAT.

ARM 3 Upgrade

- Speeds all software by 2-5 times
- Extra speed for DTP, graphics, etc.
- The original ARM 3 upgrade
- Available now. £ 229.95 inc VAT

Colour Scanners

- 400 or 600 d.p.i. Epson colour units
- A4 flatbed scanning
- High speed parallel interface
- Reviewed in AU Jan 1992
- Available now
- 400 d.p.i. £ 1395.00 inc VAT
- 600 d.p.i. £ 1595.00 inc VAT

Multiscan Monitors

- All scan from 15-38kHz for compatibility
- No problems with games etc. not working
- Resolutions to 1024x600 on 15"+ models
- Auto-sizing on 15"+ models
- Dot pitch 0.28mm, 0.31mm on 15"+ models
- Available now.
- 14" £ 349.95 inc VAT
- 15" £ 569.95 inc VAT
- 17" £ 799.95 inc VAT
- 21" £ 1229.95 inc VAT
- VIDC enh. £ 28.95 inc VAT

A540 4MB RAM Cards

- Upgrade your A540 to 8, 12 or 16MB
- Fully compatible
- Available now.
- 1 card (extra 4MB) £ 319.95 inc VAT
- 2 cards (extra 8MB) £ 604.95 inc VAT
- 3 cards (extra 12MB) £ 859.95 inc VAT

D.T. Software

FREEPOST, CAMBRIDGE.
CB3 7BR

VAT included in prices above..
Carriage included.
Dealer enquiries welcome.
E & OE.



★ INFO

COMPATIBILITY KEY

B	BBC B compatible
B	BBC B+ compatible
M	Master compatible
C	Master Compact compatible
E	Electron compatible
A	Archimedes compatible
A	BBC A3000 compatible

★ PRIZE £25 ★

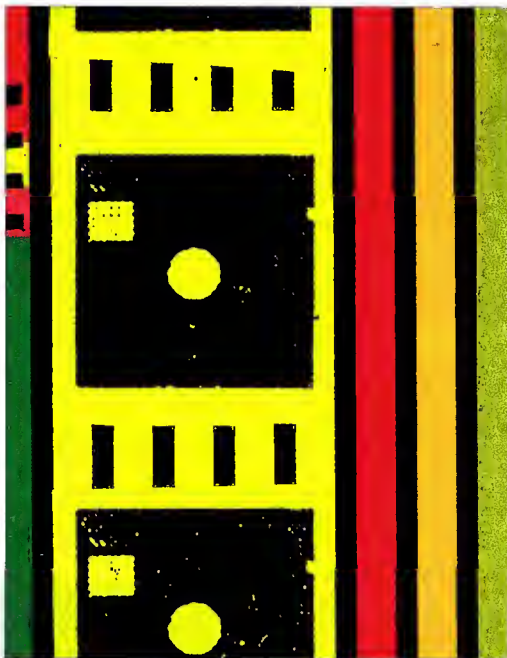
A TIGHT FIT

Laurie Jones of Bedford continues our curvy theme this month with *CurveFit*. This is a program which uses an iterative procedure to reduce the size of a formula which represents a curved line. Using an expression of x with two parameters, a and b it will fit any two parameter function of x . The menu gives a selection of functions which have proven useful, but allows the entry of any expression in the correct form: for example, $y = a + b/X$ or $y = a / (1 + b*X)$.

The usual method is to transform the data into a linear form and then to perform a linear regression. Unfortunately this gives unequal weightings to the data points, depending on the transformation used. By using the speed of the Archimedes to perform simple iterations, you can avoid the use of sophisticated curve-fitting algorithms for non-linear data, provided the theoretical curve is known. The basis of this program is sequentially to optimise the values of the a and b parameters, starting from initial 'guessed' values (the default value is one).

The x,y data set is read into an array, and the calculated value of y is found for each value of x . The observed y value is subtracted and the result squared. The squared values are summed for each x,y pair to give the initial sum of squares. The value of a is then decreased by 10 percent

DAVE ACTON and DAVE LAWRENCE
 deliver their monthly mix of bits and pieces for your eight and 32-bit machines



★ INFO COMPATIBILITY TABLE

LISTING	NAME	BBC B	MASTER	ELECTRON	ARC
Info 1	CurveFit				★
Info 2	Bezier8	★	★	★	
Info 3	BezDemo	★	★	★	★
Info 4	Toner27				★
Info 5	Point32				★
Info 6	Cube				★
Info 7	Hypno32				★
Info 8	Hypno8	★	★	★	★
Info 9	!Runimage				★
Info 10	Mortgage	★	★	★	★
Info 11	MindMaster2	★	★	★	★
Info 12	Scribe				★

and the process repeated. If the sum of squares has decreased, a is again reduced and the process repeated. (Otherwise the direction of change in a is reversed and a is increased.)

This process is repeated until the sum of squares again increases. The direction of change is then reversed and the step size reduced to 1 percent. The iteration continues until the next overshoot; the step size is reduced to 0.1 percent and direction reversed again. This process continues until the step size is 0.00001 (which can be altered at will).

```

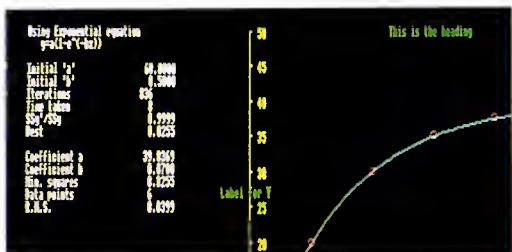
>Test
This is the heading
Label for X
Label for Y
0,0
10,20
20,30
30,35
40,37.5
50,38.75
  
```

Example data for curve fitting

The same procedure is then run to optimise b . The cycle of optimising a and b alternately is continued for 50 cycles or until the ratio of the sum of squares of y on successive cycles is between 1.00001 and 0.99999 (again arbitrary). In principle the same system could be used to fit a third parameter, but the fitting process would be very slow.

The data should be stored in a previously prepared data file – the required format of the data file is described later. Once the data file has been read, the program plots out the data points on automatically scaled axes and then presents a menu containing a set of curve options, plus an option to enter any other function of x in terms of a and b . The iteration then proceeds, is monitored by a counter and timer, and the display of the ratios of successive sums of squares.

Provided the curve chosen is appropriate to the data, and sensible a and b values were



The curve plotted by Curvefit to fit the example data

chosen, the iteration takes a few seconds to a minute or so, depending on the amount of data to be fitted.

The program then prints out the values of a and b and the function fitted, together with the residual sum of squares about the fitted line and the root mean square. The curve of best fit is then drawn on the plot of the original data points. By using a Mode 16 screen, it is possible to show the curve parameters and the fitted line on the same screen, and print it out if required. Next, an analysis of variance is produced, showing the total sum of squares for y , the sum of squares accounted for by the regression, and the residual sum of squares.

The variance ratio, F , gives an estimate of the significance of the fitted line for the number of degrees of freedom in the data. If the curve fitted was a straight line then the regression coefficient r is printed.

The main use of the program is to fit calibration curves to biochemical data and then to use these curves to calculate the concentrations of test samples. In setting up the calibration curve a set of samples of known concentration are used, and appropriate instrumental readings taken (for example, colour measurements, meter readings and radioactive counts).

The concentrations are plotted on the x axis, and the observed readings on the y axis. Once the curve is established, the values obtained from test samples are read, and the concentration determined from the calibration curve.

Although this would not be the method of choice for performing linear regressions,

comparison with the standard method gives the same values for the slope and intercept, and the same residual sum of squares to three or four decimal places, and could be made closer by increasing the number of iterations (modify the value of 'factor' at the end of PROCiterate and/or the limits at the end of PROCoptimise). No checks have been made with other curve fitting procedures.

As mentioned, data for the program should be stored in a file. This can be created using *Edit*. The file should contain a heading for the graph, a label for the x -axis and a label for the y -axis (maximum of four characters) on separate lines followed by the data in the form of x,y pairs, one per line.

Blank lines and lines beginning with a semi-colon are ignored, so you can add in comments if you want as shown in our example file (on the previous page). If you're feeling particularly unctuous you might like to SetType your file to a CSV and load the file into a spreadsheet!

There are some datasets that will confuse the program, especially if the function you are trying to fit is inappropriate, or the original guesses of a and b were a long way out.

For some functions of x , it will find false optima, where the sum of squares seems to be at a minimum. In these cases an obviously silly line may be plotted. In particular, re-entrant functions such as parabolas or trigonometric functions (sine or cosine etc) seem to confuse it.

You can speed up the iterations by omitting the monitoring of the process - there are two calls to PROCmonitor in PROCoptimise. It is quite fun to

watch the successive attempts at fitting the curve by putting in an extra call to PROCdraw in either the PROCoptimise just after optloop+=1. To really see what's going on, you could try adding a call within the REPEAT loop of PROCiterate, but it will drastically slow things down!

★ PRIZE £50 ★

FAST CORNERING

B Our coveted star prize this month goes to **David Breakwell** of Addlestone. Prompted by the *Pieces of Eight* revival of Bezier curves (*BAU* December 91), he has rattled off a speedy curve plotter for eight-bit machines. As you may or may not know, there are two ways of drawing Bezier curves. The simplest is the parametric method as used by George Blanchard in *Pieces of Eight*. This is a nice, concise method that can be easily translated into Basic and involves a third variable, usually t , that varies from 0 at the start of the curve to 1 at its end. Values for both x and y are calculated from t .

Another way of plotting Beziers is to use a recursive sub-division or 'divide and conquer' method. The advantage of this is that it can use integer arithmetic throughout. The only maths involved is a divide by two which can be performed with a simple right shift on the 6502 processor. The recursion works according to the following rules.

'To plot a Bezier curve using points a, b, c and d , where a and d are the start and end points and b and c are the two control points, calculate the mid points of ab, bc and cd (call these e, f and g). Then calculate the mid points of ef and fg (h and i). Finally calculate j , the mid point of hi . Then plot the two 'sub' Bezier curves $aehj$ and $jigd$. This should, of course, be done recursively.'

Our diagram below should make this clear. To stop the recursion a 'depth' should be passed down the calls and once this reaches a predefined level, the straight line ad will be drawn instead of recursing. Alternatively, and more efficiently, a quick check could be made at the start of the routine on the length of this line segment and the recursion then only takes place if it is longer than, say, four pixels.

We've knocked up a demonstration, entitled *BezDemo*, that plots a curve using parametric and recursive methods.



Drawing a bezier curve using a recursive sub-division method. All points e-j are mid points. Each sub-division generates one more point (j) that is guaranteed to be on the curve.



Fast corners plotted by our eight-bit routine

As David's machine code version uses operating system VDU calls to do the plotting, it will work on any eight-bit machine in any mode, including shadow modes. This does, of course, mean that it might not run as fast – directly accessing the screen memory would be quicker – but it does remove the need for complicated bounds checking for the edge of the screen and graphics window. Also it makes this version independent of screen mode.

David has included a short demonstration of his code in the listing, that merely plots random curves. From this demo, the way that you use the program should be fairly self-explanatory.

For curiosity value only, he has also sent in a routine that renders Risc OS Draw files on a BBC. For those interested, this can be found on the monthly subscribers' disc. Needless to say, it doesn't handle line widths, filled shapes, colours, text, sprites...

★ PRIZE £20 ★

UNITED COLOURS..

Jan Vibe, was the author of *Fire and Spikes* (BAU March 92) and Jan returns this month with a very nice seven line procedure for Arc users. The offering called *Toner27* generates eight shades of 27 colours in 256 colour modes. The layout of the 256-colour palette is the bane of many peoples' lives, so it's nice to see a short way of making sense of all those hues!

Jan has provided four routines, by way of demonstration



An impressive cube program; described in our plot spot graphics guide

and he earns a fiver for each! Oh, and by the way, you'll need to save the output from three of these routines for Mr Acton's *Cube* further on, so be sure to press **s** when the program boots between each section. Incidentally, when you run the program, there is one example of a recursive flower, which you have to stop by pressing **SPACE**.

PLOT SPOT

From our reader survey it seems that many of you would like some back-to-basics stuff, to assist you with Basic and machine-code programming. We'll try to respond as best we can to these and other comments from the survey in future issues. **M J Ballinger** of Cirencester has asked how to plot a point on the screen of an Archimedes using machine-code. This being the basis of literally dozens of items in past ★INFO articles, we thought it would be a good point to kick off with, so have a look at *Point32*.

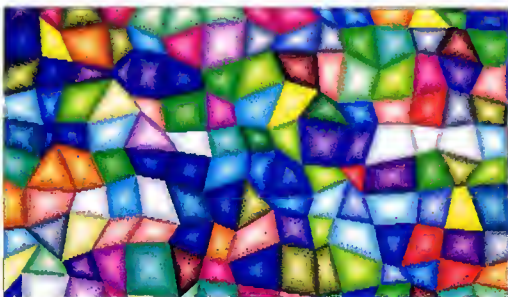
You can plot points using the Basic keyword **POINT** or by using 'official' calls. However, it is much quicker to 'poke' points directly into the screen memory. The screen of the Archimedes is arranged very simply and 256-colour modes

		Columns			
		0	1	2	3
Rows	0	0	1	2	3
	1	320	321	322	323
	2	640	641	642	643
	3	960	961	962	963

Layout of the Archimedes' mode 13 screen memory

are particularly easy to deal with. This is why so many of our demos run in modes 13 or 15 and *Point32* uses a 256-colour mode for precisely the same reason.

That reason is that in mode 13, for example, each point on the screen is represented by a single byte. You simply choose the colour you want from the 256 available, work out which byte you want to poke and put that value there. Each row of pixels



Colour plotting made easy with the *Toner27* routine

ARCterm 7

£68

This new release of our popular comms package now supports Minitel emulation and has many other improvements. Recommended by Hampshire LEA. Existing users return both disks and SAE for upgrade.

ARCbbs

£85

Our multi-user bulletin board program is under constant development, call for details.

A5000 IDE drives

A5000 drives usually replace the 40MB disk (if fitted) - we pay £60 for displaced 40Mb A5000 drives. To fit an additional drive in the second floppy slot and keep the 40Mb internal, add £10 for new cable set. Typical transfer rates are 800k/second for 100Mb and 900k/second for 200Mb. Drives have a 2-year guarantee.

A5000 internal 100Mb 17/9ms Quantum	£279
A5000 internal 200Mb 17/9ms Quantum	£449

IDE

Our IDE cards can have 2.5" drives fitted directly onto the card, making them 'hardcards'. Typical transfer rates are 700k/second for 40Mb and 900k/second for 100Mb. Drives are 3.5" unless specified as 'hardcard'.

A3000 internal 40Mb hardcard	£399
A300/400 internal 20Mb 25ms Conner	£149
A300/400 internal 40Mb 28ms cached Seagate	£259
A300/400 internal 100Mb 17ms cached Seagate	£329

SCSI

We supply 16-bit Morley cards which are the fastest on the market (cached card can sustain over 3.5Mb/sec, normal card over 2Mb/sec). Typical transfer rates are 1000k/second for 50/100Mb and 2000k/second for 492Mb. All drives are cached and have 2 year guarantees. Systems labelled (cc) come with a cached SCSI card at no extra cost, otherwise add £50 if you require one.

A3000 external 50Mb 17/9ms Quantum	£379
A3000 external 100Mb 17/9ms Quantum	£499
A3000 external 200Mb 17/9ms Quantum	£779
A3000 external 492Mb 12ms Fujitsu (cc)	£1499
A300/400 internal 50Mb 17/9ms Quantum	£319
A300/400 internal 100Mb 17/9ms Quantum	£429
A300/400 internal 200Mb 17/9ms Quantum	£699
A300/400 internal 492Mb 12ms Fujitsu (cc)	£1399

All hard disk systems come tested and formatted with all necessary cables. Delivery on hard disks £10.

Please add VAT at 17.5% to all prices. Plastic welcome.

THE SERIAL PORT



The Serial Port
Burcott Manor, Wells,
Somerset, BA5 1NH

Telephone (0749) 670058
Fax (0749) 670809
Modem (0749) 670030



(starting with the top one) consists of a block of consecutive bytes of memory as shown in the previous diagram.

In mode 13 there are 320 pixels across the screen, so the top row occupies bytes zero to 319 of screen memory. The next row follows on directly from this, so it takes up bytes 320 to 639. The next uses 640 to 959.

Unlike the BBC however, it is not always obvious where the screen starts in memory. It depends on how much of your machine's Ram is allocated to the display. There is a call which allows you to find the address of the top left corner of the screen though (column zero, row zero in figure one) and this is OS_ReadVduVariables.

It takes two parameters – the first points to a list of numbers terminated with one. The numbers are the codes for the VDU variables you want to read.

Code 148 means the start of screen as used by PLOT and DRAW. The second parameter points to where you want the values returned to be placed. It may be the same place, as in the example, if you're only going to read them once.

The plot routine in the example is called .plot and takes three parameters. In registers R0 and R1 (taken from A% and B% in Basic) are placed the co-ordinates of the point to plot. Note that these are not OS co-ordinates but 'raw' values (x in the range 0-319, y in the range 0-255). The colour to plot is passed in R2 (C%). To calculate the screen address, we use the simple formula: $address = base + y \times linelength + x$.

The value base has been

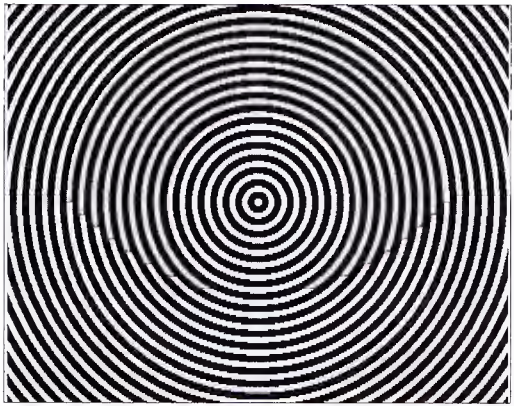
read with OS_ReadVduVariables and linelength is 320 for mode 13. We could use a multiply instruction to calculate the address of our pixel, but because $320=256+64$, we can use two shifts instead and this will be much quicker. Also, we don't need to add on the x because we can incorporate this into the STRB instruction that places our colour on the screen. The example plots a line of randomly coloured points by repeatedly calling .plot. For speed, you would normally reserve a register to permanently hold the start of screen address, so it need not be reloaded each time.

Having looked at machine-code graphics at their simplest, let's take a bit of a leap and see what else can be done. *Cube* uses the same principles as *Point32* – mode 13 is used for speed and simplicity.

Three pictures are loaded and then mapped on to the surfaces of a rotating cube. Since it was readily available, we have used the output of Jan Vibes' *Toner27* and saved them as mode 15 screens with the names *pic_tree*, *pic_flower* and *pic_tiles*. Alter the listing if you want to use other sprites – any 256-colour ones will do, whatever their size.

The program uses a cheat to perform the 'squashing' of the sprites into arbitrary quadrilaterals. The technique is fast and simple, and convincing enough if the sprite is not stretched too wildly! Our example shows the basic idea, with a sprite ABCD being mapped on to A'B'C'D'.

To do this properly would mean applying a transformation to each pixel in turn and



BAU Health Warning: not a program to run when you have a hangover

this would take many seconds. Instead, we find the lowest point in A'B'C'D' – B' in fact. Then we move up the shape a row at a time. With each row we see how far along B'A' we are, and how far along B'C'.

We then mark points with the same proportions along BA and BC and draw a line between them. Finally, we simply take this line and stretch it or squash it, so that it fits on the current row we are plotting, then move up another line and repeat the process.

Eventually we reach the row that C' lies on. We take note of this and continue upwards. We're still moving along B'A' on the left, but are now moving along C'D' on the right. Again, we take points from the original shape that are the same proportions along BA and CD, draw a line and map it on to our new shape. A little further up we encounter A' on the left, so start moving along A'D' on that side, continuing along C'D' on the right. Finally we reach the top.

Because we're plotting actual rows on the screen, we can use fast store and multiple-store instructions. Also, because we are only concerned with each point on the final image, holes will be filled in if the image is bigger than the original and smaller versions will be plotted more quickly.

The cheat becomes apparent if you stretch one corner a great deal – a fold will appear in the image. The picture is not really treated as a single piece

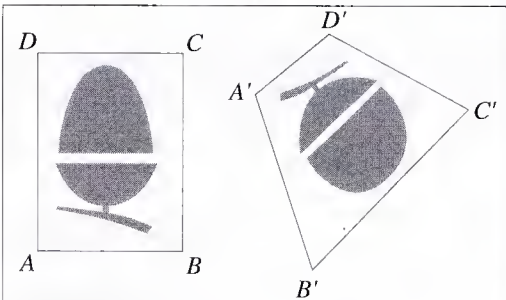
of rubber (which would be ideal) but as several pieces joined together. Still, the effects are good enough, and the speed is sufficiently fast to make the routine useable in real-time.

★ PRIZE £10 ★
LOOK INTO MY EYES

This program was an absolute hit in the BAU office. It's a one-liner from Richard Boakes and it shows you just what a strange effect your own eyes can produce. *Hynpo* (there are two versions: one for eight-bit and another for 32-bit machines) draws a pattern of concentric circles – alternately black and white. These are then animated so the pattern appears to move inwards. 'Stare at the centre for 15 seconds or more' says Richard, 'and watch your eyes play tricks on you. Look around the room!'

★ PRIZE £25 ★
UPTIME

Have you ever wanted to know if someone has been tinkering with your machine while you've been out? Or have you ever wanted to know how long you use your machine a day? Ron Wardenier from Drachten in the Netherlands has sent in a handy little application that sits in your boot up sequence and keeps a track of exactly



Squashing a rectangle



```

I > !Boot
| !Boot file for UpTime
| By Ron Wardenier
| (C) BAU April 1992

Iconsprites
<Obey$Dir>.!Sprites

I > !Run
| !Run file for UpTime
| By Ron Wardenier
| (C) BAU April 1992

Iconsprites
<Obey$Dir>.!Sprites
Set UpTime$Dir
<Obey$Dir>
Set UpTimeFlag ?
RMEnsure UpTimeLogger
1.00 Set UpTimeFlag Off
If UpTimeFlag="Off" Then
Run
<UpTime$Dir>.!RunImage
Unset UpTime$Dir
Unset UpTimeFlag
  
```

!Boot and !Run files for UpTime

that. *UpTime* keeps a record of when you have used your Arc and can also be used to detect usage of the given Arc in your absence. However anyone who is able to manipulate text files could cover their trail, so be warned! Once installed and

included in an autoboot sequence, *UpTime* is completely transparent.

Recording the time of starting work is quite easy. Just after switching on - or going up as we will call it - *UpTime* is run as part of the autoboot sequence. As well as other actions, *UpTime* then reads the RTC (Real Time Clock) and writes its value to a file. This file called *UpTimeLog* acts as a simple kind of logbook.

Not surprisingly, the time of going down (in other words, switching off) is not as easy to record. If you are very disciplined you could write some kind of closing down sequence and execute it every time you stop work. Part of such a sequence could be a program that writes the RTC-time to the file *UpTimeLog* but, of course, it is far more convenient to have the time of going down recorded automatically.

To achieve this, *UpTime* continuously writes the time of the RTC to Cmos Ram. The data in Cmos Ram is preserved by battery when the Arc is off.

So, at the next time of going up *UpTime* reads the time in Cmos Ram and writes it to the file *UpTimeLog*. This time represents the time of going down because it was the last one written in Cmos Ram.

To reduce the load on the processor, writing the RTC time to Cmos Ram is limited to once a minute. By doing so, the resolution of the recorded time is also one minute. Care is taken to perform proper rounding off when converting centiseconds to whole minutes. Again, to reduce the processor load, no use is made of *Wimp_Poll* or *Wimp_PollIdle*.

The *Wimp* desktop polling mechanism is not used for two reasons. Firstly, the writing to Cmos Ram would grind to a halt if you left the desktop. Secondly, general polling is a rather inefficient method. Risc OS itself provides the perfect solution by means of a couple of SWIs, namely *OS_CallEvery* and *OS_RemoveTickerEvent*.

OS_CallEvery is used to install an interrupt routine on a timer chain. Once installed, the rou-

time is called repeatedly after every fixed time interval. *OS_RemoveTickerEvent* is used to remove the routine from the timer chain. *UpTime* uses *OS_CallEvery* with a time interval of 6000 centiseconds (one minute). In this way, once a minute, action is taken in the form of writing the RTC-time to Cmos Ram and the Arc is not slowed down by running yet another desktop task in the background.

In Cmos Ram, the locations 30 to 45 are reserved for the user. The time and date of the RTC can be stored as a five byte value. Obviously, claiming five of the sixteen locations available is too much. Instead of storing the absolute time and date, a relative time is used which requires only two locations in Cmos Ram. With the minute as a unit of time, just over six and a half weeks can be stored in these two bytes. Anything relative must be fixed to something absolute. In this case the relative time starts ticking from a reference time.



Speed Graph is a graphics card for the Archimedes. It will provide resolutions of up to 1024 x 768 pixels with 16 colours and 800 x 600 pixels with 256 colours. High screen refresh rates guarantee professional working. But this will not slow down the computer; In the contrary, it will even make it faster. So **Speed Graph** gives you two advantages, high quality graphics and - at the same time - high speed.

only £240



LC-series A3000 external drives including 8 bit Interface, hard disc, expansion box and cables. Interface at it's own for £50, but only for use with Conner drives.

42 MB, 28 ms	£299	104 MB, 19 ms	£439	204 MB, 16 ms	£609
360 MB, 12 ms	£1099	510 MB, 12 ms	£1199		

All hard disc kits are also available with external 16 bit Interface and for the A410/A540. Please phone for details.

only £299



HQ-series The hard discs on it's own to the complete systems are covered by a 5 years warranty. The systems are available as both IDE or SCSI systems.

230 MB, 12 ms	£ 755	330 MB, 12 ms	£ 955	425 MB, 12 ms	£ 999
520 MB, 12 ms	£ 1142	1 GB, 14 ms	£ 1786		

Please add for **Lingenultly 16 bit SCSI Interface** £219; for 16 bit **FIRST IDE interface** MK 2 £56; for our nicely designed external hard disc case & PSU £96.

5 years warranty on the HQ-series



Are you looking for the new 1.6 MB floppies, as they are used in the A5000? So why don't you order our High Density-upgrade. It comes complete with Interface, new floppy drive and the necessary software. It does not use a podule place. It is compatible with the A3000 / A310 / A410 and A540 / R260. It works with Format D/E/F and MS-DOS 1.44 MB discs. It has been tested with RISC OS 2 & 3.

only £85

EVOLUTION COMPUTER Ltd.
Portland Buildings, Portland Road
Aldridge, West Midlands WS9 8PP
Tel.: 44 (0) 922 / 55 128
Fax.: 44 (0) 922 / 58 126

EVOLUTION COMPUTER
Stefan Fröhling; Volmestraße 1
D - 5882 Meinerzhagen
Tel.: 49 (0) 2354 / 14 355
Fax.: 49 (0) 2354 / 14 254

We accept all major credit cards. All prices are nett, not including delivery. Please add £9 for postage and packing.




To allow the RTC to be set a little backwards, the reference time is the time of going up, minus one week. As a consequence, the maximum period of staying up, in which all timekeeping makes sense, is limited to about five weeks. There is no need to worry should this period be exceeded since nothing dramatic will occur. Everything will go on except the time of going down will be calculated incorrectly as the reference time will no longer be valid.

The part of *UpTime* responsible for updating the Cmos Ram every minute, is held in a relocatable module called *UpTimeLogger*. This module is assembled every time *UpTime* is run, because the reference time must be known to the code in order to convert the RTC time to the two-byte relative time.

Therefore, the module is not saved to disc but transferred directly to the RMA by using `OS_Module with R0 set to 11`. The module help string contains the date of assembly but


the version string stays fixed to one. The figures on the previous page contain the *!Boot* and *!Run* files and should be entered using *Edit* and saved in a directory called *!UpTime*. The main listing, *!RunImage*, is on the yellow pages. You will also need to create a suitable sprite with *Paint* and save it in the *!UpTime* application directory. The actual logbook file *UpTimeLog* and the reference file *UpTimeRef* are not listed. These files are created and updated by the application.

★ PRIZE £15 ★
SPYROGYRA

 *Scribe* has come all the way from sunny Australia, **Sam Watkins** of Victoria to be precise. The function, operation and results of Sam's program should be self explanatory: the program as listed has been tweaked a bit from Sam's original. His version flickered quite badly as he only used one screen bank, but note the

horrible contrivances (especially in `PROCdraw`) needed to make it work with two! Multi-sync owners may like to change the `MODE 15;MODE 12 to MODE 21;MODE 20`.

★ PRIZE £15 ★
MASTERMIND TWO

 In January's ★INFO, we carried a neat little Mastermind program by **J A McHugh**. We also asked if any bright reader could come up with a good computer-play routine. One who did is **Malcolm Gray** and we've merged his thinking routine with **J A McHugh's** original to produce a complete game. You can now take turns with the computer, guessing its randomly chosen code and then choosing a code of your own for it to work out. Although it may be tempted, the computer doesn't cheat and instead uses a 'brute force' method to work out your combination. Essentially, all possible combinations are stored in an array and are

'crossed off' if they contradict the results of previous guesses.

The computer usually manages to get the right answer within eight guesses and a score is kept. Ten points are awarded for guessing at the first attempt, nine for two guesses, eight for three and so on. You might like to enhance the thinking process by adding a random element. Currently, the computer will always choose the same strategy, so if you discover a code that it has trouble with, it's up to your good sportsmanship not to repeat the formula in every game!

***QUIT**

Please send any submissions to us at the following address:
 ★INFO, *BBC Acorn User, Redwood Publishing, 20-26 Brunswick Place, London N1 6DJ*. Programs should be on disc with a description of their purpose and operation. A stamped addressed envelope with your submission will ensure the return of your disc.

Dave Lawrence
Dave Acton


A systems

Canon ION Camera

and

Video Digitiser

only £499 + VAT

 0420 561111

47 Winchester Rd
 Four Marks
 Alton
 GU34 5HG
 Hampshire

SJ
 RESEARCH


NOVELL

INSPIRATION

The most comprehensive music sequencing package available for the Archimedes.

Come and visit our demonstration area, or send a blank disc for a demo version. Fully Rise OS compatible. Purchase with Archimedes (special price), or simply add it to your existing system. All you need is a MIDI interface. Inspiration offers a control panel featuring: Replace and Overdub record modes • Cue Sheet and End • Economy Status Display • Multiple Song Lists (MIDI and man) other features. **Version 1.03 now being supplied**

Music Software		MUSIC PACKAGES	
Clares Amadeus Sampler Software	68 00	Inspiration + Rhapsody II +	
Archimedes Software Hardware	70 00	Acorn MIDI Podice (A3000)	260 00
Novate Longform Legationist	55 00	A3000LC colour system +	
Tracker (serial port)	43 00	Inspiration + Rhapsody II +	
Clares Rhapsody II	50 00	Acorn MIDI Podice (A3000)	1000 00
Clares Rhapsody II upgrade	12 00		

DTP		SOME GAMES	
Impression II (CC)	130.00	Alien Invasion (A1)	16.00
Impression Junior (CC)	74.00	Appocalypse (4th Dim)	25.00
Impression Business Supplement	45.00	Arch-Chester (4th Dim)	20.00
Tempest (Clares)	99.00	Blaszyk (4th Dim)	19.00
Ovation (Beebug)	99.00	Boogie Wuggy (4th Dim)	20.00
DATABASES		Brexit (1st 4th Dim)	20.00
Multibase (Minerva)	175.00	Chess 3D (Micropower)	16.00
AlphaBase (Clares)	36.00	Checks Away (4th Dim)	20.00
System Delta/II Minerva	48.00	Checks Away Complete	30.00
		Checks Away Extras	16.00
		Chess Knock	20.00
		Deep Ship (4th Dim)	16.00
		Elite	22.00
		E-Type (4th Dim)	16.00
		E-Type (100 miles) (4th Dim)	14.00
		Fine Facer (Items)	16.00
		Holiday Out (4th Dim)	14.00
		Holiday Out Vol 1 or 2	14.00
		Hotlines (Operator)	15.00
		Imaris (4th Dim)	16.00
		Interduster II (Clares)	36.00
		It's a War (Clares)	21.00
		Mig 29 (Denmark)	34.00
		Newton (4th Dim)	16.00
		Powerboard (4th Dim)	20.00
		Pyramit (4th Dim)	16.00
		Solomon Curs (4th Dim)	20.00
		The Real McCoy (4th Dim)	23.00
		The Real McCoy II (4th Dim)	23.00
		The Wimp Game (4th Dim)	16.00
		T.M. (4th Dim)	20.00

Archimedes Computer Systems

A3000 Entry system	580.00	Eizo 9060S Multiscan Monitor	399.00
A3000 Colour system	780.00	Eizo 9070S Multiscan Monitor	599.00
A3000LC MKII Entry system	640.00	Upgrades	
A3000LC MKII Colour system	850.00	A3000 2nd Mb	50.00
A5000 single floppy disc	990.00	A3000 2nd to 4th Mb	155.00
A5000 40MB hard disc including multi-scan monitor	1450.00	Arm 3 for A400/1	280.00
A5000LC 40MB hard disc including multi-scan monitor	1530.00	Arm 3 for A3000	330.00
A540 Entry system	2400.00	Syquest removable 42Mb drive	400.00
AlphaBase (Clares)	2650.00		
A540 Colour system	2900.00		
A540 with multisync monitor		Some second hand A400/1 available.	
		Typical example A410/1 upgraded to 4Mb and 50Mb HD	£1000.00

AMPSOUND

153a Victoria Street, St Albans, Herts AL1 3TA
Telephone 0727 50725 Facsimile 0727 58177

Please add VAT to all above prices

Accounts Manager

The Professional Solution

- ✓ **FEATURES**
- ✓ Sales, Purchase, Nominal Ledgers
- ✓ Budget Reports
- ✓ Sales/Purchase Analyses
- ✓ Debt Chasing and other letters
- ✓ Aged Debt Analyses
- ✓ Statements (User Definable)
- ✓ Re-Occurring Transactions
- ✓ Receipt/Payment/Refund & Contra Processing
- ✓ Invoice Search Facility
- ✓ RISCOS multi-tasking
- ✓ Text Editor
- ✓ Trial Balance/Quick Ratio
- ✓ VAT Return
- ✓ Profit/Loss & Balance Sheet
- ✓ Self re-building data files
- ✓ Hold transaction or Account
- ✓ Miscellaneous Accounts
- ✓ Upgradeable
- ✓ Full Support Included
- ✓ Mouse or Keyboard Driven

Accounts Manager is the ultimate Archimedes Accounting system on the market today. It is not written to run under an emulator and is not ported from another machine, it simply takes full advantage of the raw power of the Archimedes and A3000 computers, to ensure that the computerisation of your accounts is as simple as possible.

Accounts Manager is very simple to learn and use, data entry is clear and logical, reports are concise and to the point.

Because Accounts Manager puts you in control of your finances, it can greatly improve your cash flow, as well as perform the traditional functions such as VAT returns and Profit/Loss reports.

Priced at only £299.00 +VAT, there is really only one choice if you are serious about computerising your accounts. Contact your dealer for a demonstration TODAY.

KENDAL COMPUTER CENTRE
68 Stramontage, Kendal, CUMBRIA LA9 4BD
Tel: 0539 722559

ACORN ARCHIMEDES COMPUTERS EXPANSION OPTIONS FOR

INDUSTRIAL & SCIENTIFIC APPLICATIONS

HARDWARE - IEEE488 Interface, 16 Bit Parallel I/O, Dual RS423 Serial Interface, 12 Bit ADC, STE Bus Interface and complete range of STE Bus Boards, SCSI Devices - Hard Discs, Magneto-Optical Drives, Tape Streamers, Removable Hard Discs, Monitors, Printers, Plotters, Plus all Acorn Products etc.....

SOFTWARE - GINO-F 3D, GINOGRAF, GINOSURF, HERSHEY +, VIEWGRAF, VIEWSURF, Termulator etc.....



ADVICE - SUPPLY - SUPPORT
INTELLIGENT INTERFACES LTD

Established
1981

PO BOX 80, Eastleigh, Hants, SO5 5YX.
TEL 0703 261514 FAX 0703 267904

DISK STORAGE BOXES

3 1/2" 10 CAPACITY QTY 5	£4.50
3 1/2" 50 CAPACITY LOCKABLE	£3.70
3 1/2" 100 CAPACITY LOCKABLE	£4.70
5 1/4" 10 CAPACITY QTY 5	£4.99
5 1/4" 50 CAPACITY LOCKABLE	£3.70
5 1/4" 100 CAPACITY LOCKABLE	£4.70

ACCESSORIES

IBM PRINTER CABLE 1.8 MTR.....	£4.90
(ALSO FOR ATARI AND AMIGA)	
25 PIN M-M AND M-F 1.8 MTR.....	£4.90
36 PIN CENTRONIC M-M 1.8 MTR.....	£4.90

PRICES ONLY IF BOUGHT WITH DISKS



Admission with this voucher

March 8 City Hall, Candleriggs, Glasgow
14 NONOTEL, Hammermill
15 Brunel Centre, Tempiemeads, Bristol
21 Donington Park, J24 M1
22 University Sports Centre, Leeds

May 16 SANDOWN Exhibition Centre
17 Brunel Centre, Tempiemeads, Bristol

June 7 City Hall Candleriggs, Glasgow
14 Haydock Park, J23 M6

April 12 Northumbria Centre, Washington, A194 9J
26 Motorcycle Museum, J6 M42

Sole Agent for Advance Tickets
(Use this voucher for £1 off)

J R M H Telephone: 0225 868100

**ALL FORMATS
COMPUTER FAIR**

The All Formats Computer Fair is owned and organised by Bruce Everitt, PO Box 71, CV33 0XS

Normal Admission £4, with this voucher £3
Only one voucher per person No Cash Value
All Fairs 10 a.m. - 4 p.m.

3 1/2" DISKS

TYPE	QTY	25	50	100
BENCHMARK DS/DD		£18.00	£31.00	£45.00
UNBRANDED DS/DD		£12.80	£21.00	£39.00
BENCHMARK DS/HD		£33.60	£61.00	£67.00
UNBRANDED DS/HD		£25.00	£36.00	£59.00

5 1/4" DISKS

TYPE	QTY	25	50	100
BENCHMARK DS/DD		£11.00	£18.00	£28.00
UNBRANDED DS/DD		£9.50	£16.00	£24.00
BENCHMARK DS/HD		£18.00	£31.50	£52.50
UNBRANDED DS/HD		£14.00	£27.00	£48.00

ALL DISKS 100% CERTIFIED ERROR FREE.
3 1/2" INC. LABELS. 5 1/4" INC. ENVELOPE AND LABEL SET.



ALL PRICES INCLUDE VAT & P&P UK ORDERS ONLY

Cheques and Postal Orders to



24 HOUR ORDERLINE
0597 851 784

Manor Court Supplies Ltd

Telephone: 0597 851 792 Fax No: 0597 851 416
Dept AU4, Glen Cofyn House, Perybont,
Llandrindod Wells, Powys, LD1 6SY

EDUCATION AND GOVERNMENT ORDERS WELCOME

The Datafile

The Archimedes Public Domain and Shareware Library
Catalogue / Demo Disc VI

!3DRay-Pic	A small mouse controlled demo	By Artificial Intelligence
!CaveEdit	A desktop Caverns editor	By Andy Piper
!DataDemo	A graphics and Sound demo	By Nick van der Walle
!MailLabel	A neat mail label printing utility	By Toby Smith
!NewDesk	Give parts of the desktop a new look	By Owen Ashley
!ProTrack	The ultimate STracker player from 8elguim	By BASS
!Simon2	The 80's game emulator	By Patric David Bean
!Slosh	Quite a good arts package	By Wayne Keenan
!TRoll	An icon bar animated toilet roll	By Owen Ashley
!Cat-a-log	The comprehensive 500k Datafile catalogue Intruder & Zombi two Pro Tracker modules	

This disc contains over 1625k of archived PD plus the most comprehensive catalogue of all the Archimedes libraries. We pride ourselves in the speed and helpfulness of our service if you do have to return a disc for any reason we will also refund your postage along with a replacement disc.

Prices Standard discs are £1.10 each
Super discs (over 1500k of archive PD) are only £1.25

Registered Datafile Users
For £5 a year we will send you the next six Cat/Demo discs automatically and give you 2 free discs for every ten ordered.

Public Domain Voucher
Send £11 and get the above Cat/Demo disc plus a voucher for a further 12 discs. That works out at 85 pence per disc !!!

For your copy of the above disc send a cheque for £1 or a £1 coin taped to a piece of card (they don't get lost this way) to:

**22 Duxford Drive, Aldergrove
Co. Antrim, BT29 4BG**

SSERC GRAPHICS LIBRARIES

For Science & Technology Education

For Arc users of Draw, DTP, Magpie, Genesis, Sparkle etc.

NOW AS SEPARATE DISCS : CHEMISTRY ** INTERFACING **
TECHNOLOGY ** ELECTRONICS ** PHYSICS ** UTILITIES **
CIRCUIT BOARDS (E&L or ALPHA) **FREE SITE LICENCE IF YOU BUY THE LOT!**

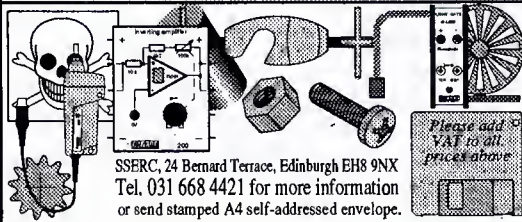
What the press says:

Educational Computing & Technology - "a veritable treasure trove of science and technology clip art.... an excellent resource ...Any DTP work will be enhanced by the quality artwork...."

RISC User - "an excellent product and must surely be invaluable to anyone who needs scientific drawings....Well done SSERC"

**£10 per disc
single users
Add £5 per
disc for
site licence
AUTHORITY
LICENCES AVAILABLE**

IF YOU WANT TO RE-INVENT THE GRAPHICS WHEEL THEN IGNORE THIS ADVERT. IF YOU ARE AT ALL SERIOUS ABOUT PUTTING TOGETHER QUALITY DIAGRAMS FOR MINIMAL FINANCIAL OUTLAY AND SAVING VALUABLE PROFESSIONAL TIME THEN FIND OUT NOW HOW THE GRAPHICS LIBRARIES CAN HELP.



SSERC, 24 Bernard Terrace, Edinburgh EH8 9NX
Tel. 031 668 4421 for more information
or send stamped A4 self-addressed envelope.

Please add VAT to all prices above



Program	Page	BBC B	B+/ 128	Master 128	Master Compact	Electron	6502SP/ Turbo	ADFS	Econet	Shadow Ram	Archimedes/ A3000/A5000	Monthly disc
*Info												
Info 1												
Info 2-3		■		■	■	■	■	■	■	■	■	■
Info 4-7												
Info 8		■										
Info 9		■										
Info 10		■										
Info 11		■										
Info12												
Facebender												
Face 1-2												
Face 3-5		■										
Chords												
Chords1												
Chords 2-3		■										
Arm Programming												

***Info**

Listing 1

```

780 VDU 4
790 ENDPROC
800 :
810 DEF PROCplot
820 GCOL 1
830 FOR i=1 TO points
840 CIRCLE data(i,1)*100/SCALE,DATA(
1,1)*500/SCALE,10
850 NEXT
860 ENDPROC
870 :
880 DEF PROCchoice
890 PRINT "Select Expression for curve
to be fitted "
900 FOR i=1 TO eqns
910 PRINT i;" " ;EQS(i);TAB(42-LENMAN
ES(i));NAME$(i)
920 NEXT
930 PRINT"" Other function of X in t
erm of a and b
940 PRINT"Select: "
950 REPEAT
960 key$=GET$
970 UNTIL key$="0" AND key$<"6"
980 eqn=VALkey$
990 X=X+(eqn)
1000 Y=Y+(eqn)
1010 IF eqn=5 THEN
1020 NSB=DATA(1,2)+DATA(2,2)/2
1030 data(1,2)=NSB
1040 data(2,2)=NSB
1050 start=3
1060 B=DATA(3,2)+DATA(4,2)/2
1070 data(3,2)=B
1080 data(4,2)=B
1090 FOR i=1 TO 4
1100 data(i,1)=1
1110 NEXT
1120 FOR i=1 TO points
1130 data(i,1)=100DATA(i,1)
1140 NEXT
1150 ELSE
1160 start=1
1170 ENDIF
1180 IF eqn=6 THEN
1190 PRINT"Enter function of x"
1200 INPUT " y="Y$
1210 ENDIF
1220 CLS
1230 ENDPROC
1240 :
1250 DEF FNnextline
1260 LOCAL line$
1270 REPEAT
1280 line$=GET$
1290 UNTIL line$<<" AND LEFT$(line$,1)
<"
1300 line$=FNnextline
1310 ENDPROC
1320 :
1330 DEF PROCloadfile
1340 CLS
1350 REPEAT
1360 INPUT "Name of data file (or 'com
and') : "file$
1370 IF ISFF$(file$)=1 THEN** THEN
1380 OPEN file$
1390 ENDIF
1400 UNTIL LEFT$(file$,1)<"**
1410 line$=OPEN$(file$)
1420 title$=FNnextline
1430 label$=FNnextline
1440 label$=FNnextline
1450 point=0
1460 REPEAT
1470 point=point+1
1480 x$=FNnextline
1490 data(point,1)=VALx$
1500 data(point,2)=VALID$(x$,INSTR(x
y$,",")+1)
1510 UNTIL EOF#IN
1520 CLOSE #IN
1530 CLS
1540 ENDPROC
1550 DEF PROCques(eq)
1560 CASE eqn OF
1570 WHEN 1:
1580 a=1.2*FNmax(1)
1590 b=0.2*FNmax(2)
1600 WHEN 2:
1610 a=1.2*FNmax(1)
1620 b=0.2*FNmax(2)
1630 WHEN 3:
1640 b=(FNmax(2)-FNmin(2))/(FNmax(1)-FN
min(1))
1650 a=FNmin(2)-FNmin(1)
1660 WHEN 4:
1670 a=1.2*FNmax(1)
1680 b=0.5
1690 WHEN 5:
1700 b=(FNmax(1)+FNmin(1))/2
1710 WHEN 6:
1720 b=1.5*FNmax(1)
1730 WHEN 8:
1740 a=-0.5
1750 b=1.5*FNmax(1)
1760 WHEN 9:
1770 REPEAT
1780 INPUT"Estimate of a="a
2240 UNTIL a<0
1800 REPEAT
1810 INPUT"Estimate of b="b
1820 UNTIL b<0
1830 CLS
1840 ENDCASE
1850 WHEN 10:
1860 a=0
1870 DEF FNsay(a,b)
1880 LOCAL i,x,y,calc
1890 sumsq=0
1900 FOR i=start TO points
1910 x=DATA(i,1)
1920 y=calc-EVAL(y$)
1930 diff=eqn(DATA(i,2)-y)CALC^2
1940 sumsq=sumsq+diff
1950 NEXT
1960 sumq=
1970 LOCAL i
1980 DEF FNmax(2)
1990 LOCAL i
2000 max=DATA(1,2)
2010 FOR i=1 TO points
2020 IF DATA(i,2)>max max=DATA(i,2)
2030 NEXT i
2040 max=
2050 :
2060 DEF FNmin(2)
2070 LOCAL i
2080 min=DATA(1,2)
2090 FOR i=1 TO points
2100 IF DATA(i,2)<min min=DATA(i,2)
2110 NEXT i
2120 min=
2130 :
2140 DEF PROClinex
2150 IF max=0 newq=oldq+0:best=0:
ENDPROC
2160 optLoop=1
2170 Iter=0
2180 REPEAT
2190 PROCIterate(TRUE,a,b,oldq)
2200 best=newq
2210 PROCminIter(newq)
2220 PROCIterate(FALSE,s,b,newq)
2230 PROCminIter(newq)
2240 optLoop=1
2250 UNTIL optLoop=100 OR best<1E-5 OR
newq/best<1.05 AND newq/best<1E-5
2260 ENDPROC
2270 :
2280 DEF PROCIterate(z,RETURN a,RETURN
cb,oldq)
2290 IF max=0 newq=oldq+0:best=0:
ENDPROC
2300 factor=1
2310 newq=FNsay(a,b)
2320 IF newq=oldq THEN factor=10
2330 REPEAT
2340 Iter=1
2350 PRINTTAB(0,5)"Iterations";FNform(1
ter)
2360 IF z THEN
2370 ca=**/factor
2380 ELSE
2390 cb=cb/b/factor
2400 ENDIF
2410 newq=FNsay(a,cb)
2420 IF newq=oldq factor=10**factor
2430 oldq=newq
2440 WHEN 3:
2450 UNTIL factor=10000
2460 :
2470 :
2480 DEF PROCmonitor(newq)
2490 IF max=0 THEN
2500 PRINTTAB(0,5)"Iterations";FNform(1
ter)
2510 PRINT"Time taken";FNform(TIME DIV
100)
2520 PRINT"SSY"/SSY;FNform(newq/best)
2530 PRINT"best";FNform(best)
2540 ENDIF
2550 a=-0.5
2560 DEF PROCdraw(a,b,SCALE,SCALEY)
2570 LOCAL x,y
2580 IF eqn=5 THEN
2590 X=FNmin(1):Y=EVAL(y$)
2600 ELSE
2610 X=0:Y=0
2620 ENDIF
2630 GCOL 5
2640 MOVE x*100/SCALE,y*500/SCALEY
2650 X=X+SCALE/100
2660 Y=Y+SCALEY/100
2670 Y=EVAL(y$)
2680 DRAW x*100/SCALE,y*500/SCALEY
2690 NEXT
2700 CLS
2710 CASE eqn OF
2720 WHEN 1:
2730 LINE 0,a*500/SCALEY,1100,a*500/sc
ALEY
2740 LINE b*1100/SCALE,0,b*1100/SCALE
Y
2750 WHEN 2:
2760 LINE 0,-3*a*500/SCALEY,-b*525/(a
SCALEY)
2770 LINE -530*b/(SCALE*Y),0,-530*b/(a
SCALE*Y),-b*500/SCALEY
2780 ENDCASE
2790 ENDPROC
2800 :
2810 DEF PROCOutput
2820 DEF FNcoef(a,b,PNorm(b)
2830 FNform("Coefficient b";FNform(b)
2840 PRINT"Min. squares";FNform(newq)
2850 PRINT"Data points";FNform(points)
2860 PRINT"R.M.S.";FNform(SQR(newq)/p
oint)
2870 CASE eqn OF
2880 WHEN 1:
2890 PRINT"X";FNform(a); " ;Ylabel$
2900 PRINT"Y";FNform(b); " ;Xlabel$
2910 WHEN 2:
2920 PRINT"Min. sites";FNform(a); " ;Y
label$
2930 PRINT"X";FNform(b); " ;Xlabel$
2940 WHEN 3:
2950 PRINT"Intercept";FNform(a)
2960 PRINT"Slope";FNform(b)
2970 WHEN 5:
2980 PRINT"NSB";FNform(NSB)
2990 PRINT"Bo";FNform(Bo)
3000 :
3010 FOR i=20 TO 50 STEP30
3020 c=c-0.3
3030 Y=DATA(3)-BSE)*CHSE
3040 X=INT(EVAL(x$))
3050 PRINT"DE";INT(i);FNform(INT(x));"
 ;Xlabel$
3060 NEXT
3070 ENDCASE
3080 ENDPROC
3090 :
3100 DEF PROCData
3110 DIM Data$(10,2)
3120 eqn=0:sum=0:sumsq=0

```




```

370 ELSE
380 PROCreadref
390 PROCassemble
400 CALL calculateendtime
410 PROCconvertdateandtime
420 PROCupdateof(result+CHR$(10))
430 ENDFE
440 ENDFE
450 :
460 tref%:=USR(maketref)
470 PROCupdate
480 PROCcloseprof
490 C%:=tr%*w%*m%
500 CALL calculate
510 PROCconvertdateandtime
520 PROCupdateof(result+CHR$(10))
530 PROCcloseof
540 PROCassemble
550 PROCgetvar
560 END
570 :
580 DEF PROCcreat
590 OSCLI("Set uptime% **$result)
600 ENDFE
610 DEF PROCconvertdateandtime
620 SYS "OS ConvertDateAndTime",time,r
result,buffer%,format% TO :zeropr%
640 zeropr%:=1
650 ENDFE
660 :
670 DEF PROCupdateof(string%)
680 PTRch%:=%EXT%ch%log%
690 IF PTRch%log%<0 THEN
700 PTRch%log%:=PTRch%log%-1
710 ENDFE
720 BUFP%:=ch%log%+string%
730 ENDFE
740 :
750 DEF PROCcreatlog
760 OSCLI("Create upTime$Dir,UpTime
og %")
770 OSCLI("Set type <UpTime$Dir,UpTime
log %")
780 ch%og%:=FREOUT("<UpTime$Dir,UpTime
log %")
790 ENDFE
800 :
810 DEF PROCopenlog
820 ch%og%:=FREOPF("<UpTime$Dir,UpTime
Log")
830 ENDFE
840 :
850 DEF PROCcloselog
860 CLOSEch%log%
870 ENDFE
880 :
890 DEF PROCreadref
900 PTRch%:=%page%
910 tref%:=VAL("G+*G+*ch%ref%)
920 ENDFE
930 :
940 DEF PROCupdate
950 PTRch%:=%page%
960 SYS "OS ConvertHex",tref%,result
buffer% TO :zeropr%+1
970 zeropr%:=1
980 BUFP%:=ch%ref%+result
990 ENDFE
1000 :
1010 DEF PROCcreatref
1020 OSCLI("Create upTime$Dir,UpTime
ref %")
1030 OSCLI("Set type <UpTime$Dir,UpTime
ref %")
1040 ch%ref%:=FREOPF("<UpTime$Dir,UpTime
ref %")
1050 AS%:=Current reference
1060 BUFP%:=ch%ref%+AS%+STRING%+LN%("A
$)-1",*)+*6000000000
1070 tref%:=
1080 ENDFE
1090 :
1100 DEF PROCcreatref
1110 ch%ref%:=FREOPF("<UpTime$Dir,UpTime
ref %")
1120 ENDFE
1130 :
1140 DEF PROCcloseref
1150 CLOSEch%ref%
1160 ENDFE
1170 :
1180 DEF PROCassemble
1190 FOR pass%=> 2 TO 2 STEP 2
1200 P%:=code%
1210 OPT pass%
1220 OPT pass%
1230 P%:=macro
1240 :
1250 :.calculatedowntime
1260 MOV R0,#R1
1270 MOV R1,#Rlocation1
1280 SWI "DS Byte",str%R,R2,dt
1290 MOV R1,#Rlocation2
1300 SWI "DS Byte",str%R,R2,dt+1
1310 LDR R2,d
1320 LDR R1,tref
1330 ADD R2,R2,R1
1340 :.calculatedata
1350 LDR R1,#minute
1360 MOV R0,R2,R1
1370 MOV R1,#R
1380 LDR R2,#offset
1390 LDR R3,#offset+4
1400 ADDS R0,R0,R2
1410 ADCS R1,R1,R3
1420 SWI R0,R1,R3
1430 SWI R0,R1,R3
1440 MOV R15,R14
1450 :
1460 :.maketref
1470 P%:=macro
1480 LDR R1,#wmin
1490 SWI R0,R0,R1
1500 SWI R0,tref
1510 MOV R15,R14
1520 :
1530 NEXT pass%
1540 ENDFE
1550 :
1560 DEF PROCassemble

```

```

2870 ORRRR R3,R3,R4
2880 MOVS R4,R4,ltr#1
2890 RNE divloop
2900 :
2910 LDR R1,#halfminute
2920 CMP R0,R1
2930 ANDRRR R3,R3,#1
2940 MOV R0,R1
2950 :
2960 :
2970 :
2980 DEF PROCerror
2990 OSCLI("Close")
3000 MODE 0
3010 REPEAT
3020 PRINT " at line :NRU;
3030 PRINT " in UpTime";
3040 END
3050 ENDFE

```

Listing 10

```

18 REM Mortgage (Info)
20 REM by John West
30 REM FOR all machines
40 REM (C) EAU Apr 92
50 :
60 MODE 7
70 PROCINT
80 PROCinput
90 REPEAT
100 PROCdisplay
110 PROCinput
120 PROCrepeat
130 UNTIL FALSE
140 :
150 :
160 DEF PROCint
170 IS:=CHR$(4);M%:=SORTAGE%+IS+CHR
$136
180 re%:=CHR$129;gr%:=CHR$139
190 ye%:=CHR$131;wh%:=CHR$135
200 VDU 23,1,0;0;0;0;
210 ENDFE
220 :
230 DEF PROCdisplay
240 CLR
250 FOR I%=> 2 TO 3:PRINTTAB(0,I%);ye%dbl
$Pline(4);$R%:=PCF%LINE(4);NEXT
I%
260 PRINTM "calculates monthly mortgage
payments:" for various rates and peri
ods:-"
270 PRINTTAB(0,6) "For a given rate of
re%+wh%$year,repaid"
280 PRINTTAB(0,7) "over re%+wh%$years
calculates repayment:"
290 PRINTTAB(0,8) "for re%+wh%$,re%
I%+0.5$wh%$,re%+1.0$wh%$,and re%+1.5
$wh%$year:"
300 PRINT TAB(0,9) "over re%+wh%$,re
$+Y%$wh%$ and re%+Y%$wh%$years.:"
310 ENDFE
320 :
330 DEF PROCinput
340 INPUT "Enter amount of loan (£) ..
":p%
350 INPUT "Enter lowest rate (% p.a.)
":r%
360 INPUT "Enter shortest time (years)
":t%
370 ENDFE
380 :
390 DEF PROCcalc
400 DIM M$(3,2),T$(3,2)
410 FOR I%=> 0 TO 3
420 FOR J%=> 0 TO 2
430 R:=(p%*(1+I%)/100)
440 A%:=R
450 B:=(1+R)^(Y%+5%*J%)
460 A%:=A*(B-(1+I%)/100)
470 M%:=I%*(Y%+5%*J%)
480 M%:=M%+J%+Y%*R%*J%*(1+I%)/100
490 T$(I%,J%):=Y%*R%*J%*(1+I%)/100
500 NEXT
510 NEXT
520 ENDFE
530 :
540 DEF PROCresult
550 CLR
560 PRINTTAB(0,0);ye%$Mortgage Int. Re
pay Monthly Total"
570 PRINTTAB(0,1);ye%$ loan rate r%
payment paid"
580 PRINTTAB(4,2);f %/yr years
590 PRINTTAB(0,3);ye%$P%LINE(3);T$(1,4)
gr%$p%
600 FOR I%=> 0 TO 3
610 FOR J%=> 0 TO 2
620 ye%:=M$(I%,J%)+(T$(I%,J%)*100)
630 IS:=LENSTR%+(n+1)
640 IS:=LENSTR%+(Y%+5%*J%)
650 IF J%>0:PRINTTAB(1,I%);ye%+n%I%+2
660 PRINTTAB(1,I%);ye%+Y%*5%*J%
670 IS:=LENSTR%(I%,J%)
680 IS:=LENSTR%(I%,J%)
690 PRINTTAB(1,I%);ye%+M$(I%,J%)
700 PRINTTAB(4,I%);ye%+T$(I%,J%)
710 NEXT
720 NEXT
730 PRINTTAB(0,21);ye%$P%LINE(3)
740 ENDFE
750 :
760 DEF P%:=macro(X)
770 IS:=STR%+(X);LN%:=X
780 IS:=LN%+(X,-1)
790 IF dot%=-2 THEN -X$
800 IF dot%=-1 THEN -X$+0"
810 IF dot%=0 THEN -X$+X$+00"
820 REPEAT
830 IS:=LN%+X
840 IS:=LN%+(X);LN%:=X-1
850 UNTIL INSTR(X$,")=LN%-3
860 -X$
870 :
880 DEF P%:=macro(X)=.01*INT(100*X$.5)
890 :
900 DEF P%:=macro(X)=STR%+(X,")
910 :
920 DEF PROCrepeat
930 PRINTTAB(5,23);re%+I%+press SPACE b
ar for repeat"

```

Listing 11

```

18 REM *Mastermind (Info)
20 REM Thinking by Malcolm Gray
30 REM Original display by J A McHugh
40 REM for all machines
50 REM (C) EAU Apr 92
60 :
70 MODE 7
80 PROC(0)
90 PROCINT
100 go:=0
110 REPEAT
120 PROCerror
130 guess%:=0
140 IF go%=> PROCcomp ELSE PROCman
150 IF black%<4 THEN score%:=score%+
(guess%+1)-guess%
160 IF go% AND black%<4 PROCinfo("Wel
l done - you got it!");
170 IF go% AND black%<4 PROCinfo("Sor
ry - it was "+*no1$)
180 IF go% AND black%<4 PROCinfo("I g
ot 1!");
190 IF go% AND black%<4 PROCinfo("Goo
p a - I didn't get it");
200 wait:=INKEY(1;300)
210 go:=1
220 IF go% PROCinfo("SCORES: your+*ST
R$(score%+0);*+***+*STR$(score%+1);w
ait=LNKEY(1;500)
230 UNTIL FALSE
240 END
250 :
260 DEF PROCinfo(is)
270 IS:=LENSTR%(IS)-LEN$(IS)/2,")*is
280 IS:=IS+STR%+(30-LEN$(IS,")*)
290 PROCWRITE(5,20);CHR$(15)+is$
300 ENDFE
310 :
320 DEF PROCman
330 FOR I%=> 0 TO 3
340 col%=(I%+RAND(7)-1
)
350 NEXT
360 DIM ch%str%=(
370 REPEAT
380 PROCerror(guess%,"Your guess")
390 guess%:=guess%+1
400 UNTIL guess%>0 OR black%<4
410 ENDFE
420 :
430 :
440 DEF PROCcomp
450 PROCerror("Enter code")
460 FOR I%=> 0 TO 3
470 col%=(I%+IN%(1)
)
480 NEXT
490 PROCwrite(5,20);CHR$(15)+Thinking
"
500 IS:=LENSTR%(IS)
510 IS:=IS+(IS)
520 PROC(1)
530 PROC(0)
540 DIM col%<4 PROC(2)
550 ENDFE
560 :
570 DEF PROCINT
580 DIM col%(3),in%(4),mark%(3,2),scor
%$(1)
590 DIM et%(20),e
600 DIM gr%(6)
610 DIM hb%(15)
620 DIM bc%(15,3)
630 DIM an%$(3)
640 col%:= "RVGWBCH"
650 is:=15
660 FOR I%=> 0 TO 7
670 a%:=1+LEN$(CHR$(128+I))+MID$(col%+I
),1)
680 NEXT
690 DEF PROCerror
700 NEXT
710 DEF PROCmakestrings
720 col%:=
730 FOR I%=> 0 TO 3
740 IS:=col%+CHR$(145+col%(I))+CHR$(17
5)CHR$(175)
750 NEXT
760 col%:=col%+CHR$(156+CHR$(135)
770 ENDFE
780 :
790 DEF PROC(0)
800 VDU 23,10,255-15;#;0;0;0;0;
810 ENDFE
820 :
830 DEF PROCerror
840 VDU 12,132,157,135
850 FOR I%=> 0 TO 3
860 VDU 31,0,132,157,32,156,31,37,1,
132,157
870 NEXT
880 VDU 31,3,18,132,157,31,0,23,132,15
7
890 VDU 31,9,0;PRINT"INPUT";$R%1;
L%
900 FOR I%=> 1 TO 17:VDU 31,4,1,141;NEXT
I%
910 FOR I%=> 1 TO 17:VDU 31,19,1,132,157,
156;NEXT
920 FOR I%=> 2 TO 21:VDU 31,4,1,141;NEXT
I%
930 ENDFE
940 :
950 DEF PROCwrite(x,y, str%)
960 PRINTTAB(x,y);str%;TAB(x,y+1);str%
970 ENDFE
980 :
990 DEF PROC(2;macro(guess%,qs)
1000 PROCWRITE(5,20);CHR$(15)+*+*e%1
$)
1010 *X* 21,1
1020 go:=0
1030 guess%:=FALSE
1040 REPEAT
1050 PROC(1)
1060 FOR I%:=1 TO 3:guess%:=I%+guess%+2
1070 key%:=GET
1080 PROC(0)
910 PRINTTAB(5,23);re%+I%+press SPACE b
ar for repeat"

```



```

1100 IF key=13 AND peg=4 done=&TRD
1110 col=INSTR(cols$,chr$(key AND 63))
-1
1120 IF col>0 AND peg<4 PROCpeg(peg*3+
2,guess,col):in(peg):colpeg(peg)
1130 UNTIL done
1140 ENDPROC
1150 :
1160 DEF PROCohoguess(guess)
1170 FOR peg=0 TO 3
1180 PROCpeg(peg*3+2,guess,in$(peg))
1190 NEXT
1200 ENDPROC
1210 :
1220 DEF PROCmark(guess)
1230 FOR i=0 TO 3
1240 mark$(i,1)=0
1250 mark$(i,2)=0
1260 NEXT
1270 black=0
1280 white=0
1290 black=0
1300 FOR i=0 TO 3
1310 IF in$(i)=col$(i) PROCdo(i,1,3)
1320 NEXT
1330 FOR i=0 TO 3
1340 FOR j=0 TO 3
1350 IF i>j AND in$(i)=col$(j) PROCdo(
1,j,6)
1360 NEXT
1370 NEXT
1380 ENDPROC
1390 :
1400 DEF PROCdo(peg1,peg2,c)
1410 IF mark$(peg1,i)=1 OR mark$(peg2,2
j)=1 ENDPROC
1420 mark$(peg1,i)=1
1430 mark$(peg2,2j)=1
1440 PROCpeg(mark$(guess,c)
1450 IF c=3 black=black+1 ELSE white=
white+1
1460 mark$(mark*3)
1470 ENDFROC
1480 :
1490 DEF PROCpenn(y,x)
1500 VDU 31,x+3,y+2:1
1510 IF c=1 VDU 10,32,32,8,8,8,10,32,3
2,3 ELSE VDU 14,52,124,124,8,8,8,10,145
c,124,124
1520 ENDPROC
1530 :
1540 DEF PROCp1
1550 k=0
1560 FOR i=0 TO 4
1570 FOR j=0 TO 4-a
1580 FOR k=0 TO 4-b-a+k
1590 FOR l=0 TO 4-c-k-b-a+k
1600 FOR m=0 TO 4-d-k-b-k-a+k
1610 FOR n=0 TO 4-e-k-d-k-b-k-a+k
1620 p$(i+1,a+b+k+c+d+e+4)=k
1630 c$(j+1)=a+k
1640 c$(k+1)=b+k
1650 c$(k+2)=c+k
1660 c$(k+3)=d+k
1670 c$(k+4)=e+k
1680 c$(k+5)=f+k
1690 c$(k+6)=g+k
1700 k=k+1
1710 NEXT
1720 NEXT
1730 NEXT
1740 NEXT
1750 NEXT
1760 NEXT
1770 FOR x=0 TO 6
1780 p$(x)=i+c$(x)
1790 NEXT
1800 max=k-1
1810 REPEAT
1820 t=FNGo
1830 c=b=0
1840 FOR y=0 TO mark
1850 IF FNGm(y)=c THEN PROCp(y,c)
1860 NEXT
1870 max=k
1880 min=k-10
1890 FOR y=0 TO 6
1900 q$(y)=c$(y)
1910 NEXT
1920 UNTIL c=k=1 OR guess=0
1930 ENDPROC
1940 :
1950 DEF FNGo
1960 LOCAL x%
1970 PROCov
1980 PROCov
1990 hb$(history)=black
2000 FOR x=0 TO 3
2010 hc$(history,x)=in$(x)
2020 NEXT
2030 history=history+x+1
2040 wht=wht+black
2050 LOCAL y%
2060 DEF PROCp(y,x%)
2070 LOCAL g%
2080 FOR g=0 TO 6
2090 c$(g)=g%
2100 NEXT
2110 NEXT
2120 DEF FNGm(x%)
2130 LOCAL t%,y%
2140 LOCAL t%,y%
2150 FOR y=0 TO 6
2160 t%=(t%+FNGin(g$(y%)+c$(x%,y%))
2170 NEXT
2180 t%t
2190 :
2200 DEF FNGin(a,b,b)
2210 IF a<b THEN b=a
2220 t=b
2230 :
2240 DEF PROCp2
2250 PROCmakepermm
2260 PROCpovdown
2270 FOR x=0 TO 3
2280 p$(x)=c$(x)
2290 NEXT
2300 REPEAT
2310 t=FNGin
2320 c=b=0
2330 FOR y=0 TO mark
2340 IF t=(t+FNGm(y)) THEN PROCp(y,c)
2350 NEXT
2360 max=k-1
2370 FOR y=0 TO 3
2380 q$(y)=c$(y)
2390 NEXT
2400 UNTIL c=k=1 OR guess=0
2410 IF black<4 THEN t=FNGin
2420 ENDPROC
2430 :
2440 DEF PROCpovdown
2450 c=b=0
2460 FOR y=0 TO mark
2470 IF FNGm(y)=FALSE AND FNGb(y)=1
2480 NEXT
2490 max=k-1
2500 ENDPROC
2510 :
2520 DEF PROCmakepermm
2530 t=(t+b+d+c+e+4)=d+b
2540 max=k+4+2-1
2550 FOR y=0 TO mark
2560 REPEAT
2570 d=d-1
2580 c=c-(d-1):d=d+4+(d-1)
2590 t=(t+b+d+c+4)=c+1
2600 t=(t+b+d+c+4)=d+4
2610 UNTIL (t=(a+b+c)+(a+b+c)+(a+d+k)+(b
k)=1):(b=b+k):(c=c+k):(d=d+k)
2620 c$(y+1)=a+(b+k)
2630 c$(y+2)=a+(b+k)
2640 c$(y+3)=a+(b+k)
2650 c$(y+4)=a+(b+k)
2660 NEXT
2670 ENDPROC
2680 :
2690 DEF FNGe(y%)
2700 IF y%max THEN
2710 LOCAL x%,f%
2720 FOR x=y%+1 TO mark
2730 t=c$(x)+FNGe2(x%)
2740 NEXT
2750 f%=t
2760 :
2770 DEF FNGe2(x%)
2780 IF c$(y%,x%)>c$(x%,y%) THEN =
2790 IF c$(y%,2)+c$(x%,2) THEN =
2800 IF c$(y%,3)+c$(x%,3) THEN =
2810 IF c$(y%,4)+c$(x%,4) THEN =
2820 t=-1
2830 :
2840 DEF PROCov(x%,y%)
2850 LOCAL t%
2860 FOR t=0 TO 3
2870 c$(y%,t)=c$(x%,t)
2880 NEXT
2890 ENDPROC
2900 :
2910 DEF FNGb(y%)
2920 LOCAL x%,t%
2930 FOR x=0 TO 3
2940 t=(t+g$(x))=c$(y%,x%)
2950 NEXT
2960 t=t

```

```

Listing 1
10 REM MakDat32 (Facel)
20 REM for Arc only
30 REM (c) B&B Apr 92
40 :
50 files=&PRNDUD "Facdat"
60 REPEAT
70 DEF output$
80 IF output$=&ENDODATA THEN ABUT
#file$(output$)
90 UNTIL output$=&ENDODATA
100 CLOSE #file$
110 #setType FacdatText
120 PRINT "Facdat created."
130 END
140 DATA
150 DATA " :>Facdat"
160 DATA
170 DATA #refin 648,513 536,500 648,50
0 648,428 648,268 488,412 884,412 648,50
4 648,360 648,578"
180 DATA
190 DATA "Segment: Left eye"
200 DATA "Line: 532,500 536,504 540,50
0 536,496 532,500"

```

```

210 DATA "Line: 536,516 532,504 532,48
4 560,504 548,508 536,508 532,508 532,50
0"
220 DATA "Line: 476,492 532,520 580,4
8"
230 DATA "Line: 484,492 532,480 580,48
4"
240 DATA "Line: 472,508 528,532 592,51
6"
250 DATA "Line: 508,644 540,648 576,48
"
260 DATA
270 DATA "Segment: Left eyebrow"
280 DATA "Line: 448,532 452,552 500,57
0 556,568 600,568 608,526"
290 DATA "Line: 448,528 496,552 552,54
4 608,536"
300 DATA
310 DATA "Segment: Right eye"
320 DATA "Line: 756,500 776,504 764,50
8 760,496 756,500"
330 DATA "Line: 760,516 736,504 756,48
4 784,504 760,516"
340 DATA "Line: 708,492 760,516 832,49
2"
350 DATA "Line: 708,492 764,480 804,48
"

```

```

360 DATA "Line: 704,512 764,532 816,50
"
370 DATA "Line: 712,476 748,464 784,46
"
380 DATA
390 DATA "Segment: Right eyebrow"
400 DATA "Line: 694,536 692,552 744,56
4 784,568 832,552 844,532"
410 DATA "Line: 694,536 748,544 800,55
2 840,532"
420 DATA "Segment: Nose"
430 DATA "Line: 624,520 624,468 624,42
0 632,424 364,644,352"
440 DATA "Line: 604,528 664,468 664,41
"
450 DATA "Line: 604,528 664,468 664,41
6 672,392 668,364 644,352"
460 DATA "Line: 600,404 588,388 584,36
"
470 DATA "Line: 632,364 644,352"
480 DATA "Line: 632,404 704,392 708,36
"
490 DATA "Line: 680,364 652,352"
500 DATA "Line: 580,388 556,352 540,32
"
510 DATA "Segment: Right cheekbone"
520 DATA "Line: 704,512 764,532 816,50
"

```

```

530 DATA "Line: 712,376 740,348 760,31
6"
540 DATA
550 DATA "Segment: Upper lip line"
560 DATA "Line: 636,336 636,308"
570 DATA "Line: 660,336 660,308"
580 DATA
590 DATA "Segment: Upper lip"
600 DATA "Line: 548,268 584,224 624,28
6 648,284 672,292 708,284 748,272 616
616 624 672 720 732 728 624,272"
620 DATA "Line: 552,268 592,268 624,27
2 652,268 680,272 712,268 744,272"
630 DATA
640 DATA "Segment: Lower lip"
650 DATA "Line: 548,268 592,268 624,27
2 652,268 680,272 712,268 744,272"
660 DATA "Line: 548,268 592,268 624,27
2 652,268 680,272 712,268 744,272"
670 DATA
680 DATA "Segment: Left ear"
690 DATA "Line: 336,480 368,504 352,48
"
700 DATA "Line: 376,384 396,332 420,344"
710 DATA "Line: 896,488 924,504 936,47
2 928,420 920,388 896,340 876,344"

```

FACE BENDER



```

720 DATA
730 DATA %Segment: Side of head + oute
r cheekbone*
740 DATA *Line: 412,516 404,444 416,35
*
750 DATA *Line: 876,520 886,444 872,36
*
760 DATA *Line: 420,368 436,344 444,32
*
770 DATA *Line: 872,368 856,348 844,32
*
780 DATA
790 DATA %Segment: Chin*
800 DATA *Line: 416,356 432,284 460,22
4 516,168 588,120 648,108 720,124 784,16
8 920,228 860,284 876,368*
810 DATA
820 DATA %Segment: Hairline*
830 DATA *Line: 404,584 420,564 456,62
4 496,664 524,708 584,712 640,708 696,70
8 752,636 804,668 840,624 868,576 880,58
8*
840 DATA
850 DATA %Segment: Hair*
860 DATA *Line: 372,264 312,368 304,51
2 328,676 396,800 516,836 632,904 752,90
8 868,824 944,704 984,544 988,408 932,28
8*
870 DATA
880 DATA %Segment: Chin cleft*
890 DATA *Line: 648,152 648,128*
900 DATA
910 DATA %Segment: Chin line*
920 DATA *Line: 612,200 648,208 692,19
6*
930 DATA %ENDOFDATA*

```

Listing 2

```

10 REM %FaceOrder (Face2)
20 REM By Van Wibe
30 REM FOR PLOT OR machines
40 REM (C) RAU APR 92
50 :
60 ON OR ERROR CLOSE OR PRINTREPORTS* a
t Lins %ERLE:END
70 MODE 135:MODE 8:OFF
80 COLOR 0,0,64,128
90 COLOR 1,160,160,160
100 COLOR 2,0,0,0
110 VDU 15,0,74,64,128
120 steps=1
130 PROCloaddata
140 face(1)=face(1)
150 %
160 REPEAT
170 PROCdistort(face(1))
180 steps(1)=face(2)-face(1)
190 steps(2)=steps(1)*steps(1)
200 FOR frame=1 TO steps
210 face(1)=face(1)+steps(1)
220 WAIT
230 SCL 6,112,h:SYS 6,113,3->:CLS
240 %
250 GOTO 1
260 CURSOR FILL 640,512,500
270 GOTO 2
280 FOR i=1 TO points
290 PLOT opt(i),face(1,0),face(1,1)
300 NEXT
310 NEXT
320 UNTIL P1=4
330 END
340 :
350 DEF FNnextline
360 REPEAT
370 line=OPT$IN
380 UNCTL line$="" AND LEFT$(line$,5)
">,"
390 line$=""
400 :
410 DEF FNcountspaces(heads)
420 PTR=lines
430 count=0
440 REPEAT
450 a$=OPT$IN
460 IF LEFT$(a$,LEN(heads))=heads THEN
470 FOR i=1 TO LEN(a$)
480 IF MID$(a$,i,1)=" " count=i
490 NEXT
500 ENDIF
510 UNTIL EOF$IN
520 %count
530 :
540 DEF PROCxy(x,RETURN Y)
550 x=VAL(line$)
560 Y=VAL(MID$(line$,INSTR(line$,","),1))
570 PROCoptospace(line$)
580 ENDPROC
590 :
600 DEF PROCoptospace(RETURN a$)
610 a$=MID$(a$,INSTR(a$,","),1)
620 ENDPROC
630 :
640 DEF FNlet(a$,b$)
650 =LEFT$(a$,LEN(b$))+b$
660 :
670 DEF PROCloaddata
680 info=FNnextline
690 ino=FNcountspaces("Ref")
700 points=FNcountspaces("Line")
710 DIM ref(ref),refy(ref),drefx(re
f),drefy(ref)
720 DIM face(points,1),face(1,points)
730 DIM seg(points),opt(points),steps(
1),face(1,points,1)
740 PTR=lines
750 line$=FNnextline
760 IF NOT F1$(line$, "Ref") ERRORR
1,"Missing reference points"
770 PROCoptospace(line$)
780 FOR i=1 TO refs
790 PROCxy(refx(i),refy(i))
800 NEXT
810 seg=0
820 opt=0
830 opt(i)=
840 GOTO 1:CURSOR FILL 640,512,500:GOTO
1,2

```

```

850 WHILE NOT EOF$IN
860 line$=FNnextline
870 IF LEFT$(line$,7)=%Segment* seg=1
1
880 IF LEFT$(line$,4)=%Line* THEN
890 PROCoptospace(line$)
900 opt(point,1)=4
910 REPEAT
920 point=1
930 PROCxy(face(point,0),face(point
,1))
940 PLOT opt(point),face(point,0),face
(point,1)
950 seg(point)=seg
960 UNTIL line$=""
970 ENDIF
980 ENDWHILE
990 CLOSE in
1000 ENDPROC
1010 :
1020 DEF PROCdistort(RETURN distort())
1030 facewidth = FNrdm(0.6,1.0)
1040 faceheight = FNrdm(0.6,1.0)
1050 round = FNrdm(-0.5,1.5)
1060 xyspind = FNrdm(-30,30)
1070 eyewidth = FNrdm(0.5,1.2)
1080 eyeheight = FNrdm(0.6,1.2)
1090 nosewidh = FNrdm(0.5,1.7)
1100 noseheight = FNrdm(0.5,1.0)
1110 mouthwidh = FNrdm(0.5,1.5)
1120 mouthheight = FNrdm(0.5,1.4)
1130 earwidh = FNrdm(1.0,1.5)
1140 earheight = FNrdm(0.3,1.0)
1150 browheight = FNrdm(0.6,1.25)
1160 chinheight = FNrdm(1.0,1.25)
1170 browwidh = FNrdm(0.6,0)
1180 eye(1)=2*round-1:1/24:1clf=1+facew
idht
1190 c2=1.5-round :c2f=ac2+facew
idht
1200 drefx(i)=refx(i)
1210 drefy(i)=refy(i)
1220 FOR i=2 TO points
1230 x=FNrefx(drefx(i),1,clf+drefy(i)+c2)
1240 drefx(i)=FNroff(x,1,facewidth)
1250 drefy(i)=FNroff(drefy(i),1,facewid
th)
1260 NEXT
1270 drefx(1)=xyspind
1280 drefx(1)=xyspind
1290 FOR point=1 TO points
1300 x=face(point,0)
1310 y=face(point,1)
1320 REM x=FNroff(x,1,clf+y*c2)
1330 x=FNroff(x,1,clf+y*c2)
1340 y=FNroff(y,1,faceheight)
1350 CAS$ seg(point,0)
1360 WHEN 1,2
1370 x=FNroff(x,eyewidth,2,eyewidth)
1380 y=FNroff(y,2,eyehight)
1390 IF seg(point,2) y=FNroff(y,
4,earwidh)
1410 x=FNroff(x,eywidh,3,eywidh)
1420 y=FNroff(y,3,eyehight)
1430 IF seg(point,4) y=FNroff(y,
4,WHEN 5,6,7
1450 x=FNroff(x,5,nosewidh)
1460 y=FNroff(y,5,noseheight)
1470 WHEN 8,9,10
1480 x=FNroff(x,5,mouthwidh)
1490 y=FNroff(y,5,mouthheight)
1500 WHEN 11
1510 x=FNroff(x,6,earwidh)
1520 y=FNroff(y,6,earheight)
1530 WHEN 12
1540 x=FNroff(x,7,earwidh)
1550 WHEN 13,16
1570 REM Nothing
1580 WHEN 15
1590 y=FNroff(y,8,browheight)
1600 WHEN 14,17,18
1610 y=FNroff(y,9,chinheight)
1620 ENDCLAS
1630 distort(point,0)=x
1640 distort(point,1)=y
1650 NEXT
1660 ENDPROC
1670 :
1680 DEF PROCf(var,ref,scale)
1690 = (var-drefx(ref))*scale+drefx(ref)
1700 ENDPROC
1710 DEF PNYoff(var,ref,scale)
1720 = (var-drefy(ref))*scale+drefy(ref)
1730 ENDPROC
1740 DEF FNrdm(min,max)
1750 = (max-min)*RND(1)+min
1760 ENDPROC

```

Listing 3

```

10 REM %create face data (Face2)
20 REM FOR PLOT OR machines
30 REM (C) RAU APR 92
40 :
50 file=OPENNOOT"Face2"
70 READ data$
80 IF data$="END" THEN PROCf1$fil$,"V
AL(")+data$
90 UNTIL data$="END"
100 CLOSE fil$
110 DIM "Face2" created*
120 END
140 DATA 83,97,98,83,83,47,88
150 DATA 83,83,83,00,00,00,00
160 DATA 00,00,00,00,00,00,00
170 DATA 00,00,00,00,00,00,00
180 DATA 00,00,00,00,00,00,00
190 DATA 00,00,00,00,00,00,00
200 DATA 00,00,00,00,00,00,00
210 DATA 00,00,00,00,00,00,00
220 DATA 00,00,00,00,00,00,00
230 DATA 00,71,82,84,85,94
240 DATA 98,81,85,70,00,00,00
250 DATA 00,00,00,00,00,00,00
260 DATA 00,00,00,00,00,00,00
270 DATA 00,00,00,00,00,00,00
280 DATA 00,00,00,00,00,00,00
290 DATA 00,00,00,00,00,00,00
300 DATA 00,00,00,00,00,00,00

```

```

310 DATA 00,00,00,00,00,00,00
320 DATA 00,00,00,00,00,00,00
330 DATA 00,00,00,00,00,00,00
340 DATA 00,00,00,00,00,00,00
350 DATA 00,00,00,00,00,00,00
360 DATA 00,00,00,00,00,00,00
370 DATA 00,00,00,00,00,00,00
380 DATA 00,00,00,00,00,00,00
390 DATA 00,00,00,00,00,00,00
400 DATA 00,00,00,00,00,00,00
410 DATA 00,00,00,00,00,00,00
420 DATA 00,00,00,00,00,00,00
430 DATA 00,00,00,00,00,00,00
440 DATA 00,00,00,00,00,00,00
450 DATA 00,00,00,00,00,00,00
460 DATA 00,00,00,00,00,00,00
470 DATA 00,00,00,00,00,00,00
480 DATA 00,00,00,00,00,00,00
490 DATA 00,00,00,00,00,00,00
500 DATA 00,00,00,00,81,81
510 DATA 81,81,81,81,81,81,81
520 DATA 81,81,81,81,81,81,81
530 DATA 81,81,81,81,81,81,81
540 DATA 82,82,82,82,82,82,82
550 DATA 82,83,83,83,83,83,83
560 DATA 83,83,83,83,83,83,83
570 DATA 83,83,83,83,83,83,83
580 DATA 83,83,84,84,84,84,84
590 DATA 84,84,84,84,84,84,84
600 DATA 85,85,85,85,85,85,85
610 DATA 85,85,85,85,85,85,85
620 DATA 85,85,85,85,85,85,85
630 DATA 85,86,86,86,87,87,87
640 DATA 86,86,86,86,89,89,89
650 DATA 86,89,89,89,89,89,89
660 DATA 86,89,89,89,89,89,89
670 DATA 86,89,89,89,89,89,89
680 DATA 86,89,89,89,89,89,89
690 DATA 86,89,89,89,89,89,89
700 DATA 86,89,89,89,89,89,89
710 DATA 86,89,89,89,89,89,89
720 DATA 86,89,89,89,89,89,89
730 DATA 86,89,89,89,89,89,89
740 DATA 86,89,89,89,89,89,89
750 DATA 86,89,89,89,89,89,89
760 DATA 86,89,89,89,89,89,89
770 DATA 86,89,89,89,89,89,89
780 DATA 86,89,89,89,89,89,89
790 DATA 86,89,89,89,89,89,89
800 DATA 86,89,89,89,89,89,89
810 DATA 86,89,89,89,89,89,89
820 DATA 86,89,89,89,89,89,89
830 DATA 86,89,89,89,89,89,89
840 DATA 86,89,89,89,89,89,89
850 DATA 86,89,89,89,89,89,89
860 DATA 86,89,89,89,89,89,89
870 DATA 86,89,89,89,89,89,89
880 DATA 86,89,89,89,89,89,89
890 DATA 86,89,89,89,89,89,89
900 DATA 86,89,89,89,89,89,89
910 DATA 86,89,89,89,89,89,89
920 DATA 86,89,89,89,89,89,89
930 DATA 86,89,89,89,89,89,89
940 DATA 86,89,89,89,89,89,89
950 DATA 86,89,89,89,89,89,89
960 DATA 86,89,89,89,89,89,89
970 DATA 86,89,89,89,89,89,89
980 DATA 86,89,89,89,89,89,89
990 DATA 86,89,89,89,89,89,89

```

```

10 REM %Source0 - for fast 6502 lined
raw (Face2)
20 REM By Dave Lawrence
30 REM FOR PLOT OR machines
40 REM (C) RAU APR 92
50 :
60 xl=471
70 yl=471
80 x2=472
90 y2=473
100 dx=74
110 dy=75
120 flags=476
130 ci=477
140 c2=478
150 err=478
160 addr=47D
170 point=47F
180 screen=480
190 FOR pass=0 TO 2 STEP 2:PA=490D
200 [OPT pass
210 JWP cis
220 draw
230 8TX xs=2
240 STY ys=2
250 STA opt=+
260 LDA 0#
270 STA point
280 drawloop
290 LDA x#
300 STA x#
310 LDA y#
320 STA y#
330 LDY point
340 STA y#
350 LDA #FF80,Y
360 STA X#
370 %ys
380 LDA #FF80,Y
390 STA Y#
400 %opt
410 LDA #FF80,Y
420 H80 draw
430 HPL move
440 JSR Lins
450 %move
460 %INC point
470 H8E drawloop
480 %draw
490 %ST
500 :
510 %line
520 LDA 0#
530 STA flag#
540 STA c1#
550 %addr
560 LDA x#
570 CMP x#
580 H8R flag#
590 AND #1
600 STA x#
610 BCS dnok
620 H8R #FF
630 AND #1
640 %dnok
650 %STA
660 LDA y#
670 CMP y#
680 H8R flag#
690 STA y#
700 STA c2#
710 H8R #FF
720 H8R #FF
730 STA x#
740 STA c1#
750 STA c2#
760 STA c1#
770 STA c2#
780 STA c1#
790 STA c2#
800 STA c1#
810 STA c2#
820 STA c1#
830 STA c2#
840 STA c1#
850 STA c2#
860 STA c1#
870 STA c2#
880 STA c1#
890 STA c2#
900 STA c1#
910 STA c2#
920 STA c1#
930 STA c2#
940 STA c1#
950 STA c2#
960 STA c1#
970 STA c2#
980 STA c1#
990 STA c2#

```

```
1310 JMP dactx
1320 -strng
1330 LDX #cl
1340 JSR addr
1350 dactx
1360 DEC dx
1370 LDA dx
1380 CMP #255
1390 ENB lineoop
1400 RTS
1410 :
1420 .addy
1430 BPL dox
1440 LDA flags
1450 AND #40
1460 BRQ yeub
1470 TBC yf
1480 RTS
1490 .yeub
1500 DEC yf
1510 RTS
1520 .dox
1530 LDA flags
1540 AND #20
1550 BRQ yeub
1560 TBC xf
1570 RTS
1580 .xeub
1590 DEC xf
1600 RTS
1610 :
1620 .addr
1630 LDA #40
1640 CLC
1650 ADC #40
1660 STA #40
1670 LDA #40
1680 AND #40
1690 STA #40
1700 RTS
1710 :
1720 .bits
1730 EQUB 128: EQUB 64: EQUB 32: EQUB 16
1740 EQUB 8: EQUB 4: EQUB 2: EQUB 1
1750 :
1760 .cls
1770 LDA screen
1780 CMP #40
1790 BRQ cla6
1800 LDA #0
1810 TAY
1820 .cla4
1830 JSR i=4000 to 45700 STEP #100: [0
PT pass
1840 STA 1.Y
1850 JRETI: [OPT pass
1860 DEF
1870 ENR #cl
1880 RTS
1890 :
1900 .cla6
1910 LDA #0
1920 TAY
1930 .cla61
1940 FOR i=6000 to 4700 STEP #100: [0
PT pass
1950 STA 1.Y
1960 JRETI: [OPT pass
1970 DEF
1980 ENR #cl
1990 RTS
2000 :
2010 OSCLI "Save FaceMC 900 *STR3" %
2020 END
```

Listing 5

```
10 REM %>hex - 8 bit facsbender (Fac
e5)
20 REM By Dave Lawrence
30 REM Based on an idea by Jan Vibe
40 REM For 8 bit machines
50 REM (C) EAU April 1992
60 :
70 steps=10
80 IF PAGE#<#1000 THEN PRINT"Page must
be #1000":END
90 ON ERROR MODE 4:REPORT:PRINT" at i
ine ",ERR:END
100 MODE 4
110 VDU 23:10,32:0;0;0;0
120 VDU 23:1,32:0;0;0;0
130 datax=4000-256*#steps:datay=dat
x-256
140 fxdatx=256*#steps:fyfx=256:optx=fx-2
56
150 rx=optx-256:ry=rx+64
160 dx=rx-128:dy=ry-128
170 HIMEM#rx
180 Lastx=datax+(steps-1)*256*2:laaty
=laetx-256
190 OSCLI "Load FaceMC 900"
210 cls=#900:draw=#903
220 ref=#0
230 DEFNAR
240 reteref=#1
250 UNTIL rx#ref=#0
260 point=#256
270 REPEAT
280 point=point-1
290 UNTIL optx=point=#0
300 point=point+1
310 ldx=#rx:ldy=#ry
320 disp#
330 PROCwrite(disp):PROCdiap(diap)
340 PROCdraw(fx,fy)
350 FOR i=0 to 255-4 STEP 4
360 datax=i+1
370 datay=i+1
380 NEXT
390 REPEAT
400 PROCdiastort
410 SOUND 1,-16,200,1
420 FOR i=0 to 9
430 PROCwrite(i-3:diap)
440 PROCdraw(datax+i*512,datay+i*512)
450 PROCdiap(i-3:diap)
460 disp#-diap
```

```
470 NEXT
480 SOUND 1,-10,200,1
490 FOR i=0 to 255-4 STEP 4
500 datax=i+1:laaty=1
510 datay=i+1:laety=1
520 NEXT
530 UNTIL#0
540 END
550 :
560 DEF PROCwrite(b)
570 f#480+420+420*b
580 ENDPROC
590 :
600 DEF PROCdiap(b)
610 a=#2000+4200*b
620 VDU 23:12,(# DIV 8) DIV 256;0;
630 VDU 23:13,(# DIV 8) MOD 256;0;
640 ENDPROC
650 :
660 DEF PROCdraw(x#,y#)
670 CALL c1a
680 A#optx DIV 256:X#dx DIV 256:Y#ey
B DIV 256:CLG: draw
690 ENDPROC
700 :
710 DEF P#rnd(max,min)
720 = (max-min)*RND(1)+min
730 :
740 DEF PROCdiastort
750 face = P#rnd(0.6,1.0)
760 faceh = P#rnd(0.6,1.0)
770 round = P#rnd(0.5,1.5)
780 eyed = P#rnd(-30,30)
790 eyaw = P#rnd(0.6,1.2)
800 nose = P#rnd(0.5,1.2)
810 noseh = P#rnd(0.6,1.0)
820 mouth = P#rnd(0.5,1.0)
830 mouthh = P#rnd(0.5,1.4)
840 earh = P#rnd(0.3,1.5)
850 earw = P#rnd(0.5,1.0)
860 chinh = P#rnd(1.0,1.25)
870 brow = P#rnd(0.5,0.8)
900 c1=(2*round-1)/1024 :c1fw=c1*face
w
910 c2=1.5-round :c2fw=c2*face
920 FOR i=1 to refs-1
930 dx=i*rx+(rx1-i*rx) :c1fw*ry+c2fw
940 dy=i*ry+(ry1-i*ry)*facew
950 NEXT
960 dx#dx-dx2+eyed/4
970 dx#dx-dx2+eyed/4
980 FOR i=0 to points-1
990 X#x+rx*(i#1-ry)*c1fw+(i#1+c2fw)
1000 Y#y+ry*(i#1-ry)*faceh
1010 I#IVAL:FN#STR(optx1+AND 67F)
1020 xi=datax+i*xx-(Y#-x1)*steps
1030 yi=datay+i*yy-(Y#-y1)*steps
1040 FOR i=0 to steps-1
1050 xi=x1+xx:datax=i*512+xi
1060 yi=y1+yy:datay=i*512+yi
```

Listing 1

```
10 REM [RanImage (Chords)]
20 REM by P.E. Marshall
30 REM for Archimedes only
40 REM (C) EAU May 92
50 REM
60 OVERHOR PROCOR
70 PROCinit_wimp
80 PROCinit_prog
90 OVERHOR PROCOROR
100 REPEAT
110 PROCpoll
120 UNTIL quit=TRUE
130 PROCshutdown
140 END
150 :
160 DEF PROCinit_wimp
170 DIM block% 1024
180 DIM menu% 255, menu2% 255, menu3%
255, menu4% 255
190 SYS "Wimp_Initialize", 200, 44853415
40 "Chords" to version.task
200 DIM sequenc% 255, delay% 8
210 Sequenc%="C F G C"
220 delay%="15"
230 quit=FALSE
240 xpr=FALSE
250 PROCcombar
260 PROCsetup_window
270 PROCinfo
280 PROCsetup_menu1
290 PROCsetup_menu2
300 PROCosetp_menu3
310 PROCsetp_menu4
320 PROCdeficons
330 spritesize=#640*90*100
340 DIM sprites%, spritesize%
350 spritesize=spritesize
360 spritesize=18*25
370 SPRITEB Spritesop%:3,256,sprites%
380 ENDPROC
390 :
400 DEF PROCsetp_window
410 window#F#rcname%#(180,-360,7,12,11
,"",14,"#1000011)
420 window#F#rcrate%(590,-560,7,2,11,"
Chords",7,13,11,11)
430 window#F#rcsize%(500,-500,7,2,11,"
Chords Bell",7,1,"#1000011)
440 PROCosetp(window%#0,900,500)
450 PROCsetp(window%)
460 ENDPROC
470 :
480 DEF F#rcrate(w#,w#,t#,t#,sc,ts%,ts%,
wb,flags)
490 block%[(2+1-1)block%[(2+1)flags
500 block%[(2+1)block%[(2+1)flags
510 block%[(2+1)block%[(2+1)flags
520 block%[(2+1)block%[(2+1)flags
530 block%[(2+1)block%[(2+1)flags
540 block%[(2+1)block%[(2+1)flags
550 block%[(2+1)block%[(2+1)flags
```

```
1130 DEF PROCmenu_item(a#,b#,c#,t%)
1140 P#sig#a
1150 P#i#a#P
1160 P#i#b#P
1170 P#i#c#t%#
1180 P#i#a#t%
1190 ENDPROC
1200 :
1210 DEF PROCinfo
1220 DIM infotext 128:P#infotext
1230 info.window#F#rcrate%(590,-244,7,2
,1,"Program Info",7,1,"#1000011)
1240 miny=-60
1250 dx#0:dy#0
1260 FOR i=0 to 3
1270 READ t$,P#P
1280 DEF PROCcreate_icon(info.window%,16,1
60,miny,56,t$,#1/0000010+512)
1290 PROCcreate_icon(info.window%,P#,170
640,miny,56,"",#7000130)
1300 miny=-60:P#t#+32
1310 NEXT
1320 DATA "Name", "Chords"
1330 DATA "Purpose", "Keyboard Chord Di
ctionary"
1340 DATA "Author", "Paul Marshall, Ant
igua W.I."
1350 DATA "Version", "1.1 January 1992"
1360 PROCosetp(info.window%,0,6,550,244
)
1370 PROCsetp(info_window)
1380 ENDPROC
1390 :
1400 DEF PROCdeficons
1410 flags=#7013093
1420 miny=-44
1430 FOR i=0 to 15
1440 READ t$,P#P
1450 PROCcreate_icon(window2%,0,210,190,m
iny,36,t$,flags)
1460 NEXT
1470 NEXT
1480 miny=-44
1490 FOR i=0 to 15
1500 FOR j=0 to 1004
1510 PROCcreate_icon(window2%,0,400,570,
miny,36,t$,flags)
1520 miny=-36
1530 NEXT
1540 miny=-44
1550 FOR i=0 to 1004
1560 READ t$,P#P
1570 PROCcreate_icon(window2%,0,400,570,
miny,36,t$,flags)
1580 miny=-36
1590 NEXT
1600 ENDPROC
1610 :
1620 DATA #, (b), D, E, F, # (db), G, A
b, h, E, h, Rewind, Enter, "Play Set"
1630 :
1640 DEF PROCcreate_icon(handle,addr,min
x,maxx,miny,ht,t$,flags)
```

CHORDS


```

230 M=FALSE
240 FOR I=1 TO LEN data$
250 F$=FNdecode:IF F$=23 THEN H$=TEXT
260 NEXT
270 H$
280
290 DEF FNdecode
300 =INSTR(Decode$,MID$(data$,I,1))-K
END
310
320 DEF PROCKey(K$,dn$)
330 IF dn$ AND NOT YFN$ PROCPlot(15,3,0
,84,126,K$(K%),40):ENDPROC
340 IF NOT dn$ AND NOT YFN$ PROCPlot(54
,3,84,126,K$(K%),40):ENDPROC
350 IF dn$ AND NOT YFN$=0 PROCPlot(8,0,
3,64,96,K$(K%),188):ENDPROC
360 IF NOT dn$ AND NOT YFN$=0 PROCPlot(
40,0,3,64,96,K$(K%),188)
370 ENDPROC
380
390 DEF PROCPlot(K$,C$,D$,L$,M$,L$,X$,Y$)
400 GCOL=0,C$=PROCI11(X$,Y$,M$,L$)
410 GCOL=0,D$=MOVEX,Y$=H$:PLOT1,M$,0
420 MOVEX,Y$=PLOT1,0,L$
430 IF M$=32 ENDPROC
440 GCOL=4,0=MOVE X$(M$/2-28,Y$+H$/44
450 IF L$=1:PRINTMID$(name$,K*2,2) E
LSE PRINTMID$(name$,K*2,2)
460 ENDPROC
470
480 DEF PROCAll_keys
490 FOR F$=0TO25:IF NOT YFN$ THEN PROCp
10(54,3,8,84,200,K$(K%),40)
500 NEXT
510 FOR F$=0TO25:IF NOT YFN$ THEN PRO
CPlot(40,0,3,64,96,K$(K%),188)
520 NEXT
530 ENDPROC
540
550 DEF FNchar
560 =MID$(S$,F$,1)
570
580 DEF PROC(F$,M$)
590 F$=MEMM(1,M$)-F$*35-8
600 IF F$=0 GCOL=1,ELSE GCOL=3,Y$=Y$
-12
610 MOVE MEMM(8,M$)+12,F$:VDU255
620 ENDPROC
630
640 DEF PROCTEXT(X$,Y$,M$,H$)
650 MOVEX,Y$=PLOT1,0,H$:PLOT1,M$,0:PL
OT1,0,-H$:PLOT1,-M$,0
660 ENDPROC
670
680 DEF PROCIL1(X$,Y$,M$,H$)
690 MOVEX,Y$=PLOT1,0,H$:PLOT1,M$,0,-H$
700 ENDPROC
710
720 DEF PROCPlot(15,3,0,84,126,K$(K%),40)
730 MODS:=REPORT:PRINTREL
740 *FX,0
750 *FY,25,1
760 END
770
780 DEF PROCinput
790 VDU4:P=0
800 REPEAT
810 L$=LEN S$
820 PRINTTAB(0,18)S$;" " ;STRING$(L$
-P$,CHR$(8))
830 C=GET
840 IF C=31 AND C=127 AND L$=159 S$=
C$=LEFT$(S$,P)+CHR$(C)+RIGHT$(S$,L
-P)
850 IF C=137 AND P=L$ P=P+1
860 IF C=135 AND P=0 P=P-1
870 IF C=127 AND P=0 S$=C$=LEFT$(S$
,C,P)-1:RIGHT$(S$,L-P):P=P-1
880 UNTIL C=13:VDU5
890 ENDPROC
900
910 DEF PROCPlay_seq
920 PROCIL1(K$,0):PROCIL1(form,1):P
ROCTick(Inv,2)
930 F$=SMPTR-1
940 REPEAT:F$=P+1:UNTIL FNchar<" "
950 Inv=INSTR("123",FNchar)+1:IF Inv<
1 P$=P+1
960 ts=FNchar:P=P+1
970 IF FNchar="b" OR FNchar="*" THEN t
s$=FNchar:P=P+1
980 key=INSTR("C.CBD.DHE.F.FG.GAA.AE"
,t$):DIV2+1
990 IF key: THEN key=INSTR("C.Dhd.EHE
.F.Ghd.ABh",t$):DIV2+1
1000 ts=" "
1010 IF INSTR("1579m.oeu",FNchar) THEN
REPEAT:ts=FNchar:P=P+1:UNTIL INSTR
("1579m.oeu",FNchar)=0 OR P=LEN S$&
1020 form=INSTR("...6..7..9...11.euM7.M
9...m..m5.m7.m9.o".t$):DIV 3+1
1030 PROCIL1(key,0):PROCIL1(form,1):P
ROCTick(Inv,2)
1040 IF P$=LEN S$& THEN P$=1
1050 PROCPlaySeq=tr
1060 ENDPROC
1070
1080 DEF PROCPlay
1090 flat=TRUE
1100 IF form=9OR key=2OR key=3OR key=5O
R key=7OR key=8OR key=12 flat=FALSE
1110 IF key=4 OR key=8 OR form=14 flat=
TRUE
1120 data$=data$(form-1,Inv-1)
1130 high=PROCI11h
1140 FOR I=1 TO LEN data$
1150 TIME=0
1160 F$=FNdecode+high*12
1170 REM Send X$=59,127 to your mid
1180 PROCKey(K$,TRM):SOUND #16=voice,1
*FX=449,300
1190 REPEAT UNTIL TIME=delay$
1200 voice=voice+1:MODS+1
1210 NEXT
1220 REPEAT UNTIL NOT INKEY(-93) AND NO
T INKEY(-74)
1230 *FX=15,0
1240 FOR I=1 TO LEN data$
1250 X$=FNdecode+high*12
1260 PROCKey(X$,P)
1270 REM Send X$=59,0 to your mid
1280 NEXT
1290 ENDPROC
1310 DEF PROCInit
1320 delay$=25
1330 decode$="123456789ABCDEFHIJKLMN"
1340 DIM wh$ 25
1350 FOR F$=0TO25:READ wh$:I$=NEXT
1360 DATA -1,-1,0,-1,0,-1,0,-1,0,-1,
0,-1,-1,0,-1,0,-1,0,-1,0,-1,-1,-1
1370 DIM kx(25)
1380 kx=-24:wx=-54
1390 FOR I=0 TO 25
1400 IF wh$(I) THEN kx(I)=wx:wx=-8
8 ELSE kx(I)=0:wx
1410 wx=kx+1
1420 NEXT
1430 name$=" C CBD DHE F FG GAA ABE"
name$=name$+name$
name$=name$+name$
name$=name$+name$
name$=name$+name$
1450 DIM MEMM(3,2)
1460 FOR F$=0TO2:FOR I$=0TO3:READ MEMM
(I$,F$):NEXT I$
1470 DATA 0,1023,300,10
1480 DATA 400,1023,400,14
1490 DATA 900,1023,340,4
1500 DIM data$(13,3)
1510 RESTORE1800
1520 FOR F$=0TO13:FOR J$=0TO3
1530 READ data$(F$,J$)
1540 NEXT:READ dummy$:NEXT
1550 DIM val$(3)
1560 key=1:form=1:Inv=1
1570 val$(0)=key:val$(1)=form:val$(2)=1
1580 voice=1
1590 *FX=1,
1600 *FX=25,240
1610 ENVLOP=15,5,0,0,0,0,0,120,-5,-2
,-20,120,80
1620 VDU23,255,1,3,7,142,220,240,112,32
1630 VDU23,0,10,54,0:0:0:0
1640 IF RMD=4:3000 THEN DIM seq$ 160 E
LSE seq$=8A00
1650 S$=C$=F 07 C
1660 PRINTTAB(0,18)S$;S$=S$+tr=1
1670 GCOL=1:PROCI11(0,0,120,380)
1680 GCOL=2:VDU5:MOVE420,360:PRINT"BEC
ACORN USER"-VDU4
1690 PROCAll_keys
1700 RESTORE1840
1710 FOR I$=0TO3:PROCSubmenu(I$):PROCI
ck(1,I$):NEXT
1720 menu=I:Items=menu$(3,menu):PROCI
ck(0,menu)
1730 ENDPROC
1740
1750 DEF PROCSubmenu(M$)
1760 X$=MEMM(0,K$):X$=MEMM(1,M$)
1770 M$=MEMM(2,M$):M$=MEMM(3,M$)
1780 VDU5:GCOL=2:PROCrect(X$,Y$,M$,
-48)
1790 PROCrect(K$,X$,M$,
-36*Y$-50)
1800 GCOL=3:MOVE X$=48,Y$=12:READ ts:P
RINT ts$
1810 FOR M$=1 TO 24:MOVE K$=48,X$=
-36*M$)-24:READ ts:PRINTts$:NEXT
1820 ENDPROC
1830
1840 DATARoot.C,C$(Db),(D,Ed,E,F,G$(Fh
),0,Ab,A,eh,E
1850 DATARoot Form.Major,5,7,9,11,Su4
Major,7,Major,9,Augmented,minor,minor
5,minor,7,minor,9,Diminished
1860 DATAInversion,Root,Lat,2nd,3rd
1870
1880 DATA 158,58D,8BD,DKH,Major
1890 DATA 158A,58AD,8AD,ADK,5th
1900 DATA 158E,58ED,8ED,EDK,7th
1910 DATA 158F,8FF,8FK,358E,9th
1920 DATA 8F1,8F1K,358E,8FF,11th
1930 DATA 158,58D,8BD,DKH,Sus 4th
1940 DATA 158C,58CD,8CD,CSH,7
1950 DATA 158F,8CF,8FK,358C,MaJ 9
1960 DATA 158,58D,58D,DH,Aug
1970 DATA 148,48D,8D,8D,minor
1980 DATA 148A,48AD,8AD,ADK,min 5
1990 DATA 148E,48ED,8ED,EDK,min 7
2000 DATA 48E,8EF,8FK,FCR,min 9
2010 DATA 147A,47AD,7AD,ADK,Dim

```

ARM PROGRAMMING

Listing 1

```

10 REM >ARM1 (ArmProg1)
20 REM By Dave Lawrence
30 REM For 32 bit machines
40 REM (C) EAU April 1992
50
60 DIM code 100
70 link=4
80 pc=15
90 FOR pass=0 TO 2 STEP 2
100 P$=code

```

```

110 (OPT pass
120 .negtest
130 MOV R0,#3
140 MOV R1,R0*5
150 MUL R2,R0,R1
160 RSE R1,R1,#1
170 ADD R0,R1,R2
180 MOV pc,link
190 JNEXT
200 PRINT "Press SPACE to run code";
210 IPROG
220 PRINT "R0=";USR(negtest)

```

Listing 2

```

10 REM >ARM2 (ArmProg2)
20 REM By Dave Lawrence
30 REM For 32 bit machines
40 REM (C) EAU April 1992
50
60 DIM code 100
70 link=4
80 pc=15
90 FOR pass=0 TO 2 STEP 2
100 P$=code

```

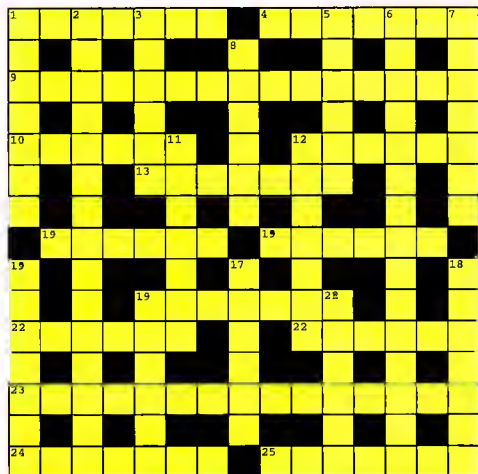
```

110 (OPT pass
120 .negtest
130 MOV R0,#255
140 MOV R1,#15
150 MOV R4,#65536
160 MOV R5,#99614720
170 MOV R9,#4100000000
180 MOV R2,#64
190 MOV pc,link
200 JNEXT
210 PRINT "Press SPACE to run code";
220 IPROG
230 PRINT "R0=";USR(negtest)

```

NOTES

BBC Acorn User cryptic crossword, April 92



Across

- 1 Following revolution, Tsarina becomes a mechanic! (7)
- 4 Policeman needs dark Chinese force to reveal a forger's skill (7)
- 9 "Might Sir fall out?" "From this, Sir surely won't!" (6,9)
- 10 Many singers are so rich, but twisted... (6)
- 12 ...they're all made greedy to some extent! (6)
- 13 Made cryptic notes about officer (7)
- 14 I am left on the quay? (6)
- 15 One who might break about on the ice (6)
- 19 A sore back? There's nothing left but this spray! (7)
- 21 What early Sixteenth century records often looked like (6)
- 22 Peter has white material (6)
- 23 The BBC, for example, manufacture internally, bottom brackets for the bulk of electronic components (15)
- 24 The French model is indeed discontinued (7)
- 25 Spinster has purpose in exploits... (7)

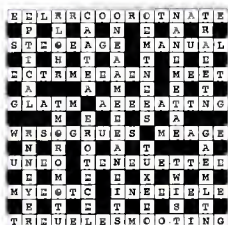
Down

- 1 ... that concerns church uprising amidst staff reform (7)
- 2 Motoring article about something to do with ratios? (15)
- 3 When stung by the wasp, he reacted by hiding the ball! (6)
- 5 Carefully hidden, I follow student into flat (6)
- 6 Readings from tarot inspire ten to reform (15)
- 7 Heavy metal supporters (7)
- 8 What you might look through to find your files (6)
- 11 Wind instrument made from tin, gold and a chunk of nickel (7)
- 12 A place for the environmentally friendly? (7)
- 16 Taken for granted that Sue's mad and deranged! (7)
- 17 Universal magazines? (6)
- 18 One ploy in five starts spreading infections (7)
- 19 Nearly the majority of all... .. and all of the majority! (6)
- 20 These could lessen distortion (6)

Chambers 20th century dictionary is recommended. Send your completed entries to *BBC Acorn User*, 20-26 Brunswick Place, London N1 6DJ to reach us by Friday February 10 1992. Photocopies of your solution are acceptable.

The solution (and winner) will be published in the June issue. Meanwhile the winner of February's crossword (answer shown right) is Paul Chaplin of King's Lynn.

Last month's solution



Circular arguments?

It will soon be summer again and once more fields all over the West Country will be full of crops, meteorologists, psychics and sceptics. Will Doug Bower and Dave Chorley be 'at it' again with pole, plank and string? Will the Plasma Vortex rear its ugly head or will Jimmy Page merely be out with his Box Brownie in search of album covers. Who knows?

But until the first circular speciality this year, perhaps you'd like to have a go at what Doug and Dave did with our specially written one-liner. Type in the listing as it is and squash it with the key definition below - the program won't run properly on multiple lines. The program will run on all Acorn machines and will present you with a beautiful field of golden corn swaying gently in the summer breeze. Doug and Dave are represented by small dots and start off in the bottom left hand corner. G, H, J and I will move them, and, naturally D swaps between who you are guiding. Pressing L will flatten the corn in a straight line between the two hoaxers and the O will make a mystical circle with the selected man at the edge and the other at its epicentre. Rings can be formed by creating a second circle within the first - the pranxters will magically stand all the corn upright again.

Complex patterns can, of course, be formed by combining these basic shapes. If anyone creates any particular masterpieces, we at the puzzle page would be delighted to see your efforts...

```

10 MODEL
20 VDUI9;3;0;19;3;2;0;
30 DIMx(1),y(1)
40 REPEAT
50 GCOL3,1
60 REPEAT
70 k=INKEY0-68
80 n=-((k=0)EORn
90 X=x(n)
100 Y=y(n)
110 x=x(1-n)
120 y=y(1-n)
130 PLOT69,X,Y
140 PLOT69,x,y
150 x(n)=X+4*((k=3)-(k=4
))
160 y(n)=Y+4*((k=6)-(k=5
))
170 r=SQR((X-x)^2+(Y-y)^
2)
180 PLOT69,X,Y
190 PLOT69,x,y
200 UNTILk>7
210 GCOL0,3-POINT(x,y)
220 IFk=8DRAWX,Y
230 UNTILOELSEFORa=0TO36
0
240 MOVEX,y
250 PLOT81,x*SINRADA,r*C
OSRADA
260 NEXT
270 UNTILO
    
```

```

*KEY0 f=PA.+4:t=f:b=&F5:REP.c=(b<>&F5):?t=-?t*NOTc-58*
c:t=t-c:x=f?-1:FOR i=1TOX-4:b=?f:?m=b:f=f+1:t=t+1:N.:f
f+4:U.f?-3=&FF:?t=&D:t?1=&FF:(PA.+3)=t-PA.|M
Function key definition to squash listings on to one line.
    
```

'O' Dear!

John Fletcher of Prestwich, Manchester has a challenge for you. Here are 12 words with their 'O's removed. Can you figure out what the words should be? While you do that, John can work out what to do with his £10 note!

- FFSHTRTHDX
- PRTCLLKUT
- STRERMDRUS
- FRENFTLSE
- RATRICTTNWD
- MNTNUSSCILGY

(see solution next month)

Solutions to March's mixed bag anagrams

- COURTROOM LINOCOLOUR MONITOR
- MIX TORRID PATTERNDOT MATRIX PRINTER
- PARAMETER SETTAPE STREAMER
- ESPRESSO CONCORDSECOND PROCESSOR
- CINDERY MAKE-UPNUMERIC KEYPAD
- CADDISH DRIVERHARD DISC DRIVE
- IDIOT GIVES RIDEVIDEO DIGITISER
- ABORTED CONECONNET BOARD
- FUNKY SECTIONFUNCTION KEYS
- SUPER ALMONDSSOUND SAMPLER

ORDER FORM

OVERSEAS SUBSCRIPTIONS

Magazine only:

Europe £35.00 Rest of World £45.00

With disc: 5.25in 3.5in

Europe £44.00 Europe £49.00
 Rest of World £64.00 Rest of World £69.00

Please tick all the relevant boxes and return this entire page to **BAU Mail Order, PO Box 66, Wetherby LS23 7HL**

I enclose a cheque/PO to Redwood Publishing Ltd

I wish to pay by Access/Visa

Card number _____

Expiry Date _____

Signature _____

FREE ADS

Due to a large backlog of ads, there is no coupon this month. A coupon will be published in next month's issue of BAU

● **Bargain Beeb! BBC B** with DFS and drive, mouse, most with boxes, Only £150 o.n.o. Will haggle. Contact Jamie Prady, Carnforth, Lancs. Tel: (0524) 781195

● **A410/1, 4Mb, 30MHz** Arm3, VIDC Enhancer, Oak 70Mb internal disc, Sesi Card, A5000 Multi Sync - serious offers. Contact C. Ducker, Surrey. Tel: (0276) 20575

● **BBC B with Opus** disc drive, View, Viewsheet, Logo Chips - £265 o.n.o. Leighton Jones, Bristol (0761) 412593

● **A310, 4Mb, colour monitor**, 220Mb hard disc - £700, Epson LQ400 & sheet feeder - £170, **BBC B**, 40T drive, etc. - £150. Contact: Richard paddle, Paignton. Tel (0803) 557843

● **A3000, serial port, Acorn** colour monitor and PRM - £600, A3000 plus monitor - £500 Contact Colin Pouton, Bristol. Tel (0272) 550971

● **BBC B, Twin disc drive**, Spare disc drive, colour moni-

tor, Watford DFS, BBC Casette data recorder, many games - £320, Contact Keith Ashman. Tel: (0923) 222563

● **A3000 LC, 2Mb, colour** monitor, original discs and manuals, Pres housing with extra software -£900 F. Duhig, London. Tel: (081) 3115545

● **Acorn controller + 20 Mb** hard disc - £130, Ram/Rom module with 96K of Ram for Archimedes - £30, 512 co-processor - £80, 6SC102 turbo for BBC - £60. Contact Neil Newman, Farningham. Tel: (0322) 862397

● **Electron AP1 and AP3**, Dumpout 3, back copies of Electron User, Viewstore, approx. 35 games. Contact Michael Holloway, High Wycombe. Tel: (0494) 437672

● **BBC B accessories, 6502** 2nd processor - £75, Watford 128K Rom/Ram board - £60. Spellmaster Chip and manual - £3. Tel: (0283) 815928

● **A3000, Acorn 2Mb** upgrade, Phillips monitor, Acorn monitor stand, £300 pounds worth of software 12 months old, mint condition - £700 o.v.n.o. Contact Nathan Thorpe, Leicester. Tel: (0533) 353448

● **Archimedes A440, colour**

BACK ISSUES

Please fill in the date (back to March 90)

Month _____ Year 90 91

Magazine £1.95 Disc £4.95 (5.25in) £5.95 (3.5in)

For overseas orders, please add £1 (Europe) and £3 (rest of World) to cover mailing costs

Name _____

Address _____

monitor, 5.25in twin disc interface, Ansi C, First Word Plus, Interdictor II, programmer's reference manuals - £950. Contact Peter Haynes, Abingdon. Tel: (0235) 525996

● **BBC B, dual 40/80 external** disc drive, View III word processor, Phillips B/W monitor, cassette and assorted games - £450 o.n.o. Contact Mrs C. Moules, 27 Alexandra Road, Stotfield, Hitchin, Herts, SG5 4NA

● **Basic BBC B, Issue 7, 30** games, educational software, joystick, tape recorder, excellent condition - £75 o.n.o. Contact Mr D. Tucker, Solihull. Tel: (0564) 779713

● **Smart cartridge - £18**, Elite - £7, Speech - £5, Twin joysticks - £10, Repton - £5, AMX Superart+mouse - £40. All BBC Master. Tel: (0452) 760408

● **BBC Master compact**, single 40/80 disc drive with manuals - £250 o.n.o. Contact Mr S. Dumford, Nuneaton. Tel: (0455) 291015

● **BBC B, dual 40/80 disc** drive, wordwise, spellmaster, manuals, books, magazines, joystick, mini office II mouse - £150. Contact N. Mozakka, London. Tel: 071- 482 5948

● **A3000, mono monitor**, serial interface, Pres 5.25in disc interface - £550. Contact Michael Morley, Cheshire. Tel: (061) 973 8063.

● **Watford 2m upgrade** for A310 plus manual, fitting tool - £60 o.n.o. Contact Elwyn Morris, Essex. Tel : (0255) 506303 (evenings)

● **Master 128, disc drive**, joysticks, games, books - £295 o.n.o. Contact Mr B. Goodall, Cheshire. Tel: (0663) 746886

● **BBC B Acorn DFS**, dual drive, wordwise, oxford pascal games - £250. Contact P. Cooper. Tel : 081-783 1621. Evenings only (not weekends).

● **A440/1, Taxan monitor** - £1275. Pres A3000 Plinth with 75Mb SCSI H disc + board - £330. 3.5 D drive - £50. Genesis, Logistix, Atelier, 4vol Riscos manuals. Contact J Huter, Somerset. Tel: (0458) 250130

● **BBC B, disc DFS interface**, Phillips 12in green monitor, disc drive, games - £250. Contact Luke, Portsmouth .Tel: (0705) 865455 **BBC B** with 1772 DFS, microvitec CUB, medium resolution monitor, tape recorder, extras, all in original boxes. Contact Mr R. Emmerson, 091-4171324

New software from

BRIGHT IDEAS

Tiler

£10+VAT

A printing utility which allows you to print Draw and Sprite files at any size using any type of printer. The user simply loads the required draw or sprite file into Tiler specifying the size of poster required, either by using one of the preset paper size, eg. A2, A0, entering the exact dimensions of the poster eg. in millimetres or by



expressing the size as a percentage of the original size. The document will then be increased or decreased in size automatically and printed when required over several pages with crop marks and references provided on each page to assist cutting/overlapping.

Parameters	
Portrait	Landscapes
User scale:	100%
Print unscaled	User width: 100mm
Print scaled	User height: 100mm
Print user size	Paper overlap: 20mm
Print preset page	Print margin: 20mm
A0 A1 A2	Print offset: 0mm
A3 A4 A5	Print offset: 0mm
Prompt between pages	OK CANCEL

TopicArt

A new form of clip art comprising of single discs containing approximately 50 hand drawn high quality draw format clip art images, each on a single subject. Site and area licences are available, please ring for



TopicArt6 - Road Signs

£8

+VAT
per disc.



TopicArt7 - Sports Equipment

Subjects available now;
1 - General
2 - Transport
3 - Costumes
4 - Entertainment
5 - Bugs 2 Slugs
6 - Road Signs
7 - Sports Equip

6 TopicArt subjects are available now. Please specify when ordering.

Buy 4
TopicArt
discs get
one free



TopicArt3
Costumes



TopicArt5 - Bugs to Slugs

TopicArt4
Entertainment

Hardware & Books (All prices exclude VAT)

★ A5000 ★

Upgraded to 4Mb free of charge
A5000 2MHD £1499
40Mb HO & Multiscan Monitor
A5000 2MHDLC £1529
LEARNING CURVE SYSTEM with Multiscan Monitor, Acorn DTP, 1st Words+, Genesis+, PC Emulator, Pacmania, introductory video etc.
A5000 2MHDLC £1759
LEARNING CRV PRINTER SYSTEM including Acorn JP-150 Ink Jet Printer

★ A3000 ★

Upgraded to 2Mb free of charge
BBC A3000 £599
As above with Monitor £799
BBC A3000 LC £639
LEARNING CURVE with 1st Words+, Genesis+, PC Emulator, Pacmania, Lemmings, introductory tape etc.
AS above with Monitor £829
BBC A3000 LCP £1089
LEARNING CRV PRINTER SYSTEM including Acorn JP-150 Ink Jet Printer
BBC A3000 £679
SPECIAL ACCESS
AS above with Monitor £879

Archimedes

A410/1 Base Machine £729
A410/1 2Mb, 20Mb HO £859
A540 ARM3, 8Mb £2495
Special offers do not apply to 0% Finance & Teachers Schemes.

RAM Upgrades

A3000
Up to 2Mb RAM £55
Up to 4Mb RAM £156
A5000
Up to 4Mb RAM £129
A400
1Mb RAM £39
2Mb RAM £75
3Mb RAM £105
Up to 8Mb £649
A540
4Mb RAM Card £399

Upgrades

5.25" Disc Buffer £35
ARM3 £185
Concept Keyboards £Call
Econet Module £46
FaxPack (CC) £289
Graphics Enhancer £169
Hawk V9 Video Dig £199
Mono Digitiser (Archi) £49
Mono Digitiser (A3000) £69
I/O Expansion Card £79
Joystick Interface £25
Joystick for above £10
Midi Expansion Card £65
Micro Mouse (Clare's) £29
PC Exp Card 1Mb(Aleph1) £595
Serial Upgrade A3000 £19
User/Midi Card A3000 £46
VIDC Enhancer £29

Printers

Canon BJ-10ex £209
Canon BJ-300 £359
Canon BJ-330 £409
Citizen Swift 24e £235
HP DeskJet 500 £329
HP DeskJet 500C £549
Panasonic KXP-1123 £159
Star LC-20 £129
Star LC-200 £175
Star LC24-200 Colour £239
LaserDirect (Qume) £859
LaserDirect HiRes4 £949
LaserDirect HiRes8 £1319
LD HiRes4 board £349

Ribbons/Toner

BJ-10ex Ink Cartridge £15
BJ-300 Ink Cartridge £10
LBP-4 Toner £65
Swift24 Mono £4
Swift24 Colour £15

Scanners

Scanlight Junior £129
Scanlight Jr 256 £199
Scanlight A4 £289
Scanlight Professional £849

Monitors

Acorn Colour £199
Philips CM8833 II £199
Taxan MultiVision 775 £389
Taxan 795A £439
Taxan Viking II £749

Books (No VAT)

Acorn Education Directory £3.95
Oabs Archi Assembly Lang £14.95
Dabs Archi First Steps £9.95
Oabs Archi Operating System £14.95
Oabs Budget DTP £12.95
A3000 Technical Guide £29.95
A540/A5000 Tech Guide (ea) £65.00
Acorn DTP Adv User Guide £14.95
Basic V. A Oabhand Guide £9.95
BBC Basic Guide (Acorn) £19.95
RISCOS PRIM's £79.00
RISCOS Style Guide £9.95
1st Word+ Manual (Acorn) £10.00
Acorn DTP Manual (Acorn) £10.00
AASM Manual (Acorn) £25.00
ANSI C v4 Manual (Acorn) £25.00

0% Finance (Inc VAT)

A5000LC System £1799
£179 Deposit plus 12 monthly instalments of £135
A5000LC Printer Sys £2075
£215 Deposit plus 12 monthly instalments of £155
A3000LC System £999
£99 Deposit plus 12 monthly instalments of £75
A3000LC Printer Sys £1275
£135 Deposit plus 12 monthly instalments of £95

Ordering by Telephone

When placing your order please have your credit/debit card ready. We will require the cardholders name, address, delivery address if different and the expiry date of the card.

Ordering by Post

Please specify the goods you require and for which computer in writing including your telephone number & delivery address. Send complete with a signed cheque/postal order or alternatively for credit/debit cards, the card number, cardholders name, address, and expiry date. IMPORTANT - Please write your name, address & credit card details in BLOCK CAPITALS to avoid confusion.

Where to Find Us

From the M63 Junction 12 roundabout follow signs to Cheddle A560 passing the glass pyramid. At the traffic lights nr Ye Olde Woolpack Inn turn left onto Brinksway. Turn next left onto Chester St and immediately left again onto Ford St. Enter on-site car park via Blue Gate.

Terms

UK residents add 17.5% VAT to all prices except books. Carriage is free (except books, paper & large software applications) on mainland UK, elsewhere at cost. Prices and manufacturers specifications subject to change without notification. Goods offered subject to being unsold and/or available. Goods not offered on trial basis. Restocking fee on non-defective returns.

Entrance to on-site Car Park via Blue Gate

M63 Junction 12 Stockport West

AS145

To M56/M62

To M63

To M56/M62

To M63

To M56/M62

To M63

To M56/M62

To M63

WE ARE HERE!



Desktop Projects Ltd

Authorised Acorn Dealer

Unit 2A, Heapriding Business Park, Ford St, Stockport, Cheshire. SK3 0BT



OPEN SYSTEMS INTER NETWORKING

Acorn have had the foresight to write software to allow common links to many types of machines. The protocol which allows this is TCP/IP (Transport Control Protocol/Internet Protocol). This defines the pockets which travel over Ethernet.

Chameleon sell products which allow Terminal emulation, File Transfer, X Windows terminals and allow you to use the hard disk on a Sun type Network file system (NFS).

These products let us link : ACORN, APPLE, IBM PC and most UNIX machines also usefully connect to Novell Fileservers.

Please do not hesitate to contact us to discuss your connectivity problems (UNIX not required)

ECONET IS DEAD - LONG LIVE ETHERNET!

At last the A3000 has an Ethernet Adaptor! This means that all ACORN Risc machines can be internetworked leaving Econet to the trusty 6502.



UNIX MACHINES PRICE DECREASE!



ACORN R225 ARM3 4Mb RAM
Discless Ethernet...£ 1830.00

ACORN R260 ARM3 8Mb RAM
100 Mb hard Disc...£3495.00

ACORN R140 ARM2 4Mb RAM
Now discontinued, we usually have traded-in R140s for sale!

UNIX UPGRADES

R140 OWNERS (If covered by Microcare).....£349.00
(Microcare expired).....£399.00

A440 / 540 etc.£999.00

If you want to run RISC IX 1.2 on your Acorn Archimedes, we are offering an upgrade service. This latest version of ACORN UNIX requires 100 Mb, an ACORN SCSI cord and 4Mb of memory. We can arrange for it to be installed on your current 100Mb SCSI anywhere in the UK mainland. Alternatively it can be purchased pre-installed on the WARP DRIVE ready for use.

This is the same version of UNIX as supplied on the R260.

UNIX STORAGE (Also RISC OS)

In our search for the fastest drive to support RISC IX (Acorn's UNIX), we have produced the Warp Drive a high performance SCSI drive in conjunction with Acorn's SCSI controller card included in R260 computers or an extra £220+VAT if your machine is not already fitted. These devices will work with other controllers but UNIX will not.



Size	Speed	External	Internal
105Mb	9ms	£ 410	£ 310
210Mb	9ms	£ 675	£ 575
420Mb	12ms	£1095	£ 995
676Mb	16ms	£1315	
1000Mb	15ms	£1735	
1600Mb	16ms	£2050	

NEW: SCSI Tape Streamers 150Mb or 525Mb
Two year warranty on all Warp Drives

All Prices add VAT @ 17.5% (15%+2.5% Poll Tax subsidy)

For the Serious Acorn User
CHAMMILTON
COMPUTERS LTD.

Stowell Technology Centre
Montford Street
Salford M5 2SE TEL (061) 745 9849

Pyramid Computer Services

16 Borough Crescent

Stourbridge

West Midlands DY8 3UT

Telephone & Fax: 0384 396739

Carriage Charges: (a) £1.50 (b) £2.50 (c) £4.00 (d) £10.00 (e) £15.00 (f) £20.00
Please add carriage charges as shown and then VAT @ 17.5%. Callers by appointment only please. Educational Orders welcomed. All offers are subject to availability. E. & O. E.



Software

Fun School 3 (under 5s 5-7s or over 7s)	£17.50 a
Smalltalk	£57.25 a
1st Word Plus release 2	£60.00 b
EasyWriter	£116.00 c
Protect V5	£110.00 d
Impression 2	£130.00 e
Impression Junior	£67.00 b
Revelation 2	£108.00 c
Ovation	£81.00 d
Schema	£86.00 b
Pipedream 4	£169.00 c
Multitutor V II	£169.00 c
Graphbox Professional	£106.00 b
Compression	£37.50 a
Air Supremacy	£17.75 a
Bambuzle	£17.00 a
Bubbe Fair	£12.50 a
Cartoon Line	£19.00 a
Cataclysm	£17.50 a
Chucks Away Compendium	£25.50 a
Cluck Reck	£17.50 a
Chess 3D	£12.50 a
Enter the Realm	£17.50 a
Grievous Bodily ARM	£17.50 a
Holed Out Compendium	£16.50 a
James Pond	£18.00 a
Learnings	£17.50 a
Loops	£17.50 a
Manchester United Europe	£17.50 a
Microdrive World Edition	£23.50 a
Mig 29 Super Falcon	£30.50 a
Fandora's Box	£17.50 a
Poizone	£13.50 a
Provoctor	£13.50 a
Saloon Cars	£16.50 a
Top Banana	£17.25 a
Wonderland	£22.50 a

Bulk 3.5" Discs available from Stock
DSD1 800K when formatted for all Archimedes models
50 £20.00 (a) 100 £36.00 (a) 200 £75.00 (b)
High Density (1.6Mb when formatted for £5000)
50 £28.00 (a) 100 £75.00 (a) 200 £145.00 (c)

Memory Upgrades

2nd Mb for A3000 (upgradeable)	£51.00 a
4th Mb for A3000 (Atomwide)	£153.00 a
RAM for A4101 A4201 (per Mb)	£32.00 a
A5000 2Mb (upgrade to 4Mb) (Atomwide)	£105.00 c

Upgrades

FAX-Pack (Computer concepts)	£260.00 d
VIXC Enhancer (Atomwide)	£23.00 a
MEMC'n	£45.00 a
ARM-3 (Alpha-One - the best!)	£195.00 c
166 Backplane for 310 (with fan)	£57.00 b
166 Backplane for 310 (NO fan)	£47.00 b
Vid-Archimedes	£135.00 c
Clares Micro Mouse	£25.00 a
Armades sound sampler board	£127.00 c

Drives

Floppy disc buffer for A3000	£27.25 a
Floppy disc buffer for 310 & 4xx/1	£27.25 a
Drive mounting bracket for 400 410/1 310	£11.00 a
External case PSU / Fan for hard drive	£7.00 b
Syquest 42Mb Removable Inc. disc case & PSU	£450.00 d
Cumana 52Mb SCSI Internal	£275.00 d
Cumana 52Mb SCSI External	£419.00 d
Cumana 105Mb SCSI Internal	£365.00 d
Cumana 105Mb SCSI External	£550.00 d
SCSI cards	From £125.00 c

Scanners

Scanlight Junior	£121.00 c
Scanlight 255	£193.00 c
Scanlight A4 with Sheet Feeder	£360.00 d
Scanlight Professional - NO card	£820.00 e
Scanlight Prof. with SCSI Card	£920.00 e

Printers

Hewlett Packard DeskJet 500	£299.00 d
HP DeskJet Camedges	3 for £37.50 a
HP DeskJet 500C (Colour at 300 dpi)	£499.00 d
Laser Direct - Queue	£699.00 e
Laser Direct Hi-Res 4	£899.00 e
Laser Direct Hi-Res card only for LBP4	£294.00 c
Citizen 120 D	£99.50 d
SeikoSia SP2400	£135.00 d
Printer Cables 1.8m	£9.50 a

A310/A305 UPGRADES

RAM expansion April
2Mb £99
4Mb £163
Special Offers
Claim any of the items below at the reduced price with your RAM upgrade.

The 2Mb board may be upgraded to 4Mb later. Educational and quantity discounts are available.

- 4-layer board gives low electrical noise and trouble-free operation.
- 8-chip design ensures low power dissipation.
- Compatible with all ARM3s, hard discs, backplanes etc.
- Established reliability record. We have been upgrading A310 computers for over two years, and in that time none of the RAM boards which we have fitted has developed a fault and needed repair. Money back guarantee.

"We have had a lot of very positive feedback about the IFEL memory upgrades. Archive.

Impression 2
£125 (RRP - £169)

IFEL 4-slot 4-layer backplane with fan
£50 (RRP - £57)

RISC-OS Carrier board for larger OS ROMs
£17 (RRP - £21)

ARM3 processor
£189 (RRP - £199)

See our other advert in this issue for A3000 and A5000 hardware and upgrades.

Prices exclude VAT



Further information and price list from;



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

SECOND SPRITE

Converting sprites to draw files provides many advantages. **GRAHAM WALTERS** looks at a new package to help you out

Creating draw files from sprites, and your own outline fonts, are the benefits of a new software packages, called *Trace*. The advantage of converting sprites is that, quite apart from the considerable reduction in file size, draw files can be scaled and manipulated to any size, without any loss of resolution.

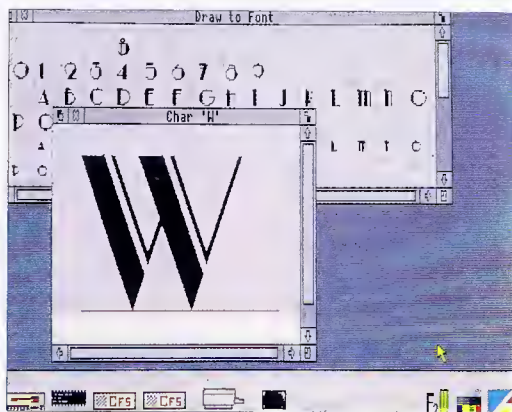
DOUBLE ACT

Trace actually includes two applications, *Trace* and *D2Font*. The former does the file conversion, while the latter converts draw files into outline fonts. Clicking select on the *Trace* icon opens the two main windows which, although initially blank, will eventually show the original sprite file and the converted draw file (see the screenshot below).

On the main menu, if a

draw file has been created, there is a facility to save it either to disc or directly into another program, otherwise this option is greyed out. It is also possible to save the sprite image itself. To initiate the tracing of the sprite, you use the *Trace* option and you can watch the draw file being created in the draw window – the pointer becomes an hour glass.

Choices leads to a submenu with two *Error* and *Save* options. *Error* determines how closely the draw file corresponds to the sprite file. A large value will give a poor rendering of the sprite file, whereas if the number is too small, it will reproduce the individual pixels of the sprite. A figure between 0.6 and 0.8 gives good results, although trial and error is required for a specific image. *Save* lets your



D2Font enables outline fonts to be created from draw files

current *Error* value become the default setting.

Info tells you of the mode, number of colours and size of the sprite and draw images. If you have a number of sprites to trace, you can place them in a directory and drop this on to the icon. Another directory called *Draw* is automatically created and you can then trace each sprite in turn, placing the resulting draw file in this directory. After tracing, a sprite can be loaded into *Draw* for final tweaking, although this was not necessary for most of the sprites I tried.

The type of sprites that *Trace* definitely does not like, are those with any dithering or graduated fills – they generally give very poor results. However, by re-working these areas in *Paint* first, a better result can be achieved.

OUTLINE FONTS

The second application, *D2Font*, loads itself in the normal way. Clicking on its icon opens a grid window which has a small light grey character in the top left hand corner of each box, to show you where to drop each draw file.

One annoying point was that positions for Ascii code numbers 128 to 159 are shown in the grid as hexadecimal numbers. These characters in your font are accessed by pressing the *Alt* key and typing the character's Ascii code number, but it would be better if the Ascii code numbers were in decimal. Double clicking

Select over one of the character squares brings up a window showing a larger version of that character, complete with a red line underneath. This represents the base line of the character, which can then be resized by using either *Select* or *Adjust*.

Normally, you need to make red line slightly larger than the character outline. For characters with tails – such as a lower case *p* – the red line needs to be moved up to keep all the characters in line.

When you have finished compiling your grid, a *Save Font* option presents a directory icon that contains the *Outlines* and *IntMetrics* files. This directory is then copied into your current fonts application. One word or warning. Unlike a normal file, you can't rename a font directory to change the font name, so make sure that the font is saved with the correct name.

CONCLUSION

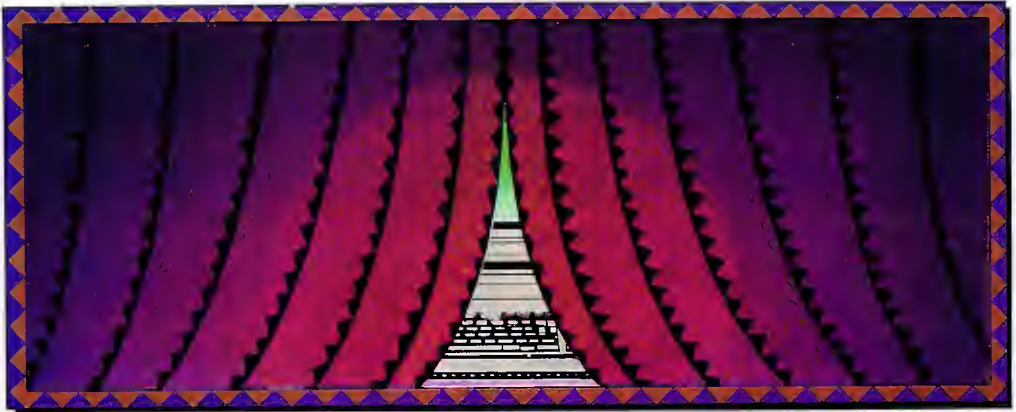
Both *Trace* and *D2Font* are very easy to use and perform their tasks extremely well. Overall, the package represents excellent value for money and is suitable for both school or home users.

PRODUCT DETAILS

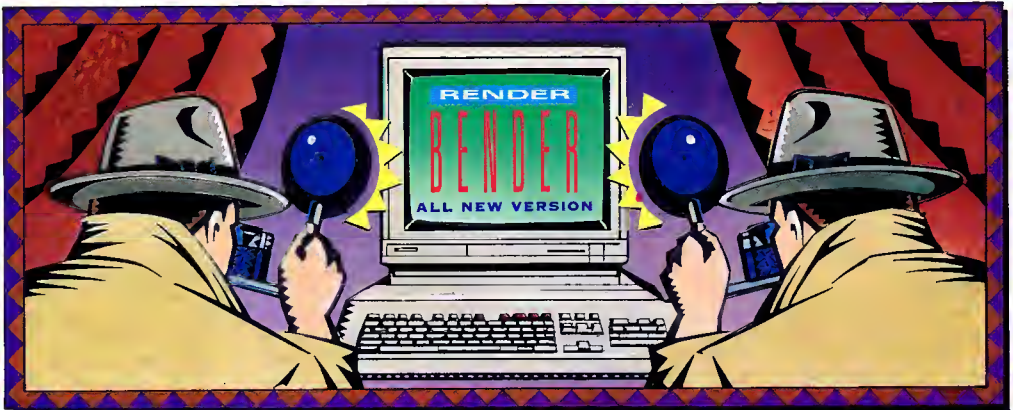
Product: *Trace*
Supplier: David Pilling, PO Box 22, Thornton Cleveleys, Blackpool, FY5 1LR
Price: £5.99
Machines: All Risc OS machines



Windows allow you to watch the sprite being traced into a draw file



What does everyone who creates moving pictures want?



A sneak preview.

Render Bender is the graphics package that allows the user to produce remarkable animated graphic sequences using Ray Tracing.

Ray Tracing isn't nearly as complex as it sounds. Basically, in a ray traced sequence, every pixel on the screen takes all relevant light sources into account. Ensuring that all the reflections and refractions are correctly calculated even if the light is reflected off several surfaces. The image could be no more faithful if you were filming real objects in real light. To produce such a superb animated sequence, however, was quite a difficult task - Until now.

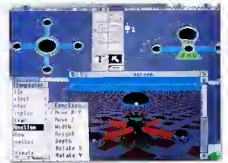
Illuminator has changed all that. It is a fully RISC OS graphical front end to Render Bender. Allowing the user to create a series of frames manually, or to give it a start point and an end point, leaving it to generate the frames in between. What you are getting is the ability to take a sneak

preview. You can see what you are going to get, before you get it. After you've created your outline frames in Illuminator, you then transfer the files to Render Bender, the fully RISC OS Ray Tracing part of the package. Which all means that now, to achieve powerful 3D Animation, you no longer have to be a mathematical genius. You just have to be the proud owner of Render Bender 2.

For more information please write to the address below for a Render Bender fact pack. We're sure you'll find it quite illuminating.

Price - £135.00 inc. Vat.

To upgrade from the original Render Bender to Render Bender 2 send us your original disc plus £74.95.



MEMORY LAPSE

The A310 is sadly lacking in one vital area.

MALCOLM BROWN looks at how you can boost its memory space

Regular users of an Archimedes A310, not to mention the A305, will be well aware of the limitations of the memory supplied. For instance, if you load up *Draw* and *Edit* on the icon bar and then draw a reasonably complex figure, suddenly there's no room left to write about it.

The answer is, of course, to add more Ram. The A310 can handle up to 4Mb of Ram without flinching and several manufacturers have come up with upgrades which allow you to increase the power of the A310 considerably.

There are two sizes of Ram board commonly available – 2Mb and 4Mb. Bear in mind however that these sizes refer to the total Ram in your machine *after* fitting, rather than the amount of extra Ram.

The 2Mb upgrades use the existing Ram in your Arc. (If you have an A305 you may have to upgrade to 1Mb before fitting.) The 4Mb upgrades, on the other hand, add 4Mb of Ram to your machine, and the existing on-board Ram becomes redundant.

Since Ram is relatively low-priced, it makes sense to go straight for the 4Mb and this is the type we have chosen to look at in more detail. It's also a good idea to fit a Memc1a upgrade (a memory control chip) while you're at it. Incidentally, if you believe that one day you might want an Arm3 in your Arc, bear in mind that some Ram upgrades limit your Arm3 choice. It is worthwhile checking with the manufacturers first.

The 4Mb upgrades fall into two categories – those you can fit yourself, as they can be simply plugged in, and those which you are advised to have

fitted by an expert, since they require some delicate wiring and soldering.

PLUG IN

With this type of upgrade (see our Watford and Ground Control boxes), fitting is simply a matter of removing the Memc and Arm chips, and fitting them into the sockets on the new board, then fitting the new board into the old sockets.

However, removing the two chips from the main board is not easy, even with the tools supplied from the upgrade manufacturers. You should also remember that these devices are easily damaged by static electricity – walking across a nylon carpet can generate up to 10,000 volts in your body!

WIRED IN

The cheapest option is a directly wired-in solution (see our Atomwide and lfel boxes). The memory board is plugged into specially installed sockets. These are simple 16 and 18-pin sockets and cost only a few pence but you do have to do a lot more work to connect up to these lines. Many other connections must be made to various parts of the Arc's existing memory and to the Memc chip.

Removing the old memory chips and installing these sockets is not for the faint-hearted or the inexperienced. The upgrades are cheaper but if you do try it yourself, you could make some expensive mistakes. Instead, it is best to leave it to the experts and use the fitting service provided.

CHOOSING A BOARD

For this review we looked at two plug-in boards and two

ATOMWIDE

Price: £199

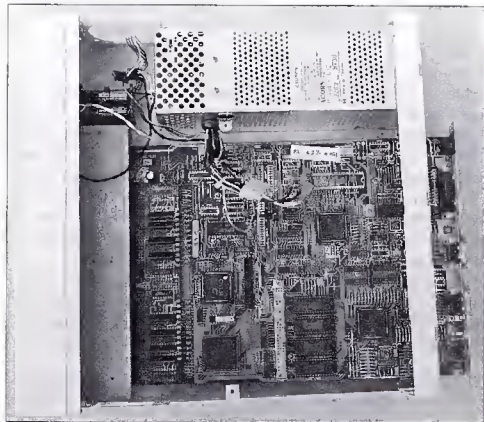
This includes a fitting service, courier service and a Memc1a

Tel: (0689) 838852

This board is certainly not one to be fitted at home. Atomwide provides a collection and delivery service, as well as fitting – which just as well, this board is even more tricky to fit than lfel's – 24

fiddly resistors need to be soldered into place. It looks extremely similar to the lfel model and fits into the same installed sockets.

The Atomwide upgrade does have slightly fewer chips, but this is not really apparent to the end-user. This is a four-layered circuit board so there should be no line noise problems, even when the machine is subjected to the hardest working conditions.



wired-in boards. Unfortunately, the cheapest board around (£155 for 4Mb) from Simtec, (0772) 812863, was undergoing a design revision at the time of the test and so could not be included.

When making a decision, the first choice is whether you can bear to be without your beloved Arc for a day or so. If the answer is no, then self-fitting is the only option and you should go for Ground Control or Watford because of their installation simplicity. Of

these two, the Watford board must win out because it is a four-layer construction, but I would like to have seen some additional insulation.

The cheaper option, and perhaps the better one in terms of compatibility with further upgrades, and the likelihood of it staying put in your machine, is a hard-wired board. lfel and Atomwide produce hard-wired boards and there is little to choose between them, since they are both both well designed and well made.

IFEL

Price: £219

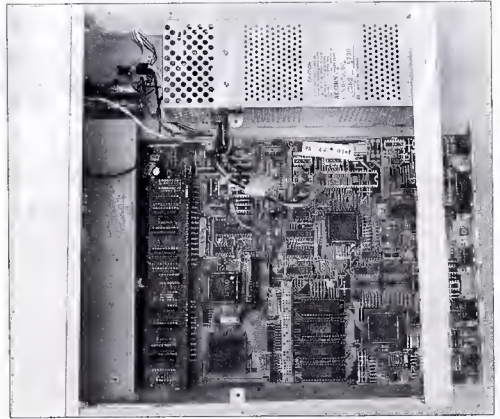
This includes a fitting service, and overnight courier service, plus an Memc1a, and Rom upgrade board
Self fitting price: £199 (with Memc1a) or £163 (without Memc1a)
Tel: (0752) 847286

This is really a dealer-fit upgrade. Although Ifel welcome DIY fitting and the upgrade can be supplied with some excellent DIY instructions, only the extremely adept should attempt to fit this board at home. The Ram

board is quite small, without the need for Arm and Memc sockets. (It also provides enlarged sockets for Risc OS 3 chips, in anticipation of a possible plug-in upgrade).

As well as connection via the installed sockets, three wires connect to address lines on the Memc socket underneath the board. The whole main circuit board needs to be completely removed in order to fit this upgrade.

The Ifel Board is four-layered and is well made. It is a neat and long lasting memory upgrade.



GROUND CONTROL

Self-fitting board

Price: £243

Tel: (0635) 524008

This board is of the easy, self-fit kind. At first glance it looks extremely neat and compact. However, all is not as it seems. First off, this is a two-layer board. It has no ground plane layer underneath the tracks on the surface: these are used to guard against electrical noise which can interfere with the data and corrupt the micro-processor operation.

What's more, the use of conventional (rather than surface mount) chip plugs and sockets has created a design with small sub-boards holding the sockets for the Arm and Memc. This lengthens the tracks at risk

from noise. Also, one logic chip on the board has several unterminated inputs – again bad design practice. However, it must be said that we found no problems of noise during the review and such troubles would usually only show up in a heavily loaded Arc.

Full marks to Ground Control for using the top quality McKenzie plugs for the Arm and Memc on this board. These require minimum force to insert them into the sockets. Just as well, since the fitting instructions suggest that you leave the main board in place, so it is put under some strain when you press home the new board.

All in all, rather more attention to detail would make this board cheaper to produce and a clear winner.

WATFORD ELECTRONICS

Self-fitting board

Price: £265

Tel: (0923) 237774

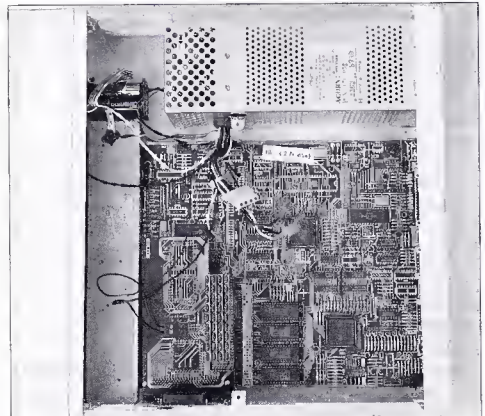
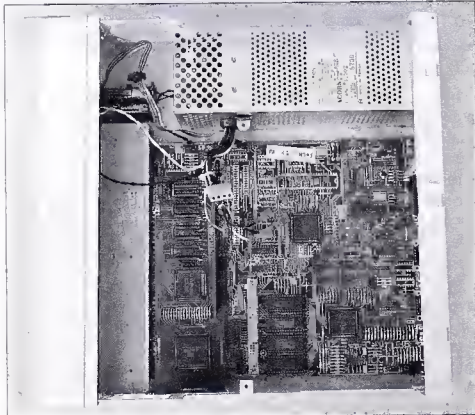
Another self-fit board, this upgrade is thoughtfully supplied with a chip removal tool for the Arm and Memc. However, this is not necessary, since a small screw-driver works much better. Also provided is a new floppy drive cable – the Ram board gets in the way and a longer cable is needed to snake around it.

Once the Arm and Memc chips are removed, the upgrade board is plugged into the empty sockets on the motherboard. A second board then slots into place and is used to hold the relocated Arm processor. So to

upgrade to an Arm3 simply involves unplugging this second board.

Again the instructions say to leave the main board in place during the installation. Given Watford's choice of low-cost plugs, more pressure was required to fit the upgrade to the main board, putting it under some strain.

The smaller board fits up against the metal side of the Arc and is insulated with only a sheet of clear plastic. This could easily be pierced by a pin causing a short circuit and on the review sample, this had already happened. However, the upgrade is otherwise well-made. It is a four layer board (although the sub-board is only two-layer) and, if you add a bit more protection to the smaller board, it is an excellent design.



TOPO LOGO KA?



You've heard of *TurtleGraphics* - now try *FreddyGraphics!* **Freddy Teddy's Playground** features our loveable bear in the place he loves best. Children teach him by clicking on icons, eg 'get on swing'. Control is either in 'immediate' mode (he does it immediately) or in 'auto' mode (build a procedure). Superb animation, sampled speech (counting words) and *Concept Keyboard* support. **£29.95 ex VAT. Includes free Site Licence. RISC OS 2 and 3.**

TinyLogo/TinyDraw (Version 2.00) is our best-selling art and maths pack for infants and children with Special Needs. *TinyDraw* turns the whole screen into a drawing & colouring area, offering 3 pencil thicknesses, a jug, shapes (rotatable and resizable), a rubber, and even an undo facility. *TinyLogo* is a gentle introduction to on-screen control. **£29.95 ex VAT. Includes free Site Licence. RISC OS 2 & 3. (Upgrade to Version 2 only £5.00 plus VAT!)**

ScreenTurtle, by **Marshal Anderson**, is our new user-friendly version of the popular computer activity we've all been using for the last decade - haven't we? Includes built-in help, screen loads & saves, command and define modes, recursion, a paint command (colour in the patterns you've made) - all the features you'll need to give children a headstart in this vital Nat. Curr. skill. Only **£39.95 ex VAT. Includes free Site Licence. RISC OS 2 & 3. (Due Feb.)**

Don't forget we still produce edsoft. for all the Acorn machines - including the **BBC, Master & Master Compact** - and classic adventures like **Peter Killworth's Giant Killer** and **The Doom Trilogy**, **Jon Thackray's Acheton** and - due any time - **Jonathan Partington's** latest release, **SpySnatcher!** Full catalogue on request.

PO Box 39
Stilton
PETERBOROUGH
Cambs PE7 3RL



Official Orders
ACCESS & VISA
tel & fax
0733 244682

JR Letronics Co

- * Super Archimedes Computers
- * A540, A5000, A3000 & others
- * Computer Peripherals
- * Educational & Business Software
- * Manuals, Discs & Paper

Proprietor:
J.H. JARLETT

Acorn 

The choice of
experience

081-977 8053 (TEL/FAX)

The Annexe 2 Broad Street Teddington

(Entrance in Queens Rd) Middlesex TW11 8RF

Mon to Fri 10 to 5 Sat 10 to 2
After-sales helpline - We try to help



KINGSWOOD
CENTRE

Residential schools centre requires young enthusiastic staff to work in the following areas: Computer instruction; outdoor activities and kitchen assistants.

All positions are 'live in, all found'.

Contact Chris Young or Jon Godson on
09074 6141

Kingswood Centre Limited
Barn Lane Nr. Albrington
Wolverhampton WV7 3AW
Tel (09074) 6141 24hr (09074) 6025
Fax: (09074) 5424

Want a dirt cheap Archimedes Computer ?...

... don't come to us!

However, we can offer you...

- Expert advice on the best Archimedes hardware and software for your needs
- Fast, courteous mail order service, once you have decided what you want to buy
- After sales service from people who know what they are talking about
- A magazine which we publish, called "Archive", to keep you up-to-date
- Special discounts for Archive subscribers on both hardware and software

Why not give us a call and talk to Paul or Adrian?

...Remember, price isn't everything!

Norwich Computer Services

96a Vauxhall Street, Norwich NR2 2SD. Phone 0603-766592. Fax -764011

Computer Holiday for young people !!

Scripture Union runs a computer holiday for 13 to 16 year olds at an attractive school set in the Hertfordshire countryside. The dates? August 3rd to 11th. The price? £101. For details, write to Jim Maddox, S.U. Holidays, 69 Cloverdale Road, London SW2 2DH or phone 081-671-8761.

ACORN APPROVED LONDON DEALER

Wide range of software and
hardware stocked

EDUCATION ORDERS WELCOME
PHONE FOR BEST PRICES

Easy to get to

Train: WOOD ST Station
(British Rail)
Road: Bottom of M11,
just off North Circular
Tel No: 081-521 1784



AUTOMATIC SERVICES

217 WOOD STREET
WALTHAMSTOW
LONDON E17 3NT



Weather Data

Weather Satellite Systems Now available for the Acorn Archimedes A310 and A3000. This Meteosat systems comes complete including everything from the Antenna to the software. Animation is standard allowing the dynamic progress of weather fronts to be monitored and tracked. High resolution images of 800 pixels by 800 lines can be stored and manipulated in colour or grey scales on any standard colour monitor. Acorn Change FSI registered and compatible. Capable of receiving up to 400 images every day this remarkable system costs just £799.00. Other Timestep products include a fully featured **LANDSAT** image Processor with 20 field study images and three full colour manuals. Acorn Change FSI registered and compatible of only £59.95

PC Globe and **PC USA** are full colour graphical databases of the world with an amazing amount of reliable data. The special Timestep education price is only £59.95
Send for our full catalogue.

Timestep Weather Systems

Wickhambrook Newmarket, C88 8QA England.
Tel: 0440 820040 Fax: 0440 820281

Special Offer Memory Upgrades

A5000 Memory - 2Mb £95

Expand your machine to 4Mb with our simple-to-fit expansion board. This high-quality board can be fitted in minutes. Just undo the case screws, slide back the lid, change a link and plug in! Since the 60mm high board fits vertically in the machine, there is no need to remove the disk drive tray as required when fitting other, larger boards. To minimise electrical interference and to ensure the highest reliability in operation, we use quality components, mounted on a 4-layer PCB, as specified by Acorn.

The board is also available in two additional options to upgrade a basic 1Mb machine to either 2 or 4Mb. We are also developing a 4-Mb card to be used in conjunction with our existing upgrade.

A3000 Expandable Memory 1Mb £45 - 4Mb £135

Well proven, easy-to-fit, plug-in upgrade to 2 or 4Mb of RAM. Quality sockets enable future user-upgrading to 4 Mb by simple replacement of the eight chips, at a cost of £120. Compatible with other internal upgrades. In using only eight chips in the design, the load on the power supply of your computer is kept to a minimum. This is especially important when an internal hard disk is fitted. Reliability is further enhanced by our use of approved connectors. Instructions included.

305/310 Memory - 4Mb £155

High quality upgrade to 4Mb of RAM. Fitting it yourself requires some ability in soldering. Alternatively, call us or your local dealer for a fitting service. MEMC1a not necessary. Will not obstruct other upgrades (ARM3, larger OS-Rom carriers, MEMC1a, external floppy buffer etc.) as our board lives under the disk drive bridge. Low-power consuming, fully buffered, eight-chip design avoids overheating for reliable operation. Full instructions included.

A400/1 Memory - £34 per Mb

Upgrade to 2 or 4Mb using our easy-to-fit memory packs, with full instructions.

Risc-OS3 Carrier Board - £20

When Risc-OS3 becomes available, owners of 300 series and old style 440s will need to fit an adaptor board to convert the Rom sockets of their machines to take the new larger capacity chips. The board is configured to take existing Risc-OS2 Roms so it can be fitted and tested now, and will only need a couple of link changes to accept the new Roms. Comprehensive fitting instructions are included.

Quality Assurance - everything we sell is fully tested before despatch

10% discount for educational users. 17% VAT to be added to UK orders. Please make cheques payable to SIMTEC. Carriage free within EEC.

SIMTEC

ELECTRONICS

Avondale Drive, Tarleton,
Preston, Lancs PR4 6AX
Tel: (0772) 812863



TMJ Computer Software

15 Harborough Road, Desborough, Northants, NN14 2QX
Telephone & Fax 0536 762713
Online BBs Darkhaven - 0604 413716

What You See Is What You Pay

	21.99	No VAT or P&P to add		113.99
Air Supremacy	21.99		Schemo	113.99
Bug Hunter In Space	15.99		PC Emulator	113.99
Bug Hunter	15.99	Pandora's Box 19.99	EDUCATIONAL	
Black 147 & Superpool	16.99	Region 3 16.99	Fun School 2: under 6	15.99
Bubble Far	16.99	Spriffle Fury 77.77	Fun School 2: 6 to 8	15.99
Blitz	16.99	Superior Golf 16.99	Fun School 2: 8 plus	21.50
Bumblebee	16.99	Saloon Cars 19.99	Fun School 3: 5 to 7	21.50
Chocks Away	19.99	The Real McCoy 25.99	Fun School 3: 7 plus	21.50
Chocks Away Extra	16.99	The Real McCoy 2 25.99	Let's Spell At home	20.99
Chocks Compendium	36.00	Trivial Pursuit 25.95	Let's Spell At the Shops	20.99
Chess 3D	16.99	Top Banana 21.99	Let's Spell Out and About	20.99
Chequered Flag	21.99	World Champ Baking 20.50	Things to do with Numbers	21.99
Cataclysm	19.99	Wonderland 29.99	Things to do with Words	21.99
Chuck Rock	21.99	Waterloo 21.99	HARDWARE	
Dreadnaught	34.00	Zelanites 19.99	Armadae Sampler	141.95
Dreadnaught add on	14.50	X-Fire 19.99	Delta Cat	31.99
Elite	37.99	MUSIC & SPEECH	Arc/A3000 Games Control	35.99
Enter the Realm	19.99	Armadae 69.95	Mouse/Joystick Splitter	17.95
E-type Compendium	19.99	Rhapsody 2 54.99	Micro Mouse	32.00
Fine Racer	16.99	Articulate 19.99	CUMANA 1 meg upgrade	59.99
Flight Simulator Tool Kit	38.99	Speech! 16.99	PRINTER RIBBONS	
Snivous Boddy ARM	19.99	ART & CAD	Citizen 120D	4.50
Holed Out Compendium	19.99	Atelier 89.99	Citizen Swift 24	4.50
Hostages	16.99	Render Bender 2 113.99	Epson LQ400/500/550/850	4.50
Interactor 2	29.95	Illusionist 89.99	KXP1080/1081/1180	4.50
James Pond	21.99	Tractor 55.00	Star LC10 & NK1000	4.50
Lemmings	21.99	Che Art 1 30.00	Star LC200 Mono	4.50
Legend of Lost Temple	21.50	Eucild 59.00	Colour	13.75
Mad Professor Mariani	16.99	Arctart 19.99	DUST COVERS	
Man U. Football	21.99	DESKTOP PUBLISHING	A3000 (Keyboard only)	6.99
Man U. in Europe	12.99	Imprestion 11 160.95	A3000 & Monitor	9.99
Microdrive Extra Courses	12.99	Imprestion Junior 87.95	Archimedes 2 piece	9.99
Microdrive World Edition	25.50	Desktop Office 105.95	ODDS & ENDS	
Mig 29 Fulcrum	30.99	Protect V 5 134.95	3.5 inch Disc boxes: 80	8.00
Mig 29 Super Fulcrum	32.99	BUSINESS & UTILITIES	100	10.00
Newyear	16.99	Arc DFS 26.99	Mouse mats	3.00
Pacmania (Domark)	16.99	ArcTerm 7 69.95	3.5 inch Head Cleaners	3.50
Powerband	19.99	Compression 50.50	MANY MORE TITLES - PLEASE ASK	
Poizone	16.99	Home Accounts 39.99		

WE HAVE MOVED!

Please note the new address and telephone no. above.
We regret any inconvenience caused.

New Titles in Stock:

Fun School 4 £21.50 all age groups
3D Construction Kit £45.00

Everything's a Bargain!

**Cumana 4 Meg Upgrade
for A3000
only £159.00**

All prices include VAT and P&P
Access and Visa Accepted
Open Mon-Fri 9.30am - 12.00pm
1.30pm - 5.30pm
Saturdays 9.30am - 12.30pm



WORK OF ART

Is this the moment that designers have been waiting for?

ROB MILLER looks at the release of ArtWorks

Computer Concepts is a company renowned for its high quality software. One case in point is its desktop publishing package *Impression 2*, which is used to produce *BBC Acorn User*.

So the announcement of *ArtWorks*, CC's new design package, has been causing something of a stir among BBC A3000 and Archimedes users. Will the new package do for design what *Impression* has done for DTP? We were invited by Computer Concepts to have an exclusive preview of the new *ArtWorks* package.



ArtWorks is best described as a high-quality design package and was used to create all of the images shown here, including the very impressive picture of a Mini, shown above.

The package is designed to be easy to use, yet is also sophisticated enough for the professional user. So what is *ArtWorks* capable of?

OBJECT-BASED

Firstly, *ArtWorks* is *not* a painting package. Although it is used to produce pictures, it is an object-based program (in the same way as *Draw*) and

builds up images of lines and shapes, rather than using individual pixels.

Every object within *ArtWorks* – whether it be a line, shape or text – is treated as an individual item and can be changed independently of those around it. *ArtWorks* is also a modular program, made up of many smaller modules which combine to form the complete package. When run, a control program loads in each module from a special directory and installs it within the *ArtWorks* environment.

STARTING UP

Like *Impression*, *ArtWorks* requires a dongle (a small black box) to be fitted to the parallel port of the machine before it will operate. Much

has been said about the use of dongles, both for and against, but I think they are a good way for software companies to protect against piracy – and they do not really effect the user once they are in place.

Running *ArtWorks* produces a start-up window displaying the version number of the software. A selection of icons then appear in the window, signifying which modules are being loaded into *Artworks*. It is then installed on to the icon bar.

A number of features from *Impression 2* have been carried over to *ArtWorks*. Any number of pictures can be loaded (or created) simultaneously, given that the host computer has enough memory. Different documents can be viewed (if loaded) or removed



Just one of the samples from the ArtWorks gallery

from *ArtWorks* as normal. Also, different preferences can be set up that affect the overall use of the package. Selecting

the preference option displays a menu covering the different tools available. Key shortcuts can be customised to allow quick access to different tools.

You can alter: angle constraint (which effects the angle that objects can be rotated to); page units; font units; the appearance of the text cursor; the appearance of the toolbox, and the way in which draw files are loaded to, and saved from *ArtWorks*.

As there are now two different *Draw* formats (Risc OS 2 and Risc OS 3) *ArtWorks* needs to know which one it is dealing with. There are also some features in *ArtWorks* which cannot be shown directly in *Draw* – graded fills for example – so there is also an option to set the quality level in a picture when converting from one program to the other.

RUNNING ARTWORKS

Clicking on the *ArtWorks* icon produces a blank window and clicking on this brings up two other windows – the toolbox and the info bar.

Both windows are panes, meaning that they are actually a part of the main window and move about whenever the main window is repositioned. This option can be changed in the preference menu.

In keeping with the modular nature of *ArtWorks*, tools are organised into obvious groups in the toolbox window. Tools of a similar nature that are not shown on the toolbox can be accessed by clicking Menu, as you would with a conventional Risc OS menu. The toolbox itself is editable; tools can be rearranged, removed or added

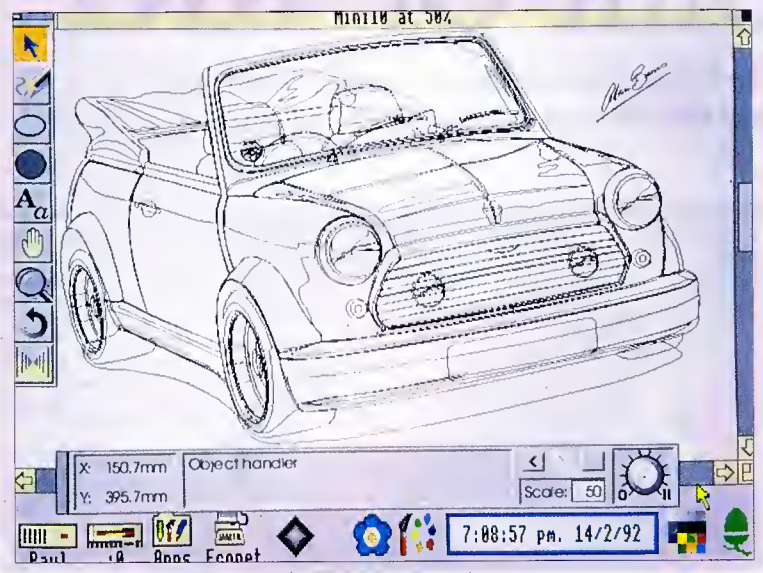
HOW TO DRAW THE LINE

The Mini car shown on the previous page was initially produced from a detailed line drawing, making the line tools one of the most important parts of the entire *ArtWorks* package.

Three line tools are provided; straight, curved (or bezier), and freehand. Users of *Draw* (myself included) often take some actions for granted. *ArtWorks* has been written to be as intuitive as possible so there are a few basic changes that can initially take some time to get used to. The line drawing tool, for example, only joins points when you click on a new point. There is no continuous 'rubber-banding' as in *Draw*, although lines can be dragged around by holding down the select button on the mouse whilst drawing. Filled objects can be created by just dragging the start point of a line

over the end point whereby they 'snap' together. Curved lines are created in a similar way to straight lines; select a new point and *ArtWorks* will draw a line between that and the last point. Like Bezier lines in *Draw*, each point has two associated control points which effect the shape of the curve.

Moving one of the control points will automatically move the other in order to maintain the roundness of the curve. 'Sharp' points can be made by selecting a special corner option on the Info box. Freehand lines can be drawn by just doodling with the mouse as you would in a normal painting package. *Artworks* will then take the squiggle and attempt to fit a curve along it. The level of accuracy can be set with a slider control and the results are impressive, especially with a fast Arm3 machine.



to customise it to the user's requirements. You can drag tools from the sub-toolbox to the main one, but dragging tools from the latter removes them and places them in the appropriate sub-toolbox.

The info bar plays a less active role. It displays a constant readout of the mouse position (in millimetres) and also the scale of the current drawing, easily altered by typing in a new percentage. However, two of *ArtWorks*' most useful features are controlled from the info bar – the undo/redo feature and the Wysiwyg (what you see is what you get) control.

Any operation can be undone by clicking on the left arrow or redone with the right arrow, and it is even possible to perform multiple undos to take a drawing back to the beginning. The undo list is saved with its associated drawing, as part of an *ArtWorks* file, and will record all actions required to create that particular illustration. But you cannot rely on it completely: there are cases when it is impossible to redo an undo, such as when deleting a complex object. A warning will be issued if you attempt such an action.

The Wysiwyg control knob allows the level of rendering in a picture to be set from simple outlines to fully shaded objects. The dial runs from one to 11, one being outlines and 10 being fully filled in objects. When set on 11, all lines are anti-aliased, producing a very clear display in any 256-colour mode, particularly when using

a multiscan monitor. Generally, the picture quality, even in 16 colour modes, is excellent, especially if the primary palette feature is selected. This sets the desktop palette so that a full colour spectrum can be displayed using dithering.

Panning or scaling the main window can take some time, especially if you are working on a complex drawing, so a special button on the info bar allows you to update the picture in the background.

IMAGE CREATION

So, how do you go about creating an image with *ArtWorks*? Well, as we said earlier, this is an object-based application, and there are only two basic objects in *ArtWorks* – lines and shapes. A line is just like a path in *Draw* and consists of a number of points with a start and end, while a shape is any line that has its start and end points joined together.

Pictures can then be built up by drawing lines and shapes of any colour together and then editing each object until you like the results. The tools used to build up a picture can be split into two categories – those that create objects, and those that change or manipulate objects in some way. These tools deal with different aspects, including lines, shape colours, and other useful features, such as zoom.

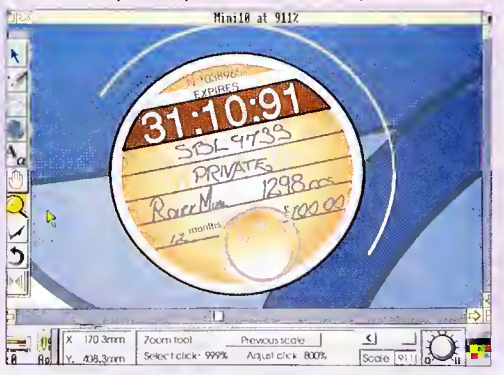
TEXT

All text is stored in modular form, in keeping with the rest of *ArtWorks* and is regarded by the program as a shape (or

ZOOMING IN

One of the most impressive *ArtWorks* tools is the magnifying glass used to zoom into the entire picture or selected parts of a picture.

Here we have zoomed in on the tax disc of our original Mini (which just happens to be out of date – tut, tut!)



shapes). This means that text can be typed in, rotated, shaded and can still be edited at all times. A new FontManager is provided with *ArtWorks* to allow rotated text, even in Risc OS 2. Text files can also be loaded in and edited, even after rotation and filling.



Although not available as yet, it will also be possible to have text squashed into envelopes (see section on moving) and still be able to edit it.

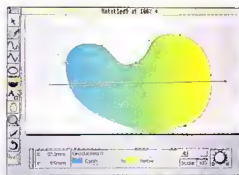
The caret will even change shape according to its whereabouts on a line.

SHAPES AND FILLS

Three shape tools give ellipses, rectangles and rectangles with curved corners. All three tools can be 'restrained' (by holding down the CTRL key on the keyboard) to produce regular shapes, such as circles, squares and rounded squares. The CTRL key is also used when another sort of 'locking' action is required: namely scaling and rotation.

But one of the most impressive features of *ArtWorks* is the graduated fill. In *Draw*, if you wish to 'shade' objects, a number of multiple objects have to be overlapped and

coloured to fit the required scale. While *Draw* lets you do this automatically in Risc OS 3 the resulting file is large and awkward to edit. In *ArtWorks*,



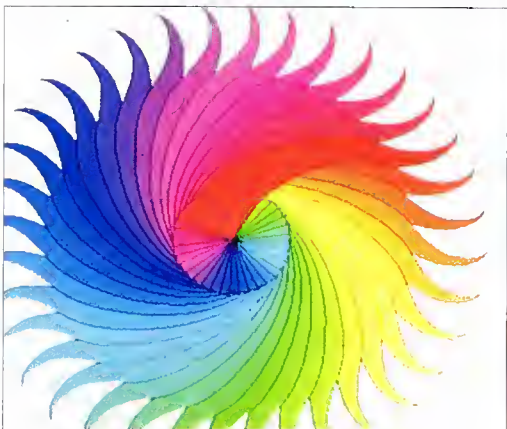
however, you merely specify a start and end point, and the two colours to fill between, and – hey presto – there it is (see picture above).

Fills are stored as just those items, thus saving a great deal of memory. Another advantage of *ArtWorks* is that they are shown as one smooth graduation, using *ArtWorks*' own special dithering routine.

COLOUR

Because *ArtWorks* is a 24-bit, full-colour illustration tool, likely to be used up to professional level, a lot of care has gone into colour selection and the provision of a wide range of colours (shown left). Selecting colours for filling is simple and is done in much the same way as selecting styles in *Impression 2*. A basic list of shades is always available – eight greys and eight colours.

The list can be added to by selecting a current colour and altering it using one of three techniques; RGB, HSV and CMYK. RGB (red, green and



The colour range is an important part of the *ArtWorks* program

blue) is the method used in the Risc OS palette utility. HSV is hue, saturation and value, hue being the general colour from the spectrum, saturation the strength of the colour and value the level of black within the colour.

CMYK is a special method commonly used in printing and refers to the amount of cyan, magenta and yellow ink required for each dot in a picture. The K stands for key and is the level of black needed.

MOVING

Any line or shape can be rotated or scaled around a movable point. The CTRL key can be used to fix rotation to steps of any predefined angle or to force objects to scale in both width and length.

Those who have used programs such as *DrawBender* and *BBC Acorn User's* very own *Stretch* program, will be familiar with the effects of the envelope tool. Rather than try to explain it, take a look at picture opposite which shows our familiar BAU logo, before and after stretching, using the envelope shown. By moving the control points on the

envelope, any object within it can be stretched or squashed.

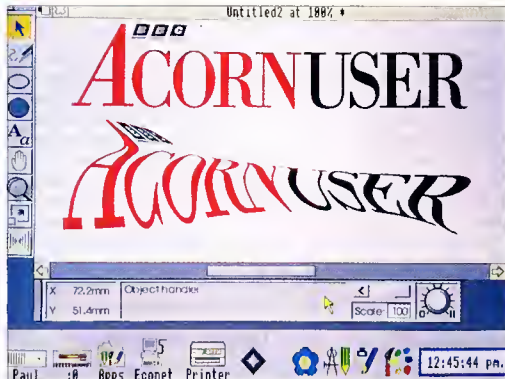
The perspective tool can also alter the shape of an object by dragging the points on to a quadrilateral, surrounding the object. The resulting picture is shown in true perspective, instead of being merely squashed.

THE COMPETITION

So how does *ArtWorks* compare with the design giants such as *Corel Draw* on the PC and *Aldus Freehand* or *Adobe Illustrator* on the Apple Mac.

Firstly, a number of things are very similar, such as the fountain fills from *Corel Draw*, plus the ability to import files from the three programs above. This means that *ArtWorks* has an immediate picture library. Loading a *Corel Draw* file is just a case of using a PC disc reader (already present in the new A5000) and dragging it in.

Users of illustration programs on the PC and Mac should have no trouble getting to grips with *ArtWorks* – once they become familiar with Risc OS. Computer Concepts has made the transition easier



The envelope tool allows for some highly versatile shaping

by including a utility, *FlipTop*, which allows you to change mode by just selecting the resolution and number of colours needed.

Where *ArtWorks* goes further is in its capacity to exploit the advanced features of the Archimedes, which makes it incredibly fast to use. Timings made, comparing programs such as *Corel Draw* running on 486-based PCs with *ArtWorks* running on an Arc with an Arm3 processor, showed that a typical redraw speed was up to five times faster with *ArtWorks*.

THE FUTURE

Because *ArtWorks* is modular in design, tools can be removed or added to the program. This means that in the future, it will only be necessary to add or replace existing modules if you want an updated version of *ArtWorks*.

Computer Concepts is hoping that third-parties will design their own *ArtWorks* modules and a reference manual will be available for those wishing to do so.

A typical example of an later addition would be, say, a graph module that could then, in turn, make use of *ArtWorks'* existing fountain fill and perspective tools. The list of possible add-ons is virtually unlimited and I can imagine a whole flood of them just as soon as the main program has sold a few copies.

In addition to the features outlined (no pun intended) it will also allow text to be typed around a curve, real-time in-betweening from one object to another, a grid facility for

accurate drawing and smart-duplicate feature to allow repeated patterns to be created simply.

CONCLUSION

Although they both operate as object orientated graphics packages, comparing *ArtWorks* with *Draw* is rather like comparing *Impression* with *View* (on the BBC Master). Both do basically the same thing, but the former application is the only choice if you want high-quality output.

Many effects that would take a long time to produce in *Draw* can be achieved in seconds with *ArtWorks*. The overall speed and friendliness of *ArtWorks* makes it possible to experiment with ideas, thus aiding productivity. Given time, patience and a little bit of artistic skill, the results can be astounding, as some of the examples here demonstrate.

With the addition of Computer Concept's Colour Direct printer (see this month's Graphics page) it forms what is perhaps the easiest to use, but most advanced graphic illustration package, on any personal computer today.

ArtWorks should be out by late spring and, despite being aimed at the professional user, I can see it becoming as popular as *Impression* is today.



ArtWorks can produce illustrations in virtually any chosen style

PRODUCT DETAILS	
Product:	ArtWorks
Price:	Under £200
Suppliers:	Computer Concepts
Tel:	(0442) 63933
Machines:	All Risc OS machines
Release date:	Late spring

IFEL36 Upland Drive, Derriford, Plymouth PL6 6BD
Tel (0752) 847286. Fax 840029**A5000
£1499**

Acorn's new machine with RISC OS 3, multisync monitor, ARM3, and 40Mb drive. An extra 2Mb of RAM (4Mb total) is included free.

A5000 learning Curve - £1531. (£1798.92 inc. VAT)

**A5000
RAM
£99**

Upgrades your 2Mb A5000 to 4Mb. High quality 4-layer board as recommended by Acorn. Fitting does not involve any soldering. Extra 2Mb (4Mb total) £99.

N.B. This upgrade is currently supplied free of charge with both of the A5000 systems above (ie standard version and the Learning Curve).

**A3000
RAM**

- Only 8 RAM chips - low power consumption
- User fittable - no soldering required
- Available as a "bare board" (ie sockets, but no RAM)
- Gold-plated connectors ensure long term reliability
- 4Mb - £148.95 2Mb - £55 Bare board - £25.50

**A310
RAM**

8-chip design ensures low power consumption. Compatible with ARM3 upgrades, backplanes, hard discs etc. Larger OS ROM option. Four-layer circuitry reduces electrical noise for trouble-free operation. The 2Mb board may be upgraded to 4Mb later. We offer a no quibble money back guarantee on this product.

2Mb - £99

4Mb - £163

See our other advert in this issue for special offers.

All prices exclude VAT.



Further information and price list available

**UNIQUEway****OFFICIAL COMPRESSION CENTRE**
Authorised Acorn Dealer and
Value Added Reseller.**Acorn**
Replay

Full details of our Acorn Replay compression service available on request. Normal turnaround 72 hrs for 12.5 fps CD-ROM Movies. Educational enquiries especially welcome. Demonstration CD-ROM available soon.

PACE Linnet 32 £358
V22, V22bis, V32 9600 baud modem**A5000 Learning Curve with FREE £1531**
2Mb extra RAM Free Home Demonstration in Glamorgan and Gwent.**Conner A5000 2nd IDE Drives**
including power splitter and interface cable

120 Mb £294

212 Mb £470

360 Mb £838

** 540 Mb £1050
NEWPostage, Packing and
Insurance £12 on all
items.All prices exclude VAT.
E&OEMail order Telephone 0222 615782 or 0223 410138 (p.m. only)
New shop opening at 44 Crwys Road, Cardiff on March 16th 1992.

PINEAPPLE SOFTWARE

The Pineapple Colour Video Digitiser Big Price Reductions !!!

Since we originally introduced the Pineapple Video Digitiser almost two years ago we have not needed to modify the design of the hardware in any respects. However, the software has been continually improved to the point where the quality and quantity of software supplied is second to none.

Now, because of the large number of sales, we are able to offer a big price reduction which makes colour digitising available to everybody. Also, because we are so confident that you will find the Pineapple Digitiser superior to anything else available, we are happy to offer our Digitisers on 7 days free approval so that you can see for yourself the power of our software.

Some of the features of the Pineapple Digitiser, many of which are still exclusive are as follows:-

- 16 bit true R G B storage in 256k ram.
- Sequences of frames of a moving picture can be grabbed and stored in memory. Up to 30 frames in a 1mb computer, 200 - 300 frames in larger computers!!
- Full screen area normally viewed on a TV set is grabbed in full.
- Images may be processed using our own high speed software routines or Acorn's Change FSI software.
- Quite simply the most powerful and easily used zooming and cropping routines available with any processing package.
- Two independent multitasking applications supplied. Non-multitasking software allows digitising without windows for adding still images to videos.
- Our hardware does not use interrupts so other applications run at full speed.
- Latest software includes built-in print routines. (Existing owners please contact us for a free update).
- Hard locking synchronising circuits for best results from video recordings.
- Available in a stand alone box for use with A3000. In this mode it can also be used with 300/400/500 series computers only occupying one expansion slot.
- Free seven day trial.

A3000/400/500 £199.00**A3000/Boxed £235.00**

Pineapple PAL Coder

The Pineapple PAL Coder is a stand alone unit which provides a coded video signal which can be recorded onto a VHS recorder or fed to a monitor with coded input.

The unit is inserted in the lead to the R G B monitor and provides an R G B output for the monitor together with a full specification PAL coded output. A second version provides a standard coded output but also provides an S-VHS output for improved quality recordings on S-VHS recorders.

Features:-

- External to computer - no expansion slots used.
- Complete sync pulse regeneration providing a full CCIR sync waveform for best results on VHS recorders.
- Selectable to work with 625 interlaced screen modes or 624 line non-interlaced modes.

Standard Version £69.00**S-VHS Version £79.00**

BBC PCB Designer

This ever popular Rom based PCB designer is suitable for all BBC micros. It's fast high density 1:1 scale print routine allows prototype boards to be made directly from a printout, and a 2:1 scale print may also be used to produce professional quality boards. A second Eprom is optionally available to add a powerful auto-track routing facility to the program. This utilises a 'rats nest' input routine and allows any component to be 'picked-up' and moved around the board without having to re-specify component interconnections.

The full auto-route facilities are available even on an un-expanded model 'B' computer. An Archimedes version is available as a free upgrade to existing BBC owners or at a similar price to the BBC version.

'PCB Auto-route is remarkable. No similar software comes near the price'
Acorn User - August 88

Manual track routing £55.00**Auto track routing £85.00****Plotter Driver £35.00**

Please add 17.5% VAT to all prices. Postage and Packing free

BARCLAYCARD
VISA

Please add 15% VAT to all prices

39 Brownlea Gardens, Seven Kings, Ilford, Essex IG3 9NL
Tel: 081-599 1476. Fax: 081-598 2343

Making backups doesn't have to be a tiresome chore.

GRAHAM BELL

looks at a simple solution

GETTING YOUR BACKUP

The essential problem with backup software is that it is less entertaining than playing games – so playing a game always seems a better way to spend that spare hour. Even the tiniest nuisance factor in the program will seem like a major fault. And, unless you make backing-up part of your daily or weekly routine, then it will probably never get done.

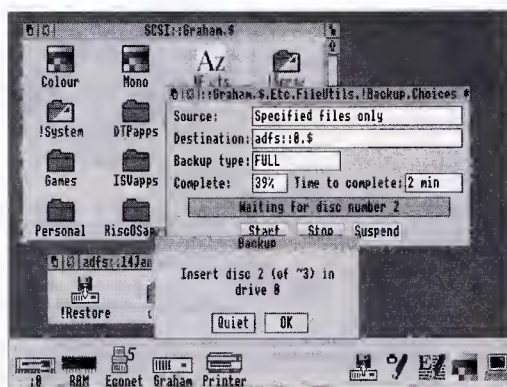
Beebug's *Hard Disc Companion* aims to make the process more palatable and version two improves on and tidies up on a lot of the loose ends in version one.

Backup is the usual icon bar application. It opens a simple dialogue showing the current choices: the main directory to backup, the place to back it up to and so on. A menu allows you to choose between a full backup, or two types of partial backup. A differential backup is every file that has been changed since the last full backup, whereas the incremental type is everything since the last backup.

WAYS AND MEANS

The best way to use this system is to do full backups regularly and then do differential backups every day. That way, two sets of discs are all that is ever needed to restore your work.

Specifying the backup destination is a simple matter of dragging a directory icon to wherever you want to put your archive (on another hard disc, say). Or you can choose the default, ADFS:0.S, to put it all on floppies. In contrast, choosing which source to back up is completely counter-intuitive: you drag an icon from the Backup window into the direc-



A full backup of pre-selected files on to floppy discs

tory you want to back up, rather than dragging the directories into the Backup window. However, there is a flexible way of choosing individual directories and files to back up by dragging them into a window, and a way of excluding files and directories by name or even by filetype.

Once you have chosen your source and destination, you can save your choices as a sort of script file – double-clicking on that file in future will repeat the same backup procedure. This is good for formalising the full/differential routine: you could keep two script files called Day and Week.

As the archive is created, it prompts for new floppies to be inserted and it names the discs in numerical order, formatting them as well, if necessary. It's reliable and you can pause at any time to do something else, or even carry on typing in a wordprocessor – it works pretty much in the background. There's no problem with long files: they are compressed and, if they are still

too long to fit on a single disc, they are split. Compression is much improved: version one contained a short list of filetypes which it would compress, and few people bothered to add to the list. Version two tries to compress almost everything except very short files. And you can tune it (by editing the Messages file) to try harder if you have an Arm3.

How much compression is achieved varies immensely: a typical mix of data files compressed to about 55 percent of its original size, but a 2.5Mb Impression document with lots of sprites reduces to 13 percent. Despite the compression, be ready with about 80 floppies to fully back up your 100Mb hard disc, and put aside a couple of hours.

The archives that Backup version two creates are self-extracting to an extent – it puts Restore and Retrieve applications into the archive, along with the data, so you can always get your stuff back, even if your only copy of Restore was on your crashed

hard disc. Unlike version one, Restore can only be used to get back the entire collection of files. Retrieve is the new application to get back selected files – but you have to remember the filenames. There's a wildcard search for filenames in an archive, but if you have to browse, you too often get the error 'window full' when you can't quite remember enough of the name. Also you cannot search for a file of a particular type.

If you do find the file, then you just drag it out to retrieve it, but it would be better if Retrieve showed a tree view of the files and directories in the archive and allowed you to select both individual files and whole branches of the tree, like the old *Mitre Discree*.

It is also worth noting that some applications, notably Beebug's own *Ovation*, cannot be run from a restored copy.

CONCLUSION

Overall, *Hard Disc Companion* is a good but not a great backup system. It's convenient to use, with fewer rough edges than version one, better treatment of new filing systems and better compression: a worthwhile upgrade. Unlike *Spark*, it splits long archives over several discs, it's faster and it compresses practically as well. But it still isn't perfect, particularly for network filesystems, where a tape system is better.

PRODUCT DETAILS

Product: Hard Disc Companion
Supplier: Risc Developments
Tel: (0727) 40303
Price: £45 plus VAT (or £15 for an upgrade from version one)

GENEALOGY

(See review in Feb '87 and Aug '89)

FAMILY HISTORY SYSTEM The most popular program ever written for us. Enables you to produce a full family tree and many other genealogical listings

£20 95
£25 95

BBC/Master/Compact version £20.95 - Archimedes version £25.95

PAYROLL

EXTENDED PAYROLL Now in its eighth year. The only BBC program for wage tax and National Insurance for up to 400 employees covering 12 months.

Four weekly and Monthly pay whether contracted or casual. Personal data per employee in two parts. Personal data per employee in two parts. Personal data per employee in two parts.

10th anniversary year

Extended pay periods or completion of pay from hourly rates. Pension deductions, sick pay, SSP, SMP. Pre and post tax adjustments and even no pay. Three different types of payslip printout and an optional coin analysis. An annual contract keep you up to date with the budget changes. Send for demo disc

£52 50

BOOKKEEPING

(see review in March '89 Acorn User)

- CASHBOOK** Double entry bookkeeping for home or club use. All data kept in memory. Three character analysis code enables you to know where the money comes from and where it goes. 46 transactions per A4 page. Analysis summary up to 30 categories. £14 95
- CASHBOOK 0** As 1 - random access giving 2000 items. CASH/BANK or VAT/BANK headings. Password control. String or numeric searches. For schools, clubs & non credit businesses. £23 95
- ACCOUNT** As 2i - Credit facility and statements. For small businesses working with credit. £35 95
- ACCOUNT PLUS** As 3i - Invoicing, Orders, Quotations etc. Full sorting of data by 5 options. Automated statements, mailing labels. Multiple automatic nominal ledgers. For independent schools and VAT businesses who wish to cut the effort. £59 95
- TAXMAN** This new program which has been under development for three years allows you to enter all your transactions and to printout end of year results with balance sheet and even calculate tax due. The Inland Revenue love it and so do we. Results can be taken from our other accounting programs and entered into TAXMAN making a superb combination. £59 95
- Micro-Trader** is a full accountancy package with features right through to final balance sheet. Stock Control at £75 00 extra. For shops/firms, accountants wanting full accounting facilities. Payroll can be integrated. £235 00
£88 13

MAILING

218 addresses in memory or up to 1875 on random access disc. Multiple selected and repeat labels, mail merge, full sorts. Ideal for subscription lists, promotions, any kind of mailing. £35 95

Ask for detailed brochure for more software and other items. Demo discs available for £2 50 each. Micro-Trader £25. Prices include VAT add 81p p/p. PLEASE NOTE OUR MOVE & CHANGE OF ADDRESS FROM CORNWALL

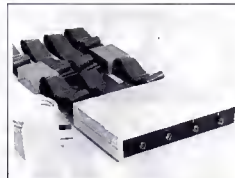
Micro-Aid
SOFTWARE FOR THE BBC MICRO COMPUTER

(FAX AVAILABLE)

Sideway Courtyard, Sarrhill, S. Ayrshire
Scotland. KA25 0PS. Tel: 0485 92265



PRINTER SWITCH-BOXES



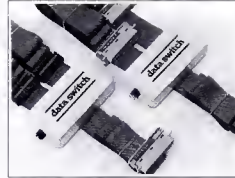
Ideal for schools and colleges. All versions come complete with cables, the 4-way units are fitted with 2x3.7m+2x1.7m+0.6m to the printer. Data buffers are fitted to the extra long 3.7m cables.

PS3 3-way BBC/MASTERS £59.50
PS4 4-way BBC/MASTERS £69.50
PS6 3-way A3000/IBM's £67.50
PS7 4-way A3000/IBM's £77.50



The compact PS5 switch box is designed for the A3000 and IBM PC compatibles. The PS5b version will allow 1 BBC+1 A3000 to share one printer. The ribbon cable lengths are 2x1.7m+1x0.4m to the printer. Super Value!

PS5 2-way A3000/IBM's £34.50
PS5b 2-way A3000+BBC £34.50



These reliable switch boxes have a proven record of over 6 years daily use in many schools and colleges and are highly recommended. The ribbon cables fitted are 2x1.7m+1x0.4m with appropriate connectors.

PS1 2-way BBC/MASTERS £31.50
PS2 1 BBC to 2 PRINTERS £31.50

TERRELL ELECTRONICS

7-B Essex Gdns., Hornchurch, Essex, RM11 3EH
Corriage paid ☎ 04024 71426 Excl. VAT

Ace Computing

RISC OS Euclid is the best multi-tasking 3D graphics and animation system for the Archimedes. It is effectively a 3D version of Draw.

Mogul makes full use of **Euclid's** unique hierarchical data structure to generate animations of 3D objects with articulated motion and simultaneous camera motion.

Arclight is a multi-tasking ray-tracer which will generate a realistic **Euclid** picture, or a complete **Mogul** film, while you are free to get on with other work.

Tween produces films from **Draw** files. It uses techniques similar to **Mogul** and generates a film by calculating intermediate frames from a set of key positions.

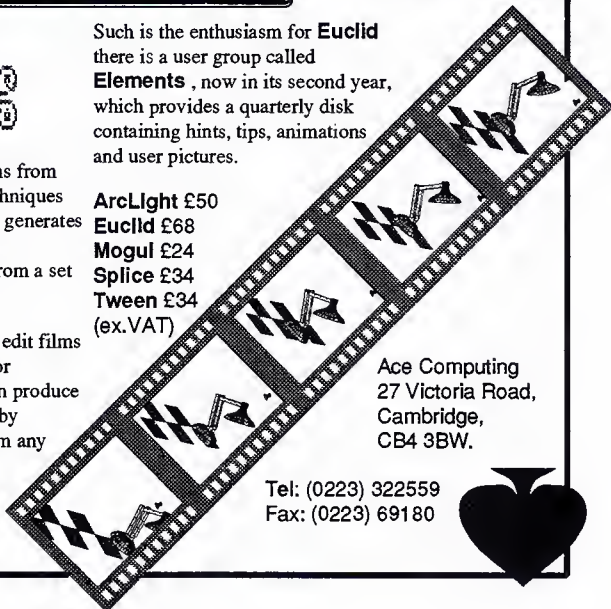
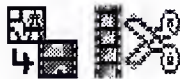
Splice allows you to edit films produced by **Mogul** or **Tween**. You can even produce hand-drawn cartoons by converting sprites from any source.

Such is the enthusiasm for **Euclid** there is a user group called **Elements**, now in its second year, which provides a quarterly disk containing hints, tips, animations and user pictures.

Arclight £50
Euclid £68
Mogul £24
Splice £34
Tween £34
(ex.VAT)

Ace Computing
27 Victoria Road,
Cambridge,
CB4 3BW.

Tel: (0223) 322559
Fax: (0223) 69180



ACTION REPLAY

PAUL JAMES examines the new full motion video system from Acorn

The *Hitchhikers Guide to the Galaxy*, that renowned book, radio and television series, provides what is probably the most famous example of where multimedia could go in the future.

It featured a hand-held computer which knew absolutely everything about the universe and was frequently consulted by Ford Prefect on his travels through space and time. Ford would ask the computer a question and the little electronic book would launch into a narrated, animated sequence, to throw light on to the subject in question.

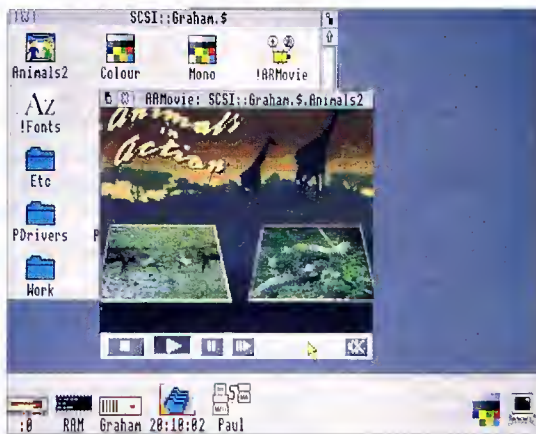
Today, the race is on in the computer world to turn massed information into a kind of 'virtual reality', with particular emphasis on moving video images. Now Acorn has joined the fray with its new full motion video system - Acorn *Replay*. Aimed primarily at developers, it will undoubtedly hasten the impact of multimedia in the Acorn market.

DATA HANDLING

Until now the major hurdle when using motion video has been the sheer size of the files involved. It is not just a case of saving one image, but a whole sequence. The storage and loading of such sequences are the biggest problems, but *Replay* tackles both by using existing hardware and some very clever software.

CD-Rom systems can store large amounts of data. Just one plastic compact disc can hold around 96,000 pages of text - and that's before compression, which can in some cases, reduce the size of a chunk of data by 20 times or more.

An increasing amount of data is being transferred on to CD-Rom format. Encyclopedias, newspapers, reference manuals and books (including



Acorn *Replay* - full-motion video capability on the Archimedes

the Bible) are now being turned into data which can be read by the computer, decompressed and finally shown on the screen.

But until recently, CD-Rom players have not been able to produce moving picture sequences on the computer screen because of their inherent slowness. A decent-sized picture - say, a quarter of a mode 15 screen - consists of around 40Kb of data. To get the 12.5 fps (frames per second) needed to fool the human eye into seeing a fairly smooth-running image, the computer needs to suck about 4,096,000 ones and zeros from the player per second. With current mainstream hardware, that is just not possible.

However, if each video frame is compressed, then it is possible to get 12.5 frames of data per second from a CD (25fps from a quicker device, such as a hard disc). The computer then has to decompress this data and place it on to the screen - no mean feat.

This is what Acorn *Replay* achieves. With a standard hardware device (either a CD-

Rom or a hard disc) containing the movie file, the decompression and display can be handled by the *Replay* software. The fact that no special hardware is needed is what makes *Replay* so cost effective, compared with other hardware-based solutions.

The compression techniques are the key to the *Replay* system, (see box) making it possible to fit a 12sec, 12.5fps film on to a single floppy disc.

HOW REPLAY WORKS

Acorn *Replay* is primarily aimed at software developers. The sequence, in the form of a video or similar media, is passed on to a company who will then master it and put it on to a large storage device, uncompressed. The first part of the *Replay* software then comes into play.

First, the video data is reduced to Archimedes' sprite format, then each frame is taken in turn and compressed. At this stage, the compression is simply a case of removing data from the image - and it is no loss, since this is data that the human eye is unable to see anyway. Areas which include several, subtly different colours are evened out, and highly detailed areas are smudged. Then a form of Delta compression is used, which relies on the fact that only one part of the picture is moving, while the rest is stationary. As the computer already has the data for the stationary part, it doesn't need it again, so this is disposed of.

Finally, the finished *ArmMovie* file is placed on to the hard disc or mastered on to a CD-Rom. This method allows about 6Mb of film in Archimedes format (this would be far bigger in original video format) to be compressed down to fit on to one 3.5in floppy disc (about 800K). This is worth 12sec of 12.5fps video.

Acorn has also thrown in multiple channel, stereo sound.

CONCLUSION

Acorn *Replay* opens up new multimedia options. Moving pictures are instantly impressive and guaranteed to grab attention. Used in the right circumstances, they are far more informative than text, one example being a short movie showing how to operate a piece of equipment. An A5000 with a built-in video tutor? Well, memory would be a problem, but it is possible.

Although *Replay* is not aimed at individuals (the Archimedes system needed to make the sequences has to be powerful and requires expensive additional hardware), it is sure to be picked up by software developers who, by incorporating the compression and decompression facilities, will be able to include moving pictures in their own packages.

Support for *Replay* has already been included in the *Magpie* and *Genesis* multimedia packages. Before long, we could see many applications, released on CD-Rom, that include moving pictures.

Leemmings	£20.00
Mad Professor Manarti	£14.00
Manchester United Europe	£19.00
World Champ. Boxing Manager	£19.00
World Championship Squash	£18.00

Linguinity	
HotLink Presenter	£34.00
Presenter Story	£129.00
Presenter II	£29.00

Longman Logotron	
ArcComm 2	£54.00
Landmarks No's 1 - 4 each	£19.00
Magpie	£54.00
Notate	£55.00
Numerator	£60.00
Pendown	£54.00
Pendown Outline Fonts	£18.00
Pinpoint	£69.00
Pinpoint Junior	£24.00
Revelation 2	£99.00
SkyHunter	£24.00

Magnetic Scrolls	
Collection 1 (3 Adventures)	£29.50
Wonderland	£24.00

MicroPower	
Chess 3D	£14.00
Zelanites	£17.35

Midnight Graphics	
ClipArt 1 over 480 images	£29.95
ClipArt 2 over 350 images	£29.95
Express	£51.02
Tracer	£52.13

Minerva Software Applications	
Ancestry	£59.00
Atelier	£69.00
Desktop Office	£79.00
Easiword	£19.00
Flexifile	£89.00
Graphbox	£60.00
Graphbox Professional	£109.00
Home/Club Accounts	£35.00
Multistore II	£179.00
PCAccess	£19.00
PrimeArt	£69.00
Timetabler	£599.00

Leisure	
Bughunter in Space	£13.00
Bug Hunter / Moon Dash	£13.00
Casino	£13.00
Caverns	£13.00
Family Favorites	£13.00
Freddy's Folly	£13.00

Hoverbod	£13.00
Ibix the Viking	£13.00
Jet Fighter	£13.00
Maddingly Hall	£13.00
Orion	£13.00
Redshift	£13.00
Talisman	£13.00
Thundermonk	£13.00

Northwest SEMERC*	
Compose World	£48.00
Compose World Files 1	£12.00
Compose World Voice Pack 1	£15.00
Conform Keyboard Software	£15.00
La Monde a Moi	£15.00
My World (Program)	£15.00
My World - Design	£7.50
My World - I'm Special	£7.50
My World - Nursery Disc	£7.50
My World - Maths	£7.50
My World - Patterns	£7.50
My World - Sampler	£7.50
My World - Skeletons	£7.50
My World - Village/Town	£7.50
Oldham Keyboard	£125.00
Phases 1	£15.00
Phases 2	£15.00
Phases - Borders disc	£7.50
Phases - Christmas disc	£7.50
Phases - Clip Art 1	£7.50
Phases - Very Hungry Caterpillar	£7.50

Oak Solutions	
Disc Sharer	£119.00
Genesis	£40.00
Genesis Plus	£69.00
Genesis II	£99.00
Oak Recorder	£29.00
Parametric Design Tool	£359.00
Printer Spooler	£65.00
Remote Logon	£34.00
Worra Battle	£14.00
Worra Plotter	£24.00
WorraCAD	£74.00

Sherston Software	
!Draw Help	£15.95
!Hhelp	£7.95
Animated Alphabet	£19.00
Arventure	£25.00
Dreamtime	£20.00
Farm	£19.00
Fleet Street Phantom	£23.00
Glimpse	£8.50
Mapventure	£23.00
Microbugs	£25.00
Nature Park Adventure	£24.50

Selladore Tales	£24.00
Space Mission Mada	£23.00
Stig of the Dump	£22.00
Teachers Cupboard	£24.50
Teddy Bears Picnic	£23.00
Viewpoints	£35.00
Wizards Revenge	£17.00
Worst Witch	£21.50

Silicon Vision Ltd	
ARC-PCB	£149.00
ARC-PCB Professional	£299.00
Data Vision	£119.00
FILM-Maker	£70.00
Financial Accountant	£199.00
Realtime Solids Modeller	£149.00
RiscBASIC	£119.00
RoboLOGO	£70.00
ShareHolder	£149.00
SolidCAD	£119.00
SolidTOOLS	£299.00
SolidsRENDEER	£119.00
SuperPlot	£29.00

SIMMIS	
Flight Sim Toolkit	£38.00

Superior Software	
Air Supremacy	£14.00
Conqueror	£15.00
Hostages	£14.00
Master Break	£14.00
Repton 3	£14.00
Speech!	£14.00
Superior Golf	£14.00
Zarch	£14.00

The Data Store	
FontFX	£9.95
ShapeFX	£9.95

The Fourth Dimension	
Apocalypse	£14.00
Arcade Soccer	£14.00
Articulate	£14.00
Arclist	£14.00
Boogie Buggy	£14.00
Break 147 / Superpool	£18.00
Cataclysm	£18.00
Chocks Away 2	£15.00
Chocks Away Extra Missions	£14.00
Chocks Away 2 + Ext. Missions	£27.00
Drop Ship	£13.00
E-Type Compendium	£18.00
E-Type Designer	£13.00
E-Type Extra 100 miles	£13.00
Enter The Realm	£18.00
Grievous Bodily 'ARM	£18.00
Holed Out Compendium	£18.00
Holed Out - Designer	£13.00
Holed Out - Extra Courses Vol 1	£13.00
Holed Out - Extra Courses Vol 2	£13.00
Inertia	£14.00
Man at Arms	£14.00
Nevron	£14.00
Pandora's Box	£18.00
Powerband	£14.00
Pysank!	£14.00
Saloon Cars	£18.00
The Olympics	£14.00
The Real McCoy 1	£20.00
The Real McCoy 2	£20.00
The Wimp Game	£14.00
U.I.M	£18.00
White Magic	£14.00
White Magic 2 inc Designer	£14.00
X-Fire	£18.00

The Serial Port	
ARCterm 7	£69.00
Investigator II	£22.00
Joystick Interface	£23.00
Tracker	£37.00

Triple R Education	
Converta-Key	£14.00
Data Word	£14.00
Money Meters	£14.00
Picture Book	£14.00
Target Maths	£14.00

Books (No VAT)

C: A Dabhand Guide	£14.95
Archimedes Assembly Language	£14.95
Archimedes Operating System	£14.95
The above books have accompanying discs add £5 for 5.25", £7 for 3.5"	
A3000 Technical Guide	£29.95
Acorn DTP Advanced U.G.	£14.95
BASIC V: A Dabhand Guide	£9.95
BBC Basic Guide (Acorn)	£19.95
Budget DTP (Draw & Edit)	£12.95
DTP Seeds (4Matton)	£8.45
M128 Ref. Man.Pls 1&2 (ea.)	£14.95
RISCOS PRM's	£79.00
First Word Plus V2	£10.00
Acorn DTP	£10.00
ANSI C Version 3	£17.00
Assembler Release 2	£25.00
Desktop C Release 4	£25.00
Desktop Development UG	£25.00

Hours of Opening

Monday - Friday 9.00 a.m. - 5.00 p.m.
Saturday 10.00 a.m. - 5.00 p.m.
Lunch 1.00 p.m. - 1.30 p.m.

How to find us



Important Facts

- NO Minimum Order Value
- NO Carriage Charges in Mainland UK
- ALL Goods Despatched within 24 Hours, subject to stock levels
- Acorn Qualified Dealer
- Acorn Service Centre
- Hotline Support on all Hardware and Software purchased from us

Terms & Conditions

TERMS: UK residents add 17.5% VAT to all prices, except books. Delivery FREE on all postal items in the UK. Foreign orders, no VAT, carriage at cost. (quotations available). Access/Visa cards accepted. Dabhand Computing Ltd. is a Qualified Acorn dealer. Official orders accepted from public sector educational/PLCs, otherwise cash with order. Tender invitations welcome. Callers welcome. We are 800 yds north of J17, M62. Prices subject to change without notification. Goods offered subject to being unsold.



DABHAND COMPUTING

DABHAND COMPUTING LTD
5 Victoria Lane
Whitefield
Manchester, M 2 5 6 A L



The Ultimate Graphical Presentation Package

Available End March 1992 please call for Launch Pack and Sample disc - Price £51.02

LOOKING AT THE FAX

With the Archimedes attracting increasing interest from business users, **GRAHAM BELL** looks at a package which can turn your Arc into a fax machine

One of the icons of modern technology is the facsimile machine. The need for fast communication means faxes are now found in most offices.

Combining fax and computer technology makes sense – in principle, a Archimedes with a printer, scanner and modem can operate as a computer system, photocopier or fax machine. Add a sound sampler and you have an answering machine too.

FaxPack from Computer Concepts is a fax expansion board which turns your Archimedes/BBC A3000 into a fax terminal. It first appeared some years ago, but it fell foul of problems with Arthur, the original operating system for the Archimedes, and was withdrawn. With the advent of Risc OS plus the *IRQuills* and *Hourglass* modules, these problems have been solved. Fax chip technology has also advanced greatly, so CC has re-designed the product.

The new package comes in the form of some software, plus a half-width podule which slots into the back of the Archimedes and connects with a phone line. Fitting to the Arc easy enough, but you do have to be careful with a tiny ribbon



cable used to attach the fax card to the sound input of the machine – it inserts differently on each model of Archimedes (300 and 400 series, 540 and A5000). There is also adaptor so that you can plug your normal telephone and *FaxPack* into the same phone socket.

With a BBC A3000, you can connect up the card via the external podule connector on the back, but you can't fit the audio cable. You must also remember to put the podule in a case – it is far too vulnerable if you leave it sticking out.

APPLICATIONS

Once set up, there are two applications to be copied from the software disc: the a normal printer driver, *PrinterFP*, and second *Faxmngr*, used for configuration of *FaxPack* and for fax reception. It is separated from *PrinterFP* so that you can still receive faxes when you load another printer driver – perhaps to print out a previous fax, for example.

Configuration is mostly a matter of selecting yes or no from a list of options – for example, whether to use touchtone dialling (if you are attached to a modern digital telephone exchange), or stick to old-fashioned pulse dialling. You should also enter your own telephone number. Fax machines identify themselves to each other, and your number will show up on the machine at the other end.

Sending your first fax is almost as simple as printing. You need both *Faxmngr* and *PrinterFP* on the icon bar, then you enter the destination fax number in a dialogue box and choose print from any application that uses the Risc OS

HOW FAXES WORK

Faxes have much in common with familiar computer peripherals. A conventional fax machine is little more than a specialised 9600baud modem teamed with an A4-width scanner and printer. The scanner scans the document, and the image data is transferred to the modem and on to another fax machine, where it is printed. In fact, the image is compressed before transmission, so it takes less time to transfer the data for each page.

Most modern fax machines are known as 'group 3', which means that the scanner and printer work at up

to 200 dots per inch – about dot-matrix printer quality. But the majority of machines have 'normal' and 'fine' scanning modes, normal being quicker because it is only 100dpi. Combined with imperfections in the scanning and crackly phone lines, it means that most faxed documents are of questionable quality.

To boost the quality on poor phone connections, most group 3 machines step down from 9600baud to 7200, 4800 or even as slow as 2400baud. But there is no standard for error-correction, because a single wrong dot on a page doesn't ruin a faxed image.

printer drivers – *Edit*, for example. When you print, *FaxPack* assembles the page in memory in seconds, then dials the number. If it connects to a suitable fax machine at the other end, it sends your document. You get control of the computer back as soon as it is assembled – the fax data is transmitted in the background, and even on an Arm2 machine, it is barely noticeable.

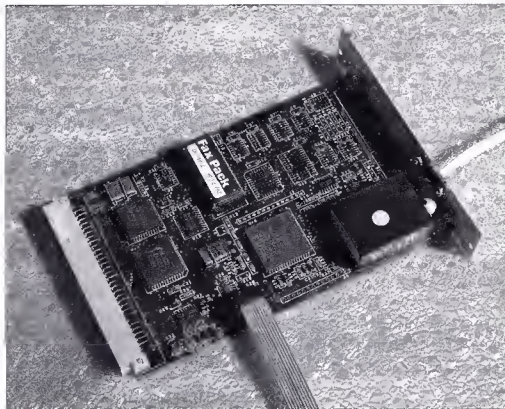
The sounds made during dialling and sending of the data are important, since without sound you don't get any indication of what happening – your fax just goes. If it fails to, because the receiving machine is engaged or won't answer, an error box pops up on the screen. Unfortunately, there is no sound on the A3000.

BETTER QUALITY

Faxes received from *FaxPack* look much better than from most dedicated fax machines: straight lines no nasty streaks etc. With conventional faxes, most errors occur at the scanning stage (which *FaxPack* avoids) rather than in transmission or printing. After transmission over normal telephone lines, even six-point text (this is nine-point) is readable.

However, it is worth turning the Quicktext option off. This is Computer Concepts' replacement for Acorn's font module, used in both *FaxPack* and the Laserdirect printers. Although it works well on a Laserdirect printer, where the resolution is 300dpi (dots per inch) or greater, at *FaxPack*'s 200dpi it tends to miss out pixels in thin horizontal curves – the tops of the 'e', for example. Although it is slightly slower, Acorn's font rasteriser draws skeleton lines through these curves to make sure the letters are continuous. Quicktext ignores the skeleton lines and leaves gaps where the outline is thin.

FaxPack adds a page number to the top of each page, and can include a running header. It slightly distorts the document, making it a bit narrower and longer than a 'true size' printer, but this isn't really a problem because of the informal nature of fax communications. However, stick to A4-size paper and be generous with the page mar-



The FaxPack half-width podule connects the Arc with a phone line

gins when setting up a document, as there can be no indication after you've sent a document that it will be completely legible at the other end.

The final software was not available for this preview, and certain features destined for the release version were missing. For example, if you forget to enter the destination fax number in the PrinterFP dialogue box, it pops up an error box when you 'print'. The final software will pop up a box requesting the number to dial – much better. It would be even better to be able to drop a text file containing solely the fax number on the printer driver icon – for example by

dragging a file out of a *Squirrel* or another database.

Other untested features of the software include keeping a log of fax traffic, and the intended *FaxPack*-to-*FaxPack* file transfer, enabling a file or whole directory to be transferred between *FaxPack*-equipped machines – you will be able to just drag the file or folder on to the PrinterFP icon.

RECEIVING YOU

Setting the *FaxPack* up for reception is quite straightforward. You need to set up a directory to receive fax files into, and you need to be running the Faxmgr application. Just how you do this varies: if

you are blessed with two telephone lines, one can be dedicated to fax traffic, and you can set *FaxPack* to auto-answer. For a more normal setup, where *FaxPack* has to share a line with ordinary telephone conversations, you can't have *FaxPack* answering all your calls with its ear-piercing whistle. You can set it to manual answering, then whenever you pick up the phone and you hear a fax tone from the other end, you use the Faxmgr menu option to begin reception. During reception you can continue with something else, since it all happens in the background and won't disturb normal work.

The quality is not as impressive as faxes you send, although it depends on how good the fax machine is at the other end. But you can read fax files simply by clicking on them. The reading application is simple, with little more than a page up/page down interface. It would benefit from an option to rotate from landscape to portrait, but it is easy to print or read the fax on-screen, crop out a section, or save it as a sprite. The latter option does have problems though, as the sprite files do not work directly with *Paint*.

You also need to clear out your fax directory fairly frequently, as each page takes up to about 150Kb of disc space – don't consider *FaxPack* unless you have a hard disc.

FAXPACK SMARTCARD

The FaxPack podule is one of only a few Archimedes expansion cards provided with its own intelligence. As well as the dedicated fax modem chip that handles the telephone line, there's an 8031 8-bit microprocessor that does most of the work. It only interrupts the Arm chip to transfer chunks of data to or from the dual-port Ram on the podule – a simpler board would use the Arm to transfer individual bytes of data and to control the fax chip directly.

The PrinterFP software shares many features with the Laserdirect, and it first assembles the page in a compressed form in the Archimedes memory. You can configure the amount of memory used and, because of the lower 200dpi resolution of fax, it doesn't need to be a big buffer: 512k is ample.

The current versions of PrinterFP and the Laserdirect drivers share a serious problem when printing out from Squirrel: text fields consisting of more than one line of text can't be printed – a huge black block is all that appears on paper. However, this isn't a problem with any other applications, and text, sprites and drawings are all correctly incorporated into your faxes.

Future software upgrades intended for the FaxPack (and for Laserdirect) include a networkable version which splits the printer driver in two – half at your workstation, half at a 'fax server' on the network. The communication between the two is at Draw-command level: this should clog the network much less than Oak Solutions' current networked version of the Laserdirect driver which transmits the compressed bit-map of the entire page over the net, and should allow printer messages to be routed back to the correct workstation.

CONCLUSION

For business users, who may be judged on the speed and quality of their output, or for general users who want to communicate with each other, *FaxPack* offers solutions. You can use it with almost any printer driver-aware application, and most of the others would work with the supplied LQemulate application that can make *FaxPack* appear like an Epson dot-matrix printer.

FaxPack works well, offers impressive results and represents exceptional value.

PRODUCT DETAILS

Product: FaxPack
 Supplier: Computer Concepts
 Tel: (0442) 639933
 Price: £299 plus VAT
 Machines: All Risc machines

ArcModem

A brand new 2400 baud pocket sized modem for the Archimedes/A3000

- Fully Hayes compatible
- BELL 103/212A
- CCITT V.21/V.22/V.22bis
- Protective cover
- Elegant design in compact size
- Mains or battery powered
- Intelligent power/saving circuit
- Long battery life

Comes complete with drivers for Arcterm* versions 6 and 7

ArcModem, Mains adapter 9v battery, leads and driver software:

Only £169.00

Arcterm 7 is a fully multitasking comms package. Available from The Serial Port

The RTFM Joystick Interface

The interface allows up to two 9pin Commodore® or Atari® style joysticks to be connected to your Archimedes/A3000. The interface fits inside your machine, though it does not require a podule slot.

The RTFM Joystick Interface has support from 4th Dimension, Eterna, Krisalis Software, Cygnus Software Engineering, Clares Micro Supplies, Cambridge International Software and Minerva Software.

Over 40 Archimedes games currently work with the Joystick Interface, and you can even control games running under the BBC Emulator!

Only £34.95



RTFM, 43 Hill Street, St Helier, Jersey.
☎ (0534) 67870, Fax (0534) 68996.



Gnome Computers Limited

25A Huntingdon Street, St. Neots, Cambs, PE19 1BG
Tel./Fax: 0480 406164 E-Mail: support@gnome.co.uk

X Window System R11.4

This software package, developed in association with Acorn Computers, converts a RISC OS based Archimedes into an X Terminal. The software will allow communication with X clients over Ethernet or Econet.

X Software	£199
Complete Colour X Terminals from	£1150

Archimedes upgrades

A440/R140 4-8MB Memory Upgrade	£550
External SCSI 200MB H/D + Acorn SCSI Card	£1250
External SCSI 1.2GB H/D + Acorn SCSI Card	£2050
External 150MByte SCSI Tape Drive	£850
External 8GByte SCSI DAT Tape Drive	£1800

Transputer Systems

Gnome Computers offers a complete range of transputer boards to fit into either RISC OS or RISC iX based Archimedes machines. Prices start at £1385 for a single 10 MIP, 2 MFLOP transputer system including a parallel FORTRAN-77, C, Pascal, Modula-2 or Occam compiler.

UNIX Specialists

SAVE OVER £100

A3000 Computer plus Learning Curve Software 14" Acorn Colour Monitor & Monitor Stand

No printer	£855
with Mannesmann MT81 (9 pin) printer	£999
with Citizen Swift 9 (9 pin) printer	£1075
with Citizen 224 (24 pin) printer	£1100

A3000 - 1mb upgrade	£60
Citizen Colour Kit	£38

A5000 Computer(2mb) plus Learning Curve Software 14" Acorn Multisync Colour Monitor & Monitor Stand

No printer	£1799
with Mannesmann MT81 (9 pin) printer	£1945
with Citizen Swift 9 (9 pin) printer	£2019
with Citizen 224 (24 pin) printer	£2044

A540 Computer	£2400
---------------	-------

TERMS

CHEQUE WITH ORDER
CREDIT CARDS Access & Visa

DELIVERY CHARGES:

£10 per machine

ALL PRICES EXCLUDE VAT:

Office Hours:

10.00am - 5.00pm Mon-Fri (Lunch 1.00-2.00)

10.00am - 1.00pm Sat

Special Education Prices

All Education Establishments qualify for special education prices on Micros, etc.

Please contact us for a quotation.

Subject to availability despatch is normally effected within 2 days from receipt of cleared payment. Please allow 7 working days for cheque clearance. Prices subject to variation without notice. All orders will be fulfilled within 28 days unless otherwise notified.

Starter Kit - Worth Over £100

Yours Absolutely Free of Charge when you buy any of the printer packs. It Contains:-

- 1 Printer Cable
- 1 Printer Stand
- 1 Printer Driver Disc
- 1 Dust Cover (Computer)
- 1 Dust Cover (Printer)
- 10 Discs
- 1 Disc Box
- 250 Sheets Continuous Paper
- 100 Address Labels
- &
- 1 Typing Tutor Program

Send for full catalogue of computers, peripherals, & consumables.

Willow Micros

Unit 11, Chancellors Pound,
Redhill, BRISTOL BS18 7TZ

Tel: 0934 - 863350

Fax: 0934 - 863292

Free software – sounds too good to be true, doesn't it? Well, that is exactly what Public Domain (PD) software is all about.

In the earlier days of Beeb computing, PD grew mainly from the programming arena. Enthusiastic home users wrote simple programs to solve specific problems – then these solutions were shared out among other users.

Over the years these 'freebie' programs have become known as Public Domain (PD), which means that you can copy and distribute the programs, usually within a set of basic ground rules, such as not altering the program files or code, leaving the author's name intact and not making any commercial profit from distribution.

The past few years have seen a steady build-up of PD program titles for the Acorn range of computers. Some have evolved to such an extent that they now rival commercial software products and represent excellent value for money, usually only costing the price of a disc and postage.

At this point, I should point out the difference between PD software and shareware software, over which there has been some confusion in recent months. Whereas PD software is free to copy, use and pass around, shareware software is free to copy and use only for a limited period.

However, if you use shareware software continuously it is customary to send the author a donation. This in turn gives the author incentive to produce more programs in the future. Some authors will also send you updated versions, or even a manual, if they receive such a donation.

EASY ACCESS

There are numerous ways to get hold of PD software. The easiest is probably by browsing through the Software Showcase pages at the back of *BBC Acorn User*, where advertisements can be found for a handful of PD libraries. Most have a demonstration disc that gives a rough indication of what software range they supply, and you can usually buy the demo for a pound or two.

Another way of obtaining PD software, if you have access to a modem, is via one of the various bulletin boards, which often contain many megabytes of software that you can download for the cost of a telephone call. However, if you are downloading, check the length of the software before you start – it can cost more to download a program, in terms of telephone charges, than to send off for a disc.

Another thing to bear in mind when obtaining PD software is the spread of viruses. Luckily, most PD libraries are fairly diligent and, personally, I have never found a virus on any PD discs. Bulletin boards are perhaps more likely to be infected, but again, most Sysops (system operators) regularly check their downloads for infection. If in doubt, obtain a virus checker which many PD libraries can supply.

As PD software covers practically any subject you can think of, we can really only give you a taste of what is around. Here is a selection of some of the more impressive titles – if you are a subscriber, all of these can be found on our *BAU* subscribers' disc, but you can also obtain them directly from the PD distributors – see our Where to Go box for more details.

GUESSTYPE

All Archimedes machines
Digital Phenomena PD

Guesstype is a handy little icon bar utility which will be of great use to bulletin board users or anyone who has accidentally changed the filetype of a file. How often have you received the error 'No run action specified for this file type?' When you encounter a file that has no file type, which you may have downloaded without re-setting its filetype, simply drag it onto the *Guesstype*'s icon and it will examine the contents of the file to have an intelligent guess at what its filetype should be.

This obviously works best on database and specialist application files which usually have some recognisable data at the beginning of the file. Files containing pure text are generally all recognised as filetype &FFF (text). When *Guesstype*

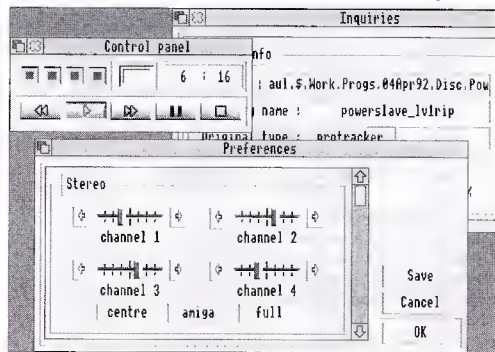
FREE FOR ALL

Can you really get something for nothing? **PAUL VIGAY** rounds up the best Public Domain software available for the BBC and Archimedes machines

KEEPING TRACK

- ProTrack – Soundtracker player routine
- All Archimedes machines
- Arcaynia PD (written by Bass)

One of the more prolific areas of PD is the range of demos and soundtracker tunes available, many ported from other computers, such as the Amiga. Hugo Fiennes wrote the first Archimedes program to playback tunes from Amiga SoundTracker, a program which over the years has been extended and modified to become a slick and professional-looking program. ProTrack has been produced by the Belgian Archimedes Software writers, Society, and is an impressive addition to any PD collection. Running from the desktop and totally Risc OS compliant, ProTrack will play any tracker tune, as well as provide you with a range of control panels enabling you to examine and control the tune in more detail. Four panels are provided: a control panel which lets you fast forward, play, rewind, stop or pause the tune currently being played; an enquiry window, which allows you to examine more specific details such as the tune length, number of samples used, memory size and effects used; a monitor screen, which lets you see the actual tracker data and musical waveforms, together with a spectrum analyser type display, all updated in realtime as the music plays; and finally, a preferences window, which lets you alter the stereo position of each channel playing. Pleasant 3D icons have been used throughout the overall package.



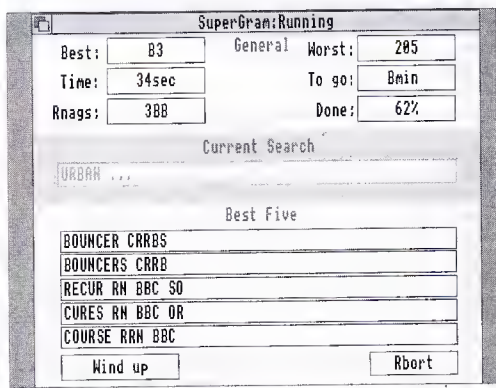
INTELLIGENT ANAGRAMS

- SuperGram - Intelligent Anagram finder
- All Archimedes machines
- The Datafile (written by William Tunstall-Pedoe)

Supergram is not a run-of-the-mill anagram solver. Indeed, if simple, single word anagrams are what you're looking for, a word processor spellchecker will do. Where Supergram excels is in creating multi-word, intelligent anagrams from phrases and sentences. In fact, you can customise it to put varying degrees of emphasis on its weighting so that you can create satirical, flattering, political or even rude sentences. It is a fully Risc OS application, which is even multi-tasking so that you can continue working while your computer shifts through hundreds of words in the dictionary. All you have to supply is a simple phrase to form anagrams from, set a few simple options such as what emphasis or bias you want, click OK and off it goes.

After a few minutes, a list of words start to appear in a window. Being multitasking, you can watch as it sorts out the best ones chosen so far. After a few moments you can peruse through pages of most amusing anecdotes. Supergram has a good knack of being able to sort words according to context, so that they can have a subtle way of linking with the original text. For example 'I am plastic' is one of the anagrams produced from the star word 'capitalism', while 'Risc workstation' produces 'It is star crown OK'.

Many hours of fun can be had by compiling insults from peoples names, answers to questions or thinking up puzzles to give to friends. Supergram just goes to show how professional looking Public Domain programs can be.



WHERE TO GO

To obtain any of the PD items mentioned in this article, and many more, here is a list of current PD distributors:

FOR BBC A3000 AND ARCHIMEDES MACHINES

Busy Beeb Computers Ltd, PO Box 25, Ormskirk, Lancashire, L39 3QR
The Datafile PD Library, 22 Duxford Drive, Aldergrove Co, Antrim, BT29 4BG

Digital Phenomena, PD Library, 104 Manners Road, Southsea Hants., PO4 0BG

Archaynia, PO Box 1927, Sutton Coldfield, B74 3QZ

Arch Angel, 2Bridge House, 17 Lower North St, Exeter, Devon, EX4 3ET
Ozone Friendly PD, 180 Cumnor Hill, Oxford, OX2 9PJ

FOR BBC B/MASTER MACHINES

BBC PD, 1B Carlton Close, Blackrod, Bolton, BL6 5DL

Mad Rabbit PD, 22 Oakwood Grove, Horbury, West Yorkshire, WF4 5JE

Robert Pike, 4 Mayfield Road, Girton, Cambridge, CB3 0PH

Coltswood PD, Maycombe, Field Road, Whiteshill, Stroud, Gloucestershire, GL6 6AG

B-bit PD, 7 Ashdale, Thringstone, Coalville, Leicestershire

Screen Teach, 21 Highlands Road, Rochdale, Lancashire

has made a guess at the filetype of the given file. It will display a small information box with two options: SetType and Retry. SetType will set the filetype of the file to that currently guessed, whereas Retry will force Guesstype to make another guess. This may become more vague the more guesses you make, but it will provide some possible ideas if you are completely stumped as to the unknown file's origin.

SAL

Save A Life (Emergency First Aid teaching)

BBC Model B/Master

Screen Teach

Sal is an informative and useful PD version of a larger commercial program, to help beginners learn the rudiments of emergency first aid. It is in the form of multiple choice questions, based upon the sort of accident you may witness in real life. Each question moves on from previous actions and responses, giving you full instructions and a tutorial if you choose the wrong answer.

It also helps by explaining why you went wrong, rather than just scoring a negative mark. This can help people learn by their mistakes and show you how a chain of actions follow each other. The program is easy to use and full instructions are provided along the way, so Sal would make an ideal teaching aid for children as well as first aid clubs where not much computer knowledge is needed.

MEGAMIX

Music demonstration

BBC Model B/Master

Eight-bit PD

No doubt many BBC micro owners will have jealously watched their A3000 and Archimedes-owning friends running impressive music and scrolling text demos. Well, now a group of programmers calling themselves The Yorkshire Boys have managed to cram sampled sound and music into a standard Beeb.

The effect is dazzling, especially when you consider that there is less than 32k to play with - although sideways Ram is used for extra effects, if fitted. It is good to see that

impressive demos are still being produced for the Beeb. Considering the sound abilities of the machine compared with the Archimedes, this really is quite impressive.

BDARK

BBC Model B/Master

Digital Phenomena

Due to the large amount of memory used by many Archimedes programs, the archiving of programs is often called for. Archiving essentially involves reading a file and compressing it by eliminating consecutive similar bytes. By compressing files, you can greatly increase the amount of data you can store on a disc, sometimes increasing the capacity by two or three times.

It also allows you to store multiple files within one file. This can help people downloading from bulletin boards, who only need to download one file rather than lots of little ones. Although the BBC micro has a much smaller memory than the Archimedes, there are still times when archiving programs can be beneficial, such as when cramming more data on to a disc.

Bdark will allow you to extract files that have been archived using Spark on the Archimedes. This is the accepted standard so far and allows Arc users to compress files for transferring to the Beeb. Using it is fairly simple - you simply copy Bdark and the file to be de-compressed on to a blank disc, and then type 'BDARK <filename>' where filename is the name of the file to be decompressed. The files will then be unsquashed and saved on the disc, so you can run the program as normal.

PD TIPS

The success of Public Domain relies in as many people as possible knowing about it - which is why we will be running more PD-related articles in BBC Acorn User in the future. So, if you want to pass on details of PD software you distribute or know about, or if you have any questions about PD, why not drop us a line? Write to: PD Tips, BBC Acorn User, 20-26 Brunswick Place, London N1 6DJ

BBC A3000 & ARCHIMEDES SOFTWARE

£25.99
INCLUDING VAT

Jelly Jaws

KRISALIS SOFTWARE LTD

£25.99
INCLUDING VAT

MANCHESTER UNITED EUROPE

KRISALIS SOFTWARE LTD

£25.99
INCLUDING VAT

MAD PROFESSOR MARIARTI

KRISALIS SOFTWARE LTD

£25.99
INCLUDING VAT

JAMES POND

UNDERWATER AGEN

STOR

SWIV

£25.99
INCLUDING VAT

KRISALIS SOFTWARE LTD

Computer aided weapons systems on-line, communications equipment operational. System checks complete, prepare for combat as a member of your notions elite assault team - SWIV. Two different vehicles of devastating destructive power, fighting together in one team.

PRIMARY OBJECTIVE : Destroy enemy control centres.
SECONDARY OBJECTIVE : Interdiction mission. The destruction by military force of all enemy units.

SWIV - No one knows what it means but everyone will know when it arrives.
CHECK OUT THE REVIEWS "Superlative Shoot 'Em Up Stunna." Zero Magazine.
"Destined to be The Shoot Em Up of the Year." Amigo Computing Magazine.
The One 93% Your Sinclair Megagame 92% C&VG 93% CU 90% Zero 91% YC 95%

OTHER GREAT GAMES FROM KRISALIS

MAD PROFESSOR MARIARTI.....	£19.99
MANCHESTER UNITED 1.....	£25.99
JAHANGIR KHAN SQUASH.....	£25.99
BOXING MANAGER.....	£25.99

HOW TO ORDER

TELEPHONE	LETTER/FAX	IMMEDIATE DISPATCH	FULLY GUARANTEED
0709 372290 ACCESS & VISA ACCEPTED	SIMPLY SEND A LETTER GIVING DETAILS OF THE GAME(S) YOU WOULD LIKE, YOUR NAME AND ADDRESS, AND PAYMENT BY CHEQUE, POSTAL ORDER, OR BY GIVING YOUR ACCESS OR VISA CARD DETAILS INCLUDING THE EXPIRY DATE	ALL ORDERS ARE DISPATCHED BY FIRST CLASS POST IMMEDIATELY. CARRIAGE IS PAID BY US IN THE UK. (ORDERS FROM OVERSEAS ADD £3 PER PRODUCT).	IF FOR ANY REASON DISKS SUPPLIED BY US BECOME FAULTY WE WILL REPLACE THEM STRAIGHT AWAY. SIMPLY RETURN THEM TO US ENCLOSED YOUR NAME AND ADDRESS.
RETAILERS CONTACT OUR EXCLUSIVE DISTRIBUTOR GREYHOUND MARKETING LIMITED Tel: 0532 621111			

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

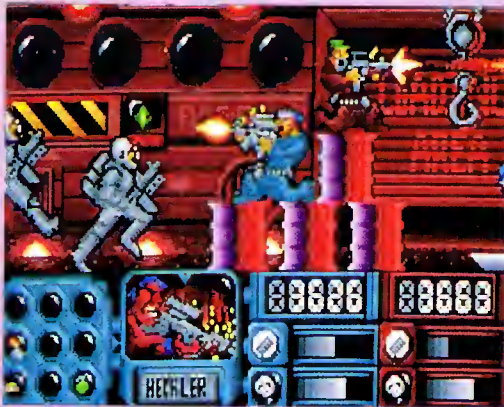
AGGRESSOR

Atomic Software
Tel: (0733) 53355
Rise OS machines
£19.95 inc VAT

Do you remember the alien out of *Alien* – tall, multi-limbed and ugly, with that big shiny shell thingy on its back? Well, some of the creatures in *Aggressor* – all wearing a sinister purple exoskeleton – are the spitting image of the old beastie (whom we have named Egor), only here they dash about in search of trouble with all the grace and coordination of an American Football player. So what do you do with them? Well... shoot 'em, of course!

But no sooner has the Egor hit the ground than you have something else to deal with, typically an oversized pink cockroach with an attitude problem, a hyperactive blue monkey with a bee under its bonnet, or an unaffectionate swarm of bees with a chips on their shoulders. Plan of action this time? Hmm... shoot!

And that's about the extent



Aggressor – fun, but not as aggressive as it should be

of the game; definitely in the 'if it moves shoot it' category. It is set sometime in the future, somewhere in space and features a couple of hard nuts named Heckler and Kosh in a war against the weirdos.

Although it sounds like it should be my kind of game – full of action, enhanced weaponry awaiting collection and best of all a two player option – somehow *Aggressor*

just doesn't make the grade. The scenario scrolls horizontally and Heckler, Kosh (or both) have to amble along, ducking and diving enemy fire and even jumping over strange holes in the ground, popping the baddies and collecting crates full of bonus gadgets which float down under parachutes from time to time. The graphics are actually fairly good, but despite some nice

detail, they lose smoothness in the heat of the action.

The trouble is that the whole game is rather too slow and you get about as much response out of Heckler and Kosh as you would from a dead duck on a cardiac monitor. Not only do they tend to ignore important signals like 'stop firing now please...' but they can't run half as fast as Egor, or the strange animals he hangs about with, placing you at a distinct disadvantage.

Also, in two player mode you are both confined to the left half of the screen, which causes severe annoyance when the forward positioned player has to wait for the lagging one to catch up.

Basically, the game looks and sounds good and has the sort of mindless plot I seem to like, but sadly the lack of speed does destroy the fun. Fast smooth action is the key to any game of this sort and lacking this makes *Aggressor* seem like a concert without a band or a football match without the teams.

Sam Greenhill

SWIV

Krysalis Software
Tel: (0709) 372290
Price: £24.95 inc VAT

Krysalis continues its tradition of bringing the best games to the BBC A3000/Archimedes by releasing its latest offering, *Swiv*. Hailed by many as the best shoot-em up available for any computer, be it eight or 16-bit, *Swiv* is a real arcade game in every way.

Set in the not too distant future, *Swiv* puts you in charge of two vehicles, a helicopter and a jeep. Both are armed for combat and have their own particular uses. The jeep is land-based and dodges behind buildings to avoid enemy fire, while the helicopter flies around the whole play area.

Both vehicles can be controlled simultaneously using the keyboard or joystick. When both the jeep and helicopter are used, it is best to have two players controlling the movement. It's not really



Just like the real thing – arcade quality from this new Archimedes game

possible to switch from one to the other and back again without losing lives.

Key controls can be customised to allow two players to fit comfortably around the keyboard, although unfortunately, only the main keys (not the function, cursor, edit or numeric keypad) can be used.

Support for both The Serial Port and RTFM joystick interfaces is built into the game.

The game is based around a continuous vertically scrolling display, over which you drive or fly. The play area is, in fact, one long strip from beginning to end and a special feature of the program allows new sec-

tions to be loaded in while you are playing, without any apparent break in play.

Because there are no breaks, the action is fast and furious and just gets more intense the further you progress. After three lives have gone, a credit feature (rather like stoking an arcade game with lots of 20ps before playing) allows you to continue from where you die.

The graphics and sound are well up to arcade standard, perhaps not quite as fast. Like most of the Krysalis games, *Swiv* is a direct conversion of the 16-bit version, with no use made of the Archimedes' superior sound and graphics capabilities. It doesn't detract from the game play, but more colour would have been nice.

If you were to stick an Archimedes playing *Swiv* in an arcade, you could almost believe it was the real thing. So if you're fed up of spending all that 'loose change', why not invest in a copy of *Swiv*?

Rob Miller

The Electronic Font Foundry



Purveyors of High Quality Fonts for Archimedes computers,

New Fonts available from EFF:

aidan, similar to the font used in the lindsfarne gospels £15.00

Allegro (Shelley Allegro Script™) £35.00

Andante (Shelley Andante Script™) £35.00

Arnold (Arnold Boeklin™) a decorative face £15.00

Ascot Black (Timotext™), a light Blackletter £18.00

Bob Melior™ £35.00

Bob, *Bob Italic*, **Bob Bold**, **Bob Bold Italic**

Quite a heavy typeface designed by Hermann Zapf

Digital Digital Oblique £16.00

Designed by Edward Betyna in 1991

Eric 1 Gill Sans™ £35.00

Eric Regular, *Eric Italic*, **Eric Bold**, **Eric Bold Italic**

Eric 2 Gill Sans™ £18.00

Eric ExtraBold, **Eric UltraBold**

Eric 3 Gill Sans™ £25.00

Narrow, **Bold Narrow**, **UltraBold Narrow**

Eve Open, (Caslon Open Face™) compliments 'Eve' £35.00

Fortuna Regular, *Fortuna Oblique*. £25.00

Gruby Blippo Black™ £25.00

Gruby Black, **Gruby Black Italic**

LIPA (JUNIPER™), OLD AMERICAN WOODEN BLOCK FACE £12.00

MrJones MrJones Italic, light, face suitable for display composition £25.00

Shel Shel *italic*, A pleasantly cursive typeface £25.00

SHERIFF (COTTONWOOD™) £15.00

Soho Black (Broadway™) £12.00

Veronica Sabon™ £40.00

Veronica, *Veronica Italic*, **Veronica Bold**, **Bold Italic**

Designed by master Typographer, Jan Tschichold in the late 60's

Venice Italian Old Style™ £40.00

Venice, *Venice Italic*, **Venice Bold**, **Venice Bold Italic**

Soon to be available:

Basia Franca (Dom Casual™)

Font names are © EFF, Adobe, Bitstream and Monotype where appropriate

Cartograph £25.00



a map symbols font

Symphony £25.00



a music symbols font

Braille £6.00



Canon BJ10e & ex Driver
360dpi using all 64 nozzles
Make full use of your Bj10e/ex
£10.00

We have the largest range of fonts available for the Archimedes, all properly hinted and well made by professionals. All of our near 250 fonts are available in all the Latin alphabets. We have 50 foreign fonts, including: Greek, Vietnamese, Russian, Hebrew, Bengali, Tamil, Punjabi, Gujarati and Devanagiri.

Our DTP department is second to none, we can provide help and advice on any DTP matter. We sell DTP related hardware and software and provide a complete telephone help service to any of our customers who need it.

For a free catalogue and pricelist, with details of our Fonts, Hardware and Software, please call or write.

The Electronic Font Foundry
Granville House
50-52, Upper Village Road
Ascot, Berkshire, SL5 7AQ

Telephone: 0344 28698
Facsimile: 0344 872923

All prices are ex-delivery & VAT, and are subject to change.

Among the many attempts to make Risc OS a friendlier environment for programmers to work in, *HelixBasic* from Craddock Computer Systems is perhaps the most imaginative. Although I say new, it is still under development, but I have looked at a pre-release version to see whether programmers' lives are about to be transformed.

APPROACH

The traditional approach to assisting application writers has been to provide various editors, procedure libraries and so on. This is all very well, but many Basic programmers simply want to be able to write a short program and see it running in a window.

HelixBasic is actually a Basic V interpreter (running independently of the standard Basic) which transparently multi-tasks, running your program in small 'time slices' while allowing other applications to run alongside it. In this respect it is what many programmers will want.

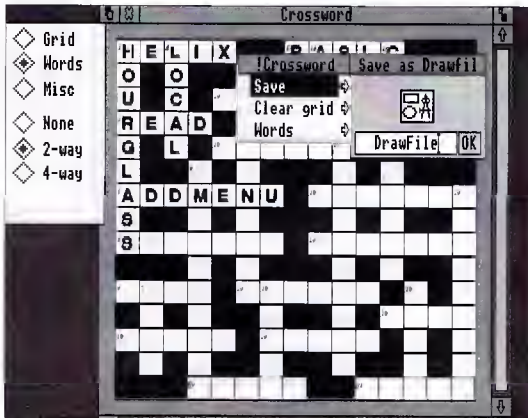
I wrote a short application in *HelixBasic* – a crossword grid designer – to see how well it performed. Although hindered by some of the problems yet to be ironed out, the program certainly ended up much shorter than the equivalent in ordinary Basic. Some tasks, particularly the displaying and saving of the finished crossword grid as a *Drawfile*, were remarkably easy.

The standard Basic commands are supported where appropriate, but there are many new ones that specifically deal with the desktop – too many to describe in full, but as an example I decided to look at menus.

If you are building a menu from scratch in a Basic application you normally require a set of functions and procedures to create and interpret them. Some programming aids allow you to build menus as text files, but this is often limiting since menus are at their best when 'dynamic' – in other words, options should really change (be ticked, greyed out and so on) depending on the circumstances. *HelixBasic* provides two keywords – `MENU` and `ADDMENU` – that greatly simplify the creation of menus,

BACK TO BASICS

New software could make programming tasks much easier. **DAVE ACTON** gives some first impressions



HelixBasic provided a shortened program for this crossword designer

while maintaining flexibility.

The main menu in my simple application was set up with just these commands:

```
MENU main_menu,"Crossword",-1
ADDMENU main_menu,"Save",SAVE
ADDMENU main_menu,"Clear
grid",MENU clear_menu
ADDMENU
main_menu,"Words",GREY
cant_enter,MENU word_menu
```

The submenus `clear_menu` and `word_menu` were defined elsewhere. The keyword `SAVE` means a save box is brought up and the last entry in the menu is greyed out whenever `cant_enter` becomes true. This illustrates an important feature of *HelixBasic* – the ability to link things to particular variables, so that any change in their value is automatically reflected elsewhere.

Another example is window titles. These can be fixed, or linked to variables so that changing them can be as sim-

ple as `titles="New title"`. Similarly, commands can be linked to particular actions, so clicking on an icon or selecting a menu entry can be set up to call a procedure, close a window or whatever.

This may cause a few surprises for newcomers to multi-tasking who expect their programs to be executed line-by-line. It is a feature of Risc OS (and not a limitation of *HelixBasic*) that you must beware of events taking place in an unexpected order.

GRAPHICS

Another key feature of *HelixBasic* is the way it treats graphics. Outside the desktop, when you draw a line on the screen you expect it to stay there. In a window, you may not always be able to see it, so your application needs to keep track of lines, circles, text or whatever so they can be

redrawn whenever necessary. *HelixBasic* quite logically stores all graphics as a sort of internal *Drawfile*. Indeed, you can save the contents of a window as a *Drawfile* with the `SAVEDRAW` command.

This facility means that my crossword designer simply had to plot the grid with a couple of `FOR...NEXT` loops and a few `RECTANGLE FILLS`, and then the finished product could be saved directly into *Drawfile*. Well, in fact a couple of the teething problems got in the way. In the pre-release version, fonts and text were not saved in the file and direct application-to-application saving was not supported, but these will be featured in the final version.

Although you can use *Edit* (as I did) to create your programs, a new and faster editor is promised, with a more graphical approach to window design. Another area where improvements are promised is in error trapping – at present, responses are far from ideal, such as 'Abort on data transfer' when you miss out the keyword `THEN`.

Geoff Craddock of CCS told me that the full release version of *HelixBasic* would be available this month and I look forward to trying it. Whether programs will run faster with the new version is yet to be seen – we may have to wait for the *HelixBasic* compiler, due later in the year.

CONCLUSION

The idea behind *HelixBasic* is essentially a very good one. Schools in particular will find the simplicity appealing and, with a compiler, a good manual and a fast editor, many programmers may be tempted.


Having said that, it will take a fair bit of work to transform the current development into a finished product. If CCS manage it, then they might well have a hit on their hands.

PRODUCT DETAILS

Product: *HelixBasic*
 Supplier: CCS
 Tel: (0604) 760991
 Price: £B5.06
 £72, education;
 £250, site licence
 (Prices exclude VAT)
 Machines: All Risc OS machines

SOFTWARE SHOWCASE

EDUCATION




EDUCATIONAL Software from STORM is FUN!

Write for an illustrated brochure
STORM SOFTWARE
 FREEPOST
 Poynton, Sherborne,
 Dorset DT9 4BR.
 0963 22469

MASTERCARD
 VISA

EDUCATION



The LIST Project
 Department of Design and Technology
 Loughborough University of Technology
 Leicestershire LE11 3TU
 Tel: 0509 222661 FAX: 0509 610813

The Technology Database
 As reviewed in BBC Acorn User March 1991

A database package of the National Curriculum Orders for Technology, covering AT's 1-5, Levels 1-10. Designed for ease of use, by any teacher, as an aid in constructing schemes of work.

BBC 'B'/Master £12.00+VAT. Archimedes £13.00+VAT
 * Crown copyright data are reproduced by permission of HMSO

EDUCATION

Make the most of your Archimedes/A3000 with a unique package for primary schools,

"Picture It!"
 a unique software package specially designed as an aid to the National Curriculum.

"Picture It!" allows children to build up scenes using sets of simple pictures, linked to specific topics currently including History, Geography, Maths, Science, R.E. and Design and Technology.


It is exceptionally easy to use, making it an invaluable classroom resource, ideal for younger pupils or those with special needs.

For further information please contact:
Apian Way Software Ltd.,
 Old Co-operative Buildings,
 Langley Park,
 Durham, DH7 9XE.
 Tel: 091-373 1389

NORTHERN MICROMEDIA

Quality educational software and resources developed by teachers for the classroom

For further information contact:
NORICC - Resources Centre • Coach Lane Campus
 Coach Lane • Newcastle upon Tyne NE7 7XA
 Telephone: 091 270 0424

A simple introductory Writing Tool for the A3000 / Archimedes. Ideal for early years and special needs, it can also be used with a concept keyboard.

Fantastic value at £12.00 (+p&p)

PRIME RESOURCES

6 Sunbury Avenue Jesmond Newcastle upon Tyne NE2 3HE Tel: (091) 281 1831

The 'Compleat' MEAL PLANNER

KITCHEN PLANNER in 3D


The National Curriculum for Design & Technology coordinates design activity in Home Economics and CDT. These popular CAL packages, tested by an advisory team of practising teachers and widely used in Home Economics & CDT, are written & published for BBC Model B/B+Master and Acorn Archimedes (versions now being made RISC OS compliant - upgrades available) by **ACADEMIC SOFTWARE**, Sourby Farm, Timble, OTLEY, Yorks, LS21 2PW. Write or telephone (0943-880628) for full Home Economics/CDT software catalogue and price list.

Educational Software A3000 / BBC / Acorn

Send for our free catalogue of programs for all Acorn computers. Ages 5 to 15

SELECTIVE SOFTWARE
 64 Brooks Road,
 STREET, Somerset, BA16 0PP
 Tel. (0458) 43079

UTILITIES



BROKEN MOUSE? PREFER TO USE THE KEYBOARD?
 Aid-Set Software makes all mouse functions become available from the

keyboard including latching, dragging, selecting from menus and adjusting the mouse speed. Only one key press to access all window icons.

A must for all users who are inaccurate using the mouse.
 Acorn Archimedes A3000 And A5000 Compatible.
 Send cheque for £30.55 inc VAT & P&P to:
Le Computer FREEPOST P.O. Box 29 Chelmsford Essex CM3 1BR ☎ 0245 362225
5 size 90p/year Special Needs/Access Teachers Scheme 9 Home and School Direct
Acorn Home and School Direct

SPECIAL NEEDS

C.J. COMPUTING SPECIAL NEEDS

SALES • REPAIRS • SPECIAL NEEDS

Please contact us for all your Acorn computers (Hardware & Peripherals)

We specialise in tailoring computer systems for special needs

**57 Westbury Hill,
 Westbury-on-Trym,
 Bristol**

Tel: (0272) 624553

STATISTICS

STATISTICS

The ESTABLISHED system

for the Acorn Archimedes is

FIRST

Write or telephone for details to

SERIOUS STATISTICAL SOFTWARE

Lynwood, Benty Heath Lane, Willaston

South Wirral L64 1SD

Tel: 051-327 4268
 NEW lower cost
FIRST JR
 now available

FONTS

Make your own Italics

For £10 you can have 'Italic', the program to transform Arc outline fonts for use in any other application.

Design Concept
 30 South Oswald Road
 Edinburgh EH9 2HG
 ☎ 031 668 4518



Call for our free catalogue including fonts or send £12 inc. p&D

LANGUAGES

KEYLINK PROLOG V2.0 For the Archimedes

- Uses standard Edinburgh syntax.
 - Comes with 120 page tutorial/manual developed especially for the first time Prolog user.
 - Fully integrated into the RISCOS WIMP environment.
 - Suitable for use with large Prolog programs such as the Open University's public domain MIKE system for Knowledge Engineering and Expert System development making it ideal for these components of A' level syllabuses.
- £69.95 + VAT (postage included).

Keylink Computers Ltd, 2 Woodway House, Common Lane, Kenilworth CV8 2ES. Tel/Fax: 0926 50909

!!VARIOUS!!

SIGNWRITER for the BBC & Archimedes

Professional quality lettering that keeps it's smooth outline at any size for 1/2" to max printer width 8" (BBC) Produce quality Banners, Posters, Letterheads, Adverts, Signs, Tickets & Notices in minutes.

BBC Disk £29.95 - Archimedes £39.95

Black & Coloured Ribbons for many printers. Please ring for availability and prices.

(All prices include VAT and Delivery)

WIGHT SCIENTIFIC
 44 ROAN STREET, GREENWICH,
 LONDON SE10 9JT

Telephone 081-859 2699 Fax 081-853 4416

Access and Visa accepted

SOFTWARE SHOWCASE

PUBLIC DOMAIN



The PD Library
Over 480 cram-packed discs of the best Archimedes Public Domain Software.

Unlike other libraries you can pick 'n mix the programs you want. Just £1.20 per disc for our own compiled discs or £1.60 for the pick 'n mix service.

What the press say:

The best organised catalogue of any of the PD suppliers I've seen. Arch Angel has a full list of software which is worth exploring in detail. (BAU Oct91).

The complete catalogue of all Arch Angel PD discs is presented in a very helpful menu system. This makes choosing and ordering software as easy as pie. Other PD libraries should take note as this feature gives Arch Angel a big advantage. (Archimedes World Dec91).

NEED WE SAY MORE?

For the latest catalogue with Arch Angel's unique 'Pick n Mix' feature, please send a £1 to:

Arch Angel PD, PO Box 41, Exeter, Devon, EX4 3EN.
Please make any cheques payable to Arch Angel PD.

PUBLIC DOMAIN



Demo Disc 9
With 16 Page Catalogue



Demo Disc 9 Crammed with over 1600K of new PD software.

Order the Offer Pack below, for just £6, or send a £1 coin for Demo 9.

- F98 Bobby Blockhead Demo
- F99 Arc Angels Mega Demo
- J31 Archivist Demonstration Version
- G93 8 Bit Stereo Sound Tracks
- +++ Arcaynia Demo Package 9 +++

PO Box 1927 : Sutton Coldfield : B74 3QZ

MUSIC

Daniel Wilson Presents his great 8-track Archimedes Tracker collection!

The Data Stream is now proud to release some of the best music ever heard on the Archimedes- 10 discs with over 30 8-track trackers - some lasting over 10 minutes! The tracks are not PD and are available only from us!

(Please make cheques payable to 'The Data Stream')

10 Disc set : £25.00
D.W.Trackers - 32 Hollinwell Avenue, Wollaton, Nottingham, NG8 1JZ

TED KIRK

THEORY OF MUSIC Questions and Exercises
LEVEL 1 THEORY OF MUSIC - tutorial
each: Arc £16 Compact £16 Master £15
BBC B (80-track) £13.50, (40-track) £14.50

PLAY WHAT I PLAY - a music game

Arc £13.50 Compact £13.50 Master/B £12.50

5000 NOTES (AMPLE music) Master/B £3.95

Ted Kirk (BAU) 33 Humber Crescent, ST. HELENS, Merseyside WA9 4HD (0744 818761)

Moribund Hedgehog PD

3 Rodmell Close, Bromley Cross, Bolton BL7 9DT

When selling more than one disk, MASHPD is the cheapest supplier of quality Public Domain software for the Archimedes. There's a unique 'Picked & Packed' service, and the swapping of software is welcome.

Send £1 now for the latest Demo Disk (including the acclaimed disk-based catalogue with a megalope of useful and entertaining software, including the official MASHPD demo). For a limited period, you'll also get a 50% off voucher.



WISH SOMETHING NEW WAS HAPPENING FOR YOUR BBC/ELECTRON ? SOMETHING IS!

For your catalogue and sampler disc, send £1.50 to BBC PD, 18 Carlton Close, Blackrod, BOLTON BL6 5DL stating disc size and format - or send an A5 s.a.e. for brief details and a summary catalogue. (Please make cheques payable to A. Blundell).

Nova Visual Services

600 x 600 d.p.i. laser printing! For top-quality printing of your documents (Draw, Impression, Poster etc.), contact me now.

Rates: 80p per A4 side
8p per side for extra copies

No minimum order!

Just send a 3.5" disc containing your document, instructions and a cheque to: M.Wiggins, 50 Fenton Road, Newport, Shropshire, TF10 7JR.

Also: images scanned at up to 256 grey levels; leaflets, business cards and promotional material printed.

For further details, Tel. 0952 814624

DTP

SELECTIVE COMPUTER SERVICES

DESK TOP PUBLISHING - SALES
'HOME AND SCHOOL EVENTS'
TEACHER'S PURCHASE SCHEME
0% Finance on Learning Curves
DERBY (0332) 690691

BBC SOFTWARE

ROOM 7 SOFTWARE

INVESTMENT ANALYSER 2 £19.98
Shares, Unit trusts and unit assurance investments can be monitored with this simple to use menu driven program. Investments can be plotted graphically and compared with other investments or indices.

INFLATE £19.98
Designed to work with the investment analyser, this program monitors the RPI index and the FTA index and calculates the RPI and FTA inflated values of each investment.

Our catalogue contains full details of these and other programs for Acorn computers. Prices include postage and V.A.T. at 17.5%. Most of our programs are available for the Electron/BBC B/B-Master, COMPACT and ARCHIMEDES range on 5.25" and 3.5" discs.

Letters/cheques to: W.L. Computer Services, Dept. 2
First floor, H.S.L. Building, 437 Warrington Road
Grinhill, Merseyside L35 4LL.
Tel. 051-426 7400 FAX. 051-493 1425

The Datafile

The Archimedes PD & Shareware Library
For details of our latest Cat/Demo disc V1 that contains over 1625K of archived public domain and the comprehensive 500K Cat-a-log please see our main advert

on page 74 of this issue of Acorn User.
Public Domain & Shareware at prices you can afford.
Standard discs £1.10
Super discs £1.25
Send your discs to us 50p and 75p

ARCHIMEDES PUBLIC DOMAIN

LOWCOST = THE BEST NAME IN PD

SEND for LOWCOST PD's latest catalogue/demo disc. It contains full details of all our exciting £1 discs. YES, JUST £1 a disc!

Nothing but the BEST at LOWCOST PD!

Please send a £1 coin or £1 cheque made payable to J. Michalski for our catalogue/demo disc to:

LOWCOST PD (LC PD), 6 FURZELAND HOUSE, SHEEPHOUSE WAY, NEW MALDEN, SURREY, KT3 5PH.

NEW

Making its premiere this month on the brand new Skyfall Spring '92 Demo Disc is the Revolutionary Interactive 'What you See, is What you Get' Database. For the first time ever you can graphically see the contents of our great discs before you buy, with a detailed description for every Application, Demo and Game.



Please send £1 for your copy of the Spring '92 Demo Disc and Catalogue.

Skyfall, PO Box 2220, Birmingham, B48 5RZ.



SOFTWARE SHOWCASE

GAMES

CREATOR ARCADE GAMES DESIGNER £38.95
Produce your own arcade-style games with *Creator*. No BASIC or ARM code programming knowledge needed.

ALPS ADVENTURE SYSTEM £34.95

ALPS allows you to create commercial-quality text adventures with graphics. Full RISC OS application.
COPS £19.95

A humorous adventure with text and graphics - spend a day as a cop on Hall Street and find the kidnapped Chief.

PLAGUE PLANET £14.95

A tough sci-fi text adventure with over 250 locations.

UK P+P free on all orders. EC: £2.50, Outside EC: £3.50

ALPINE SOFTWARE, Dept (BAU5) Tel: 0762 342510
PO BOX 25, Portadown, CRAIGAVON, BT63 5UT

SCANNING SERVICES

HOBBYIST

DTP
FUN
BUSINESS



DOCUMENT

AND
PICTURE
SCANNING

DTP-Scan

HIGH QUALITY COLOUR & B/W SCANNING

FOR ALL ARCHIMEDES USERS INC. A5000

AT SENSIBLE PRICES

ONLY £4.60 FOR 6"x4" COLOUR PICTURE
INC. DISC AND RETURN POSTAGE

* UP TO A4 SIZE * UP TO 400 DPI *

Call 061-445 0191 for Free Information Pack
Or send Picture/Doc. stating Mode reqd.(15/21)
and available computer memory (1/2/4 Mb) to:

DTP-Scan 27 Broad Oak Lane
East Didsbury Manchester M20 0QB

MAGAZINES

Absolutely

The Disc-based Magazine for the Archimedes
Absolutely is a monthly magazine with 2 discs. The first contains compacted new PD and the other contains many Archimedes related articles.
Send a £1.00 coin for cheque for a sample copy!

Please make cheques payable to 'Absolutely'

26A Bull Lane, Rayleigh, Essex SS6 8JD

UTILITIES

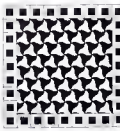
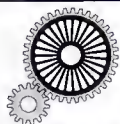
!DrawAid

Produce !Draw files as varied as these from your own BASIC programs.

!DrawAid comes with an Introductory Tutorial, a Reference Guide, and numerous Example Programs.

PRICE £10 including postage. no VAT or send SAE for information sheet.

CARVIC Manufacturing,
Moray Park, Findhorn Road,
FORRES, Moray IV36 0TP



42 Wimborne Gardens, Ealing, London, W13 8BZ.

Illusions

Archimedes Disc Magazine

Illusions Disc Magazine is suitable for all Archimedes computers. Each issue contains the latest software reviews, programming games and much much more. Prices are:

1 Issue £3, 3 Issues £7.50 and 6 Issues £13
Please make all cheques/MPOs to 'John Reed'.

ACORN USER ADVERTISEMENT PAGES - APRIL 1992

4-Mation	114	Dabhand Computing	104-105	Le Computer	16	Software Bargains	73
4th Dimension	49,59	Dabs Press	31	Longman Logotron	11	SSERC Graphics Library	74
Academic Software	116	Datafile	74,117	Loughborough University	116	Storm Software	116
Ace Computing	102	Datastream	117,118	Manor Court Supplies	74	Superior Software	0BC
Alan Blundell	117	David Adamisk	118	MHPD	117	T.M.J. Computer Software	94
Alpine Software	118	Design Concept	117	Michalski	117	Technomatic	60-61
Alsystems	71	Desktop Projects Ltd	86-87	Micro-Aid	102	Ted Kirk	117
Ampsound	72	Digital Services Ltd	12	Minerva Software	19	Terrill Electronics	102
Appian Way	116	Electronic Font Foundry	114	Morley Electronics	56	The Data Store	48
Arcaynia P. D.	117	Evolution Computers	70	Northern Micromedia	116	The Serial Port	68
Arch Angel Ltd.	117	Gnome Computers	108	Norwich Computer Services	93	Timestep Weather Systems	94
Atomwide Ltd.	IFC	Ground Control	28	Nova Visual Services	117	Topologika	93
Automatic Services	94	HCCS Associates	17	Oak Solutions	20-21	Unique Way	99
AVP Computing	48	Ian Copestake Software	1,4-5	Pineapple Software	99	Warehouse	23
Beebug	6	IFEL	88,98	PRES	32-33	Watford Electronics	34-47
Broad Oak Computers	48	Illusions Magazine	118	Prime Resources	116	We Serve	100
Carvic Manufacturing	118	Integrex	30	Pyramid Computer Services	88	Wight Scientific	116
Chameleon Computers	88	Intelligent Interfaces	72	Selective Software	116	Willow Software	108
CJ Computers	116	Irlam Instruments	IBC	Selective Computer Services	116	WL Computer House	117
Clares Micro Supplies	90	JR Lectronics	93	Senlac Computing	100		
College Computers	26-27	Kendal Computer Centre	72	Serious Statistical Software	116		
Colton Software	2	Keylink Computers	116	Sherston Software	6		
Computer Concepts	14,52	Kingswood Centre	93	Simis Ltd	8		
Computer Focus	108	Krysalis Software	111	Simtec	94		
Contex Computing	100			Skyfall	117		
D.T. Software	64						

The smArt Suite

All 4Mation packages for the Archimedes carry a FREE SITE LICENCE.



smArt is a Linked Graphics System. When picture files are loaded into smArt, different parts of the picture can be changed by making selections from a menu. The graphics components are automatically scaled so that the parts always fit. Pictures may be saved as Draw files or transferred to DTP programs or any other applications which can handle Draw files.

The smArt package comes with over two dozen files on subjects ranging from shops to cars, and churches to British Isles maps. Available as separate products are discs of smArt files on specific themes such as Leisure, Heraldry, Faces, Fashion, Homes, Trees & Gardens, and Dinosaurs.

smArt £55 (NZ\$ 198)

smArt discs £16 (NZ\$ 59)



For those wishing to create their own smArt files, smArtFiler is an application which compiles smArt files from your source Draw files. Full instructions are provided along with lots of examples. Individual components may be scaled, rotated, and placed in front of or behind other components. Menu entries may be specified.

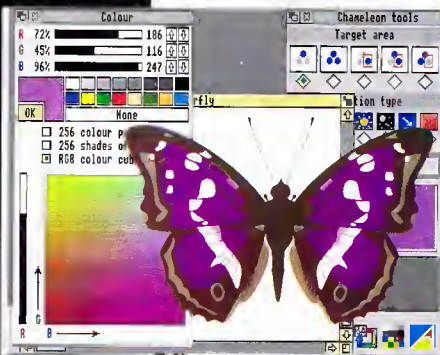
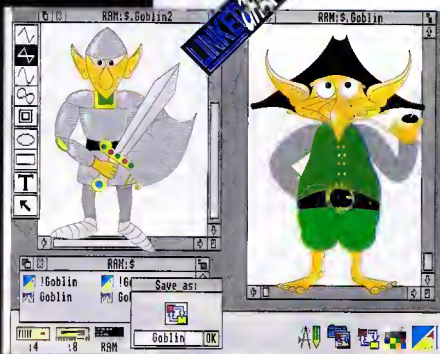
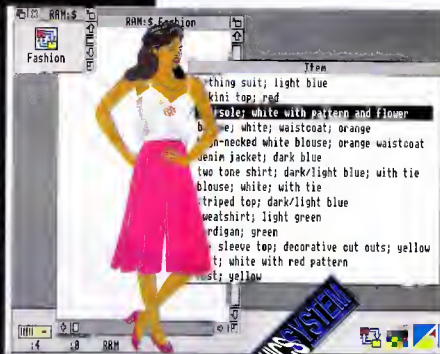
If it can be drawn it can be a smArt file.

smArtFiler £35 (NZ\$ 129)



Chameleon is an ideal companion to smArt, and a must for anyone who needs to make quick and easy colour changes to Draw files. As well as palettes for 16 and 256 colour modes, there are options for 256 shades of grey and a RGB colour cube which provides thousands of colours. Colours may be selected from other Draw files so can be copied from one picture to another. Colours may also be changed in HSV values; Hue, Saturation and Value. Edited files may be saved as normal Draw files or as colour separations. A clever Undo and Redo facility allows virtually any number of colour changes to be cancelled and then reinstated. Zoom and Magnification facilities allow accurate editing of small areas.

Chameleon £25 (NZ\$ 95)



FREE DEMO DISC

Send us a blank disc to receive a demo copy of smArt and Chameleon. Only the save facility is missing. Poster demo also available.

Poster	£89	NZ\$367.50
Snippet	£29	NZ\$120.00
Jigsaw	£29	NZ\$120.00
Jiglet	£29	NZ\$120.00
DTP Seeds*	£ 8.45	NZ\$ 35.00
* (book - no VAT)		

UK Prices: incl. P&P, excl. VAT @ 17½%.
NZ prices incl. GST.



4Mation • 14 Castle Park Road
Barnstaple • Devon • EX32 8PA
Tel. (0271) 25353 Fax. (0271) 22974



4Mation New Zealand
PO Box 12-228 • Christchurch
Fax. (03) 655-055

WIN A ROLAND PIANO KEYBOARD



Answer three questions and you could be the proud owner of the latest digital piano from Roland, worth just under £300!

The BBC A3000 and Archimedes offer great potential for making music. You may be inspired by music programs we run in the magazine, such as our chord dictionary, on page 62. A wide choice of commercial music software also exists which allows you to create and play great music, from classical to rock.

But to make the most of your machine's musical capabilities, you really need a keyboard. Which is why we are giving readers the chance to win one of the latest digital keyboards from Roland, the EP-3 digital piano, worth £299. Built-in sounds features include both acoustic and electric piano, vibes, strings and organ sounds, as well as an amplifier and speakers – so all you have to do is plug in and play!

The EP-3 makes an ideal 'first' keyboard and you don't need a technical or musical background to play one. But as you become more proficient, you can use the built-in Midi capabilities of the keyboard to connect up to your computer and other instruments.

HOW TO ENTER

The competition is open to all readers – simply answer the questions opposite, complete the tie-breaker and send the coupon to: Roland Competition, *BBC Acorn User*, 20-26 Brunswick Place, London N1 6DJ. The closing date is Friday March 27 1992. Usual competition rules apply.

ROLAND COMPETITION ENTRY COUPON

Please answer all three questions and complete the tie-breaker below.

1. What does the term Midi stand for?
2. How many sharps are there in the chord of C major?
3. Name the music application supplied with the BBC A3000/Archimedes?

.....

I would like to win a Roland keyboard because (not more than 15 words)

.....

.....

.....

Your name

Address

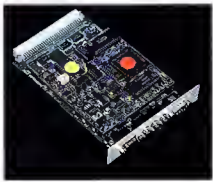
.....

Postcode

HOW TO IMPROVE YOUR IMAGE

Imaging products for Archimedes:- Scanners, Video Hardware and Software
For Graphic Arts, DTP, Word Processing, Multi-Media and Computer Based Training etc

Moving i-Mage



Multi-media video on desktop

- Scalable full motion video in window
- Simple to use from BASIC, C, assembler etc
- Support for 'Moving i-Mage' built in to Genesis and Avanti
- Produces high-quality precise colour matched sprites
- 4:1:1 YUV digital video format with 21 bits per pixel
- S-VHS or composite PAL/NTSC video inputs
- Single width card with pixel ports can be expanded for image compression and other formats eg 4:2:2



i-Scan 256

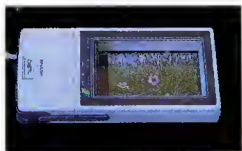


True grey level scanner

- Specifically designed for Archimedes
- 256 grey level at up to 400dpi
- Automatic scan from postage stamp size up to A4
- Upgradable
- Brightness and contrast adjustable from desktop



i-Mage



High-quality 24 bit Colour scanning

- TIFF, JPEG, closest colour matched SPRITE IRLAM and CLEAR file formats
- Fast preview and 256 grey level scans
- Multi-tasking scanning with dithering and compression carried out on the fly
- Complete range of Sharp flatbed scanners supported:- JX-100 mini, JX300 A4, JX450 A3 and JX600 A3



Elucidata



Optical character recognition

- Any monochrome sprite imported
- Multi-tasking recognition
- Trainable from outline fonts or scanned image
- Filters large objects and noise
- Handles proportional fonts

Pro-I-Mage



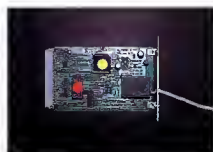
AlterI-Mage



Scanned Image Editing

- All changes/edits carried out in 24 bit domain
- Closest colour matched sprites
- Crop, sharpen, adjust gamma and colour balance etc
- Imports and exports SPRITE, TIFF, CLEAR, JPEG IRLAM and 'Moving i-Mage' files

Fax-im



Facsimile card

- Group III facsimile
- Fully featured printer driver application
- Sends full colour files to another Fax-im
- Auto-answer mode
- CCITT compressed TIFF files supported



All software RISC OS compliant Products carry full one year guarantee. Hardware includes complete package of software etc.

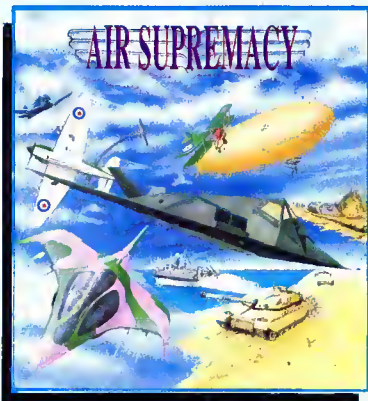
All trade marks, registered names acknowledged.

Available direct from Irlam Instruments Limited.
For more details please contact



Irlam Instruments Limited Brunel Institute of Bioengineering Brunel University
Uxbridge Middlesex UB8 3PH 0895 811401

SUPERIOR SOFTWARE



Pacific 1944



Arabia 1991

AIR SUPREMACY

Combat Strategy and Action...
In the Air, on Land and at Sea

In this totally new type of game/simulation, you can choose to swap between aircraft and ground or sea combat forces, as the battle develops. You start in 1918 in Europe, with biplanes and tanks, then proceed to level 2 in 1944 in the Pacific, with fighter aircraft and gunboats. Level 3 in 1991 involves jet aircraft and desert tanks, and finally to 2150 with futuristic aircraft and rapid attack hovercraft. As you progress, the action becomes faster and more difficult with the advance increasingly comprehensive. Mouse or keyboard control.

A3000/Archimedes

MASTER BREAK

Snooker-Style Trivia Quiz Game for 1 to 4 Players

Six categories of questions: SCIENCE & NATURE, POP MUSIC, GEOGRAPHY, SPORTS & PASTIMES, ARTS and HISTORY. Over 1500 questions in the BBC Micro/Electron version. Over 2000 questions in the A3000/Archimedes version, including digitised picture and digitised sound questions.

In the 1 player game, try to get the highest break - you might even manage the maximum break of 147. In the 2 to 4 player game, compete against your friends and family for the highest score and highest break.

Start your frame with an easy red question, then choose your colour - have you the nerve to choose the black ball question? You've used all your PASSES and the ball is OVER THE POCKET - if you miss, it's a FOUL SHOT! ALL THE FUN AND CHALLENGE OF A TRIVIA QUIZ AND SNOOKER MATCH ROLLED INTO ONE ENTHRALLING GAME.

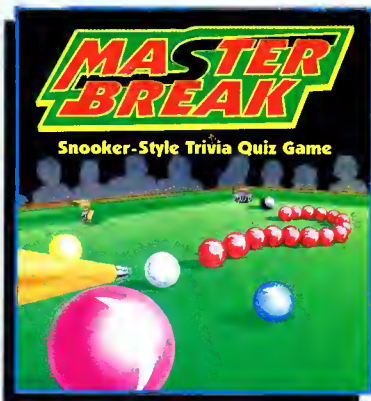
BBC Micro/Master, Electron & A3000/Archimedes



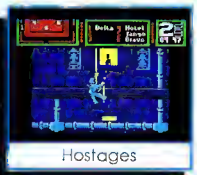
BBC Micro/Master



A3000/Archimedes



Snooker-Style Trivia Quiz Game



Hostages



Vertigo

PLAY IT AGAIN SAM 16

A New Action-Packed Four-Game Compilation

HOSTAGES

Commando action and strategic planning. Place your snipers, abseil down the Embassy and smash through the windows to rescue the hostages. Superb graphics and sounds. Keyboard or joystick control. "We are used to big blockbuster games from Superior, and Hostages is no exception"... Micro User

PERPLEXITY

Three-dimensional strategy game for Repton and Pacman fans. Puzzle your way through 16 graphically brilliant mazes. "A classic for your collection, but you may end up smashing your Beeb in frustration"... BBC Acorn User

VERTIGO

A brand-new release by Superior. Five levels of fun and skill as you try to balance your way around fifty different weird and wonderful structures. The addictiveness of play that makes for a classic. Superb music and sound effects. Joystick option (BBC Micro /Master version). Enhanced BBC Master disc version.

PIPEMANIA

The brilliant and highly acclaimed game from Empire Software. Frustration as you try to join the pipes and let the floor flow. Joystick option (BBC Micro/Master version). One or two player options. "A classic puzzle arcade game that is so addictive, it should come with a Government Health Warning"... Computer & Video Games

BBC Micro/Master & Electron

AIR SUPREMACY

A3000/Archimedes 3 1/2" Disc £24.95

MASTER BREAK

BBC Micro/Electron Cassette...\$9.95
Masler Compact 3 1/2" Disc...\$14.95
BBC Micro 5 1/4" Disc.....\$11.95
A3000/Archimedes 3 1/2" Disc.....\$19.95

PLAY IT AGAIN SAM 16

BBC Micro/Electron Cassette...\$12.95
BBC Micro 5 1/4" Disc...\$14.95
Master Compact 3 1/2" Disc.....\$19.95

BBC Micro Cassettes & BBC Micro 5 1/4" Discs are compatible with BBC B, B+ & Master 128 computers. Screen pictures show the BBC Master versions of the games, unless stated otherwise.

We have in stock over 30 different titles for the BBC Micro/Master and Acorn Electron computers including such great games as: ELITE, REVS + REVS 4 TRACKS, EXILE, SPEECH! A QUESTION OF SPORT, REPTON INFINITY and SIM CITY, and the compilation titles: ACORNSOFT HITS 1 & 2, SUPERIOR COLLECTIONS 1, 2 & 3 and PLAY IT AGAIN SAMS 1 to 15. All are available for immediate despatch.

Our A3000/Archimedes titles include great classics such as ZARCH, CONQUEROR and REPTON 3 (now with enhanced graphics), SUPERIOR GOLF, and the new, highly praised, speech synthesiser, SPEECH! Also the action-packed HOSTAGES game. Please write to the address below or telephone for a full list of Superior Software games.



ACORNSOFT

(Superior Software is a trading name of Superior Microcomputing Ltd.)
Dept. J1, P.O. Box 6, Brigg, S. Humberside DN20 9NH. Tel: (0652) 658585

PLEASE MAKE CHEQUES
PAYABLE TO "SUPERIOR SOFTWARE."



24 HOUR TELEPHONE
ANSWERING SERVICE FOR ORDERS

OUR GUARANTEE

- All mail orders are despatched by first-class post
- Postage and packing is free
- Cassettes and discs that are faulty on receipt will be replaced immediately

(This does not affect your statutory rights)