

THE MICRO USER

Volume 9

Number 5

July 1991

£1.50

euromPRESS
PUBLICATIONS

IN PERSPECTIVE

Draw accurate 3D pictures

ICONS BY DESIGN

Brighten up your programs

TOTAL CHAOS

Paint programs to the rescue

SOFT SCROLLING

Find out how games work

DATA SECURITY

Foolproof file protection

Reviews

Speech!

DT-Talk

SpeechSystem

Arcade Game Creator

...plus all the
latest
games

WINDOWS & NEUTRON
PROGRAMMERS
GOUACHE

SPECTRUM
RGB



For ALL users of the BBC Micro, Master, Electron, Archimedes series and A3000



THE WORLDS
MOST POWERFUL
MICRO

SPECIAL OFFER

Phone for details of our latest special offers.
We will match or better any advertised offer.

A3000	£599
410/1	£1099
420/1	£1299
440/1	£1699
The Learning Curve	£699
Arc. Learning Curve	£1299
Jet Set Pack	£649

*** NEW PRODUCT ***

JET SET PACK

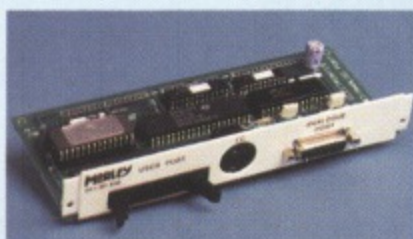
A3000 with "monitor quality" adaptor eliminates the need to purchase a dedicated monitor. Comes with four games - Interdictor, Superior Golf, Trivial Pursuit and Euclid - as well as the usual A3000 bundled software. £649

*No Monitor
Needed!
TV Modulator
Included*

ARCHIMEDES PERIPHERALS

Microvitec CUB3000	£189	Econet Upgrade	£49
Acorn Colour Monitor	£199	Acorn Rom Podule	£56
Philips 8833	£219	300 2 Slot Backplane	£37
Mono Monitor	£73	300 4 Slot Backplane	£59
Monitor Stand	£19	300/400 I/O Podule	£85
A3000 User Port & Midi	£49	300/400 Midi Podule	£69
Serial Upgrade	£19	300/400 3.5" Drive	£115

A3000 BBC ANALOGUE & USER PORT PODULE



Full specification BBC analogue and user port. The analogue port is accessible using ADVAL from BASIC5 with all BBC OSbyte calls supported.

£69

Interface software written by Acorn for maximum compatibility with the BBC.

TELETEXT

The Morley Teletext Adapter is now available for the Archimedes. Advanced specifications, include digital tuning, screen dumps etc. Connects via the external podule socket or our Analogue/User Port. £125

Existing users of our BBC Teletext Adapter can have the unit converted to an Archimedes version. £35

ST506 HARD DISK DRIVE UNIT

Faster and cheaper than 8 bit SCSI.



INTERFACE	
ST506 Podule Kit	£169

A3000 DISK DRIVES

Including ST506 Podule, cased drive with power supply, cable & leads

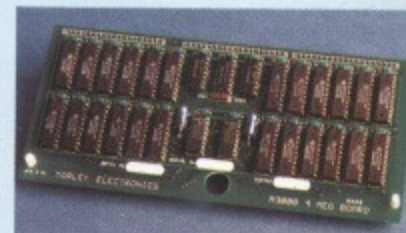
20MB	£379
40MB	£459
55MB	£559

CALL FOR 300/400 PRICES

MEMORY EXPANSION

THE BEST VALUE MEMORY UPGRADES

Unlike most other cards, our upgradeable card can be upgraded from 1MB to 3MB at a later date for maximum flexibility.



- Fully compatible with all Acorn software.
- A must for all serious Archimedes owners.
- Make full use of powerful RISC-OS packages.

A3000 1MB Expandable	£89
A3000 1MB Non-Exp.	£65
A3000 3MB Upgrade	£179
A3000 1MB to 3MB	£140
305 1/2MB	£69
400 Series 1MB	£50

A3000 3.5" SECOND DRIVE



- Easy to install - simply plug in and run.
- High quality Japanese drive.
- Includes full fitting kit and instructions

£125

A3000 5.25" SECOND DRIVE



- Kit includes:
- 5.25" Teac 80 track drive
 - Case
 - Power supply
 - Interface and leads

£169

LEADS & MISC. HARDWARE

Arch SCART Monitor Lead	£8	80 col Printer Stand	£15
Arch 9 Way Msync Lead	£8	132 col Printer Stand	£19
Arch Serial Lead	£8	A3000 Monitor Stand	£29
Arch Printer Lead	£6	Tilt & Swivel	
BBC Printer Lead	£6	Monitor Stand	£11
2 to 1 Printer switch	£20	Eprom Eraser	£18
3 to 1 Printer switch	£30	Eraser with Timer	£23
4 to 1 Printer switch	£36	5.25" Floppy Discs x10	£5
64k Printer Buffer	£115	3.5" Floppy Discs x10	£10
256k Printer Buffer	£199	27128 Blank Eproms	£3

SCSI HARD DISK DRIVES

INTERFACES

A3000 SCSI Podule	£149
300/400 SCSI Podule	£149

A3000 DISK DRIVES

Including SCSI Podule, cased drive with power supply, cable & leads

20MB	£399
40MB	£459
60MB	£559

CALL FOR 300/400 PRICES

O.N.I.C.S. LTD



MORLEY

E.L.E.C.T.R.O.N.I.C.S. LTD

Morley House
West Chirton
North Shields
Tyne & Wear
NE29 7TY

Tel (091) 257 6355
Fax (091) 257 6373

Shop hours:
9am to 5:30pm (Mon-Fri)

Acorn

We are an Acorn dealer and service centre. If you would like to have a look at the A3000 or any other Acorn/Morley product please feel free to call in and discuss your requirements with our staff.

If there is anything you require which isn't advertised, please ring for a competitive quote.

How To Order....

BY POST: Enclose cheque made payable to MORLEY ELECTRONICS LTD.

BY PHONE: By quoting your ACCESS or VISA card number.

CARRIAGE: £1 on most orders. £3 on larger items. Hard Disks, Computers + Monitors £10 (carrier).

VAT: UK customers please add 17½% to cost incl. carriage.

GOODS USUALLY DESPATCHED BY RETURN.

Government and Education orders welcome.

Acorn and Archimedes are trademarks of Acorn Computers Ltd.

SOFTWARE

This is a small selection of the software that we can supply at competitive prices. Please call for any item you require.

ARCHIMEDES

Pipedream3	£119
1st Word +	£65
Minerva Home Accounts	£79
Acorn Desktop Pub	£121
Clares ProArtisan	£82
Clares Artisan 2	£49

M/B 8 BIT SOFTWARE

Design 7 +	£8.60
Desfax	£17.40
Masterfax	£26.00
Mastercopy	£11.20

MASTER ROM EXPANSION BOARD



THE ULTIMATE ADD-ON FOR ALL SERIOUS MASTER USERS

No more need to switch your computer off to insert a cartridge containing a required ROM.

With 2 cartridges and a ROM board, a staggering 32 ROM images installed and accessible at any time.

Allows an additional 8x16k and 4x32k ROMs to be installed in the Master and still leaves the cartridge slots free.

Master control ROM which includes a clever file transfer program allowing files to be transferred between DFS and ADFS formats or vice-versa. £40

MASTER SMART CARTRIDGE

Built-in features include:

- Freeze program at any point.
- Screen dump (any mode).
- Allows most protected software to be backed up including disc to tape and tape to disc. £30

CARE MASTER CARTRIDGES

Dual 2 x 16k	£10
Quad 4 x 16k	£14
Dual 2 x 32k	£12

32K NON VOLATILE RAM
Cartridge (ideal for Spellmaster Dictionary) £33

BBC / MASTER SCSI HARD DISC DRIVES

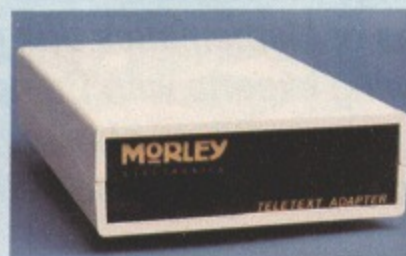
Don't be fooled by price, these units are among the fastest on the market.



Completely compatible with BBCs, B+s and Masters fitted with ADFS. Free utility disc incl: Format, Verify, Archive and Park.

20meg	£399
30meg	£449
40meg	£499
Larger Drives	POA

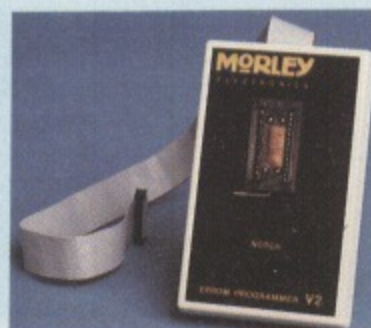
TELETEXT



THE MORLEY TELETEXT ADAPTER

BBC/Master	£104
Compact	£120
RML Nimbus	£104
Archimedes	£125
Optional PSU	£9.50

BBC / MASTER EPROM PROGRAMMER



The fastest, best value programmer in the market.

Totally software controlled.

Programmes 27128/2764/27256 Eproms: 12 and 21 volt.

Includes full ROM management software with numerous features £30

Eprom utility disc. Put all your favourite routines into sideways ROM, both basic and machine code. £5.25

BBC / MASTER DISC DRIVES

All drives are 40/80 switchable with TEAC mechanisms

Single	£79
Dual	£169
Power supply	£40

Managing Editor
Derek Meakin

Publisher
Peter Glover

Features Editor
Steve Turnbull

Art Editor
Tym Leckey

Reviews Editor
Pam Turnbull

Technical Editor
Mike Cook

Chief Sub Editor
Claire Wells

Group Advertisement Manager
John Snowden

Advertising Sales
Giles Carruthers
Yvonne Benson

Advertising Production
Gordon Wilson

Sales/Marketing Manager
John Weir

Circulation Manager
David Wren

Circulation Director
John Burns

Systems Manager
Dave Stewart

Tel: 0625 878888 (All depts.)
051-357 2961 (Subs.)

Telex: 94081191
Fax: 0625 879966

EUROPRESS
PUBLICATIONS

Europa House, Adlington Park,
Macclesfield SK10 4NP.

ABC 24,365
January-June 1990
ISSN 0265-4040

The Micro User welcomes new program listings and articles for publication. All material should be supplied on disc or tape and printed. Please enclose a stamped, self-addressed envelope, otherwise the return of material cannot be guaranteed. Contributions accepted for publication will be on an all-rights basis.

The Micro User is an independent publication and neither the BBC nor Acorn Computers Ltd are responsible for any of the articles in this issue or for any of the opinions expressed.

© 1991 Europress Publications Ltd. No material may be reproduced in whole or in part without written permission. While every care is taken, the publishers cannot be held legally responsible for any errors in articles, listings or advertisements.

News Trade Distribution: COMAG 0895 444055

SPECIAL GRAPHICS ISSUE

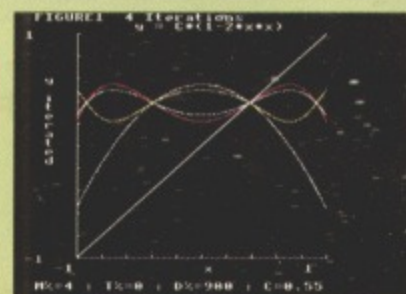
Strange attractors in three dimensions and Chaos theory: The amazing new areas of Mathematics that everyone can explore. Join the ranks of technical drawing experts with Computer Aided Perspective Drawing and discover how the experts create sideways scrolling games screens in this very special graphics issue with something for everyone and every Acorn machine.

SPECIALS

47

Chaos

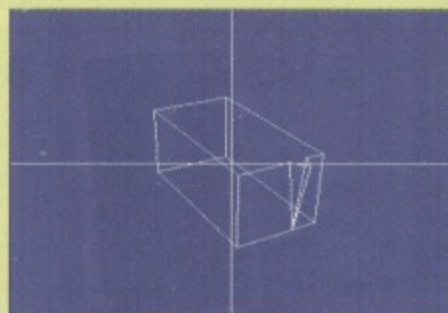
Investigate the cutting edge of modern mathematical theory with three fascinating programs



53

In perspective

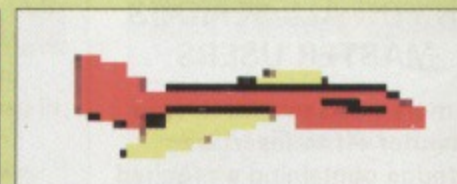
Draw in 3D with this computer-aided perspective drawing package for all Acorn machines.



83

Scrolling screens

Have you ever wondered how sideways scrolling works? Now you can find out, and try it yourself.



Type-it-in

This symbol indicates that the feature contains at least one full length listing for you to key in on your micro.



All the major listings in this magazine are accompanied by checksums to help you key them in correctly.

Get it right ✓

For full details of how to use them see the article on page 56 of the February 1991 issue.

MICRO USER CLASSIFIEDS

The best bargains in the world of all Acorn micros come from fellow readers of The Micro User. Turn to Page 88 to find just what you're looking for - from cheap modems to complete computer systems.

EDUCATION

23

Update

Up-to-the-minute news of the Acorn range of micros in use in the world of education.

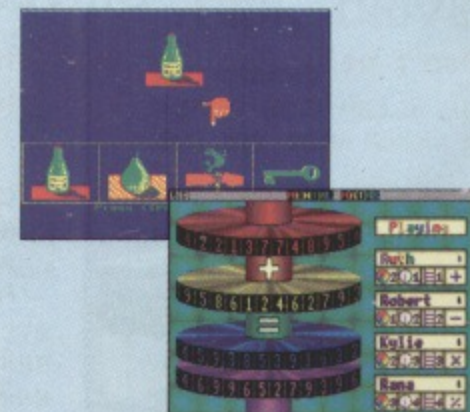
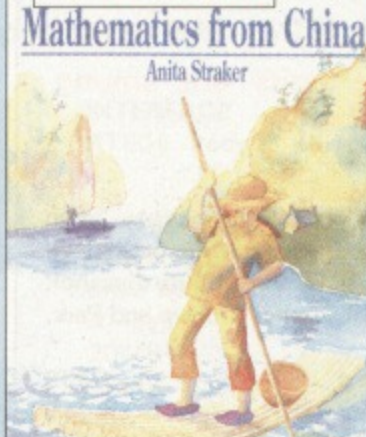


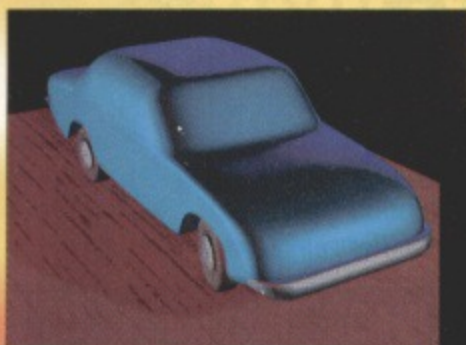
28

Reviews

Catch up on the latest software for the BBC Micro series in schools, including:

- Mix & Match with Maggie
- Concept Designer
- ESSO Five Star
- Logo Activity Sheets
- Mathematics From China



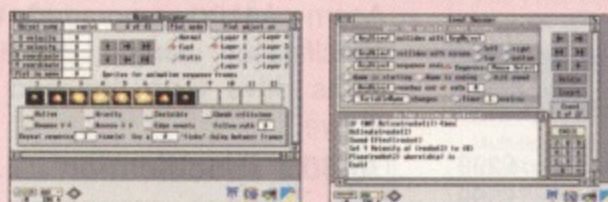


Creator Demo #2 100



Newcomers

21 **Arcade Game Creator**
Produce your own great coin-op game without knowing how to program – can it really be that easy?



61 **Graphics enhancer**
Break out into the world of 16 bit colour with this stunning new add-on board – we explore what it can do.

63 **Talking micros**
We compare the quality and features of three speech synthesisers for the Archimedes and BBC A3000.

89 **Strange attractors**
In the final part of our series discover an infinite 3D line that never crosses itself.



97 **Data encryption**
Protect your data with the most sophisticated encoding technique available on a home micro.



THE MICRO USER

Three month's free reading!

That's what we are offering new subscribers. And that's not all. Month after month they'll receive free software from the latest issue.

This month for instance, all our subscribers will receive:

- The Revised 1AD to 9999AD Calendar
- Data Encryption Software
- Perspective drawing package
- Plus all type-in listings

In addition, those readers with a BBC A3000 or Archimedes series machine will also get:

- Virus Killer version 2.0
- Plus over 900k of PD software

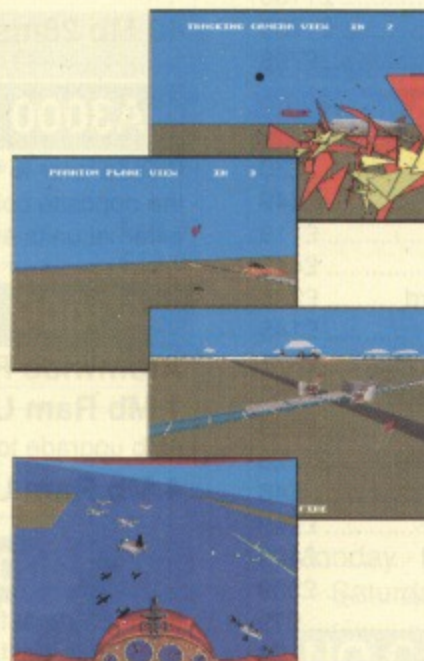
For new subscribers there's a special gift: A free binder to keep your copies of *The Micro User*.

Find out how to subscribe on Page 104



Software SCENE 40

Our experts delve into what's among the latest games releases



Dabhand Computing Ltd.

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/education/PLCs, otherwise cash with order. Tender invitations welcome. Callers welcome. We are 800 yds north of J17, M62. Fax: 061-766 8425. Prices subject to change without notification. Goods offered subject to being unsold.

Dabhand Computing Ltd, 5 Victoria Lane, Whitefield, Manchester M25 6AL. This advert was produced using Impression from Computer Concepts.

Archimedes Computers

A 3000 2Mb Ram	£599.00
A 3000 LC 2Mb Ram *	£699.00
A 410/1	£1099.00
A 420/1 LC **	£1299.00
A 440/1	£1699.00
A 540	£2995.00

We can match or improve on prices advertised or quoted in or from this magazine please phone for the best deals.

We operate the Acorn Schools, Academics & Finance schemes.

* Pack includes PC Emulator, 1st Word Plus, Genesis. ** + Acorn DTP.

Oak SCSI Devices

Worra Winnie	
20 Mb Internal Hard Disc	£299
45 Mb Internal Hard Disc	£399
80 Mb Internal Hard Disc	£599
100 Mb Internal Hard Disc	£795
200 Mb Internal Hard Disc	£1195
20 Mb External Hard Disc	£349
45 Mb External Hard Disc	£449
80 Mb External Hard Disc	£649
100 Mb External Hard Disc	£845
200 Mb External Hard Disc	£1245
High Speed Range	
40 Mb Internal Hard Disc	£495
80 Mb Internal Hard Disc	£675
100 Mb Internal Hard Disc	£995
200 Mb Internal Hard Disc	£1545
45 Mb External Hard Disc	£685
80 Mb External Hard Disc	£865
100 Mb External Hard Disc	£1185
200 Mb External Hard Disc	£1735
60 Mb Tape Streamer	£795

Archimedes A400

5.25" Ext. floppy disc interface	£30
A 540 4Mb Ram Upgrade	£449
Additional 3.5" Floppy Disc	£119
ARM 3 Upgrade (30 MHZ)	£449
ArVis S-VHS Video Cont. Board	£295
ArVis S-VHS Encoder Board	£145
ArVis Video Graphics Board	£877
Atomwide 8 Mb Memory Upgrade	£850
Chroma 345 Overlay Board	£389
Dongle Dangle (Impression/Oak)	£6
Econet Module	£46
Ethernet Expansion Card	£249
Floating Point Expansion Card	£449
Hawk V9 Video Digitiser	£339
I/O Expansion Card	£79
Keyboard Extender	£8
Midi Upgrade to I/O Exp. Card	£27
Midi Expansion Card	£65
Midi Upgrade Rom	£14
Mouse (New Style)	£40
Scanlight Junior Scanner A6 (CC)	£179
Scanlight Senior Scanner A4 (CC)	£389
Sheet Feeder for above A4 (CC)	£95
SCSI Expansion Card (Acorn)	£229
TCP/IP Ethernet	£199
VIDC Enhancer	£29

Dabhand 410/1 to 420/1

Acorn A410/1 upgraded to A420/1 specification using only the highest quality Samsung Ram and a 20 Mb Seagate ST-125-1 28ms drive or Acorn drive formatted and tested for guaranteed trouble free use.

A410/2 20 Mb	£1099
Colour System	£1289
Eizo 9060 SZ System	£1499

Dabhand 410/1 to 440/1

Acorn A410/1 upgraded to A440/1 specification using a Branded 40 Mb 28ms drive formatted and tested as above.

A440/1 specification	£1299
Colour System	£1488
Eizo 9060 SZ System	£1699

Dabhand ST506 Hard Disc Drives

Archimedes A410 Internal Hard Disc Drives for use with 'on-board' ST506 winchester controller. Comes complete with mounting chassis, screws, connecting cables and easy to follow fitting instructions.

20 Mb 28ms	£129
40 Mb 28ms	£245

A3000 SCSI Devices

Please refer to Oak External SCSI prices in the opposite column as prices for A3000 external units are the same.

A3000 Ram Upgrade

Atomwide Ram Upgrades	
1 Mb Ram Upgrade	£79
4Mb upgrade to above board	£130
4 Mb Ram Upgrade	£175

A3000 Upgrades

5.25" External floppy disc cable	£15
5.25" External f/disc buffer (Pres)	£46
5.25" External f/disc buffer (Beebug)	£39
Dust cover (Keyboard + Monitor)	£12
User & Analogue Podule	£46
Monitor Stand (Acorn)	£29
Monitor Stand (Pres)	£24
Mouse Extender (No more fiddling)	£8
Serial Upgrade	£19
Serial Link Kit (BBC-Arc)	£14
User & Midi Podule	£46
VIDC Enhancer	£29

A400 Series Ram Upgrades

Fast Samsung Ram complete with step by step fitting instructions.

1 Mb Ram	£50
2 Mb Ram	£95
3 Mb Ram	£140

Standard Monitors

Acorn Colour	£199
Microvitec Cub 3000	£199
Philips CM8833 II	£199
Philips Mono (Green)	£85

All monitors come with free lead. State type of computer when ordering.

Multiscan Monitors

EIZO 9060SZ Flexiscan	£399
EIZO 9070SZ Flexiscan ^	£599
Taxan 770+ LR Multivision .	£425
Taxan 795 Multivision ^ **	£495
Taxan Viking II Mode 23	£799

^ comes with free VIDC enhancer.

** monitor has 0.26 dot pitch and Sony Trinitron tube.

Master 128

Master 128	£369
-------------------------	-------------

Floppy Disc Drives

5.25" Single 40/80 no psu	£95
5.25" Single 40/80 with psu	£109
5.25" Dual 40/80 no psu	£185
5.25" Dual 40/80 with psu	£199
3.5" Single with psu	£85
3.5" + 5.25" 40/80 no psu	£185
3.5" + 5.25" 40/80 with psu	£209

Printers

Citizen 120D+ (Serial add £20)	£129
Citizen Swift 9	£179
Star LC10	£139
STAR LC200 COLOUR (9 pin)	£199
CANON Bubblejet BJ-10e	£289
Canon Bubblejet BJ-130e	£449
Sheetfeeder for BJ-10e	£59
Citizen Swift 24	£249
Colour Kit for above (also Swift 9)	£39
STAR LC24 - 200	£239
STAR LC24 - 200 COLOUR	£289
Sheetfeeder for LC24 - 200	£69
Integrex Colourjet 132	£519
HP Paintjet	£795
LASER DIRECT (Qume)	£899
LASER DIRECT (LPB8 Hi Res.)	£1349

Midnight Graphics Products

Midnight Tracer

!Paint to !Draw conversion, turn your sprite files into fully editable object orientated draw files which can be scaled, rotated and manipulated without any loss of detail.

Ideal for users of all Desktop Publishing and Scanning packages. Accepts any sprite file and offers many image processing facilities. Translation can be colour or monochrome, includes a unique automatic tracing feature, variable trace options and curve fitting facilities.

The manual includes a user friendly tutorial with hints and tips on how to obtain the best results from your sprite files.

!Tracer is an ARM coded Risc OS multitasking application and will easily run on a 1Mb machine.

Midnight Tracer £52.13

Clip Art - Draw Files

Give your DTP documents the right balance with Midnight Graphics Clip Art.

Over 480 Draw file images, presented in a library of five discs.

Change the images in !Draw to suit your style and purpose.

Then place them into Impression or Acorn DTP.

Clip Art . £29.95



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
A540 Technical Guide £65.00
Acorn DTP Advanced U.G. £14.95
Archimedes First Ste, s.....£9.95

BASIC V: A Dabhand Guide £9.95
BBC Basic Guide (Acorn) £19.95
DTP Seeds (4Mation) £8.45
128 Ref. Man.Pts 1&2 (ea.) £14.95
New Advanced User Guide..... £19.95
RISCOS PRM's £79.00
Additional Arc Software Manuals (Acornsoft)
First Word Plus, DTP, Assembler . (ea.) £10
ANSI C Version 3 £19

Printer Drivers

Midnight Graphics
Citizen Swift 9 Sprite Dump £26.04
Citizen Swift 24 Sprite Dump £26.04
Epson 24 Sprite Dump £26.04
HP Paintjet Sprite Dump £26.04
Integrex 132 Sprite Dump £26.04
Integrex Colourcel Sprite Dump £26.04
Juki 5520 Sprite Dump £26.04
Star LC10 Sprite Dump £26.04

Star XB24 Sprite Dump £26.04
Star LC200 Sprite Dump £26.04
Star LC24-200 Sprite Dump £26.04
Ace Computing
Printer JX £13.00
Printer PJ £13.00
Printer CA £13.00
Electronic Font Foundry
BubbleJet - BJ10e/130e £10.00

Full Range of Educational Software Available

4Mation, Chalksoft, Longman
Resource, Sherston, Widgit
And many more...



Software

ANSI C V.3 Compiler + free C Guide £139.95
Apocalypse (3D Space Game) £14.95
Arc DFS (DFS Filing System)..... £24.95
Arcade Soccer £14.95
ArcTerm (Serial Port) £59.00
Armadeus & Sampler Board (Sound Sampler) £199.00
Artisan 2 (16 Colours) £49.95
Atelier (Minerva 256 Colours) £79.95
CHESS 3D £14.95
CHOCKS AWAY 2 (Flight Simulator) £14.95
CHOCKS AWAY EXTRA MISSIONS £14.95
CHOCKS AWAY 2 + EXTRA MISSIONS £29.00
Desktop Office (Minerva Integrated Package) £99.00
DROP SHIP (Superb Graphics) £12.95
Euclid 2 (3D Drawing) £57.95
E-Type (Driving Simulation) / Designer each £12.95
Equazor (Equasion generating package) £39.00
Family Favorites (Minerva Compilation) £14.95
First Word Plus V2 (Acorn) £79.95
FONT FX (Font Effects for Draw/Impression) £8.65
Flexifile Relational Database (Minerva) £109.95
GRAPHBOX with Hotlink to PDream 3 £69.95
Holed Out, Extra Courses, Designer each £12.95
HOSTAGES (Superior) £14.95
IMPRESSION 2 (Document Processor) £139.00
IMPRESSION JUNIOR (Easy DTP) £75.00
Inertia (4th Dimension) £12.95
INTERDICTION 2 (Flight Simulator) £27.95
Investigator (The Best Disc Copier) £24.95
IRON LORD £14.95
MINI HYPERPACKS (3 games p p) No's 1 to 5 £19.95
Hyperpack (12 Games) £79.95
Maddingly Hall (Minerva Adv.) £12.95
MAD PROFESSOR MARIARTY (Platform game) .. £17.35
Magnetic Scrolls (Adventures) £22.95
Manchester United £22.95
Microstudio (Emr - Learn Music) £79.00
MIG 29 (Flight Simulator) £29.00
MULTIFS (Arxe Systems - Atari, PC, DFS) £27.95
Multistore Database (Minerva) £199.00
NEVRION (Unbelievable Graphics & Gameplay) ... £14.95
NO EXCUSES (Arcade) £14.95
PC Emulator + free PCE Shareware 1&2 £99.00
Pipedream 3 (WP) £129.00
Pipe Mania (Addiction beyond belief) £17.35
POSTER (Superb effects) £79.00
POWERBAND (3D Formula 1 Racing - 4th Dim.) ... £17.95
ProArtisan (256 Colours) £79.95
REAL MCCOY 2 (4 Game Compendium) £24.95
REDSHIFT (Minerva scrolling arcade) £14.95
Render Bender (Clares) £59.95
RHAPSODY (Clares Music package) £34.95
SCHEMA (Multitasking Spread Sheet) £99.00
Superior Golf £14.95
STUDIO 24 PLUS (EMR New Risc Os Version) ... £149.00
TEENAGE MUTANT TURTLES (Colouring Book) .. £14.95
The Wimp Game (Desktop Adventure 4th Dim.) £14.95
Thundermonk (Arcade Adventure) £14.95
Tracker (Make Great Music) £39.95
Twin World £14.95
Worra Battle (Oak Tank Battle) FREE Headphones £14.95
WorraCad (Oak 2D Draughting Package) £75.00
Worra Plot (Draw/HPGL Plotter Driver) £24.95

How to find us



Hours of Opening
Monday - Friday 9.00 a.m. - 5.00 p.m.
Saturday 10.00 a.m. - 5.00 p.m.

**NO Carriage Charges
in Mainland UK**

Acorn Qualified Dealer
Specialists in Education

TEL: 061 766 8423

The Complete Upgrade Solution



- 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 - £56 4th Mb - £159**



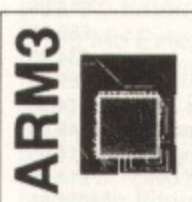
- Includes MEMC1a upgrade
 - Large capacity OS ROM sockets
 - No soldering required
 - Four layer printed circuit boards
 - Courier collection of your machine
- 2nd Mb - £225 4th Mb - £299**



- 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 - £65 3Mb - £99**



- Uses only eight RAM devices
 - Suitable for A440, A400/1 & R140
 - Fully RISC OS compatible
 - Four layer printed circuit boards
 - Courier collection of your machine
- 8 Mb upgrade - £749**



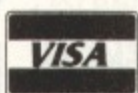
- New series Aleph One ARM3
 - 3 to 4 times performance increase
 - Surface mount technology
 - Four layer printed circuit board
 - Courier collection of your machine
- ARM 3 upgrade - £399**



- Increases resolution with all Multiscan monitors
 - Doubles desktop work area
 - Custom modes for Taxan and Eizo monitors
 - Suitable for all Archimedes computers
 - Free with any multiscan monitor from Atomwide
- Atomwide VIDC Enhancer - £29**



- Syquest removable disk systems
 - Including One cartridge, drive unit and all cables
 - 42Mb removable cartridges
 - High-flow fan fitted for improved cooling
 - Please phone for prices on other SCSI related products
- Atomwide Syquest drive unit - £470 42Mb disks - £64**



- All products are cross-compatible
 - Combination deals available on all products
 - Typical combination A310 4 Mb and ARM3 £675
 - Dealer enquires welcome
 - Phone for full details on all products
- All prices exclude VAT at 17.5% but include delivery**

ATOMWIDE

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



NEWS BEAT



Fonts fiddler foiled

EVEN great distances are no barrier when it comes to software developers protecting their products. When Mike Matson of educational software house 4Mation was tipped off that the fonts in his popular Poster package were being sold by an unauthorised dealer "in the southern hemisphere", he set a trap.

Through a third party he put in an order and obtained conclusive proof when he managed to buy back some of his own fonts.

He has since agreed to take no further action if the person concerned reimburses him.

"This highlights the problem which developers face on copyright and on stopping our belongings from being stolen", he told *The Micro User*.

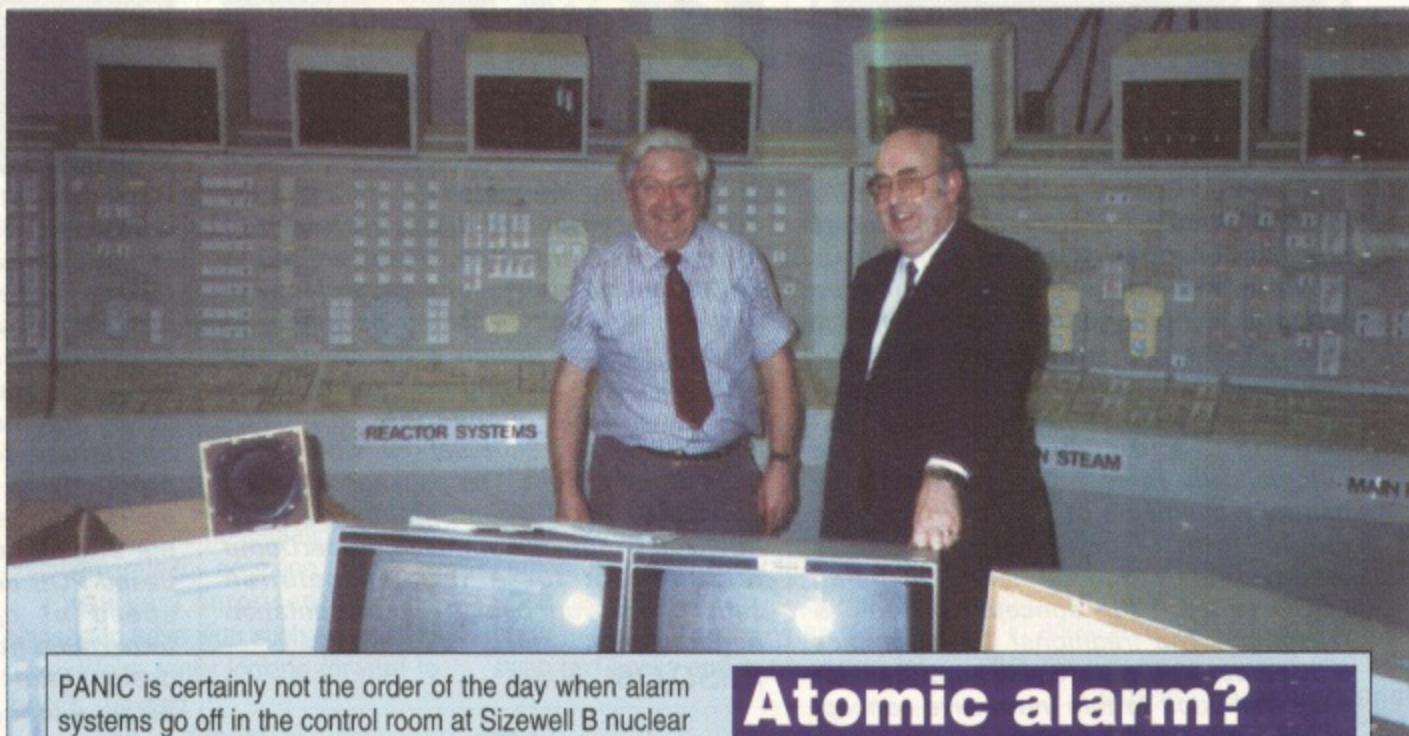
"Some people complain about the copyright screen in Poster, but we have to have some way of protecting ourselves while causing the minimum of inconvenience to the users.

"We discovered that this person had a font catalogue and some of the ones he was selling were those from our Poster package. We were also told that he was selling goods from Acorn, Longman Logotron, Computer Concepts and Beebug, and I have informed those companies.

"The silly thing about it was that he was selling our fonts for the equivalent of £8 each, which means that all 20 fonts would have cost twice the amount that the whole Poster package costs".

Crufts collection?

WHAT barks and appears in August? The answer is the next product from 4Mation. The company are keeping the package under wraps at present but we know that it includes a number of dog noises acquired from the extensive animal collection of Mike Beecher at EMR. Watch this space.



PANIC is certainly not the order of the day when alarm systems go off in the control room at Sizewell B nuclear power station, and that's partly due to an Archimedes computer.

The latest system changes the whole approach to alarms by replacing the normal shock tactics with musical sounds. Mike Beecher of Electromusic Research produced the computer generated sounds which are being installed into the system by GEC of Leicester.

"This is a government project so not too much can be said about it, but I created the original concept and produced the sounds using the EMR Sampler8 and SoundSynth sampling system for the Archimedes", he said.

"It will be used for fire alarms and operator alarms for the control room and other areas of the power station. It is low level so as not to give the staff heart attacks when it goes off".

Spokesman for Sizewell Len Green told *The Micro*

Atomic alarm? Don't panic - give us a kiss

User: "Our alarm systems are generally quite relaxing. We don't go in for wailing noises and hooters.

"Why subject operators to added stress when the object is just to draw their attention to something that needs looking at?

"You can wake someone up by either bursting a paper bag next to them or gently kissing them on the cheek. We go for the kissing method".

● Pictured inside the control room mock-up for Sizewell B nuclear power station are Mike Beecher of EMR and John Threader, GEC.

Economical X terminal from an Arc

A NEW software package has been launched to provide a low cost way of turning your Archimedes or BBC A3000 into an X terminal.

Called IX, it allows users to connect their machines to a network of Unix workstations running the industry standard X Windows system.

Developed by Gnome Computers in association with Acorn, it gives users access to the many applications running under X. If loaded into an A3000, for example, a colour X terminal can be set up for under £1,500.

The IX server can be configured to display X applications run from any type of remote workstation running X 11. It supports TCP/IP over both Ethernet and Econet networks, can provide simultaneous support for up to eight independent X screens and includes a high level of network security through DES encryption.

Users can toggle back and forth between the Risc OS DeskTop envi-

ronment and the X sessions while the X server continues to maintain its clients.

And Acorn's Arm processors mean that the speed with which applications can be managed by IX is greater than that delivered by many machines which are configured solely as X terminals or low-end workstations.

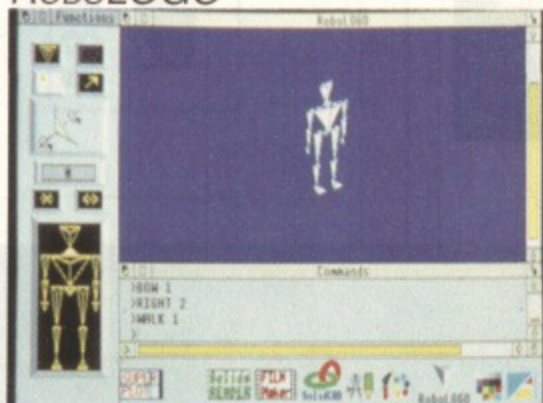
"The real potential of this application lies in areas where the user needs a multi-purpose system", said Acorn spokesman Brian Salter.

More details about IX from Gnome on 0480 406164. The software comes on a standard 3.5in floppy disc and costs £199.

SILICON VISION

DESKTOP SOLUTIONS FOR THE ARCHIMEDES & BBC A3000

ROBOLOGO



This new extension to traditional LOGO, made possible only by the enormous computational power of the Archimedes, provides three dimensional control of an articulated humanoid or animal figure through the use of a standard LOGO language. Sophisticated natural commands such as 'Walking', 'Turning', 'Bowing', and 'Picking', etc are automatically represented graphically by natural movements of the 3D figure. This natural form of graphical response is readily understood by students using LOGO to learn the concepts of logic & reasoning. The traditional Turtlegraphics & 3D Glider features are also supported for easy transition to this innovative concept in natural response LOGO.

(RISC OS) **New**

REALTIME SOLIDS MODELLER

The package includes both the sophisticated design environment of SolidCAD and the high speed capability of a Realtime Graphics Language module to provide the fastest programmable animation facilities bringing any design to life from within your own programs. Facilities include 3D Rotate, Scale, Orbit, Perspective, Position & extensive display styles for wireframes, hidden-surface removal, smooth shading and multiple light sources with individual intensities.

(RISC OS) **New**

GATE ARRAY DESIGN SYSTEM

An introductory course for teaching Silicon Chip Design with facilities for Array design, Cell design, On-line Help and a tutorial on integrated circuit design. Ideal as a low cost teaching tool for engineers & students where expensive silicon fabrication facilities are not required.

(RISC OS) **New**

SOLIDTOOLS



The first fully integrated environment for 3D CAD, Photo-realistic rendering, Interactive animation, Programmable animation and high resolution hardcopy to printers and plotters taking designers to new heights of design productivity and performance exceeding the capabilities of 'heavy-weight' packages on PC-compatibles and workstations which cost considerably more. The package includes SolidCAD, FILM-Maker, SolidsRENDER, Realtime Graphics Language, SuperDump & SuperPlot for a turnkey solution satisfying all your design and presentation requirements.

(RISC OS) **New**

SOLIDCAD

The next generation multi-tasking CAD package combining 2D Draughting and 3D Modelling techniques with advanced smooth shading and lighting effects to provide the ultimate 3D Draughting System for Architectural design, Interior design, Engineering design and Teaching CDT. Allows drawing in plan, front & side elevations and also directly in 3D to visualise a model while it is being created. Powerful zoom, pan, sweep, extrude and macro facilities are also provided to enhance design productivity.

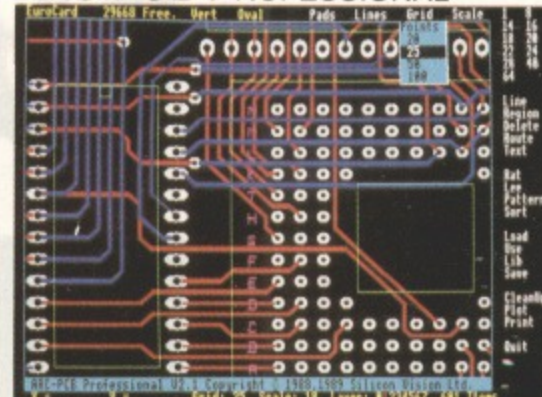
(RISC OS) **New**

FILM-MAKER

The package provides an interactive environment to create animated sequences of 3D scenes with dynamic camera motion for 'walk-throughs' and 'flight-paths' for objects within the scene. Fully compatible with SolidCAD for designs and SolidsRENDER for ray tracing, animation Oscars are now within your reach.

(RISC OS) **New**

ARC-PCB PROFESSIONAL



The ultimate PCB design package developed specifically for the Archimedes is now even better. ARC-PCB Professional follows on the success of the original and provides Faster & Improved Automatic Routing, Oval & Circular pads with fully variable sizes, Faster Redraw, Extended library part manipulation, & Instant Editing operations for substantially increased productivity. This Professional version operates orders of magnitude faster than the original and surpasses all other PC-based PCB design systems in features & speed of operation for the fastest turnaround from concept to finished board design. Take the lead for your PCB designs before your competitors do.

(RISC OS) **New**

SOLIDSRENDER

The most advanced Ray Tracing package for the Archimedes producing photo-realistic images of SolidCAD designs or FILM-Maker animations which take into account light sources, reflections, shadows, transparencies, refractions and textures for the highest quality pictures from the leading 3D graphics experts renowned for technical excellence.

(RISC OS) **New**

RISC BASIC

The best BASIC V compiler money can buy. Here's what the reviewers say:

"If you are looking for THE compiler to go for, and are confused about which one deserves to win the very public battle that has been raging in the advertisements, well my preference is for RiscBASIC" - RISC USER Aug 1989.

"In summary, BASIC V is the best version of BASIC produced and RiscBASIC provides the most compatible, fastest compiler for this language. My congratulations to Silicon Vision"

- Archive June 1989.

"RiscBASIC wins the race...has the edge overall" - BBC Acorn User Nov 1989.

"very useful indeed for development work...produced significantly more efficient code" - Micro User July 1989.

(RISC OS) **New**

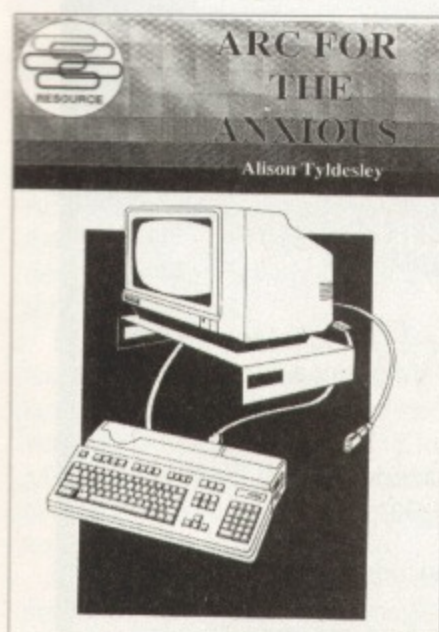
All software run in native mode on A300-400 Series & A3000 with RISC OS. Enquire for our free product Catalogue

SILICON VISION LTD, SIGNAL HOUSE, LYON ROAD, HARROW

MIDDLESEX HA1 2AG, UK. TEL: 081-861 2173

FAX: 081-427 5169. TELEX: 918266 SIGNAL G.

All product titles are trademarks of Silicon Vision Ltd. All other trademarks acknowledged.
Copyright © 1990 Silicon Vision Limited. All rights reserved.



Resourceful way with micro jargon

A NEW series of booklets from Resource (0302 340331) aims to cut the jargon out of teaching newcomers about computers.

Among the amusing titles which offer a sensible alternative to lengthy manuals are *Arc for the Anxious* and *IT for the Terrified*.

Arc for the Anxious has 31 pages of straightforward text and large clear diagrams for people who are just beginning to use a BBC A3000 or Archimedes.

It starts with a drawing of how to connect up the machine and continues with explanations of other hardware and two typical programs, *Draw* and *Pendown*. Other sections cover formatting, copying and some slightly technical aspects.

IT for the Terrified deals with the day to day things users might want to know about their BBC Micro, from connecting a printer to copying discs. Titles for both the anxious and the terrified cost £4.95 each.

Among the more general titles is a series of four booklets called *Computers in the Early Years*. They covers the basic problems which might occur with wordprocessing, data handling and problem solving.

Introduction and Text Handling each cost £4.40 with *Information Handling and Problem Solving* weighing in at £4.95. Bought together, the four cost £17.50.

On the educational front there is *IT in the National Curriculum* by Ian Birnbaum. It shows how to tackle assessment, curriculum analysis, staff training and much more. Price, £7.50.

Resource is a non-commercial organisation supported by the LEAs of Humberside and South Yorkshire.

Learning Curve leads to the wide blue yonder

THREE medical men have become flying doctors, courtesy of Acorn Computers Limited. They are among 13 prizewinners in the recent competition linked to Acorn's Test Flight promotion for its key product range, *The Learning Curve*.

Dr. Martin Shaw of Bournemouth has scooped first prize of a trip for two on Concorde in the promotion featured by *The Micro User*. He and his wife Marian will board the British Airways Concorde at Heathrow for a Mach 2 flight round the Bay of Biscay.

Their trip will include a champagne lunch and the chance to view Concorde's flight deck. They will also receive a special presentation pack to commemorate the occasion.

"I was very surprised but very pleased to have won such an exciting prize. We're really looking forward to the trip", he said.

"I had almost decided to buy a *Learning Curve* system and when I tried it out, my mind was made up. My children use it for games and educational programs and I use it in my work, both as a GP and as a medical advisor to local companies".

Dr. Henry Goodall of Basset, Southampton recently took off with *The Flying Tigers* at Goodwood Airfield when he won a week-end of light plane flying tuition.

After ground briefing both Dr. Goodall and his wife Wendy took the controls of a Cessna 152 Aerobat plane - one of the few aircraft licensed for aerobatics.

"Although I have done a bit of flying, it was many years ago", he said. "It was interesting to go up in the Cessna

152 which is a plane I have not flown in before. We went on a 15 mile circuit and although it was slightly hazy, visibility was good. It was a most enjoyable experience".

Third doctor to win an Acorn flight is Stephen Hiew of Enfield. He stayed at the Hilton National, Warwick with a friend, Mr. Kim Chan, for his light plane flying weekend with South Warwickshire Flying School at Wellesbourne Mountford Airfield.

"It was the first time that either of us have had the chance to fly a plane", said Dr. Hiew. "It was a new and very interesting experience, thanks to Acorn".

Schoolboy Gareth Moore of Farnborough has a real treat in store when he finishes his GCSE examinations in June. The 16-year-old will swap text books and exam papers for

enjoy two days of tuition and flying with Fast Helicopters at Thruxton Airfield, Andover.

"It's really something to look forward to because it comes just after I have finished my last GCSE", he said. "I have never been in a helicopter or in a plane because I always had a bit of a phobia about it but I seem to have overcome it now I have won this prize".

Also taking to the air at the controls of a Robinson R22 will be mechanical engineer Brian Readman of Wolviston, Cleveland. He will join Fast Helicopters for a week-end in July with his wife Veronica.

Winner of the third light plane flying weekend is Beebug customer S. Swain of Welwyn.

In addition to the various flights on offer, six Test Flight entrants also won

Citizen Aerochron pilot watches, each worth £250. They were Tim Cook of Ickenham, Malcolm Pigott of Southport, David Watkins of Polegate, Edward Sands of Redhill, Malcolm Holt of Brighton and G.R. Fitch of Aylesbury. "The Test Flight project was just part of our growing assault on the leisure and home user sectors of the computer market", said Acorn's sales and marketing manager for consumer

products Bob Coates.

"We find that potential new customers and those wanting to upgrade their machines are convinced by just seeing our computers in use. They speak for themselves. Test Flight was a way of getting them to look and as such, it was a great success. Our congratulations to all the winners".

More than 80 Acorn dealers throughout the UK took part in the Test Flight promotion.

Their customers were invited to try out *The Learning Curve*, which combines either a BBC A3000 or an Archimedes computer with a collection of wordprocessing and educational software.

The competition called for answers to a series of questions on *The Learning Curve* and gave entrants the chance to try out their flying skills on computer-based flight simulator *Interdictor*.



● Test Flight prizewinner Dr Henry Goodall receives a pre-flight briefing from instructor Jim Green

the controls of a Robinson R22 helicopter after his Test Flight win.

And his prize of a helicopter flying weekend for two will be even more exciting since it will be the first time Gareth has ever flown.

With his father, Graham, he will stay in the Hilton National, Newbury to

Digitiser deal agreed

CAMBRIDGESHIRE Software House (0480 67945) have acquired worldwide distribution rights to the Microeye 1A digitiser from Digithurst.

Digitising at 24 bits colour per pixel, it gives all ARM-based machines the facility to produce high quality colour images with a choice of 16.7 million possible colours.

Microeye 1A costs £395 plus VAT, and for a limited period CSH are throwing in a free copy of the *Picture Book* text and image database.

Special Offers!

FREE
with your subscription

RISC User Members' Disc

- # Members
- Printer Set-Up Utility ● Icon Bar Clock
 - Maestro Music Files ● Guessword 5 Game
 - Ol' Blue Eyes fun program
 - Text files offering informative tips for beginners, and more advanced users
 - and other exciting and useful items

RISC USER

Highly Professional Magazine
Supporting Magazine Disc
Quality Software
Technical Backup

**RISC User offers 10
magazines a year which
typically contain:**

The most popular subscription magazine devoted solely to the Archimedes range of computers including the A3000.

News on the world of Archimedes
Reviews of the latest products
Ready to run applications
Utilities, routines and advanced programming techniques
Programs and articles on sound and graphics
Series of articles for all spheres of interest:

- 'Into the Arc' — tutorial series for beginners
- 'Mastering the Wimp' — series on Wimp programming
- 'Under the Lid' — hardware series
- 'Assembler Workshop' — all about ARM Assembler
- 'Beginning 'C' — series on C language
- 'DTP/WP' — advice on using commercial software
- 'Arcade' — a round-up of the latest games

Hints and tips
Postbag for your letters and answers to your questions
Technical queries and expert answers

Magazine discs, containing all programs published in the magazine plus some additional items, are available to order or on subscription.

The magazine and support group exclusively for users of the Archimedes



BEEBUG

**The ONLY significant
magazine still
dedicated entirely
to users of the BBC
Model B and Master series.**

In April, BEEBUG commences its 10th year of publication, providing professional, useful and interesting information to thousands of subscribers. Each magazine offers:

- Stand-alone applications

- Handy utilities and useful routines
- Entertaining games

News from the BBC world

Reviews of new products, and comparative surveys

Series covering a range of interests:

- 'First Course' series for beginners
- 'Workshop' for the more advanced programmer
- '512 Forum' for users of the Master 512

- 'Practical Assembler' for Assembly language programmers

- 'BEEBUG Education'

Informative articles

Hints and tips
Postbox for your letters and answers to your questions and lots more

All programs published in the magazine are available on disc, to order or on subscription.

BEEBUG July Magazine Disc

full of high quality programs

FREE

when you subscribe to BEEBUG Magazine

Order Form

I would like to subscribe to **RISC User Magazine** starting with the July issue, and receive in addition the *New Members' Disc* Free.

I would like to subscribe to **BEERBUG Magazine**, starting with the July issue, and receive in addition the *July Magazine Disc Free* (please indicate whether you want 5.25* ☐ or 3.5* ☐ disc)

RISC User/BEEBUG Subscription Rates (1 year): £19.90 UK, BFPO, Ch.I, £29 Europe+ Eire, £35 Middle East, £38 Americas+ Africa, £41 Elsewhere
Joint Subscription RISC User and BEEBUG (1 year): £29 UK, BFPO, Ch.I, £43 Europe+ Eire, £52 Middle East, £57 Americas+ Africa, £61 Elsewhere

I enclose a cheque for £ _____ (all cheques must be in pounds sterling, drawn on a UK Bank) or, Please debit my Access/Visa account No. _____

[illegible]

Card Expiry Date _____ Signature _____

Name _____

Address _____

M7 _____ Post Code _____

BEEBUG LTD

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

PCB software updated

SILICON Vision (081-861 2173) have produced two new releases of their ARC-PCB software which harness the power of the Archimedes to the design of printed circuit boards and schematic drawings.

Providing more PCB layout features and schematic drawing capabilities, ARC-PCB Professional V3.1 now supports arc and circle drawing for silkscreen and general annotation, curved tracks for analogue design and free form tracks of any angle.

Other improvements include layer swap operations, scaling of components, rotatable text library, direct write to library directories for building custom library parts, an enhanced

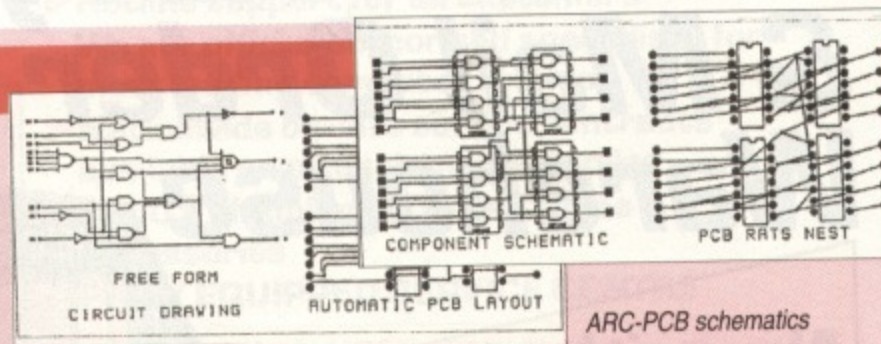
design rule-checker and improved printer and plotter drivers which handle arcs, circles and any-angle tracks.

To allow external editing with other Risc OS programs such as !Draw and DTP packages for professional presentation, the Drawfile format is also supported by V3.1.

This includes access to any Risc OS printer driver for producing artwork on laser, ink jet and wide carriage printers.

Silicon's top of the range package is ARC-PCB Schematics V4.1 which includes all the features of ARC-PCB Professional V3.1 plus schematic drawing capabilities.

Supporting free-form circuit drawing for design presentation, it also offers



full component level schematics for automatic conversion to PCB rats nest layout.

It can be automatically routed or manually tracked as required and the reverse operation for ripping up tracks into a rats nest is also available.

ARC-PCB Professional V3.1 costs £375 for a single user and £1,875 for a site licence. Existing users of V2.1 can upgrade for £75 and those with V1.6 or

earlier pay £180.

ARC-PCB Schematics V4.1 costs £575 for single user or £2,875 for site licence. Existing users of PCB Professional versions 2.1 and 3.1 can upgrade for £200 and those with V1.6 or earlier pay £380. Original discs must be returned to Silicon Vision by users wanting to take advantage of special upgrade prices.

Archimedes checking the lie of the land

WHEN Alexander von Humbolt set out on his explorations in the 18th century, his aim was to find new lands. In the 20th century, his name has now been given to a hi-tech Archimedes-based system which analyses how the land is being used.

And, like its namesake, Alexander – the new remote sensing and geographical information system – is also becoming well travelled. It is currently on trial in a number of sites around the world.

The Alexander software allows users to study images remotely sensed from such sources as satellites or aircraft. With the help of Archimedes computers, these images can be used to analyse the use of terrain for agricultural or industrial purposes.

The necessary data is already provided by numerous satellites in a vari-

ety of spatial and spectral resolutions including Meteosat, NOAA, Landsat and SPOT.

Bath College of Higher Education has just installed seven Archimedes A540s with Alexander both as a research and a teaching facility. The system can also be found at Canterbury University in Christchurch, New Zealand and at Beijing University in China.

Interest in it has also come from Australia, India and Canada where the system is seen as having great potential for earth science research by local governments and project planning companies.

Alexander was developed over two years at the International Institute for Aerospace Survey and Earth Sciences at Enschede in the Netherlands under contract to the Beleidscommissie Remote Sensing

section of the Dutch government and with substantial help from Acorn Computers.

Its main advantage is its low cost and ease of use. Traditional remote sensing and geographical information systems normally include expensive software and dedicated computers.

They offer little opportunity for the hands-on experience needed by researchers and students to acquire skills in practical image processing, analysis and presentation.

Alexander is affordable by small institutions and has the advantage of being mouse-driven under the Archimedes Risc operating system.

It also allows work to be conducted on a whole set of images rather than just one at a time and these images can also be exported to other Risc OS applications.

"We are now engaged in a joint marketing approach with ITC, as we consider Alexander to have great potential for government and commercial customers both in the UK and around the world", said Acorn's value added solutions manager, Warwick Hirst.

Joy in Capri

CAPRI Marketing (0628 891022) have been appointed sole UK distributors of the Dynamics Comp Pro joystick for the BBC range. It costs £16.99.

Converting Midi data

VERSATILITY is the keynote of the latest developments from Electro-music Research, who have produced a series of Archimedes file converters which allow Studio24Plus and MicroStudio owners to use music files from various sources.

Their Midi File Format module is an icon bar application which allows Midi data from most professional music programs on other computers to be converted into EMR format. This includes the only other Midi program on the Archimedes, Rhapsody.

Studio24Plus can now receive Atari, IBM and Macintosh Midi data and can have 9,999 patterns in a piece.

The Maestro converter accepts files from Acorn's Maestro, removing unwanted data to produce an EMR format file directly from the icon bar converter.

A SoundTracker converter takes music data into the EMR format and EMR's equivalent program Rythmbox similarly puts 8-track monophonic parts over. For prices, ring EMR on 0702 335747.

New colour printer driver

BEEBUG (0727 40303) have launched a Risc OS colour printer driver to go with Star Micronics' new range of colour printers.

Designed for all Star 9 and 24 pin machines – the LC10, LC200, LC24-200 and XB24-10 – it can also be used with all Epson-compatible dot matrix colour printers. Price, £17.63

Getting the right conception

REALISING the problems which some users may have with selecting the right Concept keyboard to interface with their computer, the Concept Keyboard Company have published a series of helpful leaflets.

Known as the How To leaflets, they are written in plain and practical terms, explaining the hardware requirements such as keyboard type and connection leads. A separate section deals with the range of software available and also gives details of suppliers.

"Concept keyboards are now available to interface via facilitating software with most popular computers on the market", said Paul Goddard of CKC. "As each computer manufacturer has different connection requirements, we believe it is important for users to understand exactly what is required in terms of hardware and software". More details of the free leaflets from Paul on 0962 843322.

UK's Largest Cash 'n' Carry & Mail Order Warehouse



**Now with
New Customer
Collection Service**



ARCHIMEDES

FREE 1 YEAR'S ON-SITE MAINTENANCE with Archimedes Micros		SYSTEM	ENTRY	MONO	COLOUR	MULTISCAN
A3000 COMPUTER £599	A3000+ LEARNING CURVE £699	410/1	£1099	£1159	£1288	£1448
		420/1	£1299	£1359	£1488	£1648
		440/1	£1699	£1759	£1888	£2048
		540/1	£2995	£3065	£3148	—

A3000 ACCESSORIES

3.5" External Drive	£97
Monitor Stand	£15
External Podule Case	£12
Serial Upgrade	£16
A3000 Technical Manual	£28
Dust Cover Micro/Monitor	£5
Dust Cover Micro	£9
User Port/Midi Upgrade	£44
UHF TV Modulator	POA

ARCHIMEDES ACCESSORIES

NEW Multitasking RISC OS	£28
3.5" 800K 2nd Floppy Drive (305/310)	£109
5.25" 800K External Floppy Drive	£84
I/O Podule (Analogue & User Port & 1MHz Bus)	£77
MIDI add-on to I/O Podule	£27
MIDI Expansion Card	£64
Econet Network Board	£45
IEEE Interface Adaptor	£265
16 Bit Parallel I/O Card	£193
Software Developers Toolbox	£147
Floating Point Unit	£449
SCSI Adaptor Expansion Card	£167
Keyboard Extension Lead	£6
2 Podule Backplane	£24
4 Podule Backplane	£37

HARD DISK DRIVES (ST506)

20Mb + Controller (310)	£294
40Mb + Controller (310)	£389
20Mb for 410 ST506	£165
40Mb for 410 ST506	£259
75Mb for 410 ST506	£379
A3000 20Mb + Podule	£349
A3000 40Mb + Podule	£469

SCSI HARD DRIVES FOR A300/400

Supplied complete with controller card	
52Mb Internal	£355
105Mb Internal	£549
170Mb Internal	£829
210Mb Internal	£899

FREE OFFER ON ARCHIMEDES MICRO'S

COMPUTER	FREE OFFER
A3000	Upgraded to 2mb RAM on Board
A410/1	Upgraded to 2Mb RAM & a 20 Mb Hard Disc, (A420)
A420/1	Upgraded to 4Mb RAM & a 40 Mb Hard Disc, (A440), Mk II Learning Curve + Dust Cover
A440/1	High Resolution 14" Multiscan Colour Monitor
or	Taxan 775 Monitor (Entry System)
or	Star XB-2410 24 Pin Colour Printer (Colour System)
A540/1	High Resolution 14" Multiscan Colour Monitor + Panasonic KX-P1180 Printer & Connecting cable
or	Taxan 795 or 775 Monitor (Entry System) or Star XB24-10 24 Pin Colour Printer (Colour System)

BBC MASTER

MASTER 128K with View, Viewsheets, ADFS BASIC Editor & Terminal and our Special FREE OFFER. A 5.25" Double Sided, 40/80 Track switchable 400K Disc Drive and 20 Floppy Discs. **£399**

BBC B & MASTER ACCESSORIES

Turbo 65C102 Add-on-Module	£113
Econet Module for Master	£45
Twin ROM Cartridge for Master	£9
Master Reference Manual I (No VAT)	£13
Master Reference Manual II (No VAT)	£13
Master Advanced Ref. Manual (No VAT)	£16
64K Upgrade Kit for B +	£31
Acorn 1772 DFS Complete Kit	£47

RAM UPGRADES FOR ARCHIMEDES

A3000	Upgrade to 2Mb RAM	£62
A3000	Upgrade to 4Mb RAM	£175
A305	Upgrade to 1Mb RAM	£96
A305/A310	Upgrade to 2Mb RAM	£239
A305/A310	Upgrade to 4Mb RAM	£429
A410/1	Upgrade to 2Mb RAM	£63
A410/1	Upgrade to 4Mb RAM	£117
A410/1	Upgrade to 8Mb RAM	£899
A420/1	Upgrade to 4Mb RAM	£169
A420/1	Upgrade to 8Mb RAM	£849
A440/1	Upgrade to 8Mb RAM	£739
R140	Upgrade to 8Mb RAM	£739

MASTER 128 CUMANA DISK DRIVES

5.25" 200K Single 40T No PSU	£64
5.25" 200K Single 40T With PSU	£79
5.25" 400K Single 40/80 Switchable No PSU	£79
5.25" 400K Single 40/80 Switchable With PSU	£89
5.25" 400K Dual 40T No PSU	£125
5.25" 400K Dual 40T With PSU	£149
5.25" 800K Dual 40/80 Switchable No PSU	£159
5.25" 800K Dual 40/80 Switchable With PSU	£179
3.5" Single Drive No PSU	£64
3.5" Single Drive With PSU	£79
3.5" Dual Drive With PSU	£125
3.5" + 5.25" 40/80 Switchable	£169

CONCEPT KEYBOARDS

A4 Standard Keyboard inc BBC Software	£115
A3 Standard Keyboard inc BBC Software	£140
A4 Archimedes Keyboard	£116
A3 Archimedes Keyboard	£141

ARCHIMEDES SOFTWARE

ART/DESIGN/GRAPHICS

Artisan II	£43
Atelier	£63
Autosketch II	£66
Gamma Plot	£38
Graph Box	£62
Mogul	£18
Poster	£82
Pro Artisan	£71
Render Bender 2	£56
Sigma Plot	£38

DATABASES

AlphaBase	£34
Genesis	£64
Multistore	£192

DESKTOP PUBLISHING

Acorn DeskTop Publisher	£125
Impression Junior	£77
Impression II	£155
Tempest	£97

INTEGRATED

Desktop Office	£103
Logistix	£83
Pipedream 3	£118

LANGUAGES

ANSI C Rel 3	£122
Assembler	£145
Fortran 77	£75
ISO-PASCAL	£75
LISP	£145
Prolog X	£145

SILICON VISION

Arc PCB Professional	£269
Gerber Plot	£91
Realtime Solids Modeller	£105
Risc Basic	£72
Robo Logo	£52
Solid Cad	£72
Solid Render	£52
Solid Tools	£196
Super Dump	£19
Super Plot	£19

SPREADSHEETS

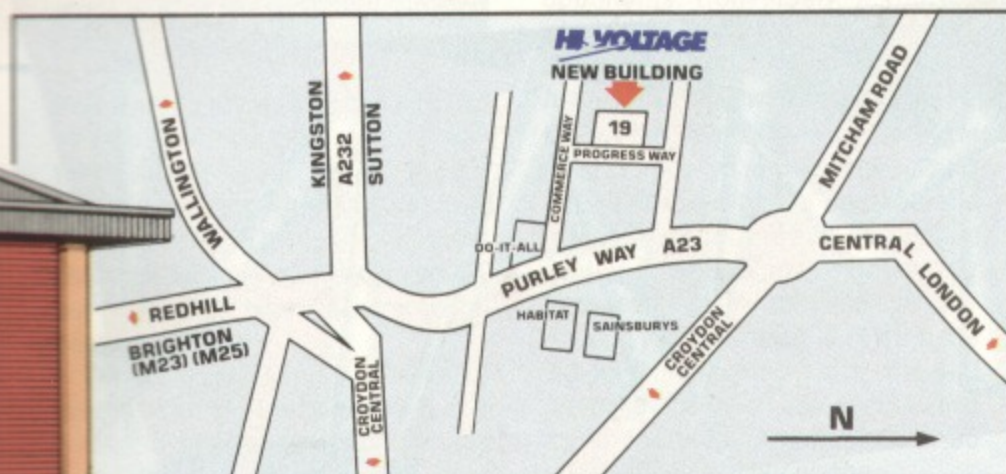
Intersheet	£23
Schema	£97
Sigmatasheet	£53
Viewsheets	£44

WORDPROCESSORS

1st Word Plus II	£68
Easiword	£29
Interword	£23
Protext 5	£129
View	£44

We also carry a wide range of GAMES and LEISURE software. Call for details.

VOLTAGE



- ▶ **Customer Car Park**
- ▶ **Massive stocks available over-the-counter from our 25,000 sq.ft. premises**
- ▶ **All items covered by original manufacturers warranty**
- ▶ **Hotline support for all customers**
- ▶ **We are official authorised specialists for most leading computer brands**
- ▶ **Nationwide on-site service contracts available on all equipment supplied**
- ▶ **1000's of Ribbons, Disks, Cables & Accessories**
- ▶ **FULLY EQUIPPED SERVICE CENTRE**

GOVERNMENT, EDUCATION, STOCK EXCHANGE LISTED PLC'S

Extra 2% discount is available for payment by cheque with Official Order

14 Day Account Terms available at 3% above our listed prices (orders over £200). Credit card orders are at normal prices

PRINTERS

Canon BJ10e	£209	Hew/Pack Deskjet 500	£306
Canon BJ300	£361	Hew/Pack Paintjet	£607
Canon BJ330	£422	Hew/Pack Paintjet XL	£1099
Citizen 1200 +	£99	Hew/Pack Rug/Writer	£852
Citizen 1240	£149	Intergrex Colour Jet	£509
Swift 9	£145	Mannesman Tally MT81	£99
Swift 24	£210	Nec P20	£191
Swift 24X	£299	Nec P30	£255
Produt 9	£205	Nec P60	£377
Produt 9X	£250	Nec P70	£478
Produt 24	£227	Nec P90	£657
Epson LX400	£114	Panasonic KXP1081	£114
Epson LX850	£157	Panasonic KXP1180	£122
Epson FX850	£288	Panasonic KXP1123	£156
Epson FX1050	£364	Panasonic KXP1124i	£213
Epson EX1000 Colour	£465	Panasonic KXP1695	£299
Epson DFX5000	£1096	Panasonic KXP1624	£299
Epson DFX8000	£2059	Panasonic KXP1654	£439
Epson LQ400	£173	Star LC10	£115
Epson LQ550	£216	Star LC200 Colour	£159
Epson LQ1010	£322	Star LC15	£186
Epson LQ850 +	£392	Star LC24-10	£155
Epson LQ860 Colour	£455	Star LC24-200	£194
Epson LQ1050 +	£485	Star LC24-200 Colour	£229
Epson LQ1060 Colour	£607	Star LC24-15	£302
Epson LQ2550 Colour	£705	Star FR10 Colour	£242
Epson SQ850	£449	Star FR15	£311
Epson SQ2550	£645	Star XB24-10 Colour	£311
Hew/Pack Thinkjet	£243	Star XB24-15	£375
Hew/Pack Quietjet	£312		
Hew/Pack Quietjet Plus	£372		

All printers marked by an * include 12 months on-site maintenance.

PLOTTERS

ROLAND	
DXY-1100	£512
DXY-1200	£647
DXY-1300	£848
DPX-2500	£2379
DPX-3500	£3299
GRX-300	£2779
GRX-400	£3649
DPX & GRX include 12 months O.S.M.	

COMMUNICATIONS

Amstrad SM2400 V22BIS	£159
Miracom WS4000	£99
Miracom WS3000 V22	£187
Miracom WS3000 V22BIS	£249
Pace Linnett	£95
Pace Linnett 1200 V22	£150
Pace Linnett 2400 V22BIS	£209
Hearsay comms software	£49
BBC/Master Modem Cable	£15
Archimedes Modem Cable	£15

LASER PRINTERS

	PPM		
Brother HL-4	4	*	£726
Brother HL-8e	8	*	£995
Brother HL-8PS Postscript	8	*	£1495
Canon LBP-4	4	*	£658
Canon LBP-III	8	*	£1009
Canon LBP-III Dual Bin	8	*	£1399
Canon LBP-III Dual Bin Duplex	8	*	£1515
Epson EPL-7100	6	*	£699
Epson EPL-7500 Postscript	6	*	£1195
HP Laserjet III	4	*	£679
HP Laserjet III	8	*	£1032
HP Laserjet IIID Dual Bin Duplex	8	*	£1594
IBM 4019E	5		£689
IBM 4019	10		£959
Kyocera F800T	8	*	£959
Laser Direct	6		£848
NEC Silentwriter 2 S60	6	*	£779
NEC Silentwriter 2 S60P Postscript	6	*	£1235
NEC Silentwriter 2 266	8	*	£935
NEC Silentwriter 2 290 Postscript	8	*	£1413
NEC LC890XL Postscript	8	*	£2339
NEC Colourmate PS Postscript		*	£5489
OKI Laser 400	4	*	£545
OKI Laser 800	8	*	£995
OKI Laser 840 Postscript	8	*	£1289
Panasonic KXP4420	8	*	£664
Panasonic KXP4450i Dual Bin	11	*	£1037
Panasonic KXP4455 D/Bin P/Script	11	*	£1625
QMS PS410 Postscript	4	*	£1479
QMS PS810 + Postscript	8	*	£2015
Qume Crystalprint WP Plus	6	*	£695
Qume Crystalprint S/ Series II	6	*	£1065
Qume Crystalprint Publisher PS 2Mb	6	*	£1559
Qume Crystalprint Express PS	12	*	£2549
Star LP-4	4	*	£719
Star LP-4PS Postscript	4	*	£895
Star LP-8 III	8	*	£1059
Star LP8 II Starscript Postscript	8	*	£1199

All printers marked by an * include 12 months on-site maintenance.
A full range of accessories and consumables are available, please call for details.

MONITORS

SPECIAL OFFER		
14" Multiscan Hi-Resolution 0.28 Dot Pitch, 1024 x 768	£249	
MICROVITEC		
1431 Standard Res.	£169	
1451 Medium Res.	£209	
14M325 (CUB 3000) Medium Resolution	£189	
1441 High Resolution	£349	
1451AP RGB/PAL & Audio	£249	
2040CS 20" High Res.	£659	
Touchtec 501 Touch Screen	£234	
NEC		
Multisync 3D 14" 0.28 Dot Pitch	£341	
PANASONIC		
14" Super Hi-Res 0.29 Dot Pitch	£244	
PHILIPS		
BM7502 12" Hi-Res Green	£69	
CM8833/II 14" Medium Resolution	£175	
TAXAN		
770LR 14" 0.31 Dot Pitch Low Rad	£382	
775 Plus 14" 0.28 Dot Pitch Hi-Res	£379	
795 Trinitron 0.26 Dot Pitch	£432	
970 20" 0.31 Dot Pitch	£1199	

To: **Hi Voltage, 19 Progress Way, Croydon, Surrey CR0 4XD.** I wish to order

QUANTITY	DESCRIPTION	PRICE

Please state disk size _____

I enclose cheque/PO for £ _____ inc VAT

or charge my Access/Visa No: _____ Exp. date _____

Name _____

Signature _____

Address _____

Postcode _____ Tel No: _____

Delivery	
Total	
VAT	
Total £	

MAIL ORDER
081-686 9890
SHOP
081-681 0349

LOW COST LEASING*
For the most competitive quotation give our specialist leasing department a call on:
081-681 7777
*Orders over £700. Business only. Subject to status.

ALL PRICES EXCLUDE VAT

DELIVERY
Hardware: £7 + VAT per box. Software: £7 + VAT per order. Lasers: £15 + VAT per printer.
Next Working Day Service - call for details
UK Offshore - call for details

CREDIT CARD MAIL ORDER

081-686 9890

FAX: 081-681 8939

OPEN MON-SAT
9 am-5.30 pm

E.&O.E.
All prices and manufacturers specifications subject to change without notice.
Please call before ordering. Goods are not supplied on trial basis.

Subject to availability despatch is normally effected within 2 days from receipt of cleared payment. Please allow 7 working days for cheque clearance. All orders will be fulfilled within 28 days unless otherwise notified.

19 Progress Way,
Croydon, Surrey
CR0 4XD
081-681 0349 (Shop)

HI VOLTAGE

Orders accepted subject to our normal terms of trading. Copies available on request.



Hac Man takes up the Castle Quest once more

Welcome to another column of all that's best in Acorn games. In the August 1990 column I passed on a few hints and tips for Micro Power's arcade-adventure Castle Quest. One was that yes, it *is* necessary to get captured by the guards and go through the routine of escaping from the prison because you need the stool, which is located inside the prison cell.

There is no getting away from the fact that you do need the stool, but it has recently been pointed out to me by Dax Turner and Stevie Carter of Wraysbury, Middlesex that you can obtain the stool without deliberately offering yourself for imprisonment.

As usual, you must first acquire the sword by using the little figures to the left of your start position as spider fodder,

then make your way up the long slope towards the prison. Just before you reach the guard at the top of the slope you must jump at him with the sword in your hand. This should kill him, leaving the way clear for you to dispose of the other two guards in the usual way.

You can now walk unopposed into the prison, take the stool and make your exit the way you came in.

Incidentally, Dax and Stevie's method of jumping at a guard as you go to fight him works well in almost all situations because you can often kill the guard with one strike instead of having to engage in the usual battle.

However, this does not work if there is brickwork or another such obstacle above your head, because you have no space in which to make your leap. Nevertheless, it is a technique worth mastering because the wizard's castle does not give up its secrets easily.

Overdrive suffers from clutch slip

Whoops! It's fix-the-buggly time again. In the April 1990 column I featured a routine for the original cassette version of **Overdrive** to allow you to select your start level and the number of cars you must pass in order to be promoted to the next level.

In the July 1990 column I featured a modification to this listing so that it could be used with the versions of Overdrive featured on the Superior Collection Volume 2. However, Steven Rangeley of Rochdale has pointed out to me a glitch in this modified listing of which I was previously unaware. My

original listing of the April routine contained a line 230 which contained two pokes of the form ?&xxxx=x, but by the time it was committed to paper line 230 had become lines 230 and 235, each with one poke.

To make the original listing Superior Collection-compatible both lines 220 and 230 needed to be modified, but I had reckoned without the rogue line 235. However, the fix is very simple – just delete line 235, re-save the modified listing and type RUN to give yourself complete control over the racetracks of the world.

Thank you Stephen.

Power pills

- Castle Quest short cut
- Overdrive pokes revisited
- Infinite energy in Citadel
- Zarch cheat mode updated
- Conqueror capers
- Apocalypse level jump

The stool's a steal!

Elk Citadel

IN the May issue I provided infinite energy routines for the versions of Stryker's Run found on the 5.25in and 3.5in Play It Again Sam disc versions for the Electron.

Now it is the turn of another game from the same package that keeps generating fan mail in this column when in the normal course of time it should have disappeared quietly into the mists of computer game history.

The game in question is **Citadel**, my favourite of the four on the first Sam collection, and the two routines provide infinite energy on the two disc versions of Citadel.

As before, type in the routine appropriate to your disc system, then save it on to one of your own blank discs – NOT on to the original Sam disc – then type RUN and follow the on-screen instructions.

```
10 REM Citadel infinite energy
20 REM Acorn Electron Play It
Again Sam 5.25" disc version
30 REM by Hac-Man 1991
40 REM (C) The Micro User
50 REM
60 oscli=&FFF7
70 FOR IX=0 TO 2 STEP 2:P%=&90
0:COPT IX
80 LDX# cli MOD 256 : LDY# cli
DIV 256 : JSR oscli
90 LDA# &60 : STA &A99 : JSR &
A00
100 LDA# 0 : STA &4048 : STA &4
```

Listing I: Citadel infinite energy for 5.25in Sam 1 d

```
10 REM Citadel infinite energy
20 REM Acorn Electron Play It
Again Sam 3.5" disc version
30 REM by Hac-Man 1991
40 REM (C) The Micro User
50 REM
60 oscli=&FFF7
70 FOR IX=0 TO 2 STEP 2:P%=&90
0:COPT IX
80 LDX# cli MOD 256 : LDY# cli
DIV 256 : JSR oscli
90 LDA# 0 : STA &4048 : STA &4
30F : STA &4565 : STA &4634 : STA
```

Listing II: Citadel infinite energy for 3.5in Sam 1 d

32-bit fun

Paul Tasker of Leamington Spa has written to me to ask for hints with three Archimedes games, **Zarch**, **Conqueror** and **Apocalypse**. Well Paul, I featured a piece about Zarch's cheat mode in my June 1988 column, but three years later it seems appropriate to repeat it.

The cheat allows you to increase your number of lives at will, re-fuel in mid-air and activate an automatic pilot.

To start, load **Zarch** as normal. Stay on the launch pad and fire to make sure that the sound is on. If it is not, press S to switch it on.

Now place one finger over each of the keys Q, T and U. Press Q and then quickly press T and U together. To see if it has worked, press D to activate automatic pilot. If it hasn't, switch the sound back on and try again – it does work.

Once the cheat mode is in operation press D to engage or disengage automatic pilot, L to increase your number of lives by one, and F to re-fuel. Any or all of these features can be used at any time.

The following hints on **Conqueror** come, so to speak, directly from the horse's mouth – Jonathan Griffiths, the author of the game. Over to Jonathan:

● *German tanks have a poorer hill-climbing ability than either the American or Russian ones. This means that if you are playing German, a good tactic is to sit at the top of hills, from where you can rush down at*

opponents. Conversely, if you are playing Allies, a good idea is to run away in the direction of the steepest hill, as this will slow down any pursuit.

● *The program calculates the angle of incidence of any shot fired at a tank, and uses this to calculate the effective armour. Thus an oblique shot at a tank will have more armour to penetrate than a square-on shot.*

● *So if you are being shot at, try to ensure that the enemy shot strikes at an angle and when you are shooting try to attack the enemy tank at 90 degrees to its armour plating.*

● *Front armour is best on all tanks, so present this to an enemy at all times. Equally, try for the enemy's flank or rear when firing back.*

● *A sensible tactic – as employed by the micro – is to form heavy tanks into groups and leave the light tanks to reconnoitre. This means that the light tanks – which can travel faster and thus run away as well – act as the eyes of your force.*

The standard tactic of the light tanks when under auto-driver is to run away from anything they cannot shoot. Consequently they make ideal scouts, as they will just report any sighting, and it is then up to the player to direct a nearby group of heavy tanks to deal with the situation.

● *When using map fire don't forget that the shells take about 30 seconds to hit the ground, so try to predict where the enemy forces will be at that time and place your fire accordingly.*

Note that computer-controlled tanks do not look for map fire, so you must stay clear of the target area until you are sure that all the shells have landed.

● *Try to balance your force when choosing tanks. Light ones are useful for reconnaissance, and also as an*

emergency reserve. Heavy tanks are good at slogging it out with the enemy.

Medium tanks combine the virtues of both the light and heavy tanks, but are generally lacking in both speed and firepower.

● *The various tanks have individual strong points, and a good player will be able to use each sort to its best advantage.*

American

Chaffee: Very fast and cheap.

M36 GMC: Also very fast, and with a good gun, but no real armour.

Sherman Firefly: Good gun, with medium speed and armour.

Pershing: Same gun as M36, good armour and medium speed.

German

Panzer III: Very cheap, but not very good at any one thing.

Panther: Excellent frontal armour, good gun and average mobility. Beware that both side and rear armour are weak

Tiger I: Excellent all-round armour and good gun.

King Tiger: Best armour and gun of any tank, but slow.

Russian:

T34/76: Good all-round armour (in common with other Russian tanks), good speed and average gun.

KV1S: Better armour than T34/76, same gun.

KV85: As KV1S, but with a better gun.

JSII: Excellent armour and gun, good mobility.

● *Don't forget to use your drone tanks. Direct one to hold an enemy*

tank's attention, while driving your tank to its rear and then shooting.

However, you should note that the computer tank has two objectives – to defend itself, and to shoot any player-controlled tanks. Thus it will turn its frontal armour towards the most powerful gun, and it will shoot at the lightest-armoured player tank.

On to **Apocalypse**: Gordon Key, the author, tells me that the game features a cheat which allows you – from any point – to jump to the next planet.

To activate it, quickly type in ELIZA with even key presses. You will receive the message ESCAPE SEQUENCE INITIATED followed by 3 PERIODS TO ESCAPE. You will then see the messages LLANERK SELF DESTRUCT SEQUENCE INITIATED and 1 PERIOD TO ESCAPE.

As long as you survive these last few seconds you will receive the message ESCAPE IN PROGRESS and will be presented to the Royal Guild of Spacing.

There the female member of the Guild panel will say to you "Very well done" in a suitably regal tone of voice. Your status is increased accordingly, and you are allocated another planet.

Note that using this level jump means that you have in effect completed that planet, so the status flag on the disc that indicates that a particular planet has been sterilised is then permanently set.

Consequently, if you really want to, you can jump to each of the planets in turn so that every time thereafter that you come to play Apocalypse all the planets will be available to you.

However, to my mind there seems little point in doing this, because if you cannot master one particular planet you will be unlikely to cope with a more difficult one.

```
30F : STA &4565 : STA &4634 : STA
&58E1 : STA &5CBD : \ infinite e
nergy
110 JMP &60FF
120 .cli EQU "LOAD CITLX"+CHR
$(13)
130 J:NEXT
140 PRINT"Please insert Sam dis
c and press any key...";:FX 15,0
150 AX=GET:*KEYO *LOAD CITADEL|
M PAGE=&1D00|M END|M OLD|M 470 CA
LL &900:END|M RUN|F|M
160 *INIT
170 VDU 21:*FX 138,0,128
```

```
&58E1 : STA &5CBD : \ infinite e
nergy
100 JMP &60FF
110 .cli EQU "LOAD CITLX"+CHR
$(13)
120 J:NEXT
130 PRINT"Please insert Sam dis
c and press any key...";:FX 15,0
140 AX=GET:*MOUNT
150 *KEYO LOAD"CITADEL"|M 470 C
ALL &900:END|M RUN|M
160 *FX 138,0,128
```





JULY is seen as the silly season by newspapers because nothing of any note usually happens during the summer months. Well, this last month has been more chaotic than silly due to the number of fractals and Mandelbröts which have made their way to my desk.

Most people admire fractals and then turn to something more practical. However, they are being used to generate clothing and poster designs and are significantly more intricate on PCs and Apple Macintoshes than they are at present on the Acorn front.

Mike Curnow from AFG – the Archimedes Fractal Group – aims to change that.

AFG is a new PD library and as the name suggests they deal only with fractals. They aim to pool the skills and talents of those in the Archimedes world and by research and sharing software routines hope to extend individual capabilities and explore new areas of fractal geometry.

Two DeskTop/multi-tasking programs Julia and Mbrot are included on this month's disc along with the rather clever AFGSprite. This utility allows sprites to be manipulated and converted from !Paint format.

It simply allows the parameters used to create a sprite to be stored in a sprite file. Using Modes 13 and 15 you can edit the sprite variables changing the type between integer, basic floating point, double floating point and so on.

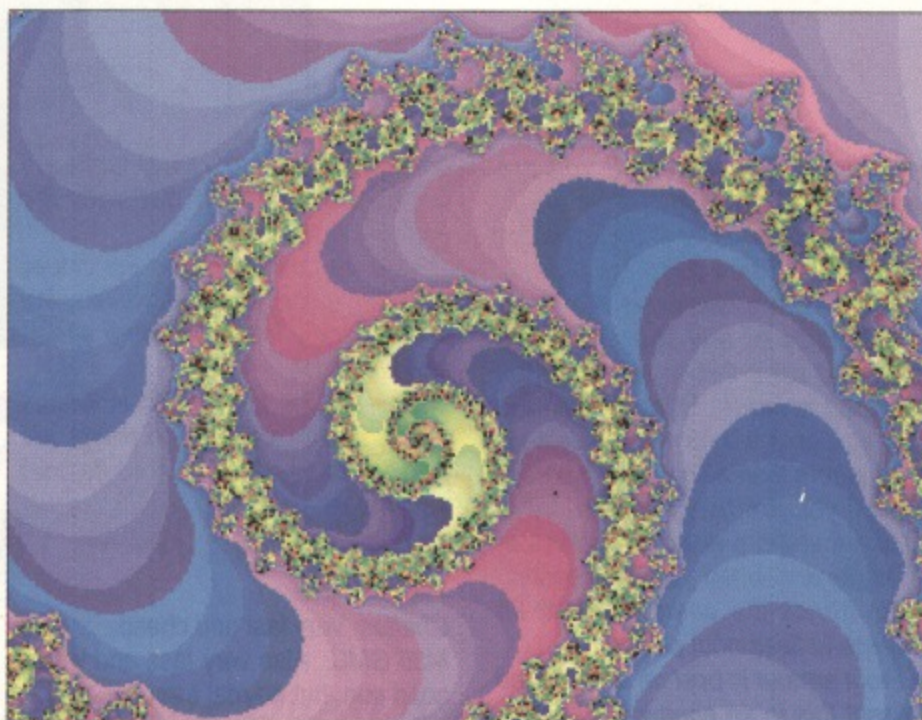
You can also add some very nice effects such as changing the colours to give a colour shift effect, and you can even animate your creation. There is a lot of potential here and exciting results can be achieved using fractal theory. If you have never tried the water before, the AFG may be just the place to start.

Fun and games

Bored with the normal arrow which represents your mouse onscreen? Then change it.

Swinger will give it a disorientated feel as it will point in a variety of directions while still being usable. But **Pointer3** will let you customise to your heart's content.

The standard is a pointing hand but to make this more individual use !Paint to edit the sprite in the sprite file



Fractal magic

!Pointer3.Pointer. You can redefine the colours and change MS1 and MS2 in the default desktop palette – do remember to save your changes to the palette under !Pointer3.Palette though.

To join the Duck, Troll and other

itinerants jogging along my DeskTop I've added **!Cel-Van**. It's a little red van with the logo CEL which potters along happily.

From the same source came !Door. Once you boot this, any file you open will be accompanied by an atmo-



Teri Paul examines this month's selection of PD goodies from the latest in Mandelbröts to a friendly clock

Chaotic ramblings

spheric creaking door sound.

Remember Wanda and Sharks? Well for the less nautical there there is now **Planes**. You've guessed it, a selection of little aircraft appear and disappear from behind your windows on the DeskTop.

Unsaintly Patience

One game I go back to again and again is the Patience provided on the Applications Discs. If you haven't the patience to keep on playing until luck allows you to win, or perhaps you just want to impress your friends, there is a version of Patience with cheat modes. Now you can put any card in a space – not just Kings – and/or change how the cards are revealed.

A brand new release that's just landed is perhaps the silliest idea I've ever seen: PacMan running in a window on the DeskTop. I know we want a full multi-tasking environment but this is really silly. However, it's very well programmed with absolutely smooth animation, though running a tad slow, and includes a pause facility and high scores.

The variety of different kinds of clocks available for the Archimedes never ceases to amaze me. Rik's Rough Clock is one which appeals. Rather than giving you the exact time it lets you know that "It's almost 20 past 11".

This is really only as exact as I need and as the clock only assesses the system once a minute it saves on processor time. You can also edit the template to change the position of the window and the colours.

On the DeskTop

Placelt is a utility which goes one step further in copying the workings of the Apple Mac DeskTop environment. Anyone familiar with this computer will know that you can take any file or application from a disc and pop it on the DeskTop and then run it, leave it there or pop it on another disc at a later date. Placelt is not quite as resilient as the Apple facility, but it's getting there.

Updated versions of FileUtils, HelpReader – which now compresses, tests and creates RunMe applications – and VKiller arrived here recently and these will be passed on through the monthly disc too. There



are also some other useful bits and pieces I have only just come across.

Westbourne PD recently sent me a file recovery utility, **!Recover**, which effectively rescues defective sectors. Simply take your file to the **!Recover** icon on the icon bar and "save as..."

If you are someone who moves files around on one disc then **!CopyOpts** could well be of help. Load this utility and two radio buttons – labelled Copy and Move – appear on the left-hand side of the icon bar.

The Copy option uses the normal DeskTop operations when you move/copy a file, but by choosing Move, files are renamed where possible instead of copied. This saves you having to wait for files to be loaded and saved because it renames the file even if you drag the file icon and don't hold down the Shift key.

Summer funds

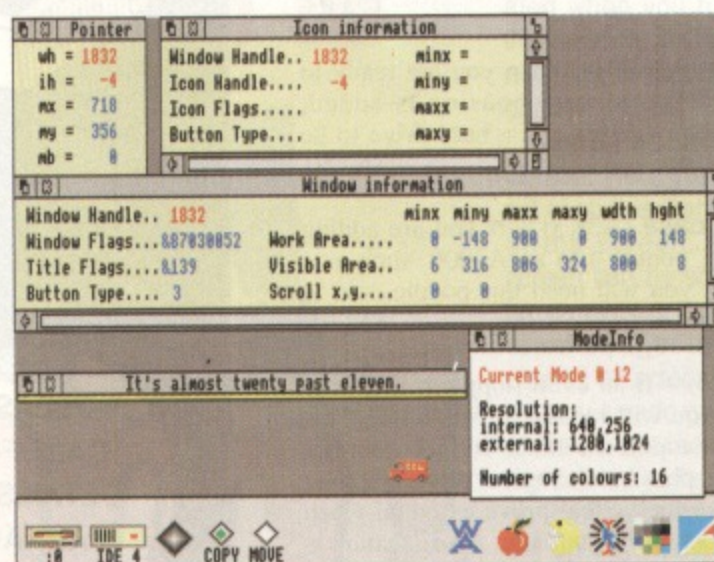
It is the season of summer sun and holidays and if you need to know just how many dollars you're going to need for your vacation then load up **!XChanger**. If you enter the exchange

rate this little program calculates how much a certain sum is in dollars or sterling. It also converts figures to hexadecimal and binary.

Ram discs are incredibly useful, but can be trying as they do tend to trap memory. **RamCram** allows you to alter the size of a ram disc when it has files in it. For instance, should you have 20k of files in a 200k ram disc there is 180k which could be used by other applications.

After booting RamCram a window appears which includes a strip indicating free memory like the ones used in the Task Manager. You change the amount of free memory by moving the strip. However, RamCram must have at least as much free memory as the ram disc has used up in files. If the application can't find enough free memory you'll be told.

If you use a variety of wordprocessors **!1stFile** is worthy of mention. It's not a new application and is now in version 2.0, but you can change the file format of FirstWord files to text/Ascii format or from text and WordWise+ formats. Simply drag the file you want to change to the icon bar and choose your option from the win-



Lot's of interesting things this month

dow. Simple! There is a minimum allowed file length of 110 bytes.

And finally, you could be forgiven for thinking that **WimpAid** is a charity – but it isn't. It's a wimp monitor utility. Giving you information about the pointer, windows and icons you assess it by clicking on the icon bar to reveal a menu with seven options. These include the x/y co-ordinates of the pointer, an SWI index giving the page number in the Programmers' Reference Manual where you can find more information, and a pause option.

More Archimedes PD libraries

Arch Angel, 9 Chancel Court, Chancel Lane, Pinhoe, Exeter Devon EX4 8QE
Archimedes Fractal Group, 30 Bowen Drive, West Dulwich, London SE21 8PN
Westbourne Services, Westbourne House, 34 Bradley Street, Wotton-under-Edge, Gloucester GL12 7AR

Arcade Games or Text Adventures?

Whatever your preference, we have programs to free your imagination and let you create great games on your Archimedes or A3000



ALPS



ALPS is the adventure creation system for the Archimedes. ALPS is multi-tasking with a built in text editor and a sophisticated sentence analyser that can handle complex player commands. You can import graphics and redesign the character set. With a unique mouse-driven user interface and ramsave and ramload features, **ALPS** has been used to produce commercially available adventures. Comes on disc with 40 page Introductory and 66 page Reference Guides.

"Painstakingly put together" - Micro User

"Powerful and easy to use" - Archive



£34.95



Creator



Creator is a complete easy-to-use arcade game designer that runs in the Desktop on the Archimedes and A3000 to bring professional games techniques to everyone. You can design arcade adventures, change screens when you want or create scrolling shoot-em-ups – the choice is yours. Supplied on two disks, including the designer, run-time system, sampled sounds, tunes, sprite library and demonstration games and comes with a 50 page User Guide

- Animated sprites • Screen designer • Flight paths
- Attack waves • Parallax scrolling • Sound effects
- Background music • Scrolling stars • RISC OS compliant
- No royalties to pay

£38.95



Also available: **ALPS Support Disc** - provides text and graphics compression for **ALPS**: crams more text into memory and allows more pictures on disc. **£19.95**. (**£15.95** if bought with **ALPS**)

Music Editor - Make your own music with this multi-tasking music editor. Input notes with mouse, keyboard or MIDI instrument. Tunes can be used in games or on their own. **£30.00** (**£24.00** if bought with **Creator**)

Postage and Packing FREE on all orders. Sales/Enquiries: 0762 342510

Alpine Software, Dept MU, PO Box 25, Portadown, CRAIGAVON, BT63 5UT

ARCHIMEDES A3000 PRODUCTS

Monitor stand (A3K1) – Probably the best monitor plinth available for the A3000 and the basis of a modular system.....£24.95

System housing (A3K2) – When you are ready to expand the A3000 this system housing is added, allowing up to 2 floppy drives and a hard drive to be added.£69.50

Expansion card case (A3K3) – If you are adding an expansion card ("podule") to an A3000, such as a hard disc card, then you will need this podule case to connect & protect the card.....£14.95

Disc buffer (A3K6) – If an extra floppy drive/s is to be connected then you will require a disc buffer. This one supports up to 3 additional drives and incorporates software control for physical to logical drive mapping and 40/80 stepping which could prove essential when using discs in 65 Host or PC emulator. A key feature is the built in expansion for further cards to be added internally; also see A3K12. *NB: Some cheaper products may only provide connection for an additional drive without buffering*.....£48.95

20Mb hard disc (A3K7) – A 20Mb hard disc drive ready to fit in A3K2, including the hard disc card and all cabling. We are not aware of any other hard disc upgrade that is treated as an internal upgrade (consult your Acorn dealer or call PRES for details).....£399.00

NEW 40Mb hard disc (A3K14) – As A3K7 but twice the capacity£499

3 1/2" Additional floppy drive (A3K8) – 3 1/2" disc drive and mounting brackets for A3K2.....£75

5 1/4" Additional floppy drive (A3K9) – 5 1/4" disc drive and mounting brackets for A3K2 – ideally suited for 65 Host or using the PC emulator.....£99.95

65 Host 1770 DFS & DFS Filer (A3K12) – A ROM and disc upgrade for A3K6 provides: 1. A desktop DFS filer that allows DFS files to be dragged to ADFS viewers or straight into applications as Edit or Pipedream. 2. BBC 1770 DFS for use in 65 Host. Automatic Icon and loader which can allow BBC DFS discs to have <SHIFT BREAK> operation. "...effectively turns your A3000 into a Model B"... *Acorn User, Sept. '90*£19.95

All prices exc. VAT



Tel: 0276 72046
Fax: 0276 51427

IN THE FOREFRONT OF A3000 UPGRADES

PLEASE
CALL FOR
DETAILS OF
PACKAGE
PRICES



"PRES's range of add-ons offers tremendous advantages. The system can grow with your pocket, it offers security and strength but most importantly it offers choice." (AU Feb. 90)

The starting point is the monitor plinth, probably (we feel definitely) the best on the market @ only £24.95 (plus VAT). From there... System Housing, Hard Disc Upgrade, Additional 3 1/2" Disc Drive, Additional 5 1/4" Disc Drive, Podule Case, Dedicated A3000 Disc Buffer, 1770 DFS for BBC Emulator & DFS Filer for Desktop, plus more to come! (the last three products can be added independently of the other items)

Contact your local dealer or call PRES direct on 0276 72046 for advice on upgrading your A3000. We have built our reputation on honest dealing on quality products with thousands of satisfied customers.

WE STILL PRODUCE AND SUPPLY OUR RANGE OF "8 BIT" PRODUCTS FOR THE ELECTRON, BBC B AND MASTER. IF YOU WANT TO KNOW MORE ABOUT UPGRADING WITH ACORN COMPATIBLE PRODUCTS... CALL FOR DETAILS

SPECIAL PRICE

DUE TO A REMARKABLE PURCHASE WE CAN OFFER
OUR ARCHIMEDES HARD DISC UPGRADES FOR...

£100.00 LESS

THAN OUR NORMAL ADVERTISED PRICES
20 & 40 MB DRIVE UNITS COMPLETE WITH THE TRIED
& TESTED ST506 (ACORN) EXPANSION CARD.
COMPLETE WITH ALL NECESSARY CABLING &
INSTRUCTIONS FOR SYSTEM FITTING.
SUBJECT TO AVAILABILITY

BY POPULAR DEMAND WE NOW SUPPLY A MUCH
WIDER RANGE OF ACORN PRODUCTS.
SO WHY NOT JOIN THE MANY CUSTOMERS WHO
SAY THEY PREFER DEALING WITH US BY
CALLING THE NEXT TIME YOU REQUIRE ANY
ACORN RELATED ITEMS.

EDUCATION AND DEALER ENQUIRIES WELCOME

STOP PRESS

FOR THE MANY CUSTOMERS WHO SAY THEY WOULD PREFER TO DEAL
WITH US DIRECT... WE NOW OFFER A 'ONE STOP' SOURCE FOR YOUR
ACORN REQUIREMENTS. THIS INCLUDES COMPLETE A3000 SYSTEMS, A400
SERIES AND LEARNING CURVE PACKAGES.

NEW PRODUCTS

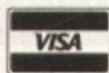
THE S.P.A.C.E. KIT... FIT A SECOND HARD DISC TO YOUR A400 COMPUTER.
THE MISSING LINK (TML)... FAST DATA TRANSMISSION BETWEEN ARCS.
FLOPPY LOCK... DISABLES AN ARCHIMEDES DRIVE BY LOCK & KEY.

COMING SOON

TRUE PODULE EXPANSION FOR A3000

P.R.E.S. Ltd, Box 319, Lightwater, Surrey GU18 5PW

Tel: 0276 72046. Fax: 0276 51427





Product: Creator, Arcade Games Designer
Price: £38.95
Supplier: Alpine Software,
P.O.Box25,Portadown,
CraigavonBT635UT.
Tel:0762342510
Requirements: BBC A3000 or
Archimedes series

MANY moons ago Alpine Software produced an adventure games creator for the 8 bit BBC Micro. It allowed you to design rooms and verbs, with little programs that controlled different events as they occurred. For the Archimedes and BBC A3000 they have upped the tempo and produced a program that let's you design your own arcade games.

The packaging is a simple video-style box, 50 page manual for version 1.00 and two discs. The version I received was 1.04 and there was a five page release note on some additions to the software. The manual has an adequate contents listing but no index at all.

Most recent releases of commercial software written in C contain a utility called !SysMerge from Acorn that will upgrade your Clib version to the very latest Clib 3.66. Unfortunately there are couple of pieces of software that don't like Clib 3.66, and there's a menu bug to go with it, however this doesn't generally interfere with using it and if you read the instructions carefully you'll find out whether the problems will affect you.

Disc one contains all you need to get started, and the manual contains a simple tutorial which will guide you through the initial steps of creating a Break-out game. My only complaint

Zing! Zap! Blam!

Geoff Brown explores an easy way to mass destruction

here is that this tutorial is too terse covering only four pages and there's just too much data crammed in. A beginner would have to take it very slowly to really understand what's going on.

It is possible to just sit down at your machine and start work, with the manual close by your side. But to produce a decent game you will have to do some serious design work, sketching out your ideas, screen layouts, types of sprites, what each object does and how it interacts with the other objects and so on.

The Creator is completely window-based and typing at the keyboard is kept to a minimum. Double-clicking the space-invader file icon brings up the same little chap on the icon bar, as you would expect. Clicking with Select or Adjust here does absolutely nothing, you have to enter the extensive icon bar menu to bring up one or more of the various editing windows.

To create a new game you have to select one of two standard game skeletons, imaginatively called !RunGameA and !RunGameB. The latter has a scoreboard area at the bottom of the screen and can scroll the top while the first scrolls the entire screen.

You then need to put an alphabet

file - several are provided - and sprite file you've designed yourself into the !RunGame directory you've chosen as most appropriate for your creation. There's a character editing utility supplied so that you can design your own character set.

At this stage you're ready to begin the actual design process so drag the sprite file on to the Creator icon, bring up the icon menu, move up to Design and take a look at your options:

The Objects window controls the initial state of each object, it's velocity, position, how it's plotted, what sprites to use for the animation sequence and how fast to run the animation, what path it should follow, if any, where to plot it in a wave of baddies, again if any, and whether it's visible. Plus how the object should respond to gravity and the edges of the screen.

These options might seem confusing but they add up to all the different ways objects are handled in all the different types of arcade game you can play.

All objects can be specified as being on one of eight different layers, zero being at the back. This controls which objects are in front of others.

At least one object needs to exist and have a sprite attached to it otherwise an error message will be gener-

ated when you run a test. However this certainly isn't a problem as there's no point in testing it if there are no objects.

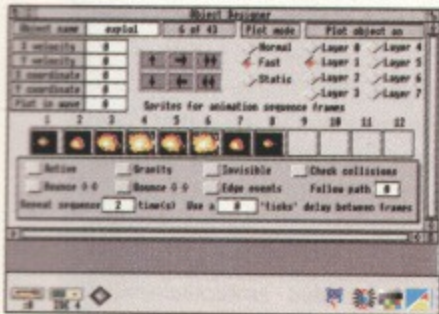
Next up on the Design sub-menu is Screen. Here you can put together a set of sprites that will compose a layer of the screen. The layers of the screen can be scrolled independently for parallax or special effects and an object on layer three will pass behind a sprite on screen layer four.

Many arcade games, particularly the shoot'em ups, have the sprites following defined paths and the Path option on the Design sub-menu allows you to set up any number of these for your objects to fly along. All you have to do is start clicking along the screen, making sure the points you create are not too far apart. Points can be deleted or new ones inserted, and existing ones can be dragged to new positions.

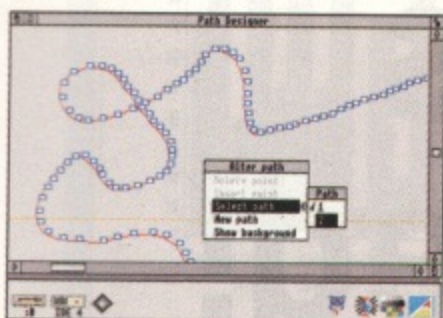
One other interesting feature is that the objects don't all have to be on the same layer so you can have the situation where a number of objects following one path can pass in front of or behind a screen sprite.

The Wave editing window is interesting: The idea of waves is pretty common, the waves of attackers in classic Space Invaders for example. But in Creator it's a bit different, a wave is just a way of gathering a number of objects together and treating them as a group. They don't have to be the same type of object and they don't have to move the same way - you could have ten objects in a wave, all looking different and all following different paths.

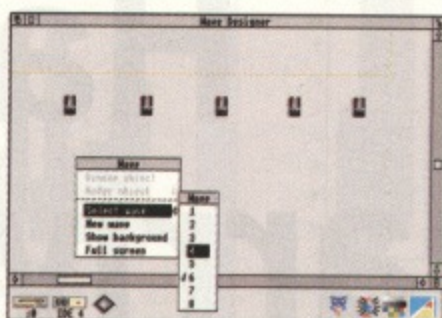
The significant feature is that they can all be started off or stopped at the same moment with a single instruc-



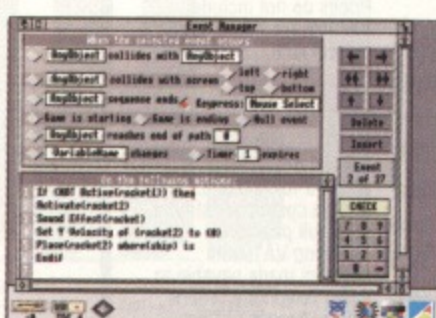
Designing objects is easy



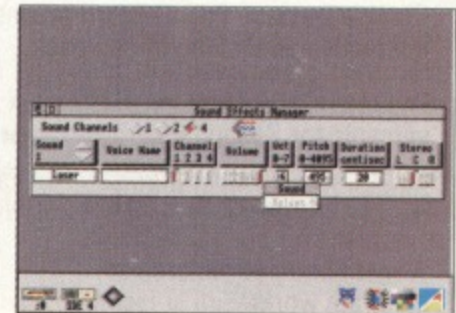
Selecting another path for editing



Preparing a wave of rockets



The Event Manager has many options



Create your own sound effects



Playing a demo game



tion, all hidden or made visible.

Additionally the position of each object in the wave can be shifted by the same amount – which would be very useful for Space Invaders. The final option is to attach a wave to a path in one smooth operation, the objects can be placed along the path at any spacing interval.

The most important window, and hence the most complicated, is the *Event* editor. As the game progresses events are produced: Objects colliding, objects reaching the end of their animation sequence or the end of their path, keys are pressed, built-in timers expire and variables have their values changed.

When an event occurs a list of possible situations is scanned and if that situation has occurred a number of actions are executed. For example, a bullet collides with a type 1 alien. The list of object-object situations is examined to see if the *bullet hitting type 1 alien* occurrence is catered for.

If it is the associated actions may be carried out, perhaps: De-activate the bullet, replace the alien with an explosion object, make the appropriate

sound, add 20 to the score.

General situations of *AnyObject* events can also be catered for. These are useful as a catch-all in case you've forgotten something. It is possible to cut and paste the list of actions although this is not a very versatile option – but it does speed things up.

The final *Sound* allows you to give names to particular sound effects which controls the sound used, which channel it comes out on, the volume, pitch, duration and stereo position. The resulting effects can be generated via an action in an event window.

Music can also be played by the system although it needs to be written by a music editor which is not yet available from Alpine. It's being written by Peter Gillett who's provided a lot of good tunes for arcade favourites on the Archimedes.

As a final point Alpine have not inflicted any nasty licensing agreements on the buyer. If you have Creator you can write and sell your game without any interference, but if you do write one Alpine would like first refusal on marketing it.

Overall this is an excellent piece of software, a bit rough round the edges

but certainly capable of producing good quality games. Some examples are provided in the form of the Break-out and, on the second disc, a sideways scrolling shoot-em up that shows how waves and paths can be used.



Waves can move very fast

Summing up

Creator is a very thorough piece of work and while one or two options I thought of were missing a quick call to Alpine showed they were a simple oversight and could be included very quickly and easily.

If you want to write arcade games but don't want to bother with the trivia of programming, then this is definitely the package for you.



Desktop Folio

Not just a desktop publisher...

For
Archimedes
and A3000

Choose Desktop Folio – word processing, desktop and interactive publishing in one pack.

Easy to use for Primary,
versatile for Secondary.

A choice of fonts for
professional design.

Simple Screen Folio bridges
the gap for BBC Folio users.

Easy to read documentation
with practical ideas.

A vast library of pictures to
illustrate work.



Please send me:

- ☐ Desktop Folio (Standalone) £90.00
☐ Desktop Folio (Primary Licence) £250.00
☐ Desktop Folio (Secondary Licence) £375.00

Prices do not include
VAT. Please add at the
current rate.

Name (block capitals) _____

Position _____

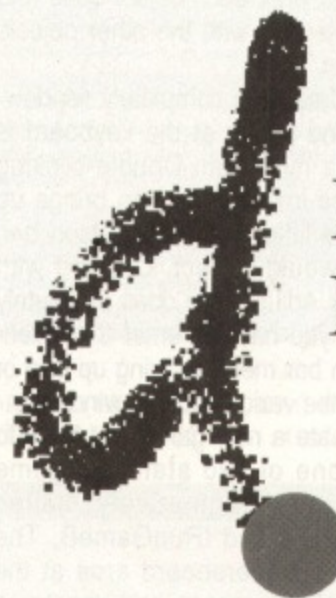
School _____

Address _____

Postcode _____

We will open a credit
account for schools.
Private customers should
send full payment
including VAT, with
cheques made payable to
ESM. Telephone orders
pay by Access or Visa
0945 63441.

Send to: ESM, Dept 94, Duke Street, Wisbech, Cambs PE13 2AE



Desktop Folio

Has arrived!

Aid for Kuwait

THE director of The Advisory Unit for Microtechnology in Education, Mike Aston, is playing a major role in helping Kuwaiti authorities rebuild their education system which was destroyed by the Iraqi invasion.

He is one of a team of educationalists currently in Kuwait City to assess the problems, help in the initial regeneration of the country's schools and to come up with a five year plan for the future.

Mike's brief is to mastermind the development of Kuwait's information technology resources. Other team members will deal with teacher training and general curriculum matters.

Until August, 1990, Kuwaiti educationalists led the way in introducing computer education into schools in the Gulf.

Their computer education resources were completely destroyed in the Iraqi invasion and they now face the daunting task of starting from scratch.

Just before the invasion the first two year phase of introducing computing into the Kuwaiti curriculum had been completed and a National Project

Centre opened in Kuwait City. It housed a collection of British software and other computer education resources together with an in-service teacher training facility.

"During the Iraqi occupation, all Kuwaiti schools were ransacked and their computers either smashed or loaded into lorries and taken to Baghdad - in many cases mistaken for TV sets", Mike told *The Micro User*.

"The National Project Centre was completely gutted and all resources plundered. Computers worth just under £1 million were taken from the schools.

"Desks and other equipment were piled up and set on fire but fortunately the fabric of the buildings was left largely intact. The Kuwaitis hope to have children back in the schools by September.

"They want to produce a scheme for the next five years, to put computers firmly on their education map both for schools and for the university".

Mike is well suited for helping in the task because he was a member of the international team which originally evaluated the National Project Centre scheme before the invasion.

"The last time I was there was pre-

Update

invasion", he said, shortly before flying out. "It will no doubt be a shock to see the devastation which has happened since. The job will also be less pleasant because it is a bit of a "no go" month when even if the weather is normal, temperatures are likely to be 130 degrees. We may be glad of the smoke from burning oil rigs which may blot out some of the sun".

Based in Hatfield and part of Hertfordshire County Council, the Advisory Unit gives technical support to teachers using computers in

schools. It has worked with the British Council in many countries overseas, helping them to develop their computer education facilities.

Children's book

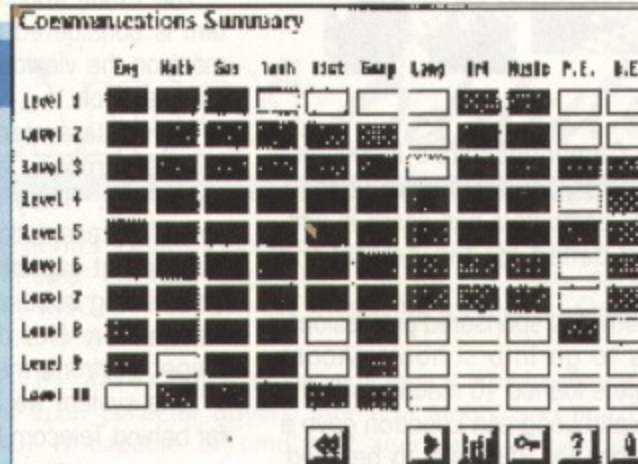
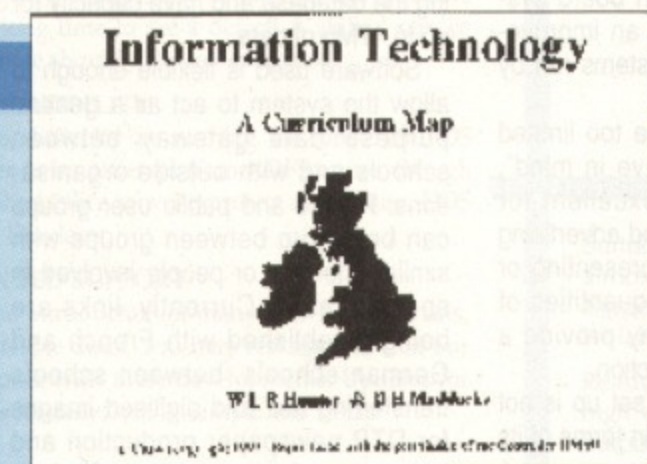
ARCHIMEDES and BBC A3000 computers have combined with Longman Logotron's PenDown word processor and the talents of a class of 12-year-olds to produce a 64 page anthology

Integrating IT

WHILE the National Curriculum lays down precise specifics for its 10 statutory subjects, complications creep in with cross-curricular skills such as Information Technology.

IT must be delivered as an integral part of all the statutory subjects to pupils aged from 5 to 16 and an Archimedes-based program has now been produced to make the task easier for teachers.

!MapIT from HM Associates (091-384 1874) is a Genesis II application which acts as a quick reference point allowing teachers to examine the contribution that IT can make, not only to individual subjects but also on a whole school



basis. In !MapIT, HM Associates have produced their own interpretation of how IT should be integrated and have based it around an easily understood colour coding system.

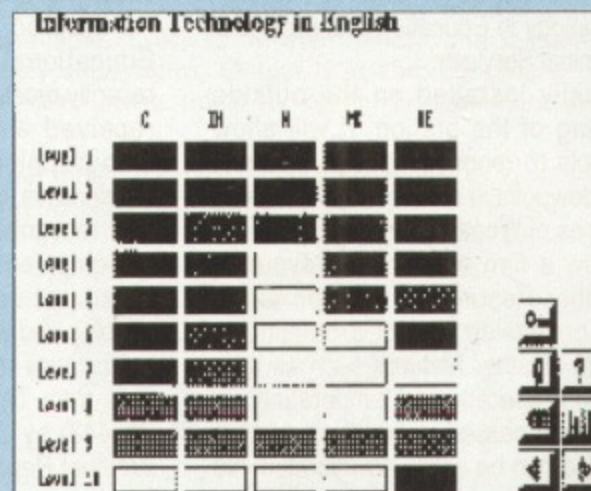
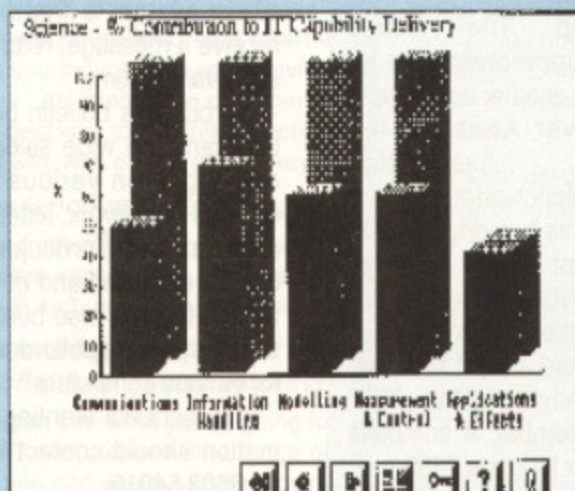
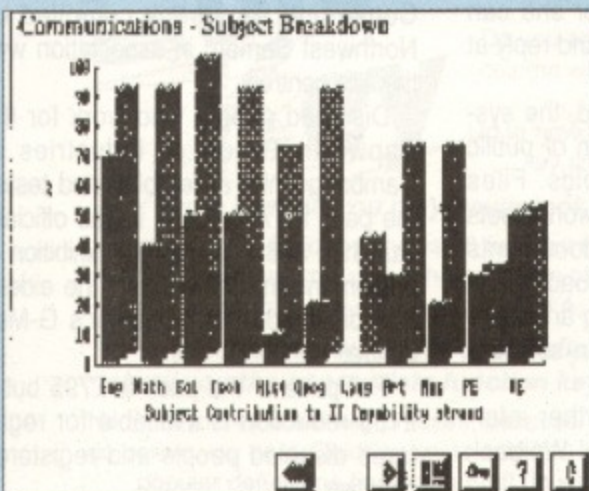
But they have also included the facility for teachers to change the

analysis to suit their own schools.

!MapIT runs under the Genesis II browser which is distributed with it, so Genesis II is not needed to make use of the application. It is needed, however, for teachers who want to make any significant alterations.

It will run on a 1Mb Archimedes but the developers recommend a 2Mb system for more effective results.

!MapIT costs £32 but special prices can be negotiated for bulk purchases and LEA licences.





of stories and other writing.

Called Lit by Keyboard, it is one of the results of an unusual "writing week" project held for year eight pupils at Parkside Community College in Cambridge which brought writers, children and educationalists in close contact with the computer industry.

Some children wrote stories for younger children and created dossiers about them in German. Others created campaign material connected with threats to the global environment.

The idea was formed when pupils gathered material for their stories but wanted them to look more like real

Lit by Keyboard



books. Cambridgeshire's inspectors and advisory teachers were keen to see how computers can assist in writing and called for the help of the industry.

Eastern Arts sponsored professional writers to go into schools, Acorn Computers loaned 10 machines to the college and Longman Logotron gave a site licence for PenDown to be used.

They also provided professional design advice and paid for the complete production costs of Lit By Keyboard.

After all the material was prepared, a small editorial group of pupils edited the word processed files into the book which is an excellent example of what children can produce when given the proper resources.

School Email link

THE educational benefits of electronic mail are being investigated with a new system believed to be the first of its kind in a British school.

Norfolk School-Net runs on an Archimedes computer using ARCbbs software at Eaton School. It provides an online, inter-school link between all Norfolk schools and there are plans to extend it further afield.

"Any school in the country interested in on-line communications is welcome to log on and become involved in this investigation of the educational possibilities of such a system", said its originator, Paul Welbank of Eaton School's IT Department. "We would also welcome calls from schools in Europe and beyond".

The Email and bulletin board system is considered to be an improvement on the viewdata systems run by many schools.

"Viewdata systems are too limited for the purposes we have in mind", said Paul. "They are excellent for colourful presentations and advertising but are not capable of presenting or transferring substantial quantities of information. Nor do they provide a proper electronic mail function."

"The system we have set up is not far behind Telecom Gold in terms of its

IoM Workshop

THE prestigious Rutherford Appleton Laboratory have now issued more details on their IoM Workshop recently announced in *The Micro User*.

To be held at the University of Oxford Computer Teaching Centre from July 7 to 9, it will give delegates in the education field an insight into new teaching software, paying particular attention to programs for BBC Micros.

The education level is sixth form in secondary schools and early years of

tertiary education, whether in a college of further or higher education, a polytechnic or a university.

"It will be useful for science teachers and area science advisors, particularly those looking for ideas on the teaching of the National Curriculum", said organiser Kate Crennell. "The recently IoM Schools Disc will be available for exploration".

Accommodation is available and delegates wishing to attend the workshop can ring 0235 821900, extension 6397 for further details.

Email facilities and is capable of handling hundreds of users around the county's schools. It is also open to the general public and has several regular users in the local area".

One of the main innovations of School-Net (also known as Star-Net) is the inclusion of an on-line database from which pupils can read or capture textual information on a variety of subjects.

They can also make their own contributions as information providers. Organisers are in the process of building the database and have capacity for up to 47Mb of data.

Software used is flexible enough to allow the system to act as a general purpose data gateway between schools and with outside organisations. Private and public user groups can be set up between groups with similar interests or people involved in specific tasks. Currently, links are being established with French and German schools, between schools transferring text and digitised images for DTP newspaper production and between primary and secondary schools.

Access to the system is by the normal Email method of computer, modem and telephone line. The facility is of particular use for contact with or between teachers.

As Paul says: "Try ringing a teacher during the school day! The advantage of our system is that he or she can receive a message, read it and reply at a convenient time".

Through its bulletin board, the system carries a wide selection of public messages on various topics. Files such as homework, letters, worksheets and National Curriculum documents can be uploaded and downloaded and School-Net are also building an extensive library of public domain software for various computers.

Any schools wanting further information should contact Paul Welbank on 0603 54015.

Helping hand

PEOPLE with learning difficulties and disabilities will reap the benefits of a new Special Access Pack launched by Acorn Computers for their BBC A3000 – now the fourth best selling computer in the UK.

Intended as a foundation system for the disabled, it includes an A3000 fitted with an Acorn serial upgrade as well as a Morley user/analogue upgrade for alternative devices such as Concept Keyboards, touchscreens and switches.

With an optional monitor and stand available, the pack also contains a utilities disc with a number of programs for users with visual or motor-related impairments.

One program emulates the movements of a computer mouse using the numeric keypad; a switch access program allows users with motor difficulties to type in data via a special switch input.

A screen window can be set to various magnification sizes, allowing users to set the size of screen print to suit themselves. A further program allows the input of text characters from a selection panel and there is also a flashing carat with a homing device to make it easier to locate the carat within a document. The pack comes with an overview booklet and a Special Needs Computing Handbook compiled by Northwest Semerc in association with the Ace centres.

Disabled people who work for the Papworth Group of Industries in Cambridgeshire assembled and tested the pack for Acorn and it was officially launched at the Naidex 91 exhibition of equipment and services for the elderly and disabled at Manchester's G-Mex centre.

Full price of the pack is £795 but a £100 reduction is available for registered disabled people and registered charities.

Weather module

A NEW module is being developed for Weather Reporter, the popular automatic weather station produced jointly by the Advisory Unit for Microtechnology in Education and Aardware Technical Services.

Easily installed on the outside cabling of the station, it will allow schools to record pressure, humidity and dewpoint in addition to the existing facilities of Weather Reporter.

Now a firm educational favourite, Weather Reporter is fitted on to the roof or outside wall of a building to record weather features such as rainfall, wind direction and temperature.

Data is passed to an inbuilt processor and can be easily downloaded into

a BBC Micro or Archimedes. Software included in the kit allows it to be output in a variety of forms for classroom analysis.

Featured in The Times Educational Supplement, the kit recently received another accolade. It received a Silver Award at the Geographical Association Conference in Manchester where it was recognised as "an original item of equipment that should make an important contribution to remote sensing and weather interpretation".

The new module should be available from The Advisory Unit (0707 265443) by September. A complete Weather Reporter kit costs £299.

**Summer
price cuts!**
See page 31

ideA

The *ideA* range of hard disc upgrades is being welcomed as the best way forward for Archimedes and A3000 users. "IDE is the small-computer drive standard for the future," says RISC User. "ST506 is on the way out; SCSI has only a limited future in the small drive market."

PERFORMANCE

IDE is the only true 16-bit hard disc system currently available for Archimedes computers. All data transfers are 16-bit all the way from the disc, through the interface, to the computer (except that the A3000 internal interface has an 8-bit link to the computer).

FLEXIBILITY

An *ideA* system can turn your A3000 into a 20, 40 or 60 Mb workstation with no external attachments, using hard discs which sleep quietly during periods of inactivity.

The *ideA* system caters for two low profile hard discs in the same internal or external housing, allowing you to build up your capacity in easy stages without wasting money.

Then there's the *ideA* 'hard card' option - a 2½-inch hard disc on a standard podule.

VALUE

We think *ideA* upgrades offer the best value for your money, and we aim to keep it that way. Advanced IDE disc technology means simpler, cheaper, more reliable interfaces. Manufacturers' prices for hard discs fall gradually, and we pass these savings on to you as soon as we can.

Our upgrade prices include controller cards and fans where needed. Our disc cases are of metal construction.

RELIABILITY

The first *ideA* customers have been using the system successfully since last year. The A3000 internal hard disc is particularly reliable - not one has had to be returned to us.

The latest IDE discs are ruggedly designed with lap-top and portable computers in mind. You'll wait a long time to see a defect! A skilled service team is ready to back up our guarantee should the need ever arise.

COMPATIBILITY

The Micro User reported "no difficulty in running all fully RISC OS applications". Our IDE filing system is no different from ADFS in use, though it has a few extra features such as the facility to write-protect a hard disc. DOS partitions can be created for the PC Emulator.

CONTINUED SUPPORT

The coming months will see the introduction of many new IDE products, including tape streamers and removable discs. You may rest assured that our software and hardware will keep pace with these developments. Updates for existing users, if they ever become necessary, will be simple and cheap.

"A beautiful solution," said BBC Acorn User. Study our special summer price list on page 31, and let us solve your storage problems too.

Be in at the beginning!

Quic Key

Do you have trouble remembering what twelve function keys do, with and without Shift and Ctrl, in twenty different applications?

Do you enjoy watching PipeDream insert a column when you thought you were saving an Impression document?

Up to now the best way to organise function key strips was with one of our Arckeyes.

From now on you may never look at a function key strip again.

QuicKey shows 36 function key combinations on your screen. All at the same time, using the minimum of screen space, even in mode 12. You can choose any of these (plus Ctrl A, Ctrl B etc) using only the mouse.

QuicKey knows which application is waiting for input and will show you the appropriate function key definitions - automatically!

No more mis-directed key presses, because you can see what you're going to do before you do it. QuicKey costs only £10 + VAT and comes with a range of popular definitions (including Edit), to which you can easily add your own.

You only have to lift your finger!

Other products too good to miss!

See page 31 for full price list



TWO (Task and Window Organiser)

Do you wish you could start applications, display directories, and open files all in one go? With TWO you can.

Do you wish your pupils were able to start work without understanding the Desktop? With TWO they will be.

Do you wish there was an easy way to tidy up your screen and find that buried window? With TWO there is.

TWO is far more than a 'sticky backdrop'. Its easy-to-use features make the Desktop a friendlier environment and will really save you time.

DrawBender

DrawBender distorts Draw files to follow a shape of your choice. A useful addition or inexpensive alternative to other graphics software, supplied with these ~~three~~ decorative fonts.

DrawBender is simple and enjoyable to use, with no complex menu structures. The example above uses DrawBender with FontFX - the two make ideal companions.

AnDi Oddule

Baildon Electronics Oddules open the way to cheap, flexible and almost unlimited external expansion via the I²C bus already supported by RISC OS. Baildon are producing a range of Oddules which may be daisy-chained.

Ready now is the **AnDi** Oddule. It has eight digital I/O channels with high current open collector drivers, four A/D inputs, and one D/A output. AnDi is capable of emulating user and joystick ports, allowing ADVAL operation from BASIC, and the use of Concept Keyboards and analogue or digital joysticks.

Cross-32 Meta-Assembler

This professional table-based cross-assembler works with over 50 target processors (including ARM2 and 3), and has been used for some time on PCs. A RISC OS Desktop version by Baildon Electronics is now available. Cross-32 is user-friendly and supports conditional assembly and macros. Output is in absolute binary, or Intel or Motorola Hex formats (ideal for eprom programmers and emulators).

You can modify the tables supplied or add new ones to cater for new processors and opcodes.

Ian Copestake Software

TMU8, 10 Frost drive, WIRRAL, Merseyside, England, L614XL

Fax 051-632 3434 Tel 051-632 1234



Please Note Our New Telephone Number

Tel: (0772) 623000 (4 Lines)

Fax: (0772) 622917

Orion will not charge extra if you wish to pay by credit card



Acorn Computers

BBC Master 128K	£399.00
BBC A3000	£599.00
BBC A3000 Learning Curve	£680.00
Archimedes 410/1	£1099.00
Archimedes 420/1 Learning Curve	£1267.23
A440/1 (47 Mb HD, 4Mb Ram)	£1699.00
A540 (100Mb HD, 4Mb Ram)	£2995.00

0% Finance available over 12 months
On A3000 LC & A420/1 LC
with or without Acorn Monitor
Promotion Ends 30th June 1991

We will try to match or beat any price advertised in this magazine, please phone for best prices.

We operate the Acorn Education and Teachers Phase IV Purchase Schemes.

Special Offer when purchased with computer!!

A3000 - £35.00 discount off subsequent items bought with computer, plus either 2Mb Upgrade F.O.C., 4Mb for £100.00
A410/1 - 20Mb HD + Upgraded to 4Mb F.O.C.
A420/1 - 42Mb HD + Upgraded to 4Mb F.O.C.
A440/1 - ARM 3 F.O.C.
A540 - 4Mb Ram Upgrade F.O.C.

*This offer cannot be used in conjunction with any other offer.

Monitors

Acorn Colour Monitor (AKF17)	£200.00
Philips CM8833 II Colour Monitor	£209.00
Microvitec CUB 3000	£199.00
Taxan MultiVision 775 (0.28 d.p.)	£389.00
Taxan MultiVision 795A (0.26 d.p.)	£469.00
(FST Black Trinitron Anti-Glare Tube)	
Taxan Viking II (19" Mono, MS)	£749.00

Cables

Arc to Monitor + Audio 2m (Not 8833 II)	£8.65
Arc to 8833 Mk II Monitor Cable + Audio	£8.65
Arc Parallel Printer Cable 1.8m	£5.25
Arc Parallel Printer Cable 3m	£10.40
Arc to BBC Serial Cable 2m	£6.95
Arc Keyboard Extension Cable 2m	£7.75
Arc Mouse Extension Cable 2m	£7.75
Surge Protector Plug	£10.49
4 Gang Protector Socket	£17.95
Arc Keyboard Replacement Cable	£ 6.95
Arc Mouse Replace. Cable (State Type)	£ 6.95

A400/1 Accessories

Items marked with an * can be used on A300/540	
1Mb Ram Upgrade	£45.00
2Mb Ram Upgrade	£85.00
3Mb Ram Upgrade	£120.00
Above memory fitted for £10.00	
Ethernet Card	£219.00*
Acorn SCSI Card	£239.00*
Arm 3 Upgrade	£399.00
Floating Point Rom (AKA20)	£469.00
Com. Con. Scan-Light Mk II A4	£369.00*
Com. Con. Sheet Feeder for above	£149.00*
Com. Con. Scan-Light + Feeder	£454.00*
Com. Con. Scan-Light Junior	£174.00*
Acorn Midi Expansion card	£65.00*
I/O Expansion Card	£79.00*
Midi Upgrade for above	£27.00*
Acorn Midi Expansion Card	£65.00*
Lingenuity SCSI Card	£169.00*
VIDC Enhancer	£27.00
Econet Module	£48.00*
Beebug Disc Buffer	£29.00

A3000 Accessories

Orion 1 Mb Ram Upgrade	£65.00
(Expandable to 4Mb using only 8 chips)	
Orion 3 Mb Ram Upgrade	£169.00
Upgrade from 2Mb to 4Mb	£149.00
Acorn Monitor Stand	£27.00
Serial Upgrade	£18.00
User Port/Midi Upgrade	£46.00
Morley Analogue/User Port	£68.00
PRES Disc Buffer Board	£48.95
PRES DFS Reader (A3K12)	£19.95
PRES Monitor Stand	£24.95
PRES System Housing	£69.50
3 1/2" Drive for PRES System Housing	£75.00
5 1/4" Drive for PRES System Housing	£99.95
Lingenuity SCSI Card	£149.00
Wild Vision External Expansion	£129.00
CC Scanlight Junior A3000	£174.00
CC Scanlight A4 Mk II A3000	£369.00
CC Sheetfeeder for A4 Scanner	£149.00
CC Scanlight A4 + Sheetfeeder	£454.00
RTFM Joystick Interface + S/W Disk	£34.95
Serial Port Joystick Interface	£18.95
Voltmace DeltaCat Joystick	£26.00

Spares

Orion can supply spares for any machine Acorn have produced mostly from stock. With next day delivery available or you can take advantage of our in house repair service. We can also supply parts for other computers and printers.

Books (No Vat)

Programmers Reference Manuals	£77.00
BASIC V Guide	£19.45
A3000 Technical Guide	£28.95
A540 Technical Guide	£65.00
Basic V: A Dabhand Guide	£9.95
Archimedes First Steps	£9.95
Archimedes Assembly Language	£14.95
Archimedes Operating System	£14.95
C: A Dabhand Guide	£14.95
Budget DTP: A Dabhand Guide	NEW £12.95

Extra Manuals

Acorn D.T.P.	£10.00
1st Word Plus Release 2	£10.00
ANSI C Release 3	£20.00

Orion - TV Modulator

Near Monitor Quality Picture
Improved Sound through the television
Integral Mains Adapter (One Box)
No Podule expansion slot is taken
Suitable for A3000 & A400 Series
Only £65.00 - Bought with computer £49.00

Printers

C.C. Qume Laser Direct	£859.00
C.C. 600 DPI Expansion Card	£309.00
Canon LBP4 Laser for above	£699.00
C.C. 600 DPI LBP8 Laser Direct	£1319.00
Canon Bubblejet BJ300	£399.00
Canon Bubblejet BJ330	£449.00
Canon Bubblejet BJ10e	£269.00
Star LC10	£125.00
Star LC 200 Colour	£175.00
Star LC24-200 Mono	£205.00
Star LC24-200 Colour	£249.00
Star LC24-10	£170.00
Citizen 120D+ (Parallel)	£115.00
Citizen 124D	£165.00
Citizen Swift 9	£162.00
Citizen Swift 24	£225.00
Citizen Swift 24x (132 Column)	£329.00
Panasonic KX-P1081	£129.00
Panasonic KX-P1180	£138.00
Panasonic KX-P1123	£172.00
Panasonic KX-P1124i	£239.00

Orion Hard Drives

Orion SCSI drives are high speed, typically 750K - 1200K per second, they are extremely quiet, and the external drives come in a small case unlike those of some of our competitors. Price includes SCSI expansion card

ST506 Internal (A410)

20Mb Drive	£139.00
42Mb CMS Drive	£249.00
47Mb Rodime Drive (Same as 440/1)	£299.00

SCSI Internal (Suitable for A300 & A400)

40/45 Mb Drive	£369.00
75/80 Mb Drive	£499.00
105 Mb Drive	£549.00
175 Mb Drive	£949.00

SCSI External (Specify A3000 or A400)

40/45 Mb Drive	£429.00
75/80 Mb Drive	£599.00
105 Mb Drive	£799.00
175 Mb Drive	£1049.00
345 Mb Drive	£1699.00
SyQuest 42Mb Removable Drive	£699.00
Larger drives available on request please phone	

Bulk Diskettes

All our Disks come complete with labels etc. and are 100% certified error free. In the event that a disk fails it will be replaced immediately.



5 1/4

DS/DD 96tpi

Quantity
25 50 100 250 500 1000

N/A £14.00 £26.00 £60.00 £115.00 £210.00



3 1/2

MF/2DD 1Meg
Sony Bulk

£9.75 £19.50 £34.00 £77.50 £145.00 £270.00
£12.50 £25.00 £45.00 £106.25 £200.00 £375.00

Discounts available for trade orders - Phone for prices

No Carriage Charges
(in mainland UK)

Opening Hours
Mon-Sat 9am - 5.00pm

Acorn Qualified Dealer
Acorn Component Level Service Centre
Acorn Econet Installation & Service Centre

Acorn
The choice of experience.

Ribbons (Compatible)

Amstrad DMP2000/3160	£2.55
Brother M1009,M1109	£2.95
Brother M1509	£5.95
Brother M1724	£5.95
Brother HR10,15,20,25,35 Fabric	£3.25
Brother HR10,15,20,25,35 Multistrike	£4.65
Canon PW1080A	£3.85
Citizen 120D/Swift 24	£3.05
Epson LX80,86	£2.25
Epson FX80,MX80,LX800,LX850	£2.95
Epson LQ500,LQ800,LQ850	£3.00
Epson MX100	£3.00
Epson LQ1000,LQ1050,FX1000	£3.50
Epson LQ2500,LQ2550	£3.55
Epson EX800	£4.45
Panasonic KXP1081,1090,1080	£3.65
Panasonic KXP1124	£3.55
Seikosha GP100	£3.20
Star LC10	£2.55
Star LC24/10	£3.95

Ribbons (Branded)

Amstrad DMP2000/3160	£5.50
Canon BJ130 Bubblejet	£10.00
Canon BJ10e	£16.29
Canon BJ300	£12.00
Citizen 120D	£3.25
Citizen Swift 24 Black	£3.95
Citizen Swift 24 Colour	£13.75
Citizen Swift 24x Black	£8.00
Citizen Swift 24x Colour	£14.75
Colourjet 132/Canon PJ1080 Black	£8.60
Colourjet 132/Canon PJ1080 Colour	£14.60
Epson LX80/86	£3.75
Epson FX80,MX80,LX800	£4.50
Epson LQ400,550 Fabric	£5.25
Epson MX100,FX1000,FX1050	£5.75
Epson EX800/1000 Black	£7.25
HP Paintjet Black	£21.00
HP Paintjet Colour	£26.00
HP Deskjet + (Permanent Ink)	£13.20
Panasonic KXP145	£7.50
Panasonic KXP140	£9.35
Panasonic KXP115	£7.50
Star LC10	£3.80
Star LC10 4 Colour	£5.75
Star LC200 Black	£5.00
Star LC200 Colour	£9.75
Star LC24/10 / LC24 200 Black	£4.75
Star LC24 200 Colour	£11.50
Canon LBP4 Toner Cartridge	£59.00
Canon LBP8 Toner Cartridge	£69.00
Qume Crystal Print Toner Set	£67.00
Qume Crystal Print Drum Set	£89.00

Software

DTP

Impression II (CC)	£145.00
Impression Junior (CC)	£74.00
Tempest D.T.P. (Clares)	£99.00
Ovation D.T.P. (Beebug)	£99.00
Desktop Folio (ESM)	NEW £79.00

Spreadsheets

SigmaSheet (Minerva)	£39.95
Schema (Clares)	£99.00

WordProcessors

1st Word Plus Release 2 (Acorn)	£69.95
EasiWord (Minerva)	£31.95
Protext 5.0 (Armor)	£119.00

Integrated Packages

Pipedream 3 (Colton)	£119.00
Desk Top Office (Minerva)	£99.00

Databases

Datavision (Silicon Vision)	£127.45
Flexifile (Minerva)	£119.00
Multistore (Minerva)	£199.00
Genesis II (Oak Solutions)	£119.00
Knowledge Organiser (Clares)	£42.00

Accounting Software

Financial Accountant (S. Vision)	£233.75
Home Accounts (Minerva)	£39.45
Business Accounts (Minerva)	£325.00
Office Tools (S. Vision)	£318.75
Shareholder (S. Vision)	£165.75
MicroTrader Accounts	£199.00
MicroTrader Stock Control	£75.00

Languages

ANSI C Release 3 (Acorn)	£125.00
RiscForth (S. Vision)	£127.45

Music

Armadeus (Clares)	£61.00
Rhapsody (Clares)	£39.95
Tracker (Serial Port)	£38.95

Utilities

Arc DFS (Dabs Press)	£22.95
Dot Matrix Colour Printer Driver (Ace)	£13.00

Education

Maths Pack (HS Software)	£11.95
Reading Pack (HS Software)	£15.75
Bumper Pack II (HS Software)	£15.75

Graphics Manipulation

Poster + Fonts (4Mation)	£79.00
Render Bender (Clares)	£58.00
Solids Render (S. Vision)	£127.45

CAD

ARC-PCB (S. Vision)	£165.75
PCB Professional (S. Vision)	£318.75
SolidCAD (S. Vision)	£127.45

Games

Arcpinball (Shibumi)	£18.00
ARCTiculate (4th Dim.)	NEW £18.00
Ballarena (Systeme)	£14.75
Blowpipe (Eclipse)	£14.45
Boogie Buggy (4th Dim.)	NEW £18.00
Chess (Micropower)	NEW £14.45
Chocks Away Version II (4th Dim.)	£18.00
Chocks Away Extra Missions	NEW £14.45
Chocks Away Compendium	NEW £28.00
Drop Ship (4th Dim.)	£14.45
E - Type (4th Dim.)	£14.45
E - Type 100 Miles (4th Dim.)	£12.75
E - Type Designer (4th Dim.)	£12.75
Gumshoes (4th Dim.)	NEW £18.00
Holed Out (4th Dim.)	£14.45
Holed Out Designer (4th Dim.)	£14.45
Holed Out Vol. 1 or 2 (4th Dim.)	£12.75
Hostages (Superior)	£14.45
Iron Lord (Cygnus)	£14.45
Inertia (4th Dim.)	£14.45
Interdictor 2 (Clares)	£26.00
Mad Professor Mariarti (Krisalis)	£14.45
Manchester Utd. (Krisalis)	£19.50
Master Break (Superior)	£14.45
Microdrive 3D USA Courses	£14.75
Mig-29 Fulcrum (Domark)	NEW £29.00
Minipack 5 (C.I.S.)	£23.95
Nevryon (4th Dim.)	£14.45
No Excuses (Arcana)	NEW £14.45
The Olympics (4th Dim.)	£14.45
Pipemania (Empire)	£16.45
Powerband V. II (4th Dim.)	£18.00
The Real McCoy (4th Dim.)	£21.50
The Real McCoy 2 (4th Dim.)	NEW £21.50
Turtles Tour the World (E. Crayon)	£14.45
Twin World (Cygnus)	£14.45
Speech (Superior)	NEW £14.45
Superior Golf (Superior)	£14.45
Square Route (Computereyes)	£14.45
Wimp Game (4th Dim.)	£14.45
World Champ. Boxing Man. (Krisalis)	£19.50
WorldScape (Eclipse)	£14.45

Graphics - Art

Artisan II (Clares)	£49.95
Pro Artisan (Clares)	£79.00
Atelier (Minerva)	£79.00
The Clipart Collection Vol. 1	NEW £19.95

Graphics - Presentation

Hotlink Presenter(Lingenuity)	£46.95
Graphbox (Minerva)	£62.45

Misc

PC-Emulator (Acorn)	£94.00
Investigator II (Serial Port)	NEW £22.95

Instant Finance available up to £1000

Purchases can be made at our premises and instant credit is available with Lombard Tricity Finance Ltd (Subject to Status). Finance is over 36 months on any purchase over £100 (APR 36.8%*).

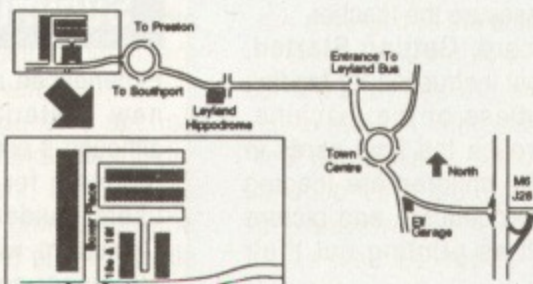
10% Deposit is required.

Identification will be required, ie Driving Licence, Bank Card or Credit Cards.

Written details are available upon request.

* Subject to change without notice

Where to find us!



All Prices Exclude VAT.

Please add VAT @ 17.5% to all prices

Dept. MU7, Units 18e & 18f Boxer Place,
Moss Side Employment Centre, Leyland,
Preston, PR5 3QL.

Callers Most Welcome

We are situated 3 miles from M6 J28. All offers subject to availability. Government & Educational Orders Welcome.

Next Working Day Delivery in UK - £5.50 Ex. Vat
Carriage on Export Orders charged at cost.

Minimum Order Value £10.00
Minimum Educational Order Value £15.00

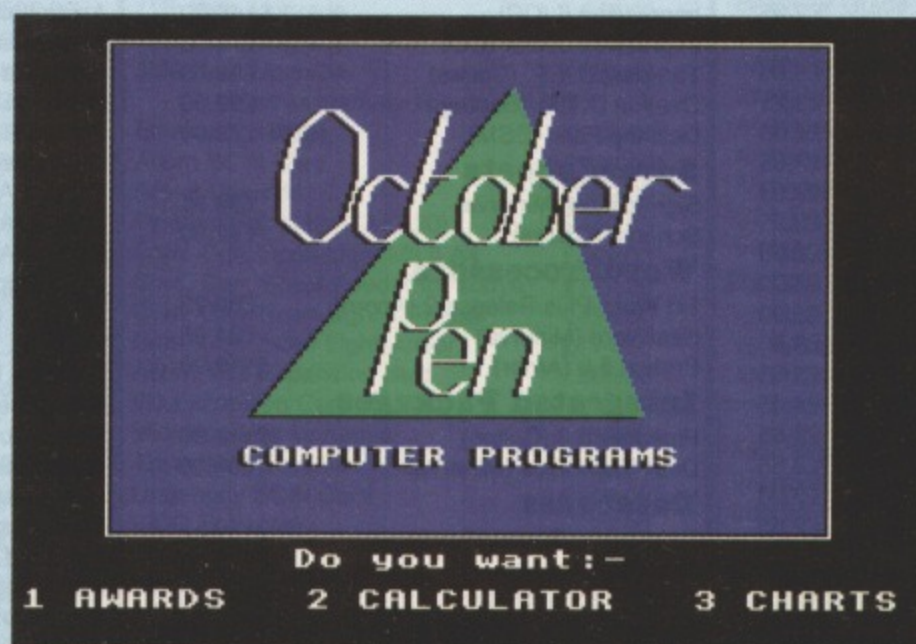
75% of all goods despatched within 24 hours, subject to stock levels.



*John Clemence
puts two
updated software
packages
through their
paces*

Product: AAA ESSO Five Star Award
Price: £20
Product: IBM Ten Step Award
Price: £17
Supplier: October Pen, Little Hyden Lane, Clanfield, Hampshire PO8 0RU.
Tel: 0705 592521
Requirements: BBC A3000 or Archimedes range

Limbering



TWO major schools athletics schemes are the IBM Ten Step for primary children and the Amateur Athletic Association ESSO Five Star Award Scheme for secondary. BBC Micro programs to support virtually all the administration and recording needs of these schemes have been available since 1986, and now the equivalent Archimedes packages have been released.

These programs will hold records for up to 2,000 pupils as well as the software on a single working copy of the program disk.

This contributes significantly to the user friendliness of the program. Indeed the whole thing is very easy to use for those totally unfamiliar with computers as they are menu-driven with clear instructions given in the manuals.

If you are familiar with either scheme the software will virtually explain itself from the menu headings. Do check with the manuals first though, as there are a couple of annoying inconsistencies.

For instance, if you choose a number from a menu you'll have to follow this by pressing Return, yet some questions require only a single letter press and no Return.

These programs may not be state of the art, and mostly work in Mode 7 with some rather untidy screens from time to time, but they are functional and easy to use. I would have liked to have seen a safeguard or warning against creating a new file with the same name as an existing one.

I also found it a shame that there is no way to extend the size of the class once the original class size has been defined.

This is a common problem with databases and one easily avoided by making sure that you always start with a class size bigger than you think you need.

Each time you create a new file you're told how much space it'll need on disk as well as how much is available. A nice touch this, although the figures can appear a little confusing.

Both programs let you see what files there are though you can't access the list when you are trying to load a file. Fortunately the rou-

Easy access to turtle power

Product: Logo Activity Sheets
Price: £12 + VAT
Supplier: Longman Logotron, Dales Brewery, Gwydir Street, Cambridge CB1 2LT.
Tel: 0223 323656

Phil Tayler takes a close look at some new help for Logo users

THE introduction of Logo into schools a few years ago resulted in a few very keen users, several dabblers and a lot of confused teachers who were not at all sure how to make a start.

Many books have been published, but most failed to provide a really simple introduction to Logo's turtle graphics.

Some teachers will have made their own materials, perhaps to run courses for colleagues, but Longman Logotron have come up with a durable and low-cost alternative.

The packs consists of 21 photocopyable activity sheets with teacher's notes. It is suitable for both BBC Micro and Archimedes although a few cards are specific to one or the

other. The authors have designed the cards for children aged 10 to 14 - although I would move each of those to a year younger. If you don't photocopy these cards the fact that they are laminated makes them very durable.

The style, aimed at the novice user, is clear and consistent. The turtles are cute enough to appeal to children while the clarity of the information will reassure the teacher.

The first card, **Getting Started**, gives excellent instruction for loading Logo regardless of the machine. When they reach the final cards in the series the children are loading and saving procedures and picture files as well as printing out their work.

As they progress through the cards they will cover colours, building procedures, parameters and

using the editor. The teacher's book is superb. There are suggested extension exercises plus background information including how to integrate Logo within a thematic approach.

Links are made here with National Curriculum Attainment Targets as appropriate.

Summing up

Experienced users will find little new material in the pack, although it could still be a useful resource for children. Novice users, guided by the National Curriculum, will find these materials a very sound and effective investment. Heartily recommended.

up



times for finding individual children are more helpful, requiring only the first few letters of a name for the software to offer suitable choices for the complete name.

Entering information is very easy. You are prompted for the appropriate data and you can alter it as often as needed. The programs warn if the result you are trying to enter is too low to be recorded.

While the Ten Steps program politely points out that some results are rather optimistic, the ESSO Five Star program was positively rude in its response to very good results – a feature that I felt was unnecessary.

Both programs have scoring calculators which do not affect any of the stored data. They allow you quickly to discover what your performance is worth in terms of points.

The Five Star software was again rudely hostile when I entered my sex with a lower case rather than an upper case M. Even novice programmers can produce code that recognises m or M as being the same, and this program's error messages are unnecessarily abrupt.

Summing up

While winning no awards for software design, these programs are functional, reliable, easy to use and inexpensive. However, I do find some of the error messages objectionable. Not only are they unnecessary, but in the context of school use, unprofessional.

Marshal Anderson joins Puff and Anita Straker in the land of inscrutable wisdom

Product: Mathematics from China
Price: £17.50
Supplier: ESM, Abbeygate House,
East Road, Cambridge CB11DB.
Tel: 0223 65445
Requirements: BBC B, Master and
Puff software

MOST decent educational packages these days provide some sort of support materials. If you're lucky the documentation will also direct you to other sources, but more recently software publishers themselves have been coming up with further extension work – usually in the form of photocopy masters to buy as an extra to the software.

Some excellent examples of this are the additional support materials available for the L game, Teddy Bears' Picnic and Topoligika's extra problem disk for Giant Killer.

ESM have now produced a support book by Anita Straker to go with her Puff adventure for lower juniors. If you have the original Puff program – published as part of the MEP study packs before ESM's involvement – the program is almost identical, so this book is equally relevant to you.

The 55 page ringbound booklet's theme is maths(ish) with Eastern overtones, and the activities fit into the National Curriculum document from level two to seven.

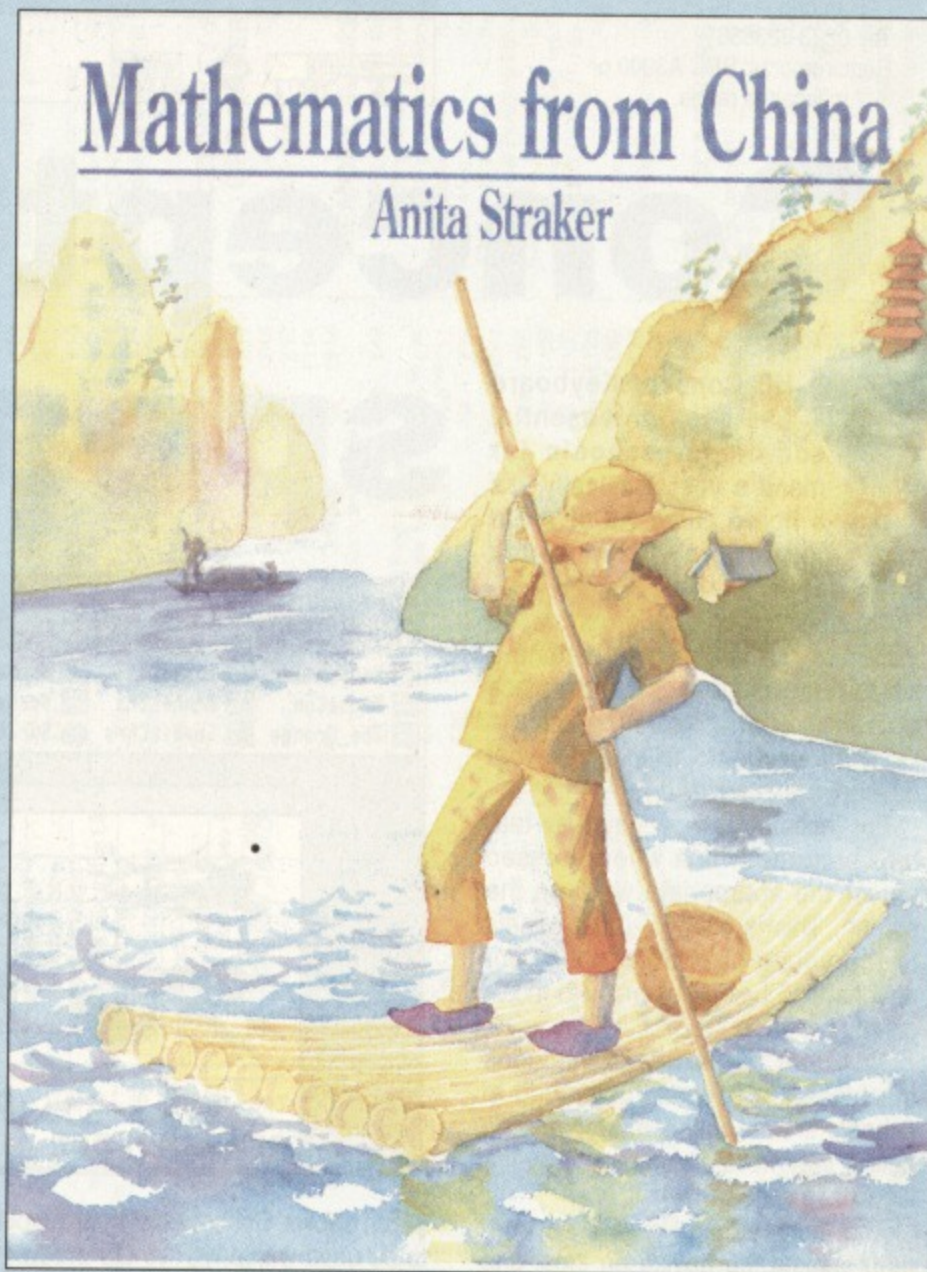
A concise introductory section goes through the worksheets under themes like numbers, the Chinese calendar, designs, games and the ubiquitous tangrams, plus a couple of recipes that you won't find at your local take-away.

You can work through either by level as they are arranged on the

Full of Eastern promise

Mathematics from China

Anita Straker



contents page, or by topic as they are arranged in the actual book.

What's noticeable is that very few of the activities are maths dressed up to make it interesting. These are real examples of numbers in action, and the tasks are mostly meaningful in themselves.

As well as poetry to read and lanterns to make, there's a short guide to creating Chinese-style paintings plus plenty of games divided into strategy and luck.

Summing up

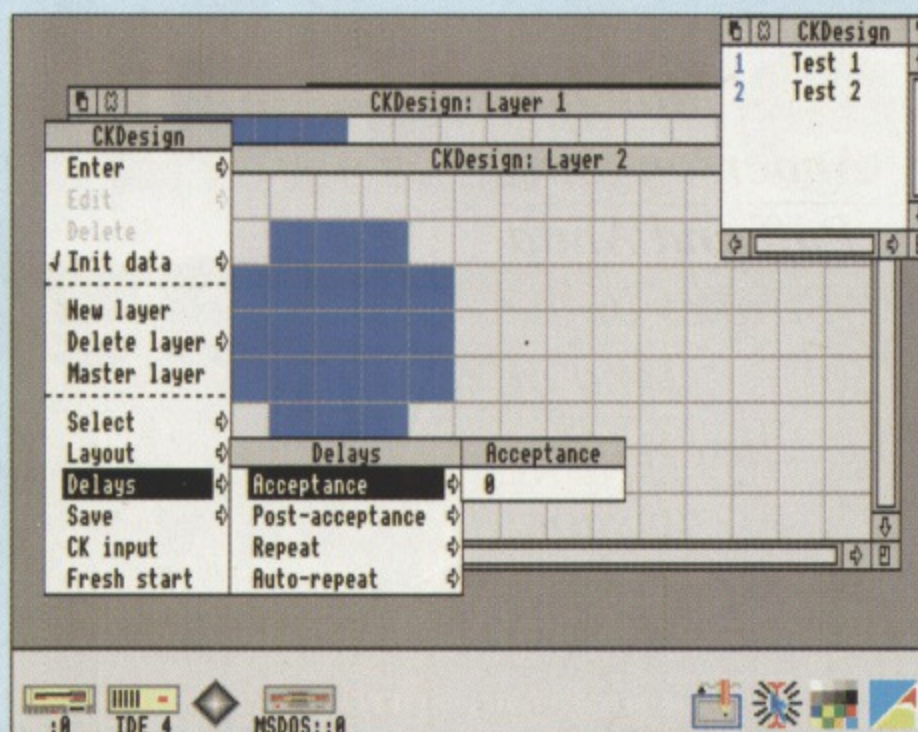
There's enough here to keep a class busy for half a term, and the material is organised so that you'll be able to apply the activities easily to a mixed ability group. The worksheets are photocopiable with clear instructions needing a minimum of preparation work before using them alongside the Puff program or without it.

It is an excellent resource for any junior classroom showing how activities on the computer are only a part of any project.



Rog Frost discovers a new way to make the most of your Concept Keyboard

Product: Concept designer
Price: £24.00 + VAT
Supplier: Longman Logotron, Dales
Brewery, Gwydir Street,
Cambridge CB1 2LJ
Tel: 0223 323656
Requirements: BBC A3000 or
Archimedes range



Conceptually speaking

THE Concept Keyboard has been an essential add-on for schools for many a year. Basically, it's a board either A3 or A4 in size containing 128 touch switches.

Each switch can be programmed individually or in blocks to perform a single task. Usually you'll find a piece of paper – an overlay – on the Concept Keyboard to indicate what different areas will do.

For instance, an overlay may feature pictures which when pressed enter the appropriate word on the screen. This is often of great benefit to the young or handicapped – or anyone who has problems with motor control.

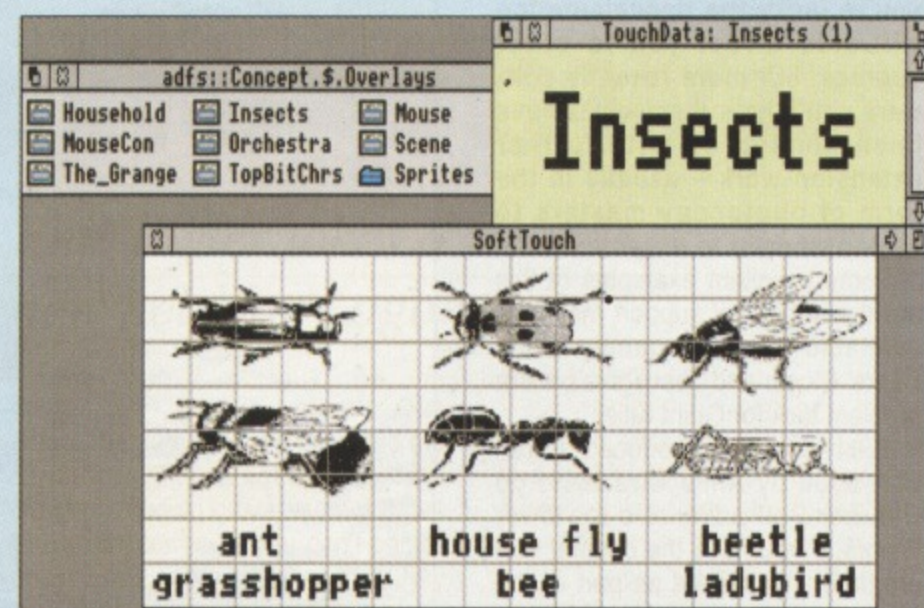
Now that the newer Archimedes machines are becoming standard in schools it was only a matter of time before they were accompanied by the Concept Keyboard.

The multi-tasking Risc OS environment makes the device an ideal one for customising many standard programs to be suitable for younger users.

The problem with using these keyboards lies in the programming. Most teachers do not have the time to bother acquiring the necessary programming skills no matter how useful they concede the keyboard to be.

Enter Longman Logotron and the Concept Designer, a suite of software aimed to make programming easy, help is also given with designing the overlays.

Heart of the system is !CKDriver



which allows Concept Keyboard input to be used with any Risc OS program that accepts text. For instance, while writing this review I use the phrase *Concept Keyboard* frequently.

Rather than typing it each time, I can include it by simply pressing the relevant part of the Concept Keyboard. No in-depth computer knowledge or skill is needed.

Programming is carried out once !CKDesign is loaded. Two windows appear onscreen, one a simple text editor and the other a representation of the touch switches.

Moving the mouse over this graphic while holding down the select

key on your mouse will mark an area of the keyboard – an individual switch or all 128.

Text can then be entered into the wordprocessor and stored on those marked switches. A wordprocessor is supplied with !CK Design, but !Edit, Pendown or most other packages will do just as well. Your only constraint is the the software must be able to save work as a plain text/Ascii file.

In addition you can also program specific keys, such as Return, Delete, Print and so on, on to the Concept Keyboard.

The manual is admirable and explanations are given in a simple

and straightforward manner.

The entire programming process is quick and simple and any teacher with the smallest amount of computer knowledge will be able to master the task in short order.

Of course people may wish to develop applications away from a Concept Keyboard. After all, you do need a user port to access the keyboard and it's unlikely that every computer will have one. !SoftTouch provides the solution by using an imitation Concept Keyboard on screen.

You access it by clicking via the mouse and this very clever idea is made even more useful by the ability to alter the display size.

The program requires a mere 16k of memory as does !CKDriver. This means that these programs can remain in memory with all but the most greedy of applications. !SoftTouch can also be used to create a sprite to fit the window. This can then be printed as a paper overlay.

The final part of the package is !TouchData, which allows you to display large text or sprite-type pictures. Rather than the text being set to another program, !TouchData takes control of the information and displays it in the fonts and sizes you have chosen.

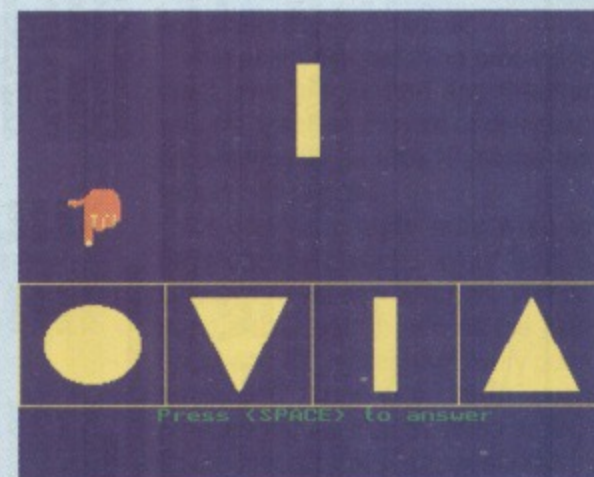
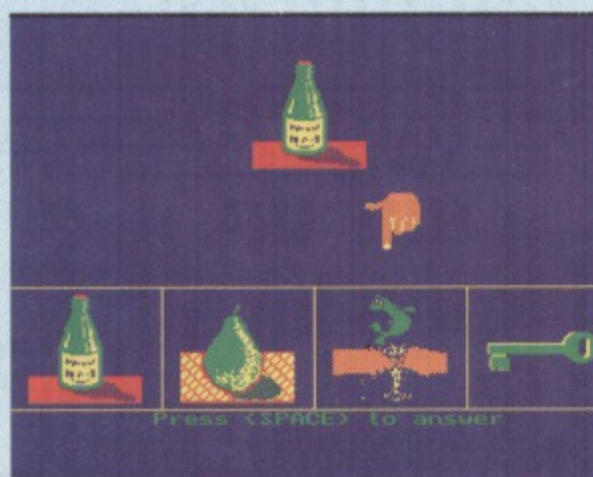
You'll find a good selection of resource files in the package. Eight sample overlays are available on disc and paper overlays in the manual. A collection of skeleton files in !Draw format contains blank overlays which can be printed out and artistic touches added.

There are two especially useful sprite overlays for !SoftTouch. One with awkward accented letters is ideal for foreign language study and another allows the Concept Keyboard to emulate the usual mouse actions. All in all a useful bank of possible uses.

In addition Logotron have included a collection of text files giving detailed help if you want to write large application programs. Aimed to encourage all programmers to follow the same protocols it's fascinating but something the ordinary user can avoid.

Summing up

A first rate package which will make it easy to use the Concept Keyboard with most good Archimedes software. It is an inexpensive and easy to use way to make the most of a Concept Keyboard. Strongly recommended.



Mixed bag of tricks

Evaluating three programs designed for the Archimedes and the PC Emulator – Marshal Anderson reports

Product: Hooray for Henrietta
Price: £24.99
Product: Henrietta's Book of Spells
Price: £24.99
Product: Mix and Match with Maggie
Price: £24.99
Supplier: Scetlander, 74 Victoria Crescent Road, Glasgow G12 9JN.
Tel: 041-357 1659
Requirements: A3000 or Archimedes range and PC Emulator

SCETLANDER have a fair range of educational software for the BBC Micro and more recently have developed a new set of programs for IBM PC-compatible machines. Three have just been tweaked so that they will operate under the PC emulator on the Archimedes.

Mix and Match works at a pre-reading level looking at some basic skills. Recognition, visual discrimination and short-term memory are dealt with in three different activities.

As you begin you meet Big Maggie who will ask your name. Maggie is a sort of Loch Ness monster and is part of the theme throughout the package.

The games are chosen from a pictorial menu using the spacebar and Return key. The first section, Two of a Kind, is sub-divided into six. In Pictures a single picture appears at the top of the screen and four along the bottom. A pointing finger moves along the bottom set and you press the spacebar when the two pictures match.

Should you choose wrongly a cross is drawn through the incorrect picture and the program indicates the correct

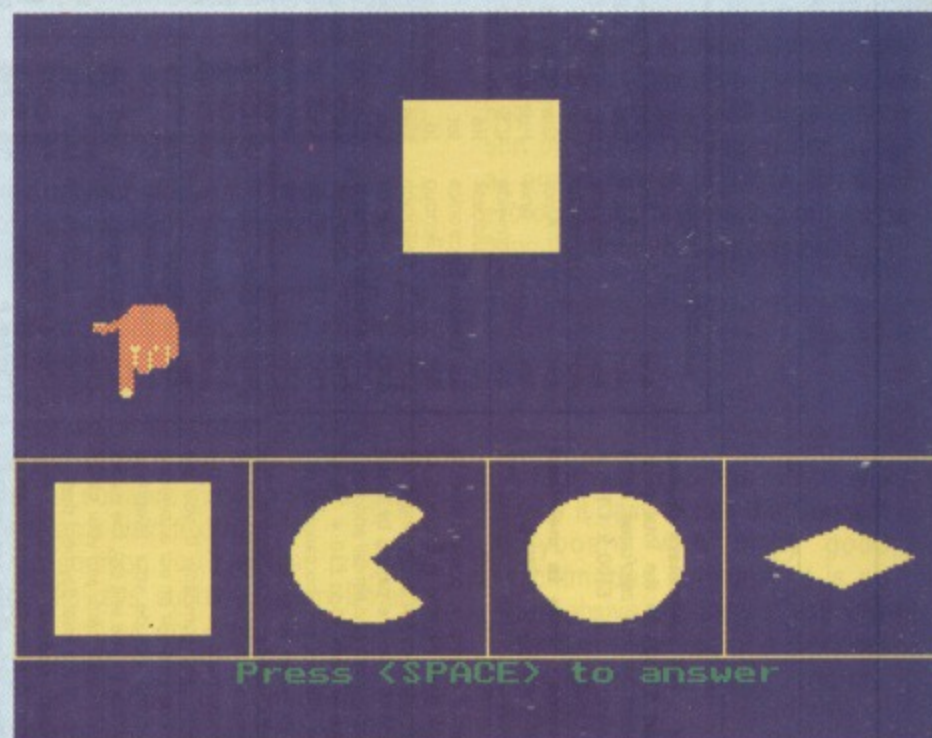
choice. You then get to try again. At the end of the game – which can run up to 10 questions – a row of smiling and sad faces appear to show how you did and where help is needed.

The procedure is identical for the options of shapes, upper and lower case letters and numbers – that is the shapes of the figures, rather than any

attempt at counting.

Next comes Same. Taking the skills a little further by showing an object in four different rotations of 90 degrees you are now looking for a more subtle match.

This is a nice extension task, but it appears third on a page of six tasks. A better position would be as the final



game in the set as there is no explanation of the games in the manual and it comes as a bit of a surprise. The four sub-options are the same again.

The next set comes under the heading of Odd One Out. The subject matter is the same as Two of a Kind – four pictures, numbers or letters are arranged at the bottom of the screen, three of which are identical.

As the finger moves over them you must choose which is the odd one out. With the numbers and pictures this is relatively easy, but the letters call for close scrutiny and this is an extremely good way to work on bad reversals. In the Same option the pictures are all the same, the difference being in the orientation of one picture.

Forget-Me-Not offers the same options and works very much like Two of a Kind except that the graphic to match is removed from the top of the screen before the four pictures and so on appear at the bottom.

The letters section is the most challenging and good recognition as well as short-term memory can be developed.

I found that the clock and calendar options didn't seem to do anything. The calendar with the current date is taken from the system clock and runs in analog and digital mode. Though a nice visual, Scetlander have not modified the sound effects and Archimedes attempts to cope with IBM sound commands soon becomes irritating.

As a whole the set is nicely put together. The Escape key always takes you back to the previous activity and the parent/teacher section gives control over most aspects of the program.

The sound you'll want off because of the emulator's shortcomings. It is a weakness of the PC Emulator that there is no way of switching off the sound altogether. This would speed up the programs significantly.

The teacher/parent's options lets you choose the number of wrong guesses the program will allow, the number of questions asked and so on.

The progress recorder is really far too detailed and is poorly explained in the manual, making the comparison between performances long-winded – one child going through the package once will produce 18 screens of results.

In some specialised situations this kind of detail is of use, but a percentage/time taken result for each section would have been better.

Moving up the age ranges will bring you to another package. **Hooray for Henrietta** is maths-based and aimed

at 5 to 12-year-olds. It covers quite a range of ages and abilities but only allows you to set the difficulty levels to low, medium or high. Having said that, you do have some control over which of the four rules are rehearsed and the time allowed for answers.

Once you enter the game you'll receive a short narrative introduction concerning wedding plans and a mischievous parrot. Level is a sub-division of difficulty and is explained in terms of age and Attainment Level in the manual.

The storyline is that you must retrieve Henry's clothes from John the Parrot so that Henrietta can marry

lot more interesting to fail and see what happens to Henry than to get the maths right. In this way Hooray for Henrietta breaks a golden rule of educational software – reward the correct answers not the wrong ones.

Finally you must go for the trousers and once you have Henry correctly attired you pose for the wedding photo and go to the next level. There are eight levels and disappointingly the final one ended with no additional congratulations.

There is only one way of ending the game before level eight – to lose. If you manage all the levels without failing you will have played each

a nasty message from Morgana.

Filling in the missing vowels is your task in Complete. A nice idea as it makes you look carefully at the make-up of words, but this program doesn't contain very well chosen words.

When faced with b—rd, str—ng and b-g-n there is more than one right answer, but the software will only accept one specific word as being correct. This sort of blunder can cause confusion and frustration.

Crack-It is a well thought out code game. You are given a word in code and the alphabet is displayed on the screen. You also see an example of a word written in the code.

The codes are all straightforward displacement of letters – the higher the level the further the displacement. Again you are racing Morgana, this time up some steps, your reward being the clue letter.

Hang-up is hangman. Each correct word allows Henrietta to climb a ladder while each failure helps Morgana. However, graphically it is more interesting to fail than succeed.

Your next chore is Jumbles where you must sort out jumbled letters to make a word. The problem of multiple answers is somewhat overcome as the first two letters of the answer are shown at lower difficulty levels.

Finally you have to arrange the letters won during the games to make the magic word to free Henry. This should be easy, and it is, but you only have three chances to guess the right word. When you do get it right you'll see Henry transformed into his former self.

The key to using this program has to be in creating your own word lists. This is easy to do within the program, especially as it seems to equate difficulty of words with their length.

As with Hooray for Henrietta, the results information is too detailed but the teacher/parent customisation options allows you to define the program accurately for your children's needs.

Summing up

Graphically the programs are good, the movement smooth, the menus logical and the teacher/parent control comprehensive. Each package has something to offer and these programs will hold children's attention for a while and help them reinforce certain skills.

However, I would recommend an adult to keep a close eye on these programs as well as supporting activities away from the computer.

HELP - Key to Results Table

a	b	c	d	e	f
g	h	i			

a - Student's name;
b - Date game completed (according to computer's DOS clock);
c - Game selected;
d - Items selected by computer;
e - Number of boxes selected;
f - Set of results being viewed - the last 10 sets are available;
g - Up to 4 (see 'e') columns indicating which items the student was shown;
h - Number of box containing target item;
i - Actual answer given or 'Not attempted' means (Esc) was pressed before this question was reached, or that the game was not attempted;

Other Notes:
1) To print out a set of results press (Ctrl-P).
2) To view a different set of results, use the ']' key to look at the next set or the '[' key to look at the previous set.
Shortcut: Press a number to load that set (0-10).

Press (F1) or (Esc) to leave HELP

Henry. Fail and John will cover Henry in custard.

Going for the coat first puts Henry on a platform above a vat of custard. As you answer questions Henrietta climbs towards a level attached to a rope, which in its turn is connected to the platform.

If you answer the questions before the time runs out Henrietta manages to climb up and pull the lever – fail and down goes Henry into the custard. I was a bit surprised, having selected addition as my rule, to see the question as $? + 5 = 15$ – but maybe I'm being too fussy.

Now for the hat. This time Henry is under the vat of custard. Racing against John's boat, each correct answer puts you close to the prospective groom. Get there first, or it's custard time again.

Trying for the boots has the custard suspended in a bag over Henry's head. The bag will be activated by an amazingly complex-looking device.

What is true of the whole package is especially true of this game – it's a

game, this is not my idea of "boredom-free practice".

Yet children often enjoy the repetitive rehearsal of skills they already have as it helps them feel secure and confident. However, this package makes too many conceptual blunders for me.

Henrietta's Book of Spells has the hapless duo married, but Henry has fallen foul of Morgana the Morbid who has turned him into a frog. Rather than cut her losses, Henrietta sets out to rescue him by finding the magic word to reverse the spell.

The word is found by tackling five games which can be played or replayed in any order.

Flash is a standard type-it-back spelling program reinforcing the look, cover and write remember idea. Type the word incorrectly three times and Morgana scores.

If you reply correctly and Henry makes it across the screen before Cedric the Skeleton reaches Morgana you'll see the first letter of the magic word. Losing means you don't get the letter but you do receive

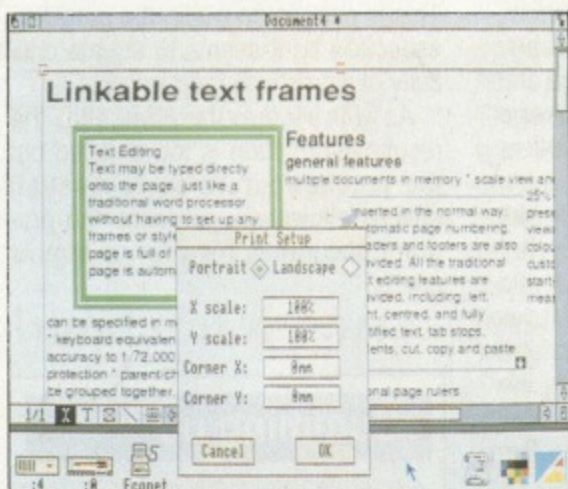
The user-friendly solution to professional desktop publishing

Ovation

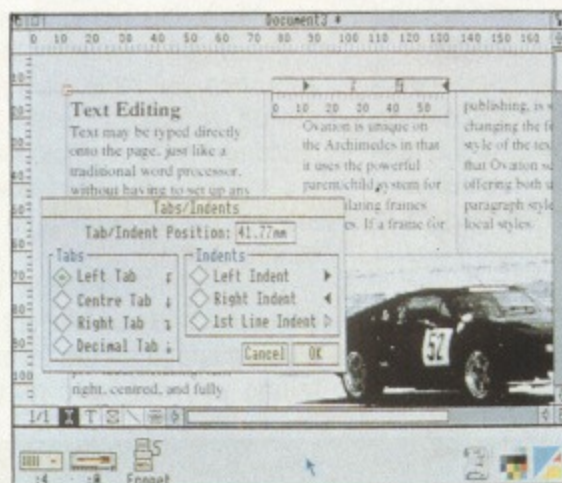
Ovation sets new standards of quality and value by offering professional features in an easy-to-use package at an affordable price. It is a complete desktop publisher providing a formidable array of features that are straightforward to learn and instinctive to use. We guarantee that you will be able to produce high quality documents within hours of opening the package.

Is it a word processor?

Ovation can be used just like a traditional word processor. In fact it provides more word processing features than most dedicated word processors themselves. And unlike many DTP packages, text may be typed straight in without any setting up whatsoever, and it flows from page to page with headers, footers and page numbering all done for you.



Ovation is frame-based, with typed or imported text formatted in rectangular frames. Frames may contain their own independent story, or may be linked together causing text to flow from one frame to another anywhere in the document.



You can import pictures that are in Draw or Paint format. Once imported, pictures may be moved freely around the document, enlarged, reduced, cropped, or scaled to fit frames precisely - all in an instant.

Adding style is simple

Ovation provides user-defined paragraph styles and easy-to-use local effects that give instant control and can be mastered in a matter of minutes! A wide range of styles are available allowing you to create documents with a distinctive appearance. Very accurate typographical control is provided, making Ovation suitable for the most demanding professional applications. •

Extensive graphics

An extensive range of features is provided for manipulating graphics. Paint and Draw format pictures may be imported from scanners, digitisers and drawing packages etc. and may then be instantly enlarged, reduced, cropped as required. With line drawing facilities and definable border styles, Ovation provides features virtually unheard of in its price range.

Laser-sharp printing

Ovation uses the RISC OS printer drivers to produce high quality printing on dot-matrix, ink jet and laser printers. It prints pages exactly as they are created on the screen, at the highest resolution your printer can deliver. The PostScript driver allows for the printing of documents on high quality laser printers and typesetting machines.

Spelling checker

Ovation contains a fully integrated high speed spelling checker with a dictionary of over 60,000 words and a host of other features. You can even edit the main dictionary. Requires 2Mb.



The Ovation package includes a 250-page user guide for both novices and experienced users alike, a quick reference card listing all the keyboard and mouse short cuts, 7 outline fonts (22 faces), and a range of clipart.

Price breakthrough!

Ovation runs under RISC OS on an Archimedes or A3000 with minimum 1Mb RAM and costs just £99.00 plus VAT.

Ovation is available from all good dealers

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

Please write or phone for a brochure. This advert was produced entirely using Ovation.

WE looked last month at an interface board using the I²C bus connector from your Archimedes. Now I would like to go into the various operation modes of which the board is capable.

To recap, the interface board consists of two chips, the PCF8574 an 8 bit digital I/O and the PCF8591 analogue interface.

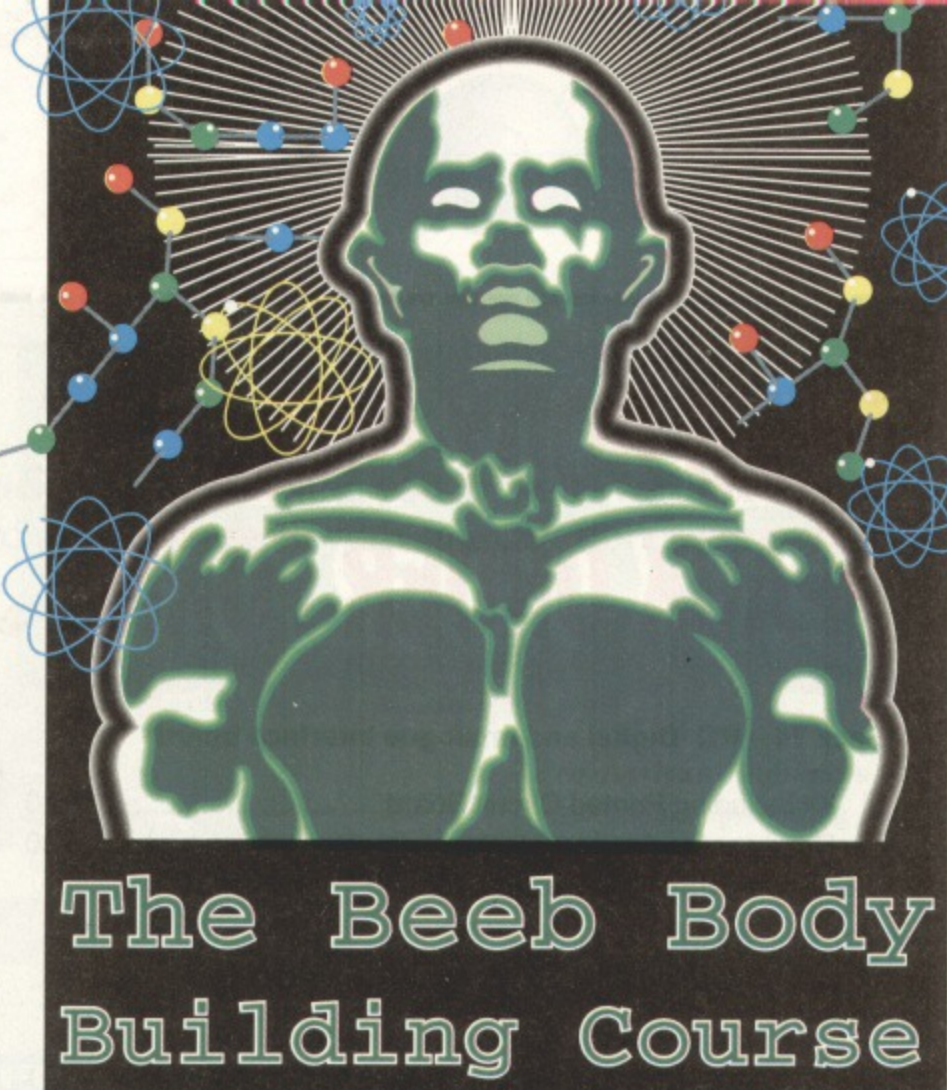
The digital side is quite straightforward, as we saw last month. It consists of a single register. Write to it and you change the bits, read it and you get the logic levels on the lines. Unlike the User Port, there is no data direction register.

This means that the bits can act as inputs and outputs at the same time. This is achieved by having an internal, weak pull-up resistor so that a logic 0 output is a hard output but a logic 1 output can easily be pulled down by any driving device. The only thing you had to do was make sure that you sent logic 1's to the bits you were using as inputs.

The analogue side, however, is much more complicated and can operate in a very flexible manner. Figure 1 shows the block diagram of the input/output side of the PCF8591.

You will see that, as a device that boasts four analogue inputs and one analogue output, it only has one digital to analogue converter. This device, as we shall see, works overtime to produce all these functions.

Just like the analogue input port on the Model B and the Archimedes I/O module, this device has an analogue



Operating the interface

Part 3 of Mike Cook's
I²C bus adventure

input multiplexer – just a fancy way of saying a four way switch! Any one of the input lines can be switched to the next stage of the circuit a *Sample and Hold* block.

This is, in effect, an analogue memory device. Whenever it is told to

sample the input it holds that voltage on its output until it makes another sample.

This is important here, since it means that the input voltage does not have to be stable while the analogue-to digital conversion is taking place,

thus allowing quickly changing voltages to be measured with little error.

The output of the sample and hold is taken to a comparator – a circuit that gives a digital 1 or 0 depending upon which of its two inputs are at the higher voltage. The other input, as you see, is taken from the output of the digital to analogue converter.

What the *successive approximation logic* does is to play a guessing game with the system. The unknown voltage from the sample and hold is compared with a known voltage from the digital to analogue converter. By adjusting the known voltage you can match it to the unknown one.

This works like the high-low number game: One person thinks of a number and the other tries to guess it, each guess being greeted with the response high or low.

The best way to play this is to guess initially at a half way point, then you half the range again until you home in on the answer. Thus you make repeated successive approximations. In our case, after eight guesses the logic has the value worked out and sends the answer back to us.

While all that is going on you might be forgiven for thinking that you couldn't use the analogue output. However, there is a further sample and hold circuit buffering the analogue output.

This means that you can set the analogue output and it will stay fixed while the D/A goes through its gymnastic routine.

Normally, a sample and hold wouldn't hold its voltage indefinitely, it

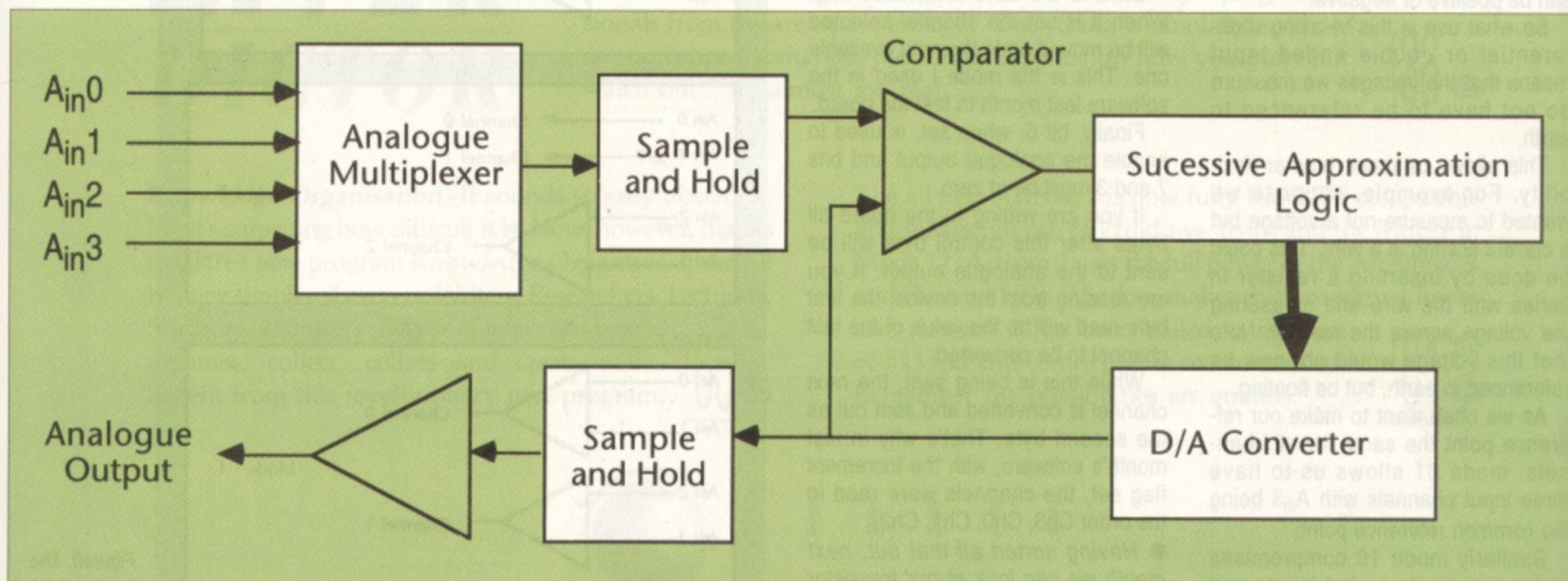


Figure 1: Block diagram of PCF8591



suffers from what is known as *hold droop* – honest. However the PCF8591 keeps a track of the value you last sent it and keeps refreshing that value between A/D conversion cycles.

All this complexity does not slow the device – it can operate and convert samples as fast as the I²C bus can operate, so there is no need to see if it is busy before giving it a command.

As if that were not enough, the input to the A/D is capable of being configured in four different ways or modes, as shown in Figure II.

The lines labelled A_{in} are the analogue inputs to the multiplexer while those labelled Channel are the lines that are converted. The mode numbers are shown in binary so that, as we shall see later, it is easy to use them.

Mode 00 is the simplest, where the A/D conversion is performed on the input lines. This is what happens on the joystick port of the older computer. We say this is a single ended input because the voltage is measured between this line and earth.

In contrast, look at Mode 11. Here we have only two different channels but each has two inputs which go to a differential amplifier with a gain of one. This means that the voltage presented to the A/D converter is the difference between the two input voltages. If these voltages were the same the output would be zero.

You will see that A_{in0} is labelled + and A_{in1} is -. This means that if A_{in1} is the higher of the two voltages the digital result will be a negative number. So while the inputs can only go between zero and 5 volts, the difference between these two voltages can be positive or negative.

So what use is this? Having a differential or double ended input means that the voltages we measure do not have to be referenced to earth.

This allows us much greater flexibility. For example, suppose we wanted to measure not a voltage but a current flowing in a wire. This could be done by inserting a resistor in series with the wire and measuring the voltage across the resistor. Note that this voltage would not now be referenced to earth, but be floating.

As we often want to make our reference point the same for all channels, mode 01 allows us to have three input channels with A_{in3} being the common reference point.

Similarly mode 10 compromises giving two single ended inputs and one differential input. Having sorted

out the modes how do we switch between them? Figure III shows the layout of the PCF8591 control byte. This is the first byte sent to the device, all subsequent bytes will be considered as data bytes.

As you can see, bits 4 and 5 control the input mode and should contain the mode number you want to use. Bits 0 and 1 control which channel you want to read.

Note that in some modes it will be possible to set them to non-existing channels.

When this occurs the PCF8591 automatically uses the highest available channel.

Bit 2 is the auto increment flag. When it is set the channel selected will be moved on to the next available one. This is the mode I used in the software last month to test the board.

Finally, bit 6, when set, is used to enable the analogue output and bits 7 and 3 must be at zero.

If you are writing to the board all bytes after this control byte will be sent to the analogue output. If you are reading from the device, the first byte read will be the value of the last channel to be converted.

While this is being sent, the next channel is converted and sent out as the second byte. That's why in last month's software, with the increment flag set, the channels were read in the order Ch3, Ch0, Ch1, Ch2.

● Having sorted all that out, next month we can look at our transistor curve tracer application.

BEEB BODY BUILDING PACK ORDER FORM

Pack 74 – I²C Digital and analogue Interface board

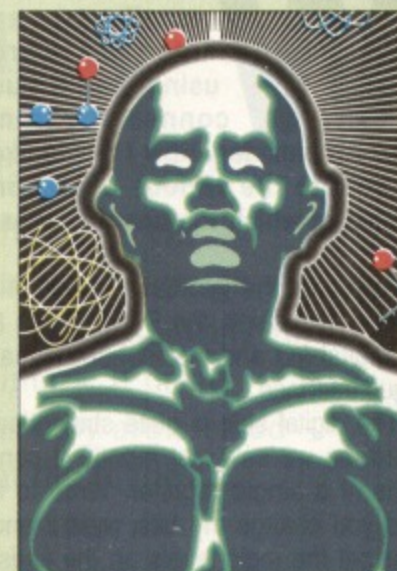
- ☐ Kit including Printed Circuit Board..... £21.00
☐ Ready assembled and tested..... £25.00

See last month for details of the connecting cables

Name _____

Address _____

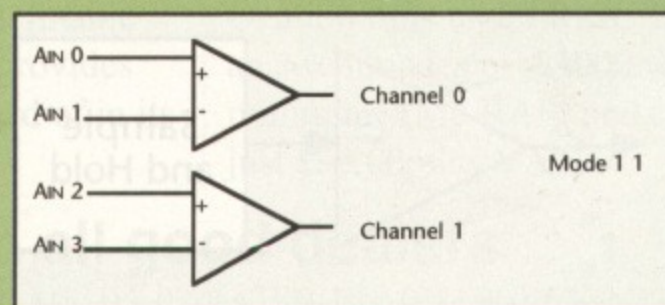
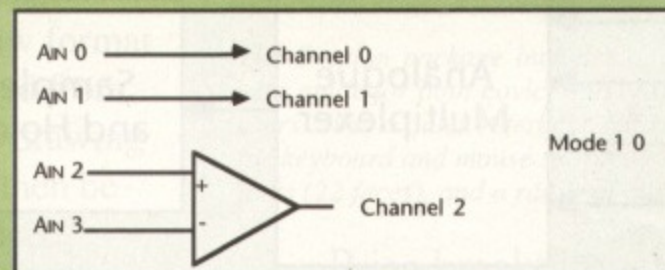
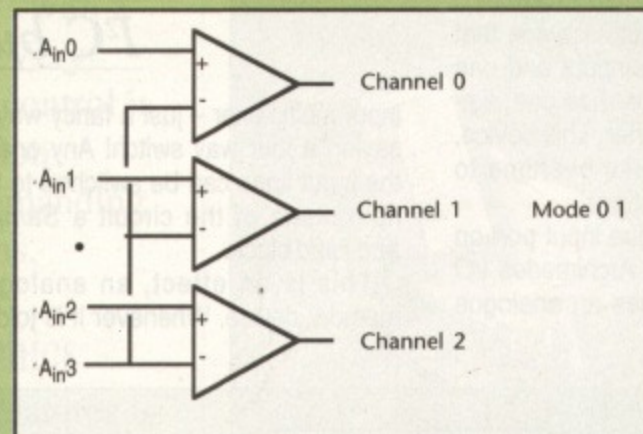
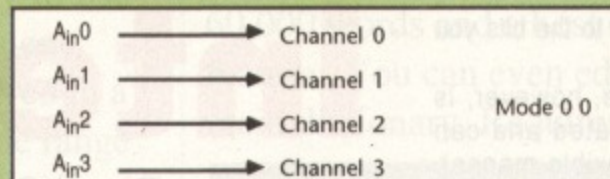
Post code _____



Educational establishment orders accepted.

Make cheques payable to
Musbury Consultants and send to:
 8 Fairhill, Helmshore, Rossendale,
 Lancs BB4 4JX.

Foreign orders add £3.00 if airmail delivery is required. Copies of previous articles are available – contact Musbury Consultants for details.



FigureII: The analogue input modes



Clares Micro Supplies welcome you to their world of computer software for the Archimedes, where your imagination is the *only* limitation.



PRO-ARTISAN

Pro-Artisan enhances all the advantages of the Archimedes, providing an immensely powerful graphics package that is so easy to operate. Allowing *Pro-Artisan* to successfully integrate into every environment. From schools, colleges and universities to the world of television and Graphic studios.

£105

RENDER

BENDER

screens into super smooth and visually stunning animated sequences.

Render Bender is a powerful 3D animation package that allows the construction of scenes using 3D objects with advanced ray tracing algorithms. After which it is easy to compile ray traced

£85



Armadeus Sound Sampler, "the biggest break for ears in years" can take any stored sound and create unbelievable effects and sound tracks for use in your own programs, videos, etc. Add on the 8 bit A to D, *Armadeus* Sound Sampler Board at £154.95 and you can plug in your own tape/record player, even C.D. The output quality could put you on Top of the Pops.

£85



INTER DICTOR

This is not just a game but a realistic flight simulator. You are in control of a high performance jet whose handling characteristics have been programmed by professionals from the aerospace industry. Everything is simulated so there are no canned scenarios, the action depends on how you play. But watch out... it's almost too real.

£36

Knowledge Organisation. It sounds so easy doesn't it, but it's surprising how difficult it is. Now, however, thanks to Clare's new program *Knowledge Organiser*, it can all be very simple—Lawyers, Writers, Researchers, Lecturers, Students, Z88 users. Everyone who needs to organise, collect, collate and create will benefit from this revolutionary new program.

£65

The all new *Artisan 2* is now fully RISC OS compatible and makes full use of Windows, Icons and the Mouse in Mode 12. *Artisan 2* uses the full power of the Archimedes and the new Help Window makes this program a joy to use. *Artisan 2* has been hailed as the best of its kind and comes highly recommended. Remember the possibilities are endless.

£61.95



CLARES
MICRO SUPPLIES

98 Middlewich Road, Rudheath, Northwich, CHESHIRE CW9 7DA.
Telephone: 0606 48511 Fax No: 0606 48512

Designed for your imagination

The Electronic Font Foundry

our latest
Script

The Only Archimedes DTP specialists

The Electronic Font Foundry are the only DTP specialists in the Archimedes field. As well as our vast range of professional PostScript® compatible typefaces we sell a range of hardware suitable for both professional or amateur DTP. Take a look at some of our prices to see what value you get from us.

We are expanding our range of fonts into other languages; we already have Greek (Modern and Classical), Cyrillic, Hebrew and Punjabi as well as all European languages, with keyboard modules available if you need them to simplify their use. We will soon have fonts for some more Indic languages available for sale; Bengali, Devangari, Farsi, Gujarati and Tamil.

Latest, latest...
ਲੇਟਸਟ ਪਲਾਸਟੀਕ ਦੀ ਵੇਚੇਰੇ ਯੁੱਛ

For Font Catalogue and comprehensive price list write to:

**• The Electronic Font Foundry • Granville House • 50-52 Upper Village Road • Ascot • Berks • SL5 7AQ •
or telephone/Fax 0344 872923**

Archimedes Computers

A3000	£545
A3000 with 2Mb RAM	£595
A3000 Learning Curve*	£645
A3000 Learning Curve* with 2Mb	£695
A410/1	£995
A410/1 with 2Mb RAM	£1095
A410/1 with 4Mb RAM	£1195
A420/1	£1195
A420/1 with 4Mb RAM	£1295
A420/1 Learning Curve**	£1295
A440/1	£1495
A540/1	£2595
A540/1 with 8Mb RAM	£3045

*Learning Curve includes: 1st Word Plus with Spell Checker, PC Emulator, Genesis and Genesis applications and demonstration video.

**420 LC also includes Acorn DTP

Monitors

Acorn 14" colour	£199
Philips 14" colour with stereo speakers	£249
EIZO 9060S 14" multiscan colour	£445

All prices ex VAT & delivery

EIZO 9070S2 16" multiscan colour	£675
Taxan 770+LR 14" multiscan colour	£425
Taxan 795 14" multiscan colour	£495
Taxan 775 Viking II	
19" paper white monochrome	£699

Printers

Canon Bubble Jet, 360 dpi, 64 nozzle head printers. Price includes RISC OS printer driver;

BJ-10e Portable, prints onto A4	£295
BJ-300 A4 Paper, built in tractor feed	£450
BJ-330 prints on paper up to A2 size, built in tractor feed	£550

Ink cartridge for BJ-130/BJ-130e	£13
Ink cartridge for BJ-10e	£17.50
Ink cartridge for BJ-300 series	£13

Laser Printers

Canon LBP4, 4 pages per minute	£895
Laser Direct interface to drive above printer at 600dpi	£325

Laser Direct LBP8, 8 pages per minute, complete with 600dpi podule	£1395
Toner cartridges for above printers	£70

SCSI Hard Drives

Removable external drive	£460
45Mb disc for above	£75
SCSI Podule	£175

Complete System

£660

Software

Impression II	£145
Impression II network version for up to 20 computers	£660
Impression Junior	£75
FontFX	£10
Snippet	£29
Ovation	£95
Ovation Demo Disc	£5
Midnight Graphics Clip Art	£29.50
Equasor	£45
Poster	£79
Acorn DTP	£119
RISC OS Printer Driver for Bubble Jet printers BJ 130, 130e and 10e	£10
Multi FS	£35

Free after-sales service and telephone hotline support with every purchase from us.

COLOURJET 132

COLOUR INK JET PRINTER

Compatible with:—

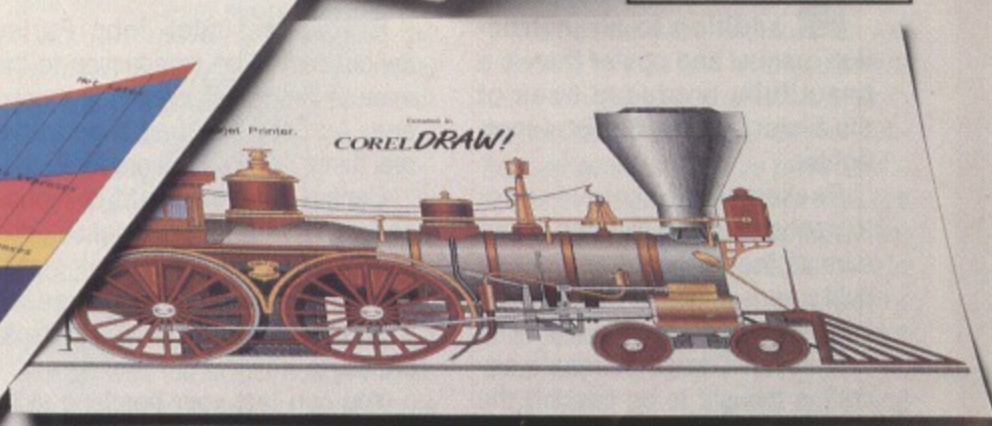
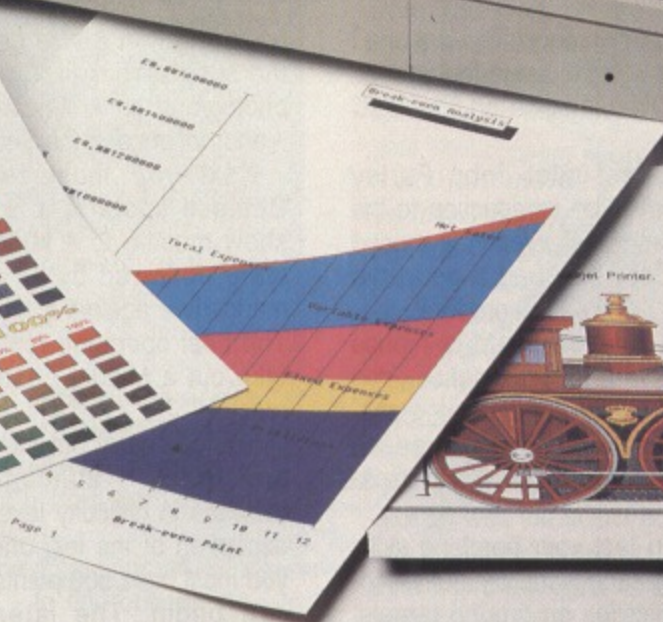
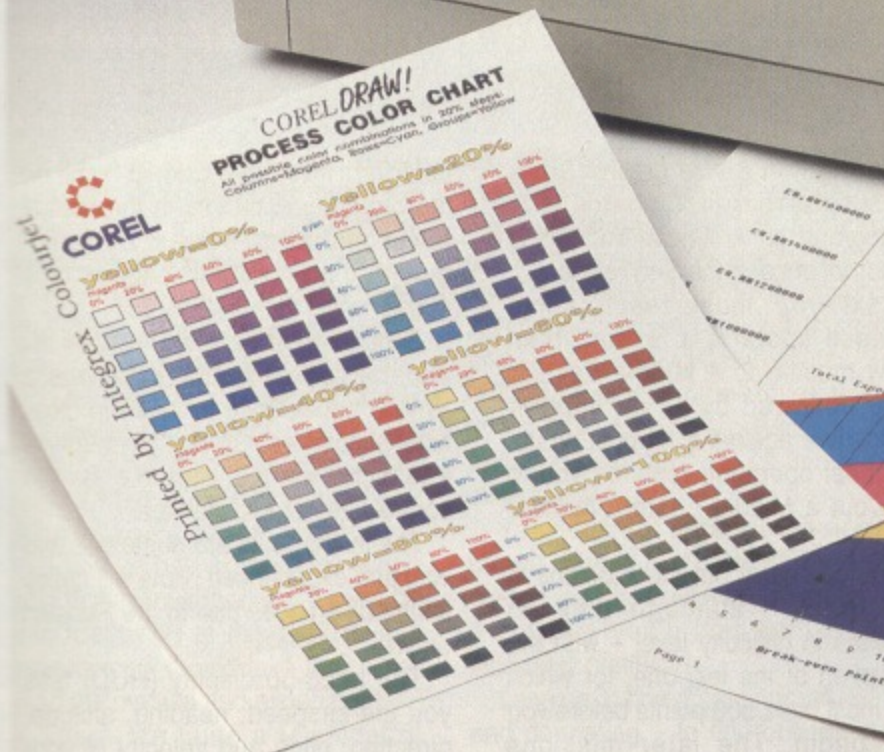
IBM pc
Archimedes
Nimbus
BBC Micro
Amiga
Apple Mac
(serial version)

LOW COST
LIST PRICE
from £636 + VAT



Low
Operating
Cost

Windows 3
Driver
available



EMULATES OTHER COLOUR PRINTERS EG. IBM 3852, Canon PJ1080A, Quadjet
PRINTS OVERHEAD TRANSPARENCIES

EDUCATIONAL DISCOUNTS AVAILABLE



INTEGREX LTD., CHURCH GRESLEY, SWADLINCOTE,
DERBY'S DE11 9PT
Tel (0283) 551551
Fax (0283) 550325
T/x 341727 INTEGEX



Price: £39.95

Supplier: Domark, Ferry House,
51-57 Lacy Road, London SW151PR.
Tel: 081-780 2224

Requirements: BBC A3000 and
Archimedes range



MiG-29 Fulcrum

...by the seat of your pants

THE documentation accompanying MiG-29 Fulcrum will delight any aircraft enthusiast. In addition to an instruction manual and poster there's a beautifully produced book of the history of the Soviet super-fighter.

Packed with colour photographs, it chronicles the exposure of the MiG-29 from its first public appearance at Farnborough in 1988.

Mikoyan Design Bureau's aircraft is thought to be possibly the best all-round fighter in the world. It's at least as manoeuvrable as the F16, can take off from shorter airstrips, has a faster rate of climb and superior missile firing capability.

Originally released on the PC where it faced stiff opposition from the established airplane simulators of F16, Falcon and Bomber, it's nice to see a named flight simula-

tor on the Archimedes. The last one I remember with the same feel of realism was Red Arrows on the BBC Micro.

British test pilot John Farley announces in the introduction to the manual that the simulation is a good one. As John has had a go in the real thing, I'll take his word for it.

Control is by keyboard or mouse and there is a joystick option. You start your career on a training mission, a simple outing to introduce you to the fighter's layout and capabilities.

You can test your bombing skills on a firing range and try out air-to-surface missiles on ground targets. Drones appear so you can have a go at air combat too.

Should you crash at this stage the loss isn't permanent since Heaven has a brand new Fulcrum fuelled up and ready for take-off. But when you go on a real mission you have just one life.

Five scenarios are on offer, each

beginning with a nice graphic to set the scene. Your first mission is to photograph an American submarine – and *not* engage the Sea Harriers.

Next you must teach some Chinese upstarts a lesson, then show muscle to a Middle East oil state, followed by an air support manoeuvre against a terrorist group. The final operation requires you to take out a Middle Eastern nuclear reactor.

You can carry out the missions in any order – although they do increase in difficulty level – with the exception of the last one, for which you must have 500 points before you can begin. The later missions demand additional strategy and determination on your part.

Your view from inside the cockpit can be switched to any of eight directions, or you can choose to watch the aircraft from outside. There are also options to see the action from a guided missile's point of view or using the eyes of the tar-

get itself. If you feel more at home on the ground you can sit in the control tower and fly the beast by radio, though the maximum range is only 10km.

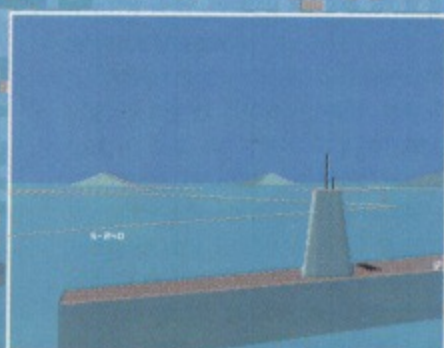
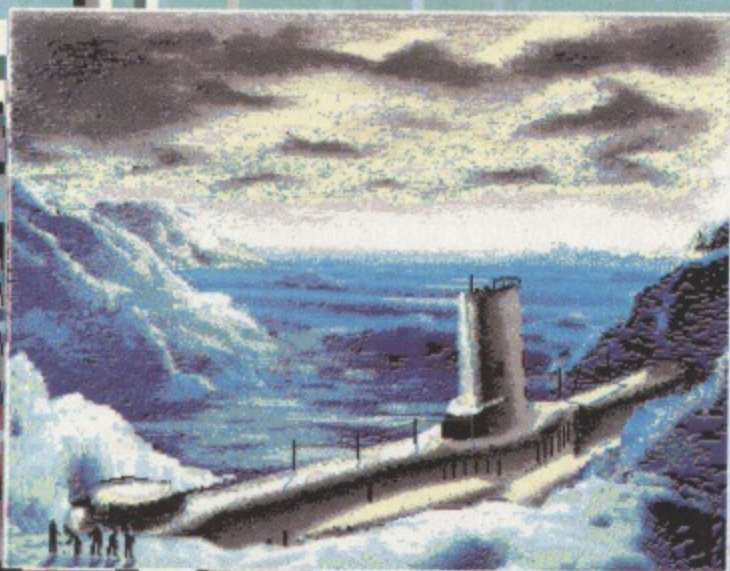
Everything is depicted in solid 3D and the cockpit instruments have a similar appearance to those in other flight simulators – in fact anyone with Interdictor will feel at home, as the controls are almost identical.

The instruments are numerous and vital and experienced pilots will notice subtle differences due to the Russian origin.

The head-up display (HUD) tells you the airspeed, heading, altitude, direction, pitch and velocity of your MiG.

The pitch bars are particularly useful as they stay parallel to the ground and help you keep your wings level when you can't see the horizon.

In the event of HUD failure there is a duplicate set of instrumentation on the head-down display. It's easy to get lost if you don't watch the display,



but there is sufficient information once you understand the guidance system. After that, finding your target is relatively easy.

Your destination is pre-set and you simply have to follow the pointers produced by your instruments. The auto-stabiliser is an especially useful feature. It keeps you straight while flying, but remember to disengage it when you enter combat or it will cramp your manoeuvrability.

If you've had some experience with flight simulators, you'll soon be into the swing of things. The less experienced should take their time, read the manual and experiment.

There are quite a few control keys to learn, though you can get airborne using only a few of them. Becoming familiar with the intricacies of afterburners, airbrakes, flaps, landing gear and wheel brakes does take some time though. The ejector seat is a good place to start. Your real problems start when you meet an enemy

equipped with air power and anti-aircraft artillery. Of course you are not quite defenseless as you are standardly equipped with 23mm cannon, AA-8 heat-seeking air-to-air missiles, AS-7 air-to-ground guided missiles and S-240 air-to-surface rockets.

Effective deployment of these takes skill, especially when you are involved in a dogfight or flying low over a target.

Your current weapon choice is shown on your HUD. Before you fire a guided missile it must be locked on to a target – you'll find the first kill incredibly gratifying.

Landing at home base for refuelling and debriefing – to find out the current mission status – is no picnic. I regularly found myself ablaze on the runway inside a mangled MiG.

This simulator is well programmed, beautifully packaged and the stunning graphics and quick reaction to commands make it a must for any enthusiast.

Jo Giles

CHESS has been played on computers as long as space invaders. Bells and whistles have been added and a lot of time and money spent in developing a game able to beat a really top player, possibly because a large cash prize has been offered for the designers of a game to beat a chess grandmaster.

The latest version to hit the small screen is three dimensional which seems to be one of the prerequisites of such programs these days. The graphics are large, well drawn and represent the traditional chess set. You are presented with additional displays concerning time, moves and overhead display.

You can play against another human or against the computer or – if you get fed up with losing – set the computer against itself. As you can never find another chess player when you need one I chose Archie.

You set the time allowed for the computer's move and the level you want to play. You can – due to the multi-tasking nature of the Archimedes – play more than one game at once, but as the clock is tied to the processor the more games you play simultaneously the slower the clocks will run. You'll need 2Mb to have three games running at once.

Only valid moves are allowed and the list of moves – using standard notation – is displayed on screen. You can scroll through them to assess the play so far if you want.

You move by clicking with the select key on the square you want to move from and then on the square you want to move to. If it is valid your piece will change position, your opponent's clock will start and you await your turn.

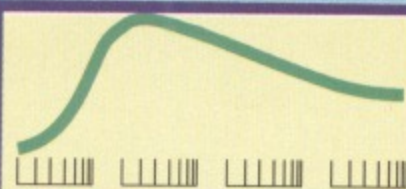
You can move by clicking on the overhead display on the 3D display and the computer's response is outlined on the overhead display so you can tell what is happening.

A pause facility has been built in. The level number acts as a traffic light. Clicking on it changes it from red to yellow to green.

The red and green are obvious, but clicking with the adjust button makes this yellow and allows you to clear the board and set up a board how you want it.

This edit option is handy if you want to reenact a particular move. I would suggest that you only use it if you know your chess as the limited position checking possible in such a program means that you can start with an illegal setup.

As you play you'll notice a book icon above the board, which is the



**Software
SCENE**



Price: £19.95

Supplier: MicroPower, Northwood House, North Street
Leeds LS7 2AA.

Tel: 0532 458800

Requirements: BBC A3000 and Archimedes range

Chess 3D



computer's book of standard openings and moves. The computer will follow a book line as long as you match its move as it expects. If you don't the book icon will close.

Micropower have left room for you to add to this as and when you want using the drive icon which is also in the window. The original or your customised book can then be printed out.

There are some very nice features in this version of chess especially the ability to restart from a specific point in the move list, rotate the board, or change sides – though your clock time does move with you.

3D Chess plays a tough game and at the lowest levels it's only the time limit which changes, not the skill involved. I would recommend this to any above average chess player, especially as the extensive print facilities allow analysis of moves and strategies in detail. A help option or an option outlining possible valid moves would have been a useful addition for novice players.

Pam Turnbull

WHEN the Archimedes was first designed no provision was made for adding a joystick. The latest company to tackle this little problem is The Serial Port, who have a 9-pin Atari-style interface which caters for two joysticks at once.

Measuring 6.5cm by 5.5cm the interface plugs into the Archimedes' parallel port. On the top are two sockets where you attach your joysticks and a switch which is used to determine whether the interface is active or invisible.

The 9-pin sockets are the most popular on 8-bit computers and are both inexpensive and come with features like rapid fire.

There is a possible problem for A3000 users as when two joysticks are plugged in the clearance between the parallel port and the internal upgrade panel is minimal. As this is where expansion such as Pres Disc Buffer will be found, be careful.

The interface is rather neatly designed so as to plug into your

parallel port but still allows your printer to be available at the flick of a switch.

Should your software use dongles – as is the case with Impression, for instance – you may find that using interface, printer lead and a dongle that these will stick out. The Serial Port do offer a cable which will overcome this problem though.

Double clicking on the Joystick Test application will ensure that movement is recognised by the software and confirms that the interface and your joysticks are in good working order.

The manual is both informative and well laid out. One outstanding feature is its ability to emulate key presses that various software uses. By equating joystick movement to the relevant keyboard presses it enables you to use a joystick with software not neces-

sarily written with one in mind.

Some applications provided enable you to create your own programs using the interface's own programming language. By creating files using !Edit you can make your software automatically invoke the interface and emulate the correct keys, then go on to load the game. A nice additional application checks that the joystick responds correctly to the simulated key presses.

The Serial Port have produced a package of high calibre which works well with simple or complex games – and there is even a mouse simulation via the joystick.

Brett Colley



Price: £23.95

Supplier: The Serial Port, 30-33 South Street, Chichester, West Sussex PO19 1EL.

Tel: 0243 531194

Requirements: BBC A3000 and Archimedes range

Joystick interface ... adding control



Price: £12.95 (tape), £14.95 (disc), £19.95 (Master Compact disc)

Supplier: Superior Software, PO Box 6, Brigg, South Humberside DN20 9NH.

Tel: 0652 58585

Requirements: BBC Micro or Electron

LATEST in the line of Sams, number 15, comes on three floppy discs and as usual contains four games – this time two new ones and two old favourites – Cyborg Warriors, Last Ninja 2, Ricochet and Network.

Last Ninja 2 has been a success on many formats and the BBC one was no exception. You are a ninja dressed in the traditional garb and compelled by honour to destroy evil. Perhaps not the most authentic of scenarios or the most original, but it's fun.

Martial arts are as popular as soccer and as you creep, jump and practice ninjutsu all over 1990 New York you'll become hooked.

Over six levels you destroy or avoid thugs, police and bees in Central Park and go on to fight



increasingly tough adversaries on the streets, in the sewers, not to mention offices, cellars and finally the home of the notorious bad guy, Kunitoki Castle.

Bashing everything in sight is good for you from time to time and Last Ninja 2 increases its hold as it has elements of arcade adventure thrown in, with objects to collect and puzzles to solve.

Moving on, Ricochet is an arcade adventure with excellent and cute graphics and some intricate puzzles to solve over five levels. You control S.P.R.A.T – the Small Partially Robotic Alien Time-traveller. The fact that he looks like a very bouncy red rubber ball is irrelevant.

His – and your – quest is to collect one hour glass from each level by rolling left and right, up and down ladders and ropes as well as jumping.

It's very simple in design, but the graphics, humour and puzzles make it a definite must.

The first of the two new games on this compilation is Network. Very reminiscent of Chuckie Egg, you start in the middle of the screen your mission to jump from platform to moving platform avoiding dangerous needles and the like. I liked the *defunct* message when I snuffed it.

Your aim is construct a Flynche machine. This consists of 20 light blue bits and pieces which are scattered throughout the area, but do watch out for the aliens who aim to stop you. You can teleport, manoeuvre or shoot them to prolong your five lives.

The scenario and gameplay are similar to a number of other older products but if you want to try your hand at another arcade adventure



Play it Again Sam

...value for money entertainment

BLASTON!

...save the world again

HOT from France comes a game with no illusions. Blaston is a simple blow up everything in sight game where you collect more fire power and dodge more and more bad guys as you go.

There is a plot of course – you must save the world, again. This time it is CORE323X, a mining planet whose very surface exudes uranium, the now vital fuel for all of known space.

Control the planet and you control the galaxy. Needless to say someone wants to take this away from you – the Korguls. Not only have they rammed your supply vessel but they now threaten to land and massacre the miners.

Being a democratic lot, the miners had a vote and elected you,

Johnny Blast, to save the day. Then they dressed you in the best armour they could find, topped it off with a powerful laser cannon and wished you goodbye.

While they hold the fort you have got to board one of the Korguls' orbiting shuttles, then recapture the supply ship and save the planet and your colleagues.

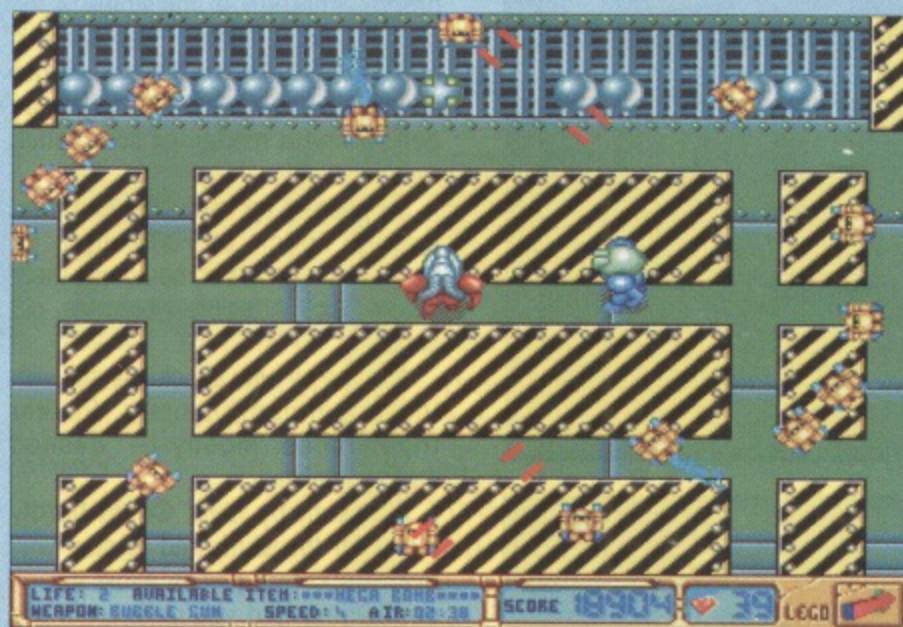
There are just two more things you need to know. Firstly you have got to top up your oxygen supply every 15 minutes – leaving you three minutes per level. And secondly the Korguls are renowned for their unrivalled animal-like strength.

The game is simple. You scroll up the screen manoeuvring with either the keyboard or joystick and kill everything that shoots.

You will start quite slowly – your speed indicator giving you a speed of one. Also your laser cannon leaves a bit to be desired.

Watch out for the silver balls which litter the place. Shoot them once and when they change shape and colour travel over them to claim your bonus. But shoot them a second time and they'll disappear.

The bad guys can shoot them too, so be quick. Select your bonuses using the spacebar to up your speed



to three and fire back a little more effectively.

I found the most effective way to shoot was at an angle – north-west, south-east and the like. Also shoot where the Korguls are going to be, not where they are.

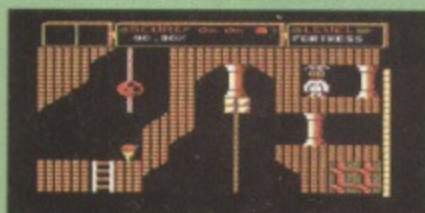
You are most definitely on your own and the Korguls come in all shapes and sizes. The square robot types are particularly nasty and will do for you in short order.

Collect as many bonuses as possible, for as you progress your adversaries become harder to kill.

When you die you make a lovely mess on screen.

Simple, unpretentious and quite surprisingly addictive, Blaston is well programmed, with good graphics and sound making a professional-looking package. Go on, treat yourself.

Jo Giles



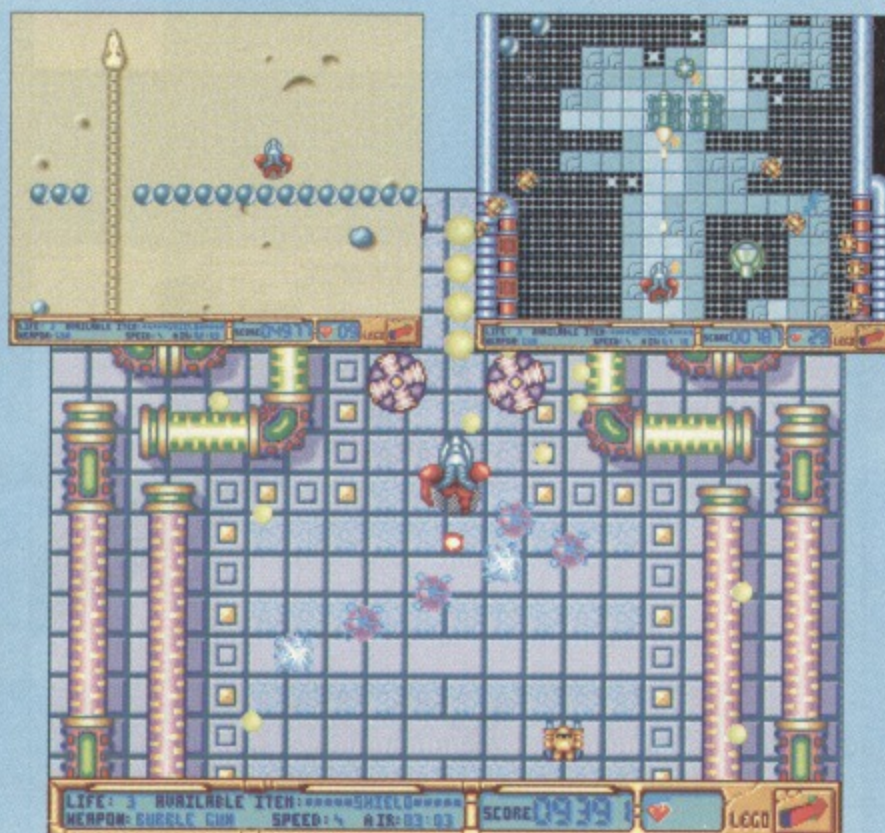
you could do a lot worse worse.

Last, but not least comes **Cyborg Warriors**. It's arcade adventure Commander Stryker-style. You'll find it easy to die and difficult to progress quickly, but again there is nothing different or unusual here.

Basically shoot aliens, collect the tokens they turn into and when you have enough you can boost your weapon power. One niggle is the lack of standardisation of left and right controls here. Cyborg Warriors requires Shift and Z rather than Z and X.

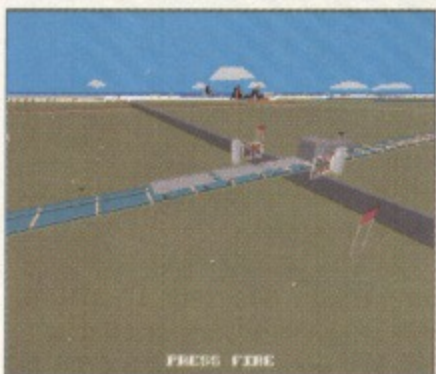
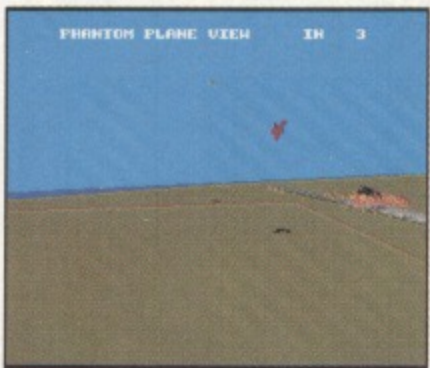
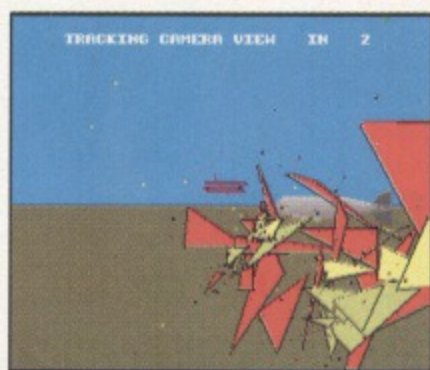
As is usual from Superior, the standard and presentation are of the highest quality. If you haven't already acquired Ricochet and Last Ninja 2 in their previous incarnations then buy Sam 15 – the new ones are a bonus.

Teri Paul



Price: £19.95
Supplier: Eterna/Vector Services,
13 Dennington Road,
Wellingborough,
Northamptonshire NN8 2RL.
Tel: 0933 279300
Requirements: BBC A3000 and
Archimedes range

15



WHAT ho, chaps! Looks like another load of tricky blighters trying to blot out the true blue British spirit. Jolly poor show, what? Have to show 'em we're made of sterner stuff.

New scenarios a bit tougher than before, another 20 missions to fly, plus six recon flights. I was chatting to Flight and he waffled on about completing the six recon missions getting one a medal, or some such rot.

So popped up for a little look-see, just to knock out a couple of Zeppelins – hadn't come across them before. Big? Absolute whoppers, old chap.

And the air was absolutely stiff with those German blighters, Fokker tripehounds mostly – dashed manoeuvrable.

Flak too, by jove. Could hardly move for the stuff, had to stay well over 2,000 feet just to avoid it, any dogfighting and you're soon in the proverbial soup.

Still not too bad, just don't try to take 'em all on, that's what I say: Three to one's OK but twenty to one? Not likely.

Desmond popped by, so we thought why not take a couple of

birds up together, see how it goes. Well, it was a lot of jolly fun, absolutely ripping stuff. Full speed ahead with both of us flying different machines. Terrific.

Took another couple of missions on between us, then got posted to the North Sea. Thought it'd be a bit quieter, but the first thing we had to do was a bit of demolition on a couple of trains and a depot. Still not too hard with two, there's always the other chap to watch your back. Teamwork's the name of the game.

Had one of these new-fangled moving picture cameras, took in the whole trip then back at base we played right through it again.

Jolly fun, we could see everything that happened, and from any angle – even from the the bosch planes as our tracer went through their wings. Super.

Pretty tricky the way things are developing, those enemy builders are certainly putting up some strange birds. Loads more fighters of course, but there's also those Zeps, cargo planes, barrage balloons, oil tankers, gun boats.

There's absolutely everything crammed in, but it's a lot fun – especially with two, each with his own crate.

Well, must sign off now, Desmond



and Greengage have popped over for another spot of Bosch bashing. Tally ho!

Lazarus

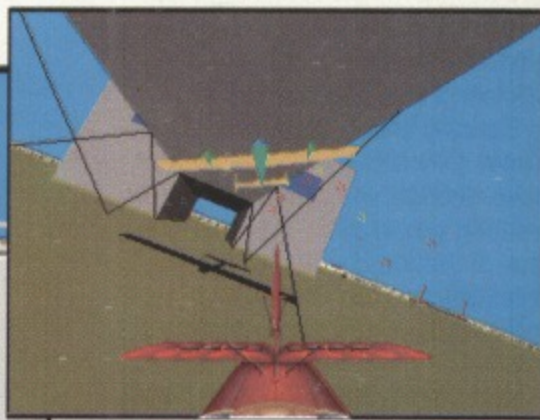
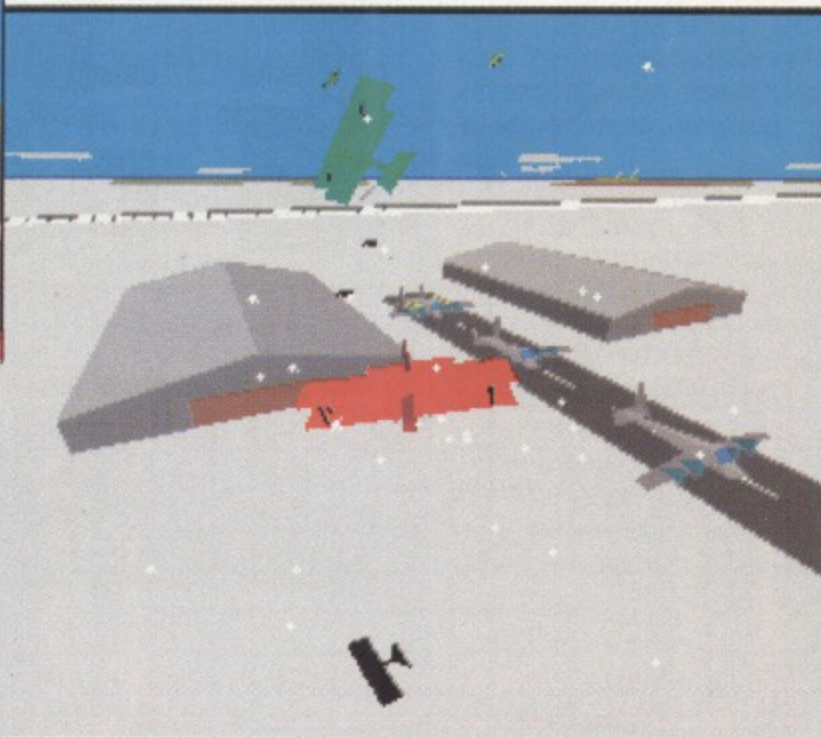
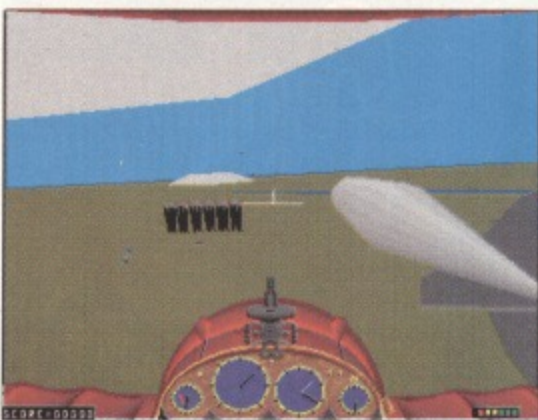
Price: Chocks Away Extra Missions £19.95, Chocks Away Compendium £39.95

Supplier: The Fourth Dimension, 1 Percy Street, Sheffield, S3 8AU
Tel: 0742 700661

Requirements: BBC A3000 and Archimedes range

CHOCKSAWAY

... extra missions





BLASTON



You have been chosen from among the best warriors of the Universal Guild to defeat the Korguls invaders, who are trying to take control of your Uranium rich planet for their own purposes. You must fight them in the desert, a factory, a space "grill" and finally their own space ship. Your task isn't simple but you're really the best!

CODER :
FYB
GFX :
Sylvio
PORRETA
SOUND :
FRD



FINE RACER



Take control over a fast rally buggy and race against various opponents, in a land of adventures.

Your car is upgradable and will respond differently on tarmac, sands or rocks. Of course, you're not MAD MAX but if you meet him make him bite the dust.

CODER :
FRD
GFX :
SAURE
SOUND :
FRD



BUBBLE FAIR



It all began at the fair.

Inky and Jinky were just having fun when the first bubble came down from the sky ...

This game features 72 levels, challenges, bonus and a special noughts and crosses game.

It uses a big overscan screen (384 x 264) with 256 colors.

AVAILABLE JUNE 91

CODER : Philippe Aubessard
GFX : Laurent ROUSSEL
MUSIC & SOUND : Stéphane ANQUETIL
J. AMBROSSE

BALLARENA

If other micros had the power of the Archimedes, they would have this game ...

What the press says :

"It's a game of top quality ... Buy this game, you won't be disappointed" 11/90, BBC Acorn User.

"Ballarena is polished and professional as well as beautifully put together ..."

Graphics : 10 - Sound : 10 - Playability : 9 - Value for money : 10 - Overall : 9 - The micro user 3/91.

CODER : FYB
GFX : FRK
SDX : FRD



All our games are

RTFM Joystick interface compatible.

GAME'S CREATOR

Do you know why coders, graphic artists and musicians from France, England, Ireland, Germany and Switzerland work with us? It's because we offer the highest royalties. We also do adaptations for Coin ops and other machines!

You want more informations : Send us a demo of your game at our headquarter and we'll send you our views :

ETERNA, 4 rue de massacan, 34 740 VENDARGUES, FRANCE.

TACTIC

We're not really sure that you can beat your Archimedes !... Why not give it a try?

"TACTIC can be highly recommended" Syracuse first issue.

"TACTIC is just another addictive game, containing precisely the right amount of simplicity and ingenuity to keep a player going back again and again".

"It's horribly addictive despite the difficulty level and the sound really is nice ..." BAU Graphics :9-Sound :8-Playability :9-Value for money:10-Overall:9-The micro user 3/91.

CODER : FRD
GFX : FRK - **SDX :** FRD

Now on adaptation for :
AMIGA - PC - ATARI ST - APPLE II GS



ETERNA c/o Vector Service Ltd
13 Denington Road
Wellingborough
Northants NN8 2RL
Tel.: 0933 279 300

You can order by cheque, postal order, visa or access. Each game is priced £19.95 inc VAT. Please add £2 per order for post & packing.



Poster

An object-based DTP package which allows you to do far more than create posters. In fact there isn't much in the way of DTP design and layout that can't be done with Poster. It's almost an art package. The application is fully RISC OS compliant, so can 'talk' to Edit, Draw and any other RISC OS program. Poster comes with its own set of unusual outline fonts but will allow you to use any RISC OS outline fonts. It also has a huge collection of interesting borders and clip art. Two features place

Poster in a different league from other packages. Firstly, you can do wonderful things with text. It can be made to flow along any path or it can be moulded into virtually any shape (as can outline Draw files). Secondly, the size of your document is not dependent upon the limitations of your printer. Poster will allow a document of any size to be created (although 100 metres square is not very practical). It then prints the document in sections which can be cut and assembled using the trim marks. Poster documents may be used in other DTP packages.

Snippet

A utility which will make you wonder how you ever managed without it. Snippet will allow you to print or save any part of any screen. It will even cope with most programs running under the 65Host BBC Emulator. But Snippet will allow you to do lots more. Sprites may be converted from one mode to another and even 8 bit BBC screens may be easily converted into Archimedes sprites. A vast array of tools allows you to trim sprites, add borders, change colours, use outline fonts to add text, edit pixels, rotate sections and combine any number of sprites to make a single sprite. A carousel allows sprites to be displayed.



ALSO...

JIGSAW — allows sprites of any size to be converted into jigsaws with real jigsaw-shaped pieces. It comes complete with a set of pictures including some by the well-known artist Rodney Matthews.

JIGLET — the version for younger users. It has fewer pieces and a more appropriate set of pictures.

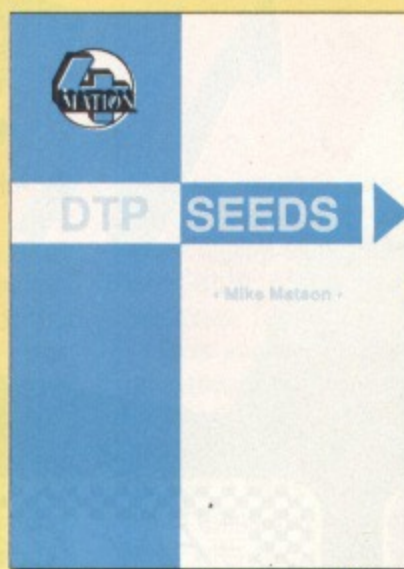
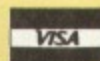
CRAFTSHOP 1 and **CRAFTSHOP 2** — programs allowing those with limited artistic ability to create some stunning results. Both packages are currently in use in thousands of schools and homes.



	£	NZ\$
POSTER	89	367.50
SNIPPET	29	120.00
JIGSAW	29	120.00
JIGLET	29	120.00
CRAFTSHOP 1	29	120.00
CRAFTSHOP 2	29	120.00

DTP SEEDS 8.45 35.00 (discount on 5 or more copies)
no VAT on books

PRICES
include P&P
include site licence
exclude VAT @ 17½%



THIS BOOK WAS
CREATED WITH POSTER

DTP SEEDS

Your Desk Top Publishing program is capable of producing some stunning results. But are you? Do you sit and stare at that blank screen wondering where to start? DTP SEEDS is a book to flick through, a collection of ideas designed to get your imagination working. There are no pages of heavy text to wade through, no references to kerning and leading; just page after page of examples for you to copy, adapt and improve upon. The contents are divided into:

**School Stationery • Business Stationery • Emphasis
Page Layouts • Front Pages • Covers • Posters
Graphs • Titles • Flyers • Contents Pages • Logos
Advertisements • Invitations • Headers • Footers**

FREE SITE LICENCE !!!



We could charge you three, four, or even more, times the normal price for a site licence. But we won't. For our Archimedes packages the price you see is the price you pay. And this price includes a site licence.



4MATION

14 Castle Park Road,
Barnstaple • Devon • EX32 8PA
Tel: (0271) 25353 Fax: (0271) 22974

4MATION New Zealand

P.O.Box 12-228
Christchurch
Fax: (03) 655-055

PARABOLA ENTERPRISES
CHIPPING TONNAGE — MONTH 4 1995



UK
EXOTICA
94



place
where
fashion
THE
place to be
THE
experience

age half hotel
march 13-18

8th Annual
LY GAMES
at
Harper's Field

SATURDAY JULY 28

- BANANA STACKING
- 5 LEGGED RACE
- 10 GALLON TROUSERS
- BODY PAINTING
- COW PAT TOSSING
- CARAVAN CRUNCHING

adults £2.50 children and OAPs £1
all proceeds to charity

CHAOS

reigns

Jim Vernon presents some programs that reveal the unpredictability of nature

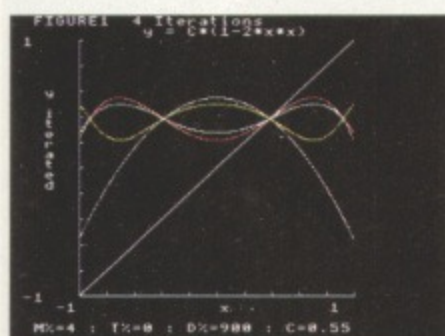


Figure I

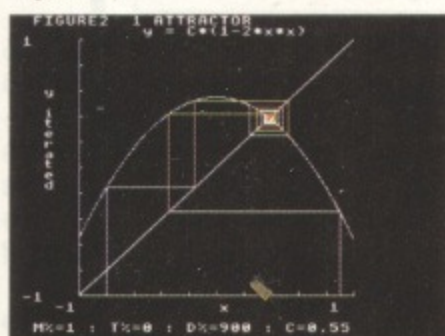


Figure II

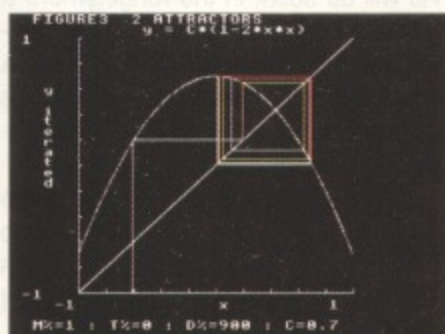


Figure III

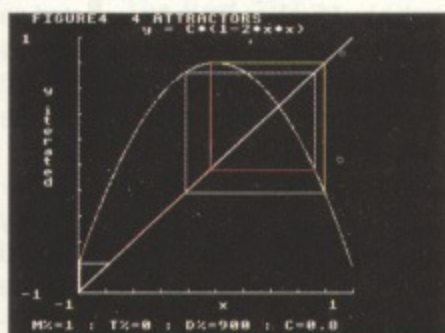


Figure IV

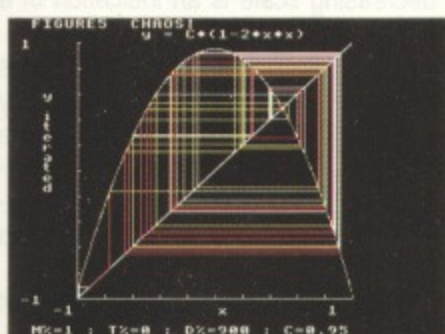


Figure V

RECENT developments in mathematics and science have led to a whole new subject: *Chaos*. With the help of calculators, then computers, recursive calculations have opened doors to hitherto unguessed developments, from the complex roots of equations and the attractive pictures of the Mandelbrot set to Conway's *Life*.

Scientists used to believe that if only the right equations and parameters could be found all future physical developments could be calculated from present measurements.

But now they realise there are elements of uncertainty at the very core of scientific truth and that quite tiny changes in parameters or starting conditions can eventually give enormous shifts in results or even lead to total uncertainty: *Chaos*.

The recalculation of an equation using the result of the previous calculation as the new starting point, known as recursion or reiteration, has long intrigued mathematicians. On a computer this becomes a simple matter of jumping back to the beginning of the formula taking the last result with it and so on, round and round.

This short listing illustrates this by iteratively calculating the terms of a geometric progression and summing them, using two as the divisor and one as the base figure. Line 50 is inserted to slow the process down so you can see what is happening:

```
10 x=1:y=0
20 REPEAT
30 x=x/2: y=y+x
40 PRINT x,y
50 A=GET
60 UNTIL FALSE
```

Here x is halved at every repeat of line

20 and rapidly declines to a very small quantity, while y quickly sums to one. Here's a more complex one:

```
10 x=0.9:C=2
20 REPEAT
30 x=C*x*(1-x)
40 PRINT x
50 A=GET
60 UNTIL FALSE
```

The formula in this program – $C*x*(1-x)$ – is known as the simple logistic equation, and is used in biology to show the growth and decline of populations, in which x measures the population (as a fraction of a fixed value) and C is fixed depending on the environment. The formula measures the population at a series of time periods.

With an initial x of 0.9 and C as 2, x fluctuates but rapidly settles to 0.5 and stays there. By changing the value of C in line 10, you will find that for C less than one x rapidly declines to a tiny value.

But for C between 1 and 3, x fluctuates but eventually reaches a single value, that value being given by the formula $x=1/C$ and so is independent of the initial value of x. As C gets nearer 3 x takes longer and longer to reach its stable value. For a long time that was as far as the analysis of this formula was taken.

However in the 1970s, Robert May and others discovered that with the value of C above three x, after initial fluctuations, settled down to two values, vibrating between them. At C = 3.3, for example, the values are 0.4792 and 0.8236.

It has been discovered experimentally that some insects, under constant general conditions, have two

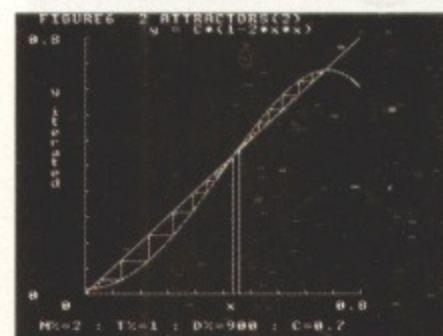


Figure VI

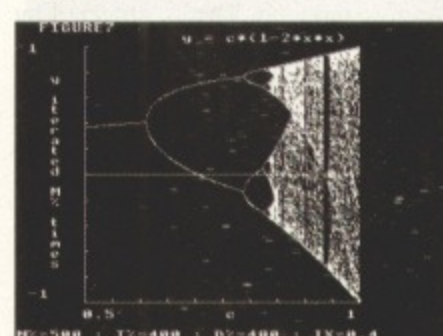


Figure VII

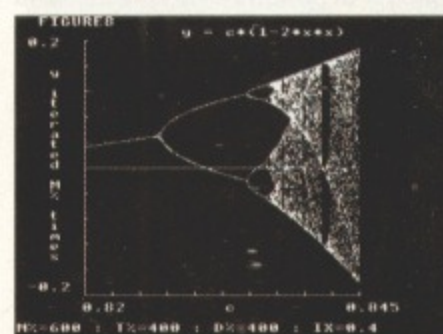


Figure VIII

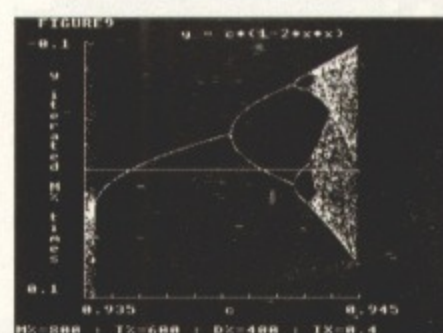


Figure IX

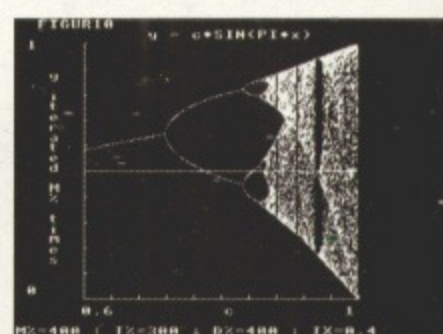


Figure X



significantly different stable population states.

But this wasn't the end of the story. If C is slowly increased beyond 3.4 x stabilises at one of four values, then one of eight and then one of sixteen. The C values have to be increased very slowly and with this simple program that becomes difficult. After a certain value of C (3.575) there is no sign of stability. Chaos has appeared and the values seem to jump all over the place.

To produce this sort of performance the formula in line 30 of Listing II can be any which rises to a single maximum. The following table gives a number of such functions, defined as they would be in a Basic program, with the appropriate ranges of values.

To be able to define any function to be tested and to vary the initial values of x and C a more complex program is required. This is provided by Listing I – Chaos1 – where the formula should be defined in terms of x and C , as in column one of the table.

The value of C and the initial value of x can be specified. There is also scope for the total number of iterations, $M\%$, and the number of these not to be shown, $T\%$, to be varied. It's also possible to choose $T\%=0$ and see the movement towards stability, or choose $M\%=230$ and $T\%=200$ and see whether x has reached stability after 230 iterations. The number of iterations and the value reached are displayed.

You can also increase C progressively by a fixed amount DC by pressing I – to see the effects of gradual increases. If your monitor does not produce clear figures in Mode 0, try Mode 3 by altering line 210 and amend $M\%$ to 20 in line 310.

This program can be used to test out the various functions in the table over the ranges indicated. It will be found that in all cases as C is increased there is first one point of stability, then a bifurcation – split – to vibrate between two values, then four, eight and so on.

Books

R.M. May, Simple Mathematical Models with very Complicated Dynamics (Nature, Vol.261, 10 June 1976)

E. Rietman, Exploring the Geometry of Nature (Windcrest Books, 1989) – the computer programs in this book are in GW Basic.

J. Gleick, Chaos – Making a New Science (Sphere Books, 1988).

Points of stability

The movement of x to a single point of stability – called an attractor point – or, to two or more points can be graphically studied by Listing II: Chaos2. This graphs the results of any function against the original value of x .

The number of iterates to be shown – $M\%$ – and the beginning number to be excluded – $T\%$ – can be set as before. For example, $M\%=4$ and $T\%=3$ would draw a graph of the 4th iterate only.

After the function is defined and the value of the parameter C fixed, ranges of value for x and y and the number of points to be calculated on the x axis are specified. Axes are drawn with 10 intervals marked to permit accurate measurement of points of intersection. The program also draws the straight line $y = x$. The resulting graph is automatically saved with the values of the parameters used.

Provision is also made in the program for defining two initial values – $FF1$, $FF2$ – for stairways of approach to the limiting values. Figure II show such a stairway on the first iterate with $C=0.55$.

From $FF1=-0.8$ on the x axis a vertical line is drawn to meet the graph $y=F(x)$, which we'll call $G1$, then a horizontal line is drawn to meet the line $y=x$ at point $G2$.

Here x has the same value as $y=F(x)$ at point $G1$ and a vertical line

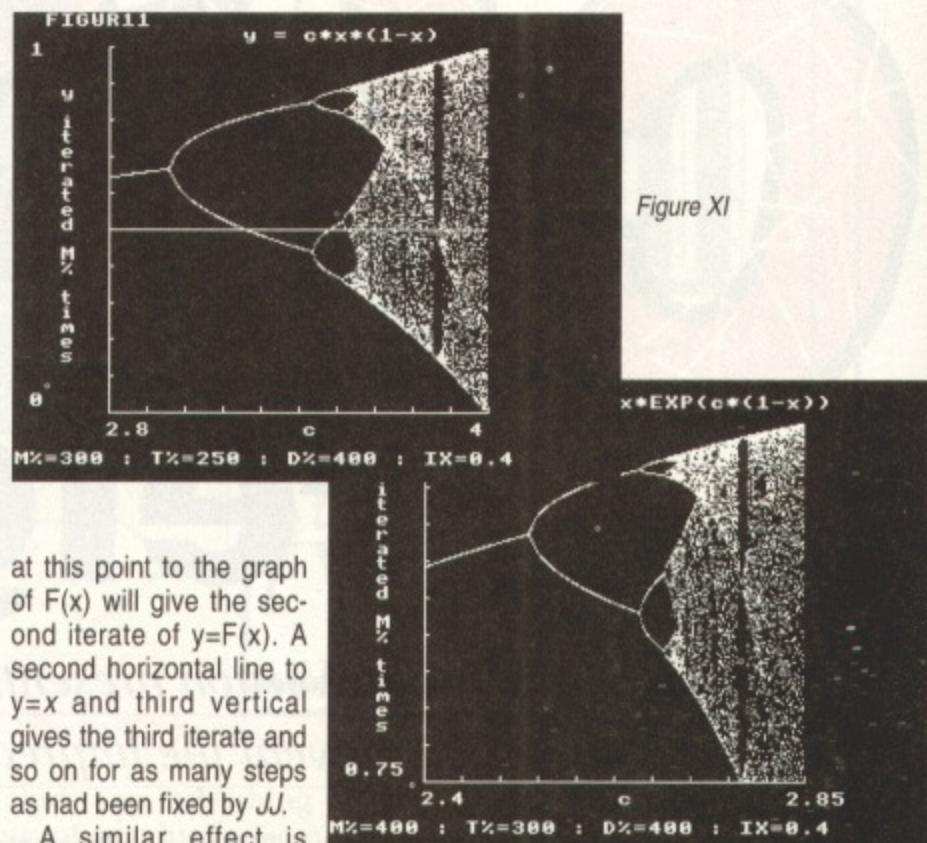


Figure XI

Figure XII

at this point to the graph of $F(x)$ will give the second iterate of $y=F(x)$. A second horizontal line to $y=x$ and third vertical gives the third iterate and so on for as many steps as had been fixed by JJ .

A similar effect is obtained for any value of C less than 0.61 but with higher values the stairway does not reach a single final resting place.

Figure III shows what happens for $C=0.7$ – we get a square. If C is further increased to 0.8 there are two squares as shown in Figure IV.

Figure V shows what happens if C is made more than 0.85: The graph becomes chaotic, repeatedly visiting a whole range of values with a wider range the closer C approaches one.

What is happening when iterated $F(x)$ does not reach a stable value can be examined in Figure VI which is a magnified picture of the part the second iterate between $x=0$ and $x=0.8$ when C is 0.7.

The two stairways start from 0.43 and 0.45 and in this case move by two iterates of $F(x)$ at a time. They settle at two widely separated values of the function. This is, therefore, an example of small differences in initial values producing very different results. Chaos1 can be used to check the values of the stable points in Figures II to VI.

Diagrams of Chaos

As it is clear that variations in the value of c produces differences in the final values of $F(x)$, the next program – Chaos3 – maps iterated values of $F(x)$ against changing values of c .

Any appropriate formula for $F(x)$ can be used, defined in terms of x and c . For each of $D\%$ values of c , $F(x)$ is iterated $M\%$ times. In order to avoid preliminary fluctuations in $F(x)$ the first $T\%$ iterations are not graphed.

$M\%$ and $D\%$ can be made low, say 100, for a quick check that the right

areas have been chosen, but $M\%$ needs to be increased to at least 300 with $T\%$ at 200 and $D\%$ to 400 to produce an uncluttered graph, although with those figures the calculations may take up to an hour. The line $y=XMAX$ is also drawn, the purpose of this will be described later.

Figure VII is a typical product of this program for the function $c*(1-2*x*x)$. As will be seen, in the range where c gives a unique value of $F(x)$ that single value is graphed $M\%-T\%$ times. A small increase in the value of c gives a neighbouring value of $F(x)$, thus producing a single line.

When c reaches its first bifurcation point at 0.61... the line splits in two then as c is increased further each line divides again into four then eight lines.

Chaos3 permits smaller ranges of values of $F(x)$ and c to be selected so that enlargements of particular areas can be studied. Figure VIII is an enlargement of Figure VII around the area where $F(x)$ equals 0.

It will be seen that the shape, allowing for the change in scales, is nearly identical. Further enlargements would produce the same result, within the capacity of the computer. This repetition of the same pattern on an ever decreasing scale is an indication of a fractal.

As c is further increased the values of $F(x)$ show no obvious consistency and, in effect, chaos has started. The graph of $F(x)$ then covers first two vertical lines and later one which gradually grows until it stretches from -1 to 1.

It is, however, a strange kind of

Formula	Ranges			
	x	y	C	XMAX
$C*(1-2*x*x)$	-1,1	-1,1	0.5,1	0
$C*x*(1-x)$	0,1	0,1	1,4	0.5
$C*SIN(PI*x)$	0,1	0,1	0.5,1	0.5
$C*x*(1-x*x)$	0,1	0,1	1.8,2.6	0.57735
$C*(1-(2*x-1)^4)$	0,1	0,1	0.75,1	0.5
$1-C*x*x$	2,-1	1,0	2	n/a
$C*x-x^3$	2,0.5	1.5,1.6	2.6	n/a
$x*EXP(C*(1-x))$	0,3	0,2	2.4,3	n/a

caption

The Fourth Dimension

1st Class U.K. FREE Delivery

HOW TO ORDER



TELEPHONE

(0742) 700661 / 769950

ACCESS & VISA Accepted

24 Hour Service 7 Days a Week



LETTER

Simply send us a quick letter telling us the game(s) you require, your name and address, and payment via cheque, postal order or ACCESS or VISA card details.

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

NO Quibble GUARANTEE

If any of our discs ever become faulty (for whatever reason) we will replace them free of charge immediately

Simply return them to us with your name and address

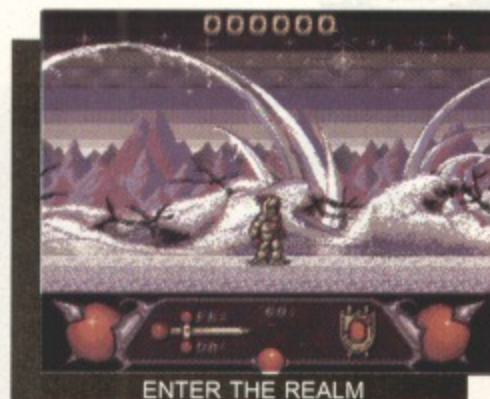
SAME DAY DESPATCH

All orders are despatched immediately by 1st Class post. Carriage is paid by us in the U.K. (Overseas orders add £3 per product).

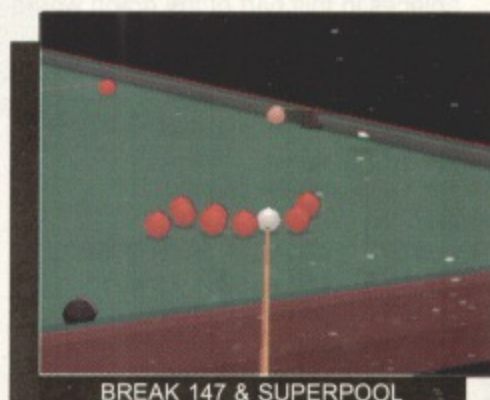
FULL DETAILS OF ALL OUR GAMES ARE AVAILABLE ON REQUEST & ARE SENT WITH ALL ORDERS

SPECIAL OFFER

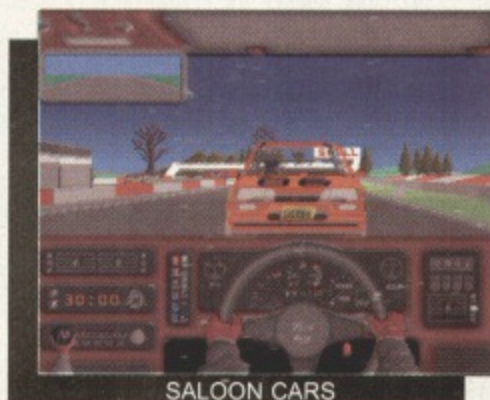
If you buy 3 or more products directly from us you may deduct £10 from the total cost



ENTER THE REALM



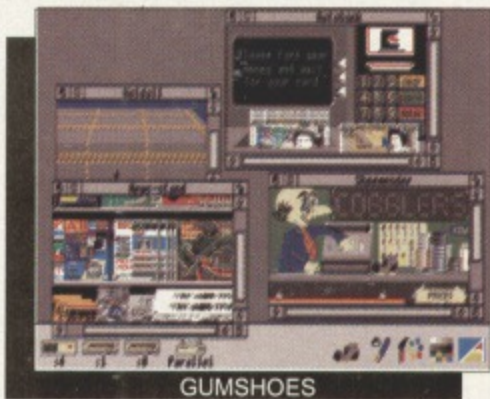
BREAK 147 & SUPERPOOL



SALOON CARS



CHOCKS AWAY EXTRA MISSIONS



GUMSHOES

BBC A3000 & ARCHIMEDES

ALL the following Archimedes games are compatible with the BBC A3000 and 310 & 400 Series

Saloon Cars (See COMING SOON)	24.95
Break 147 & Superpool (See COMING SOON)	24.95
ARcticulate (A comprehensive speech package)	24.95*
Boogie Buggy (Arcade Graphics & Gameplay)	24.95*
Gumshoes (Detective Graphic Adventure)	24.95*
The Real McCoy 2 (4 Game Compilation)	29.95
(Apocalypse, Holed Out, The Olympics & Inertia)	
Chocks Away (Biplane Sim. 1 or 2 players)	24.95
Chocks Away Extra Missions	19.95
(26 extra missions plus some superb enhancements)	
Chocks Away Compendium	39.95
(Chocks Away + Chocks Away Extra Missions)	
The Wimp Game (Unique Graphic Adventure)	19.95
Powerband (Superfast Formula 1 Grand Prix)	24.95
The Real McCoy (4 Game Compilation)	29.95
(U.I.M., Arcade Soccer, White Magic & Quazer)	
E-Type (3D Classic Car Racing)	19.95
E-Type Designer	16.95
E-Type Extra 100 Miles	16.95
Holed Out (3D Golf for 1 to 6 players)	19.95
Holed Out Extra Courses Vol.1	16.95
Holed Out Extra Courses Vol.2	16.95
Holed Out Designer	19.95

Drop Ship (Superfast Arcade Action)	19.95
Nevryon (Unbelievable Graphics & Gameplay)	19.95
Inertia (Isometric Arcade Action)	19.95
Apocalypse (3D Mega Game - 9 Planets)	29.95
The Olympics (6 Varied Events)	19.95
Pysanki (Futuristic Arcade Adventure)	19.95
Man-At-Arms (Medieval Arcade Adventure)	19.95
U.I.M. (Massive 3D Action Adventure)	29.95
Arcade Soccer (World Cup 1-24 Players)	19.95
White Magic (Arcade Adventure)	19.95
White Magic 2 + Designer	19.95
Quazer (Furious Arcade Action)	11.95

COMING SOON

*Gumshoes, Arcticate & Boogie Buggy

The above 3 titles should all now be released

Saloon Cars Hopefully June '91

The Ultimate Driving "Game-ulation"!

Break 147 & Superpool Hopefully June '91

'Real' snooker & pool simulator par excellence

Enter The Realm Hopefully September '91

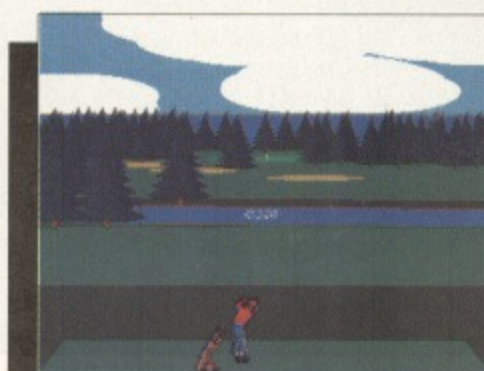
An epic arcade adventure from the author of Nevryon



BOOGIE BUGGY



NEVRYON



HOLED OUT

THE FOURTH DIMENSION

1 Percy Street
Sheffield
S3 8AU
Tel. (0742)
700661 or 769950



chaos, because there are within this dark area values of c at which $F(x)$ has again distinct values. These are visible as vertical white lines. Some can be seen on Figure VII and further enlargement of limited areas would produce a lot more.

By research it is possible to find places in this part of the graph where $F(x)$ has any number of values from

three upwards. With $c=0.936$, for example, there are three distinct values of $F(x)$. This can be verified by program Chaos1 which gives the three values as -0.703, 0.01 and 0.936. Increasing c to 0.942 leads to a bifurcation to six values, then 12 and so on until chaos returns again.

Figure IX magnifies the area from $c=0.935$ to 0.945 to show what is happening at the centre of these three values of c . The graph starts

from chaos, suddenly acquires a value – the other two are off the picture – then bifurcates, bifurcates again and rapidly goes back to chaos.

The general shape of the graph is again similar to that in Figure VII.

Chaos3 can be applied to any other formula of the types listed in the table. Figures X, XI and XII show three typical results for the formulae $c \cdot \sin(\pi \cdot x)$, $c \cdot x \cdot (1-x)$ and

$x \cdot \exp(c \cdot (1-x))$. Despite the fact that they originate from very different sources the graphs of iterated $F(x)$, allowing for differences of scale, have a strong family resemblance.

● Well, that's about it for Chaos here. Although there's no end of it in the mathematics world, you can see that at least in some cases it does apply to the real world too.

```
10 REM RECURSIVE CALCULATIONS
20 REM by Jim Vernon
30 REM (c) The Micro User
40 MODE7
50 PRINT"" RECURSIVE CALCULATIONS"
60 PRINT"" Any Suitable Formula"
70 PRINT""The formula is iterated starting from ""a selected value of x. A fixed value""of C is chosen. Its value c can be""increased by pressing any key."
80 PRINT""The number of iterations (M %) and the""number, if any, not to be printed(TX)""is also selected."
90 INPUT ""Formula in x and C ""X$
100 INPUT ""Value of constant C ""C
110 INPUT ""Increment in C value (DC) ""DC
120 INPUT""Initial value of x ""IX
130 INPUT ""Total number of iterations ""IM%
```



```
140 INPUT "Number to be ignored ",IT%
150 MODE0
160 MX=IM%:TX=IT%
170 X=IX
180 FOR NX = 1 TO MX
190 IF NX <= TX GOTO 220
200 @X=&0080A
210 PRINT"n= ";NX," F(x)= ";X," C= ";C
220 X=FNformula(X)
230 NEXT
240 INPUT"N for more iterations, I to increment C and E to finish",A$
250 IF A$="N" TX=MX:MX=MX+30:GOTO 180
260 IF A$="I" C=C+DC:GOTO 160
270 IF A$="E" END
280 GOTO 240
290 DEF FNformula(X)=EVALX$
```



10 = 0 0	160 = 1750 8
20 = 0 0	170 = 2CEB 7
30 = 0 0	180 = C966 E
40 = 8AFC C	190 = 7B3B B
50 = 3454 A	200 = 7612 5
60 = B360 3	210 = A955 7
70 = 7840 9	220 = CA8B 6
80 = 837C 3	230 = 2C83 7
90 = C53D C	240 = 6A1C 9
100 = 7EAF C	250 = 8B9E 2
110 = 29F9 2	260 = FBA1 D
120 = 13 C	270 = E659 2
130 = 13A C	280 = 2305 9
140 = C321 6	290 = EBB6 5
150 = FA1B A	

```
10 REM STAIRWAY PROGRAM
20 REM by Jim Vernon
30 REM (c) MICRO USER
40 MODE1
50 PRINT"" ANY FORMULA"
60 DIMFF(2)
70 PRINT""This prog. graphs any iterated F(x)""against x for any number (M%) of""iterations and over any range of x ""
80 PRINT""The value of parameter C and the total""number of iterations per value of x""to be ignored can be varied."
90 PRINT""Beginning and number of stairs can be""chosen and early stairs not shown."
100 REM Input constants, ranges etc.
110 INPUT""Formula in x and C (=y)""X$
120 INPUT""Value of C (C) ""C
130 INPUT"Limits of x (=X0,X1)""X0,X1
140 INPUT"Limits of y = F(x) (Y0,Y1)""Y0,Y1
150 INPUT""No. of points on x axis(DX)""DX
160 INPUT ""Total no. of iterations per val.x(=MX)""MX
170 INPUT""No. of iterations to be ignored(TX)""TX
180 TX=TX+1
190 INPUT""Initial stairway values (zero if none, equal if only one) (FF(1)&(2))""FF(1),FF(2)
200 INPUT""No. of moves to attractor (J)""JJ
210 INPUT""No. of moves ignored""TT
220 INPUT""NAME of File""A$
230 INPUT""Description""B$
240 CLS
250 VDU19,7,0,0,0:VDU19,0,7,0,0,0
```

```
260 REM Draw axes (with 10 divisions), mark ranges etc.
270 PROCaxis(200,150,200,950)
280 FOR I=1 TO 10:PROCaxis(200,150+I*80,210,150+I*80):NEXT
290 PROCaxis(200,150,1000,150)
300 FOR I=1 TO 10:PROCaxis(200+I*80,150,200+I*80,160):NEXT
310 PRINT TAB(2,0);A$;" ";B$
320 PRINT TAB(12,1)"y = ";X$
330 PRINT TAB(1,2);Y1:PRINT TAB(1,27);Y0
340 PROCiter(3,6)
350 PRINT TAB(4,28);X0:PRINT TAB(19,28)"x":PRINT TAB(29,28);X1
360 PRINT TAB(2,30)"MX=";MX" : TX=";TX-1; " : DX=";DX;" : C=";C
370 REM Calculate iterated values of y against values of x
380 K=X1-X0:P=K/DX:L=Y1-Y0
390 DD=3
400 FOR N=TX TO MX
410 FOR x=X0 TO X1 STEP P
420 y=x:z=x
430 FOR KX=1 TO N
440 y=FNformula(y)
450 NEXT
460 S=(y-Y0)*800/L+150
470 SS=(x-Y0)*800/L+150
480 R=(x-X0)*800/K+200
490 REM Values not plotted if outside chosen ranges
500 IF S<150 OR S>950 GOTO 540
510 IF R<200 OR R>1000 GOTO 540
520 GCOL 0,DD:PLOT 69,R,S
530 GCOL 0,3:PLOT 69,R,SS
540 NEXT
550 DD=(DD+1)MOD4
560 IF DD=0 DD=1
570 NEXT
580 IF FF(1)=0 OR FF(2)=0 GOTO 820
590 FOR PP=1 TO 2
600 G=FF(PP)
610 FOR AA=1 TO MX
620 G=FNformula(G):H=G
630 NEXT
640 GCOL 0,3
650 MOVE (FF(PP)-X0)*800/K+200,150:DRAW (FF(PP)-X0)*800/K+200,(G-Y0)*800/L+150
660 DRAW(G-X0)*800/K+200,(G-Y0)*800/L+150
670 BB=1:CC=1
680 REPEAT
690 IF BB=0 BB=1
700 G=H
710 GCOL 0,BB
720 FOR AA=1 TO MX
730 H=FNformula(H)
740 NEXT
750 IF CC<TT GOTO 790
760 DRAW(G-X0)*800/K+200,(G-Y0)*800/L+150
770 DRAW (G-X0)*800/K+200,(H-Y0)*800/L+150
780 BB=(BB+1)MOD4
790 CC=CC+1
800 UNTIL CC>JJ
810 NEXT
820 PROCsave(A$)
830 END
840 REM Procedure for drawing lines to make axes etc.
850 DEFPROCaxis(LX,MX,NX,OX)
860 MOVE LX,MX
870 DRAW NX,OX
880 ENDPROC
890 REM Formula defined
900 DEF FNformula(x)=EVAL(X$)
910 DEF PROCiter(A$,B$)
920 LOCAL AS
```

```
930 FOR I = 1 TO 10
940 A$ = MIDS("y iterated",I,1)
950 PRINT TAB(A$,B$+I)A$
960 NEXT:ENDPROC
970 DEFPROCcli($&700)LOCALX$,Y$
980 Y$=7:CALL&FFF7:ENDPROC
990 DEF PROCsave(Z$)
```

10 = 0 0	300 = 5C2E E
20 = 0 0	310 = 9676 9
30 = 0 0	320 = 9374 9
40 = EA3A A	330 = B064 F
50 = 52A0 4	340 = 30B5 2
60 = 4824 D	350 = 1E43 E
70 = 348C 1	360 = CF5A 6
80 = CC32 2	370 = 0 6
90 = E5FC 2	380 = FAD D
100 = 0 2	390 = 10F9 7
110 = A9B0 0	400 = 9312 F
120 = 3844 7	410 = EBF5 E
130 = 28D5 6	420 = 614 B
140 = 23DC 1	430 = 86B2 7
150 = 59CD 2	440 = BCD9 8
160 = FCC 7	450 = 2C83 2
170 = 53CA 8	460 = B17B 7
180 = 5E5E A	470 = 9CAE C
190 = 3E5A E	480 = 6BA4 9
200 = E23A B	490 = 0 9
210 = 8D00 A	500 = 5B6 B
220 = E754 E	510 = 1A5E 1
230 = 3F48 1	520 = 7EC7 7
240 = 7A16 1	530 = 7C9A C
250 = F71A 1	540 = 2C83 1
260 = 0 1	550 = EBF8 0
270 = D5BA 7	560 = E93A 6
280 = 6C9D 6	570 = 2C83 1
290 = 1757 C	580 = 5230 D


```

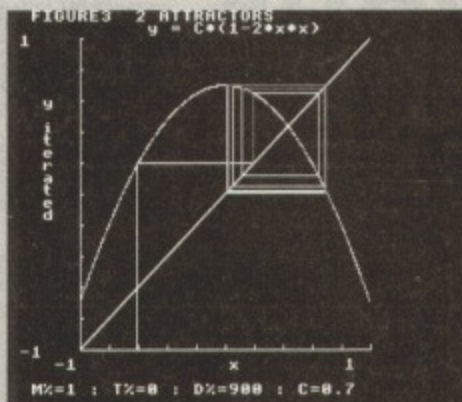
10 REM DIAGRAMS OF CHAOS
20 REM by Jim Vernon
30 REM (c) The Micro User
40 MODE1
50 PRINT "ANY FORMULA y=F(x)"
60 PRINT "This prog. graphs F(x) iter
ated M% times against changing c for t
he " chosen formula. Ranges of y and of
c " and the initial value of x can be
" varied."
70 PRINT "The range of c is divided i
nto D% intervals and y is iterated M%
times " for each value of c, the first T
% values ignored and the rest, if with
in " the chosen range of Y, graphed."
80 REM Input constants, ranges etc.
90 INPUT "Formula - in x and c ", XS
100 INPUT "Limits of c (=C0,C1)", C0,C1
110 INPUT "Limits of y (=Y0,Y1)", Y0,Y1
120 INPUT "Initial x (=IX)", IX
130 INPUT "No. of points on c axis(D%)"
,D%
140 INPUT "Total No. of iterations per
val.c(=M%)", M%
150 INPUT "No. not to be printed(T%)", T
%
160 INPUT "Value of XMAX", XMAX
170 INPUT "NAME of File", AS
180 CLS
190 VDU19,7,0,0,0,0:VDU19,0,7,0,0,0
200 REM Draw axes (with 10 divisions),
mark ranges etc.
210 PROCaxis(200,150,200,950)
220 FOR QX=1 TO 10:PROCaxis(200,150+QX

```

```

*80,210,150+QX*80):NEXT
230 PROCaxis(200,150,1000,150)
240 FOR QX=1 TO 10:PROCaxis(200+QX*80,
150,200+QX*80,160):NEXT
250 PRINTTAB(2,0);AS
260 PRINTTAB(15,1)"y = ";XS
270 PRINTTAB(1,2);Y1:PRINTTAB(1,26);Y0
280 PROCiter(3,4)
290 PRINTTAB(6,28);C0:PRINTTAB(19,28)"
c":PRINTTAB(30,28);C1
300 PRINTTAB(0,30)"M%=";M%"; T%=";T%
"; D%=";D%"; IX=";IX
310 REM Calculate values of F(x) itera
ted M% times for each c
320 K=C1-C0:P=K/D%:L=Y1-Y0
330 FOR c=C0 TO C1 STEP P
340 y=IX
350 FOR NX=1 TO M%
360 y=FNformula(y)
370 REM First T% values of y not shown
380 IF NX<=T% GOTO 390
390 YS=(y-Y0)*800/L+150
400 CS=(c-C0)*800/K+200
410 REM y not plotted if outside range
420 IF YS<150 OR YS>950 GOTO 440
430 PLOT 69,CS,YS
440 NEXT
450 YMAX=(XMAX-Y0)*800/L+150
460 IF YMAX<150 OR YMAX>950 GOTO 490
470 PLOT 69,CS,YMAX
480 REM Same calculations and plot for
next value of c
490 NEXT:PROCsave(AS):END
500 :
510 REM Formula defined
520 DEF FNformula(x)=EVAL(XS)
530 :
540 REM Procedure for drawing lines to

```



```

make axes etc.
550 DEFPROCaxis(LX,MX,OX,PX)
560 MOVE LX,MX:DRAW OX,PX
570 ENDPROC
580 :
590 DEFPROCiter(AX,BX)
600 LOCAL AS
610 FOR I=1 TO 19
620 AS = MIDS("y iterated M% times",I,
1)
630 PRINTTAB(AX,BX+I)AS
640 NEXT:ENDPROC
650 :
660 DEFPROCcli($$700)LOCALXX,YX
670 YX=7:CALL&FFF7:ENDPROC
680 :
690 DEF PROCsave(Z$)
700 IF PAGE<8000 PROCcli("SAVE "+Z$+"
3000 8000")
710 IF PAGE>8000 OSLI("ScreenSave "+
Z$)
720 ENDPROC

```

10 =	0 0	390 =	E73 E
20 =	0 0	400 =	7040 B
30 =	0 0	410 =	0 B
40 =	EA3A A	420 =	4D5 E
50 =	AE9F 6	430 =	2ABF 5
60 =	66D3 9	440 =	2C83 0
70 =	DE99 2	450 =	5D0D A
80 =	0 2	460 =	95FD F
90 =	A8E C	470 =	27B 0
100 =	9ECF 5	480 =	0 0
110 =	8B71 4	490 =	A96C 9
120 =	ACFF F	500 =	9719 7
130 =	F9F2 4	510 =	0 7
140 =	185B F	520 =	E048 C
150 =	F5C4 3	530 =	9719 5
160 =	5184 7	540 =	0 5
170 =	E754 2	550 =	1158 1
180 =	7A16 8	560 =	DAD9 0
190 =	F71A D	570 =	ED0F 5
200 =	0 D	580 =	9719 A
210 =	D5BA E	590 =	72D5 6
220 =	9314 0	600 =	309C 0
230 =	1757 D	610 =	A4DC 1
240 =	D074 6	620 =	8822 9
250 =	33AA 3	630 =	F1A9 6
260 =	ECE6 6	640 =	E531 7
270 =	78CD 0	650 =	9719 9
280 =	56D7 4	660 =	6188 3
290 =	AAC3 B	670 =	50E0 0
300 =	C81E F	680 =	9719 5
310 =	0 F	690 =	8DDE 4
320 =	23CF 6	700 =	E14F 7
330 =	6FD1 5	710 =	80D0 C
340 =	5A5F E	720 =	ED0F 3
350 =	C966 E		
360 =	BCD9 1		
370 =	0 1		
380 =	AAC5 4		

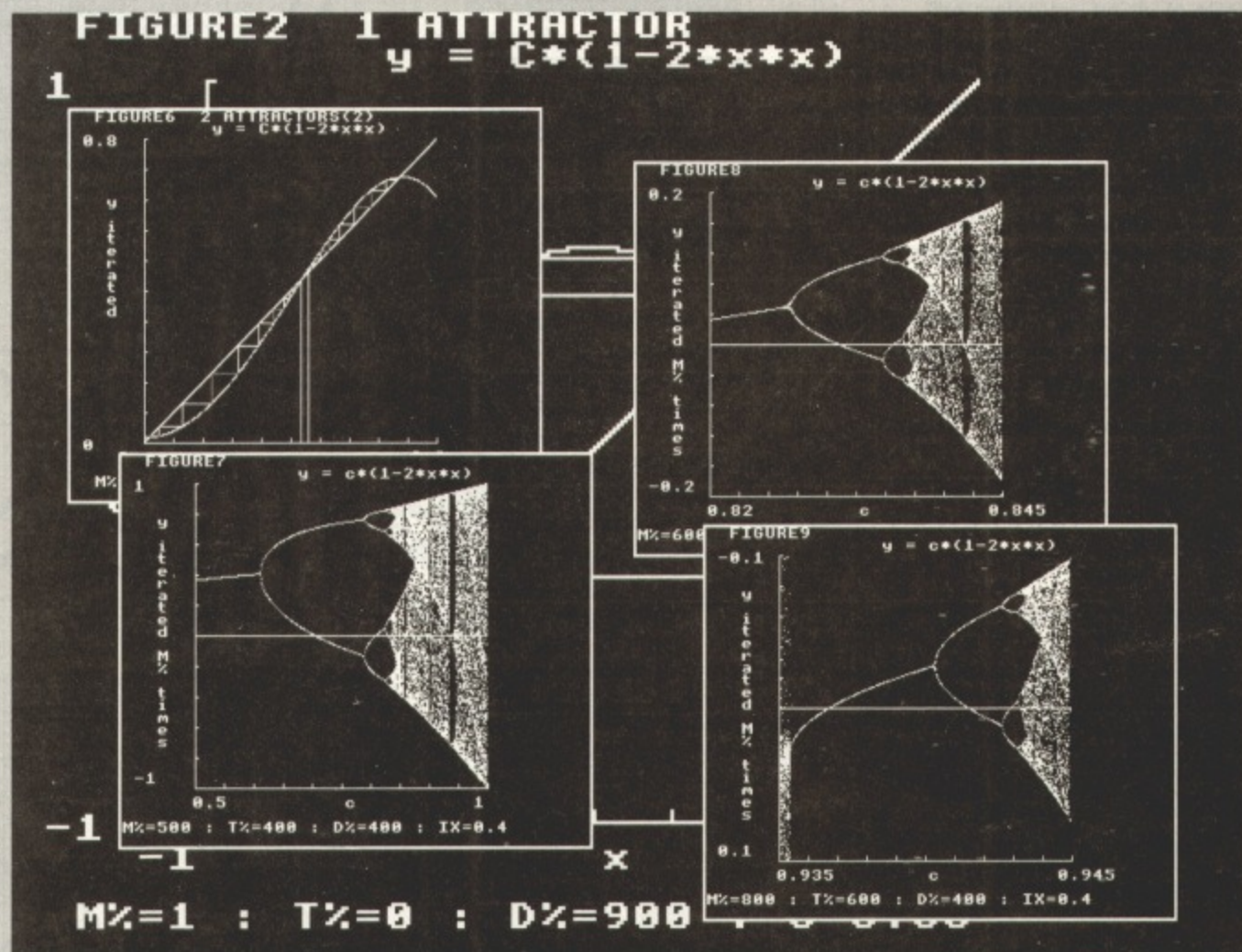
```

1000 IF PAGE<8000 PROCcli("SAVE
"+Z$+"
3000 8000")
1010 IF PAGE>8000 OSLI("ScreenSave
"+
Z$)
1020 ENDPROC

```

Get it right ✓

590 =	2F74 F	810 =	2C83 F
600 =	EEE4 9	820 =	B483 3
610 =	F97 B	830 =	FD2E A
620 =	9632 A	840 =	0 A
630 =	2C83 7	850 =	3BAA B
640 =	41D9 2	860 =	9238 4
650 =	3190 F	870 =	31D6 2
660 =	7A20 C	880 =	ED0F 3
670 =	9725 5	890 =	0 3
680 =	BFBA 8	900 =	E048 6
690 =	A640 F	910 =	3A74 8
700 =	2238 6	920 =	309C B
710 =	D20B E	930 =	A8B9 5
720 =	F97 C	940 =	4B8A A
730 =	F4C2 E	950 =	23A2 E
740 =	2C83 8	960 =	E531 B
750 =	52C1 2	970 =	6188 3
760 =	7A20 8	980 =	50E0 8
770 =	9E1D 6	990 =	8DDE D
780 =	7AE0 6	1000 =	E14F C
790 =	C1D9 8	1010 =	80D0 1
800 =	2F4D B	1020 =	ED0F 8





Give your software a hard edge

.....

In the jungle of Desktop Publishing and Computer Aided Design, tracking down the perfect drawing tool can seem like a never-ending task.

Now discover **TRACER**, the ideal companion for users of all DTP and scanning packages.

TRACER will take a sprite file and turn it into a draw file, which can then be edited or manipulated without any loss of detail.

Amongst the many features of **TRACER** is a **curve fitting facility**, **variable trace options** and the unique **Automatic Tracing Facility** – giving you the control to keep even your wildest image in line!

For use with the Archimedes, **TRACER** is an ARM coded RISC OS multi-tasking application and will easily run on a 1Mb machine.

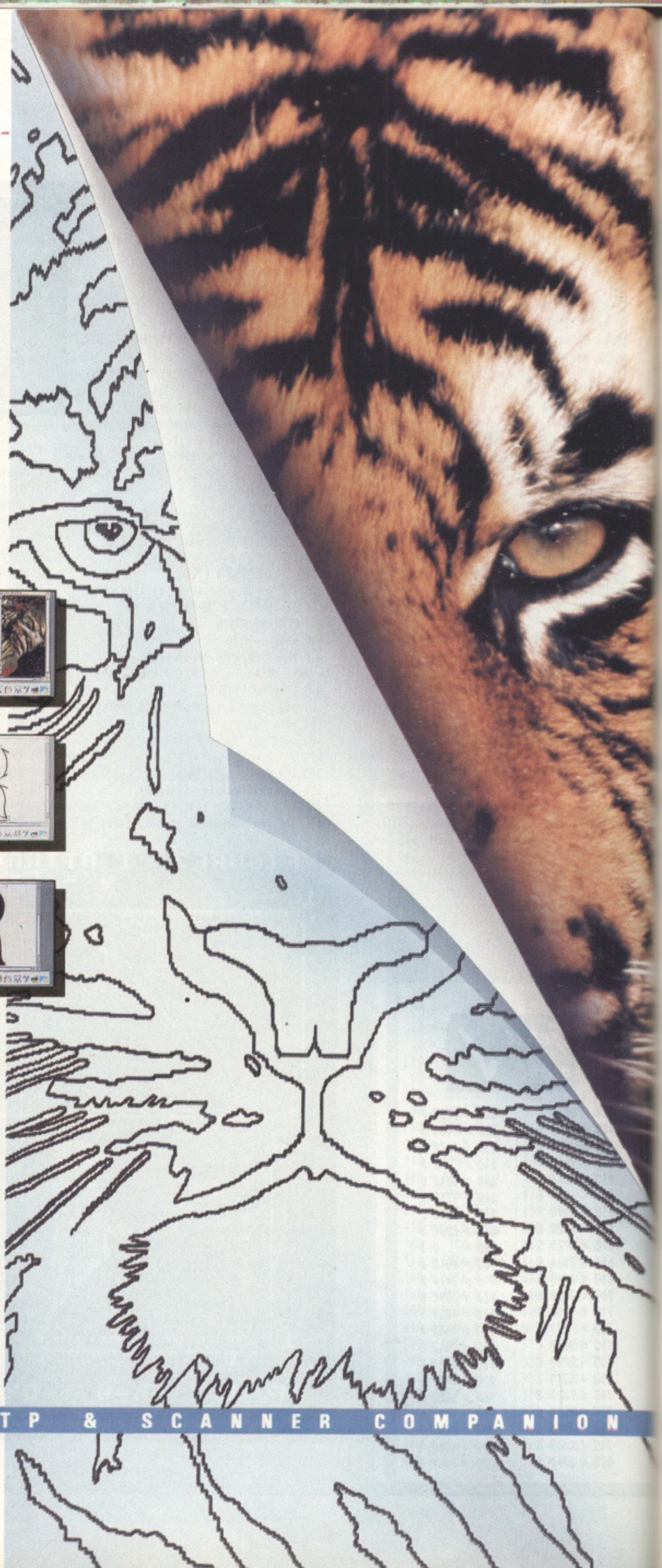
TRACER. The Creative Computer Drawing program. RRP £52.13 (excl. VAT).

TRACER



T H E P E R F E C T D T P & S C A N N E R C O M P A N I O N

For information and orders
TELEPHONE 061-766 8423
Midnight Graphics, 5 Victoria Lane,
Manchester M25 6AL



Take a new PERSPECTIVE

If you are a designer or draughtsman in almost any mechanical field, a technical illustrator or graphic designer, there will come a time when you need to produce an accurate perspective drawing from a dimensioned working drawing.

If you work for a large company using CAD, facilities for making the 3D drawing may be available but if not, and you are not conversant with the subject, a visit to the local public library or the nearest bookshop may seem to be a way round the problem.

If you are able to find any book on the subject it will almost certainly only give details of the traditional geometrical methods, as shown in Figure I.

There are so many drawbacks to the geometrical methods that they are virtually useless for serious work. A very large sheet of paper is needed for a small view, due to poor accuracy curves cannot be plotted, a very high standard of draughting skill is essential, they are time consuming and lack versatility.

A satisfactory solution is to use a

mathematical method, but unfortunately the information is not generally available. The calculations are complex and lengthy, but with the aid of your computer and a suitable program they become child's play.

The obvious advantage is that once data from the working drawing has been entered, it can be used for an infinite variety of views by simply altering a few variables. Also, great accuracy is assured.

The method to be described, which we'll call CAPD - Computer-aided

Harry Wall has a program to produce computer-generated true scale 3D drawings

perspective drawing -, is practical, simple to operate, extremely versatile and works like this: The salient points to be used are numbered on the working drawing and the three co-ordinates of each point entered into the computer.

The variables which determine the relationship of object to eye are entered and also the sequence in which the points will be joined together to produce the view. A wire drawing can then be switched on to the screen.

By using the keyboard this can be completely rotated in two planes, enlarged, reduced, and the eye point moved forward and backward.

When the view is to your liking a print out of the X and Y co-ordinates of the final view can be made and saved to disc. These can be used to feed into a plotter, make a drawing manually or dumped to a printer.

The draughting skills needed are minimal. Frame switching using colours is used which means that the next view is drawn on the hidden

screen so that when the views are changed, they do so instantaneously.

The program needs the extra memory that only the B+, Master and Archimedes can provide - unless you have shadow screen on your Model B or Electron.

The basic idea behind CAPD is simple. If you view an object through a flat sheet of glass with one eye closed and the outline seen is marked on the glass, this will be the equivalent of the perspective drawing with the sheet of glass representing the drawing paper.

The maths are solely to translate dimensions W, L and H taken from the subject, to X and Y which are the co-ordinates in the final view. There is no need for you to get involved with the maths since the program takes care of it and therefore you'll be spared a description of how they work.

Although vanishing points are not used, parallel lines on the object converge correctly to invisible vanishing points the positions of which are determined by the variables keyed in.

Before using the program, the first step is to compile a chart listing the width, length and height dimensions taken from the working drawing.

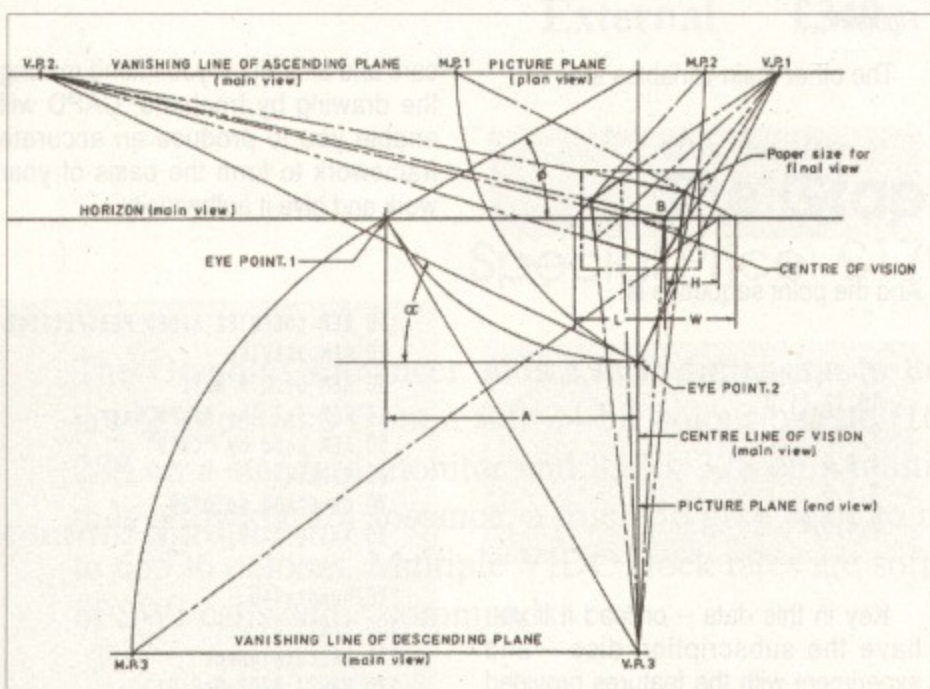


Figure I: Traditional geometrical methods

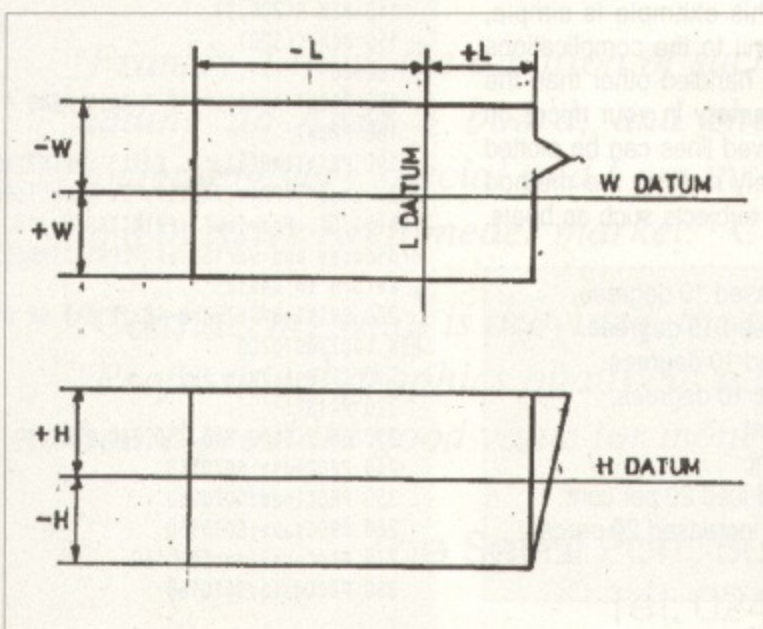
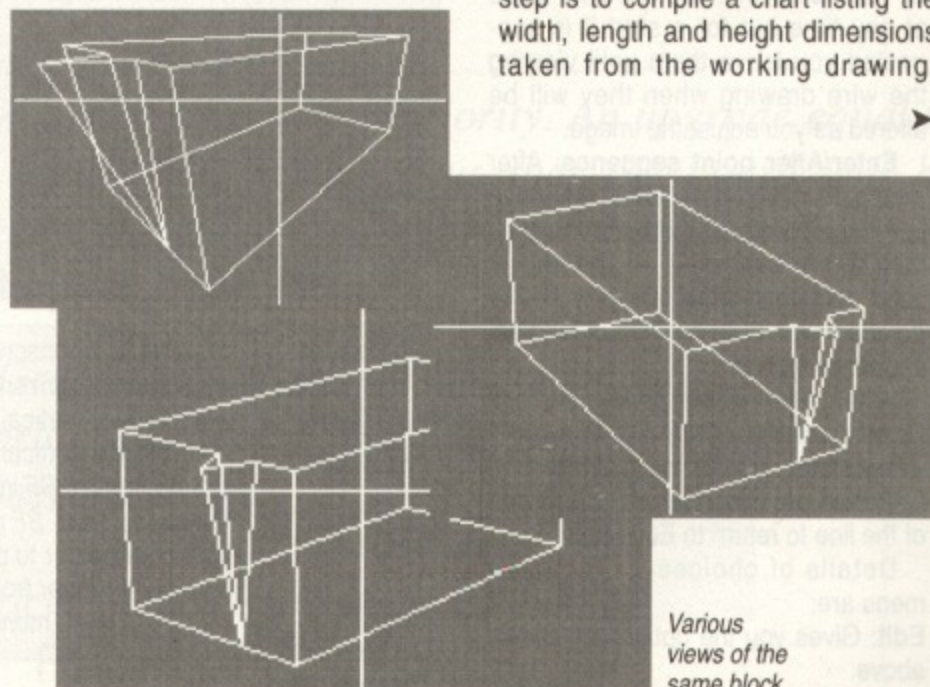


Figure II



Various views of the same block



GRAPHICS

These are *W*, *L* and *H*. Number each point to be plotted and decide on the *W*, *L* and *H* datums. The way the working drawing is dimensioned will help.

Each dimension must be taken from one of the datums and will be + or - depending on which direction it takes, see Figure II for the rules.

The next step is to relate the *W*, *L* and *H* datums to the centre of vision by determining *W2*, *L2* and *H2*. For a single subject the *C.V.* should be at the centre of the object.

It is possible to create a picture having more than one object in it. In this case the *C.V.* should be at the centre of the scene.

Each subject has to be dealt with separately and the relationship between each object will be determined by the values given *W2*, *L2* and *H2*.

Provided *A*, *S* and *SF* are the same for each object, when they are finally plotted on a single sheet of paper, they will all fit into the perspective of the scene with all parallel lines converging correctly to common vanishing points. See Figure III for details of the signs for *W2*, *L2* and *H2*.

When you have reached this stage the worst is over. The program can now be brought in to do the really hard work. Type the listing, check for errors with the checksums and save it as CAPD.

When it's run the main menu will appear, so go from this to Edit. Details of the choices follow, but in the main you simply follow the prompts. At any time, Escape will return you to the main menu.

Enter subject data: Enter all the *W*, *L* and *H* dimensions from your chart following the prompts.

Alter subject data: Enables you to alter any *W*, *L* and *H* dimensions.

Enter/Alter variables: Enter the *W2*, *L2* and *H2* values you have established. Default values for *A*, *S*, *P* and *SF* have been set. You can alter these at any time but for a start it is suggested you leave them until viewing the wire drawing when they will be altered as you adjust the image.

Enter/Alter point sequence: After the points have been plotted you have to tell the computer the order in which they are to be joined. At the end of each sequence when the pen has to be lifted, type 0. At the end of the final sequence type 00.

When altering the numbers press Return until you come to the point wanted then type in the new number. Continue pressing Return to the end of the line to return to Edit menu.

Details of choices on the main menu are:

Edit: Gives you the options as shown above.

Load: Loads any file saved with CAPD.

Save: Saves data from working drawing, variables, co-ordinates for 3D drawing and point sequence.

Preview: Produces a wire drawing on the screen. This can be manipulated by pressing the keys shown in below

The auto key repeat is switched off, but you can press any of the above keys as often as you wish. The *A* variable, which controls the distance from eye to picture plane, is important.

If too small the view will be distorted and if too large the view will look more isometric than perspective.

Co-ordinates and variables: This displays data from working drawing, variables, co-ordinates for 3D drawing and point sequence. The list is automatically updated each time one of the manipulation keys is pressed in Preview mode.

To plot the 3D view manually, use the 3D co-ordinates *X* and *Y*. The 3D view in Figure IV shows the direction the dimensions are taken according to the signs.

The value of *SF* - scale factor - has been arrived at to suit the size of preview on screen but it may not be what you want for the final drawing.

Look at the *X* and *Y* dimensions and decide if you want to alter the overall size. *SF* can then be altered in Edit mode, in one of three ways. Enter a value, enter *SF***n* or *SF*/*n*, *n* being the ratio of alteration. You can then go to item five on the main menu to read the revised dimensions.

So that you can try out the versatility of CAPD quickly, below is given the essential data for the block shown in Figure IV:

Point	W	L	H
1	-25	40	35
2	25	40	35
3	25	-60	35
4	-25	-60	35
5	-25	40	-15
6	25	40	-15
7	25	-60	-15
8	-25	-60	-15
9	-15	40	35
10	-5	40	35
11	-10	50	35
12	-10	40	-15

Left cursor	Rotates in a horizontal plane. <i>P</i> decreased 10 degrees.
Right cursor	Rotates in a horizontal plane. <i>P</i> increased 10 degrees.
Up cursor	Rotates in a vertical plane. <i>S</i> decreased 10 degrees.
Down cursor	Rotates in a vertical plane. <i>S</i> increased 10 degrees.
L	Larger in size. <i>SF</i> increased 10 per cent.
S	Smaller in size. <i>SF</i> reduced 10 per cent.
C	Eye point closer to picture plane. <i>A</i> reduced 20 per cent.
F	Eye point farther from picture plane. <i>A</i> increased 20 per cent.
Tab	Return to main menu.

The control keys

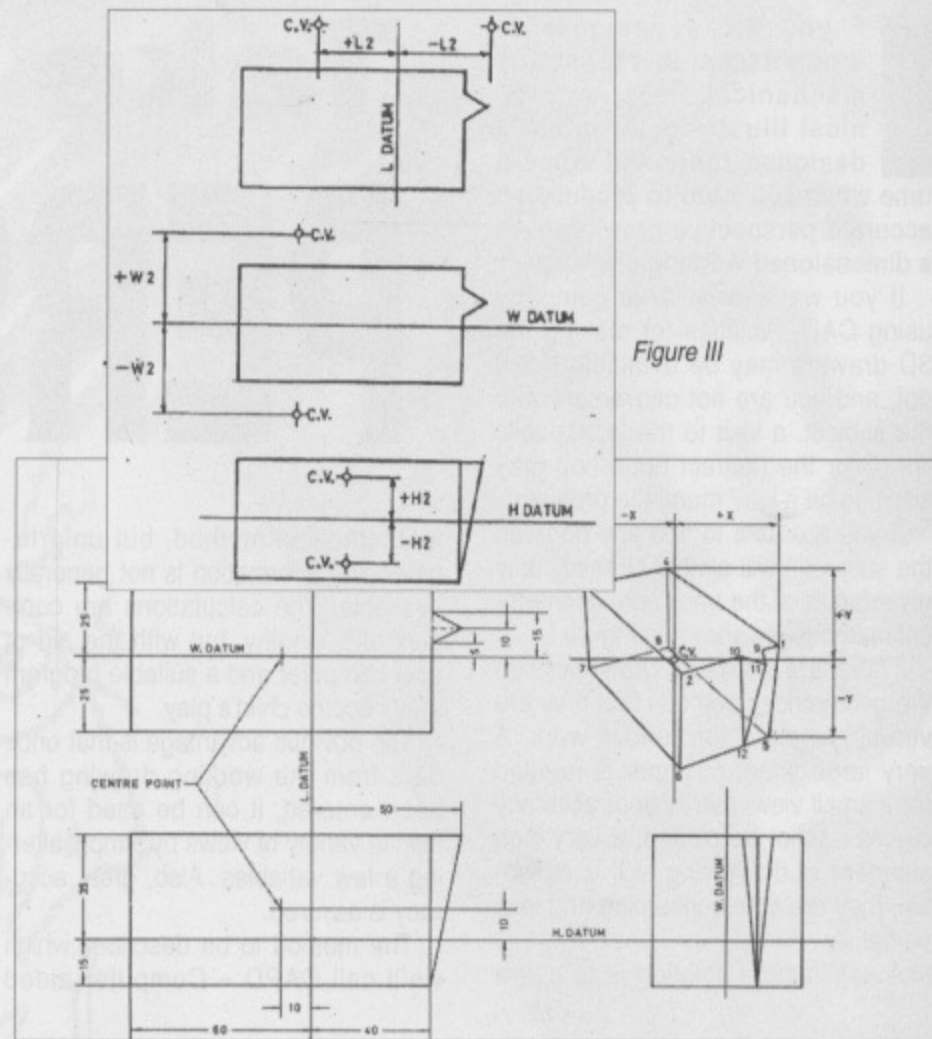


Figure IV

The other main variables are:

A=330 *S*=30 *P*=150
W2=0 *L2*=10 *H2*=10
SF=5

And the point sequence is:

1,4,3,2,10,11,9,1,5,8,7,6,5,0
 10,12,11,0
 9,12,0
 4,8,0
 3,7,0
 2,6,0,0

Key in this data - or load it if you have the subscription disc - and experiment with the features provided by CAPD.

Although this example is simple, there is no limit to the complications which can be handled other than the amount of memory in your micro. In particular, curved lines can be plotted very accurately making the method invaluable for subjects such as boats,

cars and aircraft. If you intend making the drawing by freehand, CAPD will enable you to produce an accurate framework to form the basis of your work and give it authenticity.

```

10 REM COMPUTER AIDED PERSPECTIVE
20 REM DRAWING
30 REM by H.R Wall
40 REM (c) The Micro User
50 REM Load by "CAPD"
60 MODE129
70 ON ERROR GOTO160
80 A=350:S=30:P=30:W2=0:L2=0:H2=0:Sf=
1
90 numpts%=0
100 *FX11,0
110 PROCassigncol
120 VDU23;8202;0;0;0;
130 DIM A(100,4)
140 DIM B(200,3)
150 DIM C(300)
160 CLS
170 PRINTTAB(5,5);"* * MAIN MENU * *"
180 PRINT
190 PRINTTAB(5);"1. Edit":PRINTTAB(5);
;"2. Load":PRINTTAB(5);"3. Save":PRINT
TAB(5);"4. Preview":PRINTTAB(5);"5. Co-
ordinates and variables":PRINTTAB(5);"6
. Return to Basic"
200 PRINT:B=GET:B=B-48:IF B<1 OR B>6 T
HEN VDU7:GOTO200
210 IF B=6 THEN 300
220 PRINT
230 ON B GOTO 240,250,260,270,280
240 PROCedit:GOTO160
250 PROCload:GOTO160
260 PROCsave:GOTO160
270 PROCpreview:GOTO160
280 PROCdata:GOTO160

```


Hard Drive Options From The Serial Port

We produce a range of hard drive upgrade options for the Archimedes range of computers. The controller card can be based either on the **SCSI** or **IDE** interface standards and drives come in many capacities for internal (300/400 series) or external connection. The hard drives used are high quality **Seagate** devices which are all fully guaranteed for one year.

SCSI is becoming the Archimedes 'standard' choice due to the range and number of devices you can connect to the interface - such as tape streamers, scanners printers, CD-ROM drives etc as well as hard drives. Our SCSI package uses our **fast 8-bit interface podule** - also available as an **internal A3000 card** at no extra cost - and Acorn SCSI compatible software.

IDE is now the fastest selling drive standard in the world. It has two main advantages in that it is fast and is excellent value. We produce a **full 16-bit IDE interface** podule complete with all necessary software that allows it to be used in exactly the same way as all other filing systems such as SCSI, ADFS, RAMFS etc. For the A3000 we supply an external boxed version including the podule which has the advantage of leaving your internal slot free for other upgrades.

Example prices (including interface) - for other drive capacities (up to 1352Mb) please contact us:

SCSI	45Mb 28ms Internal	£299	80Mb 24ms Internal	£399
	External	£369	External	£469
IDE	40Mb 28ms Internal	£269	89Mb 19ms Internal	£379
	External	£349	External	£449

The Graphics Enhancer

Special Price: £179 - including installation

The Graphics Enhancer adds a new dimension to the graphics capabilities of the Archimedes. Now you can use any 256 colours from a full 24-bit colour palette (16.7 million colours) in the desktop at resolutions up to 768 x 288 on a standard monitor and 832 x 328 on a multi-sync, as well as other modes such 512 x 512 and 640 x 480 thus allowing, for instance, a true 256 grey scale to be obtained. Outside the desktop modes are available using up to 65536 colours. Multiple VIDC clock rates are software selectable and the interface can be controlled by a range of SWI calls and * commands.

For a full specification sheet please contact us.

"Frankly, I think the addition of such a board should be a very high priority. An upgrade equal to adding an ARM 3 board, and cheaper...The Serial Port promises us that the board will be something very special and I am inclined to agree. I think that the Graphics Enhancer will appeal to a massive Archimedes market." **Computer Shopper April 1991**

"Considering what is provided, the price of the Graphics Enhancer is very reasonable."

"Professional graphics quality at a home-user price is very rare these day, and in my opinion this board provides good value for money." **RISC User June 1991**

The Serial Port, Burcott Manor, Wells, Somerset BA5 1NH

Tel: 0243 531194 Fax: 0243 531196

All prices above exclude VAT. SCSI and IDE systems can be installed by us for an extra £25 - otherwise delivery is £10.



GRAPHICS

```

290 GOTO160
300 END
310 DEF PROCpreview
320 CLS
330 PROCcalcframe
340 ZR%:=1:ZR1=ZR%
350 PROCdrawframe1(ZR1)
360 PROCframe1on
370 PROCmove
380 PROCkeyin
390 IF G=9 THEN 540
400 PROCcalcframe
410 ZR%:=1:ZR1=ZR%
420 PROCdrawframe2(ZR1)
430 PROCframe2on
440 PROCeraseframe1(numpts%+1)
450 PROCmove
460 PROCkeyin
470 IF G=9 THEN 540
480 PROCcalcframe
490 ZR%:=1:ZR1=ZR%
500 PROCdrawframe1(ZR1)
510 PROCframe1on
520 PROCeraseframe2(numpts%+1)
530 GOTO370
540 ENDPROC
550 DEF PROCdraw(ZR%)
560 R%:=0:PROCptnum
570 REPEAT
580 X=B(ptnum%+ZR%-
1,2):Y=B(ptnum%+ZR%
-1,3)
590 PLOT 69,X,Y
600 PROCptnum
610 REPEAT
620 X=B(ptnum%+ZR%-
1,2):Y=B(ptnum%+ZR%
-1,3)
630 PLOT 5,X,Y
640 PROCptnum
650 UNTIL ptnum%=0
660 PROCptnum
670 UNTIL ptnum%=0
680 PROCdatums
690 ENDPROC
700 DEF PROCpers
710 R=PI/180
720 IF L+L2=0 AND W+W2=0 THEN
B9=0:V=0
:GOTO770
730 IF L+L2=0 THEN
B9=90*R:V=W+W2:GOTO
770
740 IF W+W2=0 THEN
B9=0:V=L2+L2:GOTO77
0
750 B9=ATN((W+W2)/(L+L2))
760 V=(W+W2)/SIN(B9)
770 K=V*SIN((P*R)+B9)
780 L9=V*COS((P*R)+B9)
790 IF H-H2=0 THEN BA=0:T=L9:GOTO830
800 IF L9=0 THEN BA=90*R:T=H-
H2:GOTO83
0
810 BA=ATN((H-H2)/L9)
820 T=(H-H2)/SIN(BA)
830 Y1=T*SIN(BA+(S*R))
840 J=T*COS(BA+(S*R))
850 X=K*A/(A+J)
860 Y=Y1*A/(A+J)
870 X=X*SF+640:Y=Y*SF+512
880 ENDPROC
890 DEF PROCassigncol
900 VDU19,0,4,0;:REM Frame 1 Back
910 VDU19,1,7,0;:REM Frame 2 Fore

```

```

920 VDU19,2,4,0;:REM Frame 2 Back
930 VDU19,3,7,0;:REM Frame 1 Fore
940 ENDPROC
950 DEF PROCframe1on
960 VDU19,1,7,0;
970 VDU19,2,4,0;
980 ENDPROC
990 DEF PROCframe2on
1000 VDU19,1,4,0;
1010 VDU19,2,7,0;
1020 ENDPROC
1030 DEF PROCeraseframe1(ZR1)
1040 GCOL2,2
1050 PROCdraw(ZR1)
1060 ENDPROC
1070 DEF PROCeraseframe2(ZR2)
1080 GCOL2,1
1090 PROCdraw(ZR2)
1100 ENDPROC
1110 DEF PROCdrawframe1(ZR1)
1120 GCOL1,1
1130 PROCdraw(ZR1)
1140 ENDPROC
1150 DEF PROCdrawframe2(ZR1)
1160 GCOL1,2
1170 PROCdraw(ZR1)
1180 ENDPROC
1190 DEF PROCmove
1200 ZR2%:=numpts%+1
1210 FOR ZR%:=1 TO numpts%
1220 FOR ZC%:=1 TO 3
1230 B(ZR2%,ZC%)=B(ZR%,ZC%)
1240 NEXT:ZR2%=ZR2%+1
1250 NEXT
1260 ENDPROC
1270 DEF PROCkeyin
1280 *FX4,1
1290 G=GET
1300 IF G=139 S=S-10:GOTO1400
1310 IF G=138 S=S+10:GOTO1400
1320 IF G=136 P=P-10:GOTO1400
1330 IF G=137 P=P+10:GOTO1400
1340 IF G=76 SF=SF+(SF/10):GOTO1400
1350 IF G=83 SF=SF-(SF/10):GOTO1400
1360 IF G=67 A=INT(A-(A/5)):GOTO1400
1370 IF G=70 A=INT(A+(A/5)):GOTO1400
1380 IF G=9 THEN 1400
1390 GOTO1290
1400 *FX4,0
1410 ENDPROC
1420 DEF PROCcalcframe
1430 ZRB=1
1440 FOR ZR%:=1 TO numpts%
1450 W=A(ZR%,2):L=A(ZR%,3):H=A(ZR%,4)
1460 PROCpers
1470
B(ZRB,1)=ZR%:B(ZRB,2)=X:B(ZRB,3)=Y
1480 ZRB=ZRB+1
1490 NEXT
1500 ENDPROC
1510 DEF PROCptnum
1520 R%=R%+1:ptnum%=C(R%)
1530 ENDPROC
1540 DEF PROCsave
1550 PRINTTAB(10)"* * SAVE * *";
1560 PRINT " ";:INPUT"File name "
fname$
1570 VV=OPENOUT(fname$)
1580
PRINT#VV,numpts%,A,SF,H2,L2,W2,S,P
1590 FOR R%=1 TO numpts%:FOR C%=1 TO 4
1600 PRINT#VV,A(R%,C%):NEXT:NEXT
1610 R%=0
1620 REPEAT
1630 R%=R%+1
1640 PRINT#VV,C(R%)
1650 UNTIL C(R%)=0

```

```

1660 R%=R%+1:PRINT#VV,C(R%)
1670 IF C(R%)>0 THEN 1620
1680 CLOSE#VV
1690 ENDPROC
1700 DEF PROCload
1710 PRINTTAB(10)"* * LOAD * *";
1720 PRINT " ";:INPUT"File name "
fname$
1730 VV=OPENUP(fname$)
1740
INPUT#VV,numpts%,A,SF,H2,L2,W2,S,P
1750 FOR R%=1 TO numpts%:FOR C%=1 TO 4
1760 INPUT#VV,A(R%,C%):NEXT:NEXT
1770 R%=0
1780 REPEAT
1790 R%=R%+1
1800 INPUT#VV,C(R%)
1810 UNTIL C(R%)=0
1820 R%=R%+1:INPUT#VV,C(R%)
1830 IF C(R%)>0 THEN 1780

```

SUBSCRIBE NOW!
If you prefer to save the wear and tear on your fingers you'll find this listing - together with all the others from this issue - on this month's disc, sent free if you subscribe to *The Micro User*.

```

1840 CLOSE#VV
1850 ENDPROC
1860 DEF PROCdata
1870 CLS
1880 PROCcalcframe
1890 @%=&02020A
1900 PRS="0":VDU14
1910 PRINTTAB(3,5);"* * CO-ORDINATES
an
d VARIABLES * *";
1920 PRINTTAB(5)"SUBJECT DATA"
1930
PRINT;TAB(5)"Pt.";TAB(15)"W";TAB(2
4)"L";TAB(33)"H"
1940 FORR=1 TO numpts%
1950
@%=&90A:PRINT;TAB(5)A(R,1);:@%=&02
020A:PRINT;TAB(13)A(R,2);TAB(22)A(R,3);
T
AB(31)A(R,4):PRINT:NEXT:PRINT'
1960 PRINTTAB(3)"VARIABLES"
1970 @%=&90A
1980 PRINTTAB(3)"A=";A;" S=";S;"
P=";
P;" W2=";W2;" L2=";L2;"
1990
PRINTTAB(3)"H2=";H2;:@%=&02020A:PR
INT;" SF=";SF
2000 @%=&90A
2010 PRINT'
2020 PRINTTAB(7)"3D CO-ORDINATES"
2030
PRINTTAB(7)"No.";TAB(17)"X";TAB(27
)"Y";
2040 FOR R=1 TO numpts%
2050
@%=&90A:PRINT;TAB(7);B(R,1);:@%=&0
2020A:PRINTTAB(10)B(R,2)-
640;TAB(25)B(R,
3)-512:PRINT:NEXT
2060 @%=&90A
2070 PRINT'
2080 PRINTTAB(6)"Order in which to
join
points"
2090 PRINTTAB(2)"Note! 0=lift pen
0,0=
end of plotting"
2100 R=0

```

```

2110 REPEAT
2120 R=R+1
2130 PRINT;C(R);";";:IF ?&1E>36 PRINT'
2140 UNTIL C(R)=0 AND C(R+1)=0
2150 PRINT;"0"
2160 IF PRS="Y" VDU3:GOTO2210
2170 PRINTTAB(3);:INPUT"Printer? Y/N "P
RS
2180 IF PRS="N" GOTO2210
2190 IF PRS<>"Y" THEN 2170
2200 VDU2,15:GOTO 1910
2210 ENDPROC
2220 DEF PROCdatums
2230 PLOT 69,0,512
2240 PLOT 5,1280,512
2250 PLOT 69, 640,0
2260 PLOT 5,640,1024
2270 ENDPROC
2280 DEF PROCedit
2290 CLS
2300 PRINTTAB(10,5)"* * EDIT * *";
2310 PRINTTAB(5)"1. Enter subject data"
'
2320 PRINTTAB(5)"2. Alter subject data"
'
2330 PRINTTAB(5)"3. Enter/Alter variabl
es"
2340 PRINTTAB(5)"4. Enter/Alter point s
equence"
2350 PRINTTAB(5)"5. Return to Main Menu
"
2360 PRINT:ED=GET:ED=ED-48:IF ED>5 VDU7
:GOTO2360

```

10 =	0 0	440 =	3A84 A
20 =	0 0	450 =	3227 3
30 =	0 0	460 =	700B D
40 =	0 0	470 =	9C11 1
50 =	0 0	480 =	1CD6 5
60 =	ACED D	490 =	3B9F 8
70 =	131D E	500 =	67B7 3
80 =	1C8C 9	510 =	989F D
90 =	AE9 E	520 =	3F1B 1
100 =	B046 1	530 =	B56 5
110 =	34DC 6	540 =	ED0F E
120 =	F716 8	550 =	ACC4 4
130 =	157E 4	560 =	493B A
140 =	8A7C 4	570 =	BFBA 5
150 =	AA25 0	580 =	6072 2
160 =	7A16 4	590 =	22C0 9
170 =	3AE4 C	600 =	4533 C
180 =	7475 A	610 =	BFBA 7
190 =	AE21 9	620 =	6072 1
200 =	3E43 A	630 =	326D 8
210 =	B255 6	640 =	4533 1
220 =	1F96 F	650 =	484B A
230 =	DD0A A	660 =	4533 5
240 =	FC7D 3	670 =	484B 3
250 =	F469 0	680 =	2DB1 7
260 =	7F4 2	690 =	ED0F 5
270 =	8965 B	700 =	F798 D
280 =	C1F8 F	710 =	F7C 4
290 =	BBC3 6	720 =	DEF5 B
300 =	FD2E F	730 =	2244 8
310 =	5DB 1	740 =	3499 5
320 =	7A16 F	750 =	42CB B
330 =	1CD6 1	760 =	1E1B F
340 =	3B9F 1	770 =	37AF 4
350 =	67B7 C	780 =	679E 7
360 =	989F 7	790 =	BF3C C
370 =	3227 2	800 =	DEE3 1
380 =	700B 4	810 =	299D F
390 =	9C11 9	820 =	F32 9
400 =	1CD6 8	830 =	4348 0
410 =	3B9F 7	840 =	913C E
420 =	A957 F	850 =	81FC E
430 =	C1CF E	860 =	B6F1 6


```

2370 ON ED GOTO 2380,2390,2400,2410
2380 PROCsubjectin:GOTO2290
2390 PROCsubjectmod:GOTO2290
2400 PROCvarin:GOTO2290
2410 PROCjoinin:GOTO2290
2420 IF ED=5 GOTO2440
2430 GOTO2290
2440 ENDPROC
2450 DEF PROCvarin
2460 CLS
2470 PRINTTAB(5,4)"* * ENTER/ALTER
VARI
ABLES * * *
2480 PRINTTAB(2)"Enter new value or
els
e press RETURN""
2490 PRINTTAB(2)"Eye to C.V. (A=";A;")
";:INPUT XX:IF XX=0 A=A ELSE A=XX
2500 PRINT':PRINTTAB(2)"Tilt of base
(S
=";S;") ";:INPUT XX:IF XX=0 S=S ELSE
S=X
X
2510 PRINT':PRINTTAB(2)"Rotation
P=";P
";:INPUT XX:IF XX=0 P=P ELSE P=XX
2520 PRINT':PRINTTAB(2)"Width datum to
C.V. (W2=";W2;") ";:INPUT XX:IF XX=0
W2=
W2 ELSE W2=XX
2530 PRINT':PRINTTAB(2)"Length datum
to

```

```

C.V. (L2=";L2;") ";:INPUT XX:IF XX=0
L2
=L2 ELSE L2=XX
2540 PRINT':PRINTTAB(2)"Horiz. datum
to
C.V. (H2=";H2;") ";:INPUT XX:IF XX=0
H2
=H2 ELSE H2=XX
2550 PRINT':PRINTTAB(2)"Scale factor
(S
F=";SF;") ";:INPUT XX:SF=XX/EVAL(XX):IF
X
X=0 SF=SF ELSE SF=XX
2560 ENDPROC
2570 DEF PROCsubjectmod
2580 CLS
2590 PRINTTAB(5,8)"* * ALTER SUBJECT
DA
TA * * *
2600 PRINTTAB(5)"Point No. to alter
";:
INPUTG:R=G:GOTO2610
2610 PRINT'TAB(5);"Width
(W=";A(R,2);")
";:INPUTXX:IF XX=0 A(R,2)=A(R,2) ELSE
A
(R,2)=XX
2620 PRINT'TAB(5);"Length
(L=";A(R,3);")
";:INPUTXX:IF XX=0 A(R,3)=A(R,3) ELSE
A
(R,3)=XX

```

```

2630 PRINT'TAB(5);"Height
(L=";A(R,4);")
";:INPUTXX:IF XX=0 A(R,4)=A(R,4) ELSE
A
(R,4)=XX
2640 PRINT'TAB(5);:INPUT"Another
point
? Y/N "ANS
2650 IF ANS="N" THEN 2680
2660 IF ANS<>"Y" THEN 2640
2670 GOTO 2580
2680 ENDPROC
2690 DEF PROCsubjectin
2700 R=numpts%1
2710 CLS
2720 PRINTTAB(5,8)"* * ENTER SUBJECT
DA
TA * * *
2730 PRINT TAB(5)"Pt. No.
";R:A(R,1
)=R
2740 PRINT'TAB(5);"Width (W)
";:INPUTX
X:A(R,2)=XX
2750 PRINT'TAB(5);"Length (L)
";:INPUTX
X:A(R,3)=XX
2760 PRINT'TAB(5);"Height (H)
";:INPUTX
X:A(R,4)=XX
2770 PRINT'TAB(5);:INPUT"Another
point

```

```

? Y/N "ANS
2780 IF ANS="N" THEN 2810
2790 IF ANS<>"Y" THEN 2770
2800 R=R+1:GOTO 2710
2810 numpts%=R
2820 ENDPROC
2830 DEF PROCjoinin
2840 CLS
2850 PRINT;TAB(5,3)"* * ORDER OF
JOININ
G POINTS * * *
2860 PRINTTAB(2)"Note! 0=lift pen
0,0=
end of plotting""
2870 R=0
2880 REPEAT
2890 R=R+1
2900 PRINT;" Point No.
(";C(R);")";:IN
PUT PN$:IF ASC(PN$)=-1
C(R)=C(R):GOTO293
0
2910 PROCjoinstr
2920 C(R)=PN
2930 UNTIL C(R)=0 AND C(R-1)=0
2940 ENDPROC
2950 DEF PROCjoinstr
2960 PN=0
2970 FORN=1 TO LEN(PN$)
2980 PN=PN*10+(ASC(MID$(PN$,N))-48)
2990 NEXT
3000 ENDPROC
>*check

```

```

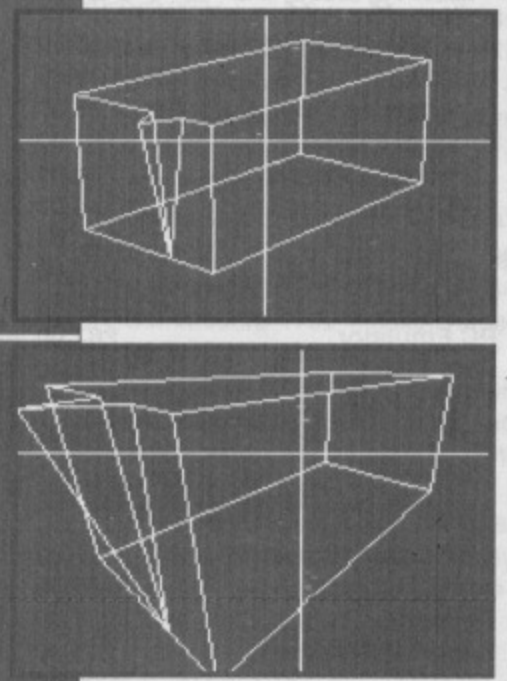
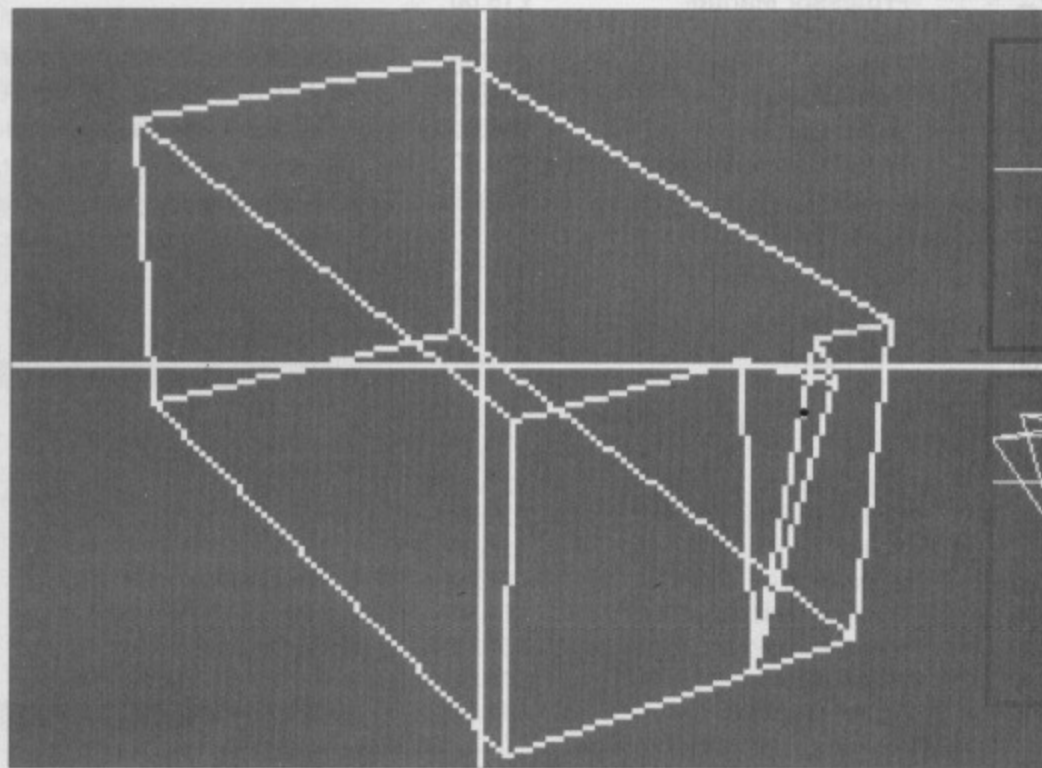
870 = 8734 7
880 = ED0F C
890 = CB1E B
900 = 8CEA 9
910 = 5D9 7
920 = 34C 1
930 = 8A7F 1
940 = ED0F E
950 = 125D 8
960 = E675 B
970 = B349 1
980 = ED0F B
990 = 4B00 3
1000 = 7DA9 F
1010 = 2895 D
1020 = ED0F A
1030 = 41E4 3
1040 = 5D2C C
1050 = 9CB1 E
1060 = ED0F 1
1070 = DA57 4
1080 = 6D4F E
1090 = C9E2 7
1100 = ED0F 6
1110 = 4433 F
1120 = 341F 8
1130 = 9CB1 7
1140 = ED0F 9
1150 = 8AD3 E
1160 = 47C 4
1170 = 9CB1 5
1180 = ED0F 1
1190 = AC4B 4
1200 = DC90 2
1210 = 200B 6
1220 = 4B0F E
1230 = ABFB 2
1240 = A327 E
1250 = 2C83 5
1260 = ED0F 7
1270 = 7E7C 1
1280 = E383 2
1290 = EBB 0

```

```

1300 = CFAA 8
1310 = EE43 5
1320 = E097 C
1330 = C17E D
1340 = B574 0
1350 = 43D4 B
1360 = 2C12 4
1370 = FE96 A
1380 = 65B7 6
1390 = 848D 4
1400 = F3A2 4
1410 = ED0F F
1420 = E314 1
1430 = EDB9 2
1440 = 200B D
1450 = A2AF 4
1460 = 69F4 3
1470 = 3F86 0
1480 = 3FD1 A
1490 = 2C83 B
1500 = ED0F 2
1510 = 4B44 9
1520 = B67 8
1530 = ED0F 0
1540 = EB7 5
1550 = F6DE 2
1560 = 9008 1
1570 = 3B86 6
1580 = 5996 1
1590 = E3FF 1
1600 = 8494 D
1610 = B0FF E
1620 = BFBA C
1630 = D8E2 2
1640 = D17F 9
1650 = 8B61 F
1660 = 676D D
1670 = D3E7 5
1680 = 1AC8 9
1690 = ED0F C
1700 = 503A B
1710 = E258 3
1720 = 9008 3

```



```

1730 = 16F2 A
1740 = 8981 B
1750 = E3FF 8
1760 = D67 A
1770 = B0FF F
1780 = BFBA D
1790 = D8E2 7
1800 = 60E7 D
1810 = 8B61 4
1820 = D6F8 6
1830 = 53C7 7
1840 = 1AC8 4
1850 = ED0F E
1860 = 62DB 9
1870 = 7A16 E
1880 = 1CD6 B
1890 = C0FC 1
1900 = E7DA E
1910 = F3AE B
1920 = 8AB2 9
1930 = 37C7 0
1940 = 310B F
1950 = E38F 7
1960 = CD6F A
1970 = 90E2 8
1980 = 9A1D 8
1990 = 6992 0
2000 = 90E2 E
2010 = 1F96 8
2020 = 6B15 7
2030 = 1380 1
2040 = C043 B
2050 = D62F 5
2060 = 90E2 D
2070 = 7475 0
2080 = 7A12 0
2090 = 9894 6
2100 = 7534 8
2110 = BFBA 5
2120 = 881E A
2130 = D6BE C
2140 = D16C E
2150 = 385B 8
2160 = 2D1F D
2170 = 50FB 4
2180 = 16BA 8
2190 = 5B77 6
2200 = 4F27 B
2210 = ED0F F
2220 = BB7F 9
2230 = 6C86 2
2240 = 99B1 0
2250 = 24F1 9
2260 = 81FB 9
2270 = ED0F 4
2280 = C824 B
2290 = 7A16 B
2300 = EB9F 6
2310 = E344 8
2320 = 368A 8
2330 = 2DA2 A
2340 = 87B 2
2350 = 72A0 3
2360 = 967 4
2370 = 44D0 A
2380 = 545A 9
2390 = 9CD8 1
2400 = CB67 B
2410 = 900B 4
2420 = 6813 1
2430 = 1CB9 6
2440 = ED0F 5
2450 = 615C 0
2460 = 7A16 E
2470 = D388 B
2480 = ABB9 C
2490 = 120C 1
2500 = 17FC 6
2510 = 1CE 5
2520 = F43C 5
2530 = 64A4 9
2540 = AF72 D
2550 = A065 7
2560 = ED0F 9
2570 = 33F7 8
2580 = 7A16 0
2590 = DFA7 A
2600 = 9CA2 2
2610 = 9D5B D
2620 = 6006 D
2630 = 1BB2 2
2640 = D153 3
2650 = C581 D
2660 = A257 0
2670 = 8DC8 E
2680 = ED0F D
2690 = AEA4 B
2700 = 27E6 9
2710 = 7A16 8
2720 = B750 7
2730 = 7B3F 5
2740 = 51CB B
2750 = FF91 2
2760 = A50B 5
2770 = D153 B
2780 = 2525 7
2790 = 42F3 4
2800 = 65DC 1
2810 = 460D E
2820 = ED0F 6
2830 = 6A9F D
2840 = 7A16 1
2850 = 5A86 E
2860 = 9894 A
2870 = 7534 1
2880 = BFBA E
2890 = 881E 0
2900 = 4E68 7
2910 = 495C 9
2920 = 88ED 2
2930 = 1CE9 7
2940 = ED0F D
2950 = 6423 3
2960 = 360D B
2970 = 1552 D
2980 = 85A9 0
2990 = 2C83 3
3000 = ED0F 6
>*sp.

```

Get it
right ✓

Archimedes Software

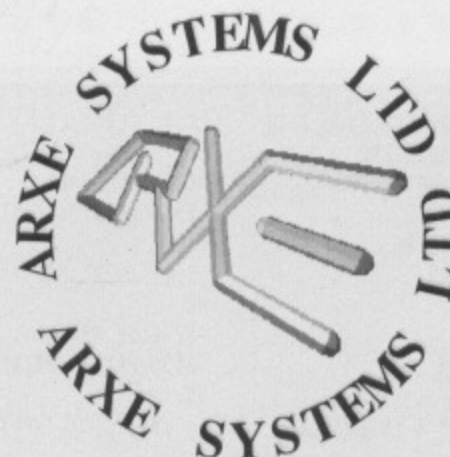
E & OE

Desktop Publishing

Acorn Desktop Publisher	£108.00
Fonts	
Newhall	£39.00
Starter	£39.00
Symbol	£39.00
Impression 2 (Ver 2.10)	£132.00
Impression Junior	£72.00
Ovation	£72.00
Poster	£78.00
ShowPage	£130.00
Tempest	£99.00

Art & Graphics

ArcLight	£38.00
Artisan 2	£44.00
Atelier	£72.00
Euclid 2	£46.00
Font FX	£8.00
H.P. Jet Printer Driver	£12.00
Mogol	£15.00
Pro Artisan	£73.00
Render Bender	£58.00
Revelation	£66.00
Snippet	£29.00
Tracer	£46.00



For all your
Archimedes needs...

☎ 081 534 1198 ☎

Credit Cards Welcome

Please make all cheques payable to "Arxe Systems Ltd"

Arxe Systems Ltd, Dept M1,
PO Box 898, London, E7 9RG

Word Processors

First Word Plus (Rel 2)	£68.00
Impression 2 (Ver 2.10)	£132.00
Impression Junior	£72.00
Pipedream 3	£110.00
Protext (Ver 5)	£114.00

Games/Adventures

ArcPinball	£19.00
Ballarena	£14.00
Blaston	£15.00
BlowPipe	£15.00
Boogie Buggy	£19.00
Chess 3D	£19.00
Chocks Away(Mk2)	£19.00
Chocks Away Missions Disk	£15.00
Drop Ship	£15.00
Fine Racer	£15.00
Hostages	£15.00
Interdictor II	£27.00
IronLord	£15.00
Mig-29 Fulcrum	£28.00
Master Break	£15.00
Manchester United F.C.	£19.00
Nevryon	£15.00
PowerBand	£19.00
Professor Mariati	£15.00
Real McCoy 2	£23.00
Tactic	£14.00
Twin World	£15.00
Wimp Game	£15.00
World Championship Boxing	£19.00
WorldScape	£15.00
Joystick Interface	£20.00
Alice In Wonderland	£25.00
Fish	£14.00
Guild Of Thieves	£17.00
The Pawn	£17.00

Business

Alphabase	£36.00
Desktop Office	£96.00
Equasor	£49.00
Financial Accountant	£203.00
Genesis II	£99.00
HotLink Presenter	£43.00
Knowledge Organiser	£46.00
Presenter 2	£35.00
Schema	£95.00
Squirrel	£108.00
Timewatch	£23.00

Languages & Tools

Acorn ANSI 'C' Release 3	£125.00
ArcDFS	£23.00
Archimedes Basic Compiler	£73.00
Arcterm 7	£61.00
Cambridge Pascal	£61.00
Fortran 77	£84.00
Investigator 2	£21.00
ISO Pascal Rel 2	£87.00
MultiFS	£30.64
PC Emulator	£87.00
Risc Basic	£112.00
Toolkit Plus	£37.00
Twin	£25.00

Education

Craftshop 1	£27.00
Craftshop 2	£27.00
Jiglet	£27.00
Jigsaw	£27.00
Junior Database	£51.00
Magpie	£50.00
Numerator	£68.00
Touch Type	£41.00

Sound & Music

ARTiculate (Speech Synth)	£19.00
Armadeus	£59.00
Rhapsody	£37.00
Superior Speech	£15.00
Tracker	£38.00

MultiFS

MultiFS provides the Archimedes with multiple filing system support. It allows the user to read and write to PC, Atari ST and BBC DFS discs from within the desktop environment.

MultiFS Features

- * True RISC OS Filer
- * Provides Access to DOS partitions
- * Filetypes maintained on DOS discs
- * Filetypes mapped to DOS extensions
- * Formats and creates system discs
- * Supports disc names for DOS

Best Sellers

Genesis II	£99
Impression 2	£132
Pipedream 3	£110
Revelation	£66
Schema	£95
Squirrel	£108
Tracker	£38

New Games

Blaston
Chess 3D
Fine Racer
Mig 29 Fulcrum
Real McCoy 2
Wonderland

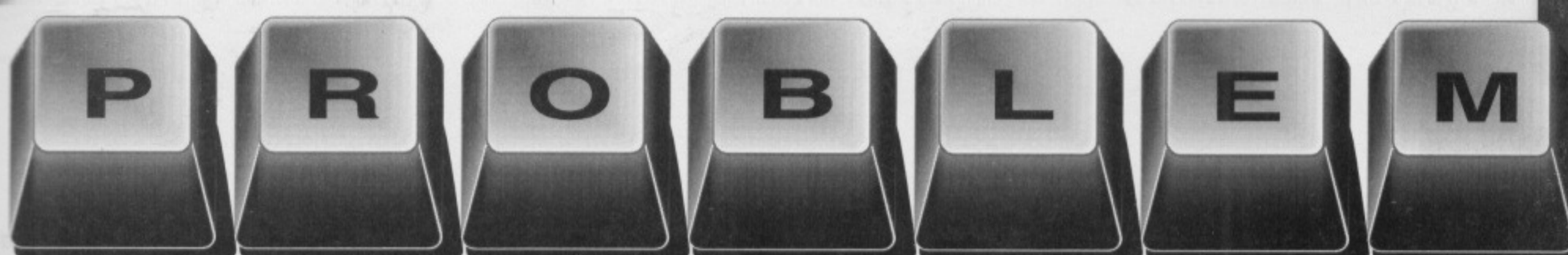
Hardware

The Graphics Enhancer card from the Serial Port gives you the choice of 16.7 million colours.

Please write for further details.

All prices exclude VAT (@17.5%). Mainland UK postage free for cash sales only. Overseas postage please enquire. If you cannot see what you require please write or phone for availability and a copy of our comprehensive software catalogue.

All orders are processed immediately. However, delays can sometimes occur when suppliers are slow to deliver. We apologise for any inconvenience this may cause to our customers. Please include contact telephone number for written orders. Official orders welcome, payment due in 30 days. Invoices subject to late payment surcharges and carriage.



Your technical questions answered by MIKE COOK

Just not talking

I WOULD like to transfer some files from my brother's Amiga to my Archimedes. Can I use the serial port for this? If so, which pins need to be connected?

The Amiga's serial port includes connections with the same names as the Archimedes' nine and I've tried joining the five needed for communicating between two Model Bs but the computers seem to ignore each other.
— Matthew Chilton, Oxford.

● The simplest way of transferring between the two machines is to use the PC disc format. You can get an Amiga utility to write to a PC formatted disc and they can be read on the Archimedes by something like MultiFS, PC-Access or the public domain, PCdir.

However if you want to use the serial port remember that the TX data line from one computer has to be connected to the RX data of the other. In

addition the Archimedes needs the DCD, DRS, CTS and DTR line all connecting together. Finally the baud rate and data format need to be the same.

The problem here is that a lot of people do not bother with the data format, but the default values on the BBC Micro and the Archimedes are different. The command *FX156,18 will set up the word format to 8 bits data no parity and 1 stop bit. See the User Guide for other formats.

A3000 on the air

WHENEVER I use my BBC A3000 I keep getting Radio 1! Well, it's not Radio 1, but I do keep hearing a radio station broadcasting in German on the FM waveband.

It comes from the speaker on the disc drive side. The sound is intermittent and very low volume.

What is making this noise and how do I get rid of it? I have a Beebug A3000 disc drive buffer fitted. Could

the plug between the board and the internal drive have a gap which performs like a variable capacitor? — A. T. Marketos, Liphook, Hants.

● I doubt that you are picking up a German FM radio station, as such transmissions are normally restricted to line of sight — about 50 miles. You are probably picking up the medium wave transmissions of the same radio station.

This is not particularly strange and has nothing to do with anything acting as a variable capacitor. What is happening is that the input to the audio amplifier is acting as a radio detector.

Again, this is not strange as a radio

detector can simply be a diode and the base emitter junction of an input transistor will act in that way.

As the radio signal is so small the volume is not very loud. You can make it louder by attaching a long piece of wire to the audio input. However what you really want to know is how to stop it, and a simple 33pF capacitor between the audio input and earth should do the trick.

Saving eyesight

RECENTLY I bought a secondhand Master and have been using it with my 14in portable TV. I also have a Commodore 64 with a Commodore 1702 colour monitor which I am considering selling.

I understand that colour TVs don't make good VDUs for computers, and I was wondering if it is possible to use my Commodore 1702 monitor rather than doing away with it.

The back of the monitor has three inputs terminals — Audio, Luma and Chroma — which are all used to connect to the computer.

I'd be grateful if you could help me, as it would save me a lot of money and cause less damage to my eyesight. — H. Matin, Hendon, London.

● The 1702 is half a TV set, in that it requires separate Chroma (colour) and Luminosity (brightness) signals. These are the two parts of a colour signal that are mixed together on the Master.

What you need to do is to separate

When an Electron elects not to print

I HAVE an Electron with Plus 1 and Plus 3 and use View. The setup drives a Brother M1009 printer quite successfully. It also works with a Centronics GLP and an Adler Royal 2000 daisywheel which gives excellent print quality.

But I just can't get it to drive the Epson P40 battery-operated printer properly, as I get about 50 per cent garbage — yet this printer works perfectly with a BBC Micro and a Dragon 64.

I suspect that the Electron does not use quite the right voltage levels and it may require adjustment using pull-up or pull-down resistors.

Unfortunately I don't understand these things, so I wonder if you

could explain it in some detail? — W. Elliott, Liverpool.

● The load resistance of any input is simply a measure of how much power it will drain from an output. For example if a device had a load resistance of 1k Ω then if an output wants to drive it to 5 volts the output will have to be capable of delivering 5mA. The formula is: Amperes = Volts / Resistance.

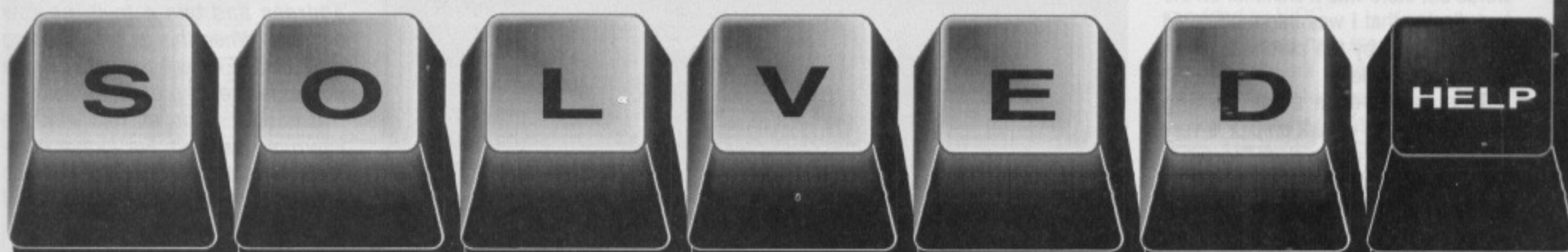
Most devices have an output resistance. This coupled with the input resistance forms a potential divider. In the above example suppose the output had an output resistance of 1k Ω then when the output went to 5 volts the input

would only be driven to 2.5 volts, the two resistors splitting the applied voltage.

This is something of an artificial example, as most outputs have a low resistance — normally less than 100 ohms — and most inputs are often very high, like 100k Ω .

As your P40 is a battery-operated device it could be that the input threshold is a bit higher than that provided by the computer. If this is so you would need a pull up resistor of about 3k Ω on each input going to the printer's supply.

Often this voltage is available on the connector. However, the problem could be caused by the lack of a common earth.





these inside the Master. The luma input of the monitor should be taken from the monochrome video output socket of the Master and the Chroma input from the junction of transistor Q12 and the 1k resistor R137.

In addition the Commodore system, being American, uses NTSC as opposed to the PAL system used in this country. The Master can be converted to NTSC colour modulation by changing over link LK15.

Having said that, a lot of the quality of a colour signal is lost in modulating it like this, and I would be surprised if the results were that much better than those you have now.

Scart connection

HAVING dusted off my Electron I wonder if you could tell me how to use the RGB socket as my television has a Scart socket. All I get from most shops is: "Shouldn't bother mate, we have a more modern set for £XXX."

I do small electrical projects so I know which end of a soldering iron to hold and could get any extra items needed. — **T. Scott, Leeds.**

● The October 1990 *Body Build* article contained all the information you need to connect your computer to a Scart socket. The kit is still available from Musbury Consultants at £6.00

High v low resolution

IT HAS been my experience that it's not just TV salesmen who may be unable to advise on the dot pitch of all the monitors they sell in order to provide a comparison. It can apply to the man behind the counter in a computer shop.

I was interested to learn that the expected performance of the medium resolution monitor has only marginal advantage over a 14in TV and I wonder why standard resolution monitors are being sold at all.

My own experience has been that a medium resolution monitor was rather worse than the Amstrad CTV1400 that I previously used when I needed to use software with coloured text.

Not only is the resolution marginally worse but there was a shimmer on the text display that I was informed could be eliminated by the purchase of an additional module.

This has been a disappointing experience, and *caveat emptor* is very much the order of the day. There is a deplorable lack of availability of performance specifications from which judgements can be made. — **Ken**



Yeomans, Rickmansworth, Herts.

● The reason that the monochrome mode on the Phillips monitor is described as a high resolution is that by turning off the red and blue guns the pixels are reduced in size by 2/3 and appear to be much sharper.

That's the rationale. Whether you believe it or not is another matter. Advertising is such that yesterday's low resolution monitors are today's standard resolution.

I doubt whether the purchase of a module would stop shimmering, as this is mainly a function of the persistence of the phosphor.

Missing a cog

MY system consists of a Model B with a Torch Z80 dual disc drive. Recently drive A has become faulty. It works on power-up, but having warmed up it won't load anything and comes up with Disc fault at 01/00. There's a sound like cogs in a gear train failing to mesh.

I have been told that drives do wear out, so I opened the casing, swapped the two drives over and, having ensured everything was properly con-

figured, tried it out. Drive B was now faulty, which confirmed my original diagnosis.

I can use the single drive without difficulty when using Basic, but all Torch software requires both.

I have tried to get a replacement but nothing I've found will fit. Torch appear to have ceased trading and the only drives that look like they might fit were advertised back in 1985. I would be very grateful for any help you can offer. — **G. Wilkinson, Bradford.**

● As you have said, the disc drive itself is at fault. Failure after a short time of working indicates that something is very close to permanent death. Most of the chips on the drive are surface mounted and very difficult to replace.

However, from your description it might just be that the track zero detector switch is faulty. This is an opto-slot detector and could be replaced.

To see if it is, run your drives so that you can see the head movement. If, when it is faulty, the head is banging itself against the end stop this would indicate that it is not detecting track zero. An oscilloscope on the

track zero line of the disc cable could also confirm this. Failing this, if you can't get an exact physical replacement, you could always mount the good drive and new one in another box.

Incompatible external

I HAVE an external 3.5in drive attached to my A3000 which keeps corrupting discs. I bought the drive in 1989 for a Spectrum, and it worked perfectly with a BBC Master. It has its own power supply.

The interface manual says that the step rate should be 8ms, but the drive was on 6ms and I had to set it to 12ms as the next slowest rate. What is causing the corruption and how can I stop it? — **A. T. Marketos, Liphook, Hants.**

● Giving a drive a longer step time than is needed will do no harm, so you are right to set it to 12ms. The test you must carry out is to see if this drive will format a disc and can then read and write that disc. If it will, you will find that the disc can't be read by your internal drive, which means you have a problem of head alignment on your external one.

Faster access

I AM developing an arcade game for the 8 bit BBC Micro and speed is a crucial factor. A recent article showed how to access the keyboard fast on the Electron, but how is it done on the Master? — **Linus Blomberg, Delsbo, Sweden.**

● The keyboard is in the form of a matrix which is scanned by software. The trick in speeding up access is to look only at a limited number of keys. On the Master the keyboard is connected to a custom keyboard encoder chip — IC16 — which is linked directly to the systems bus and accessed through the slow data bus.

Write &03 to &FE41 to select the keyboard then access the data direction register at &FE42 to make bit 7 an input and the rest outputs. Then writing to &FE40 will access the key matrix.

Bits 0 to 3 will give the column address and bits 4 to 6 the row address. When this is done reading bit 7 of &FE40 will tell whether the addressed key is pressed or not.

It is best to do all this with the interrupts disabled. For further information see the *Advanced Reference Manual* of the BBC Master published by Watford Electronics.

Chips with everything

I HAVE a Watford Rom board and the instructions say that two low capacity ram chips can be linked together and act as one larger chip. They then list the link positions for various types of chips.

One of these is the 6264, and in the Watford catalogue there is a 6264LP-8K, presumably the LP standing for low power? Is this the right chip?

Having got the right chip how do I load sideways rom images into the ram bank? — **James Dallas, Dorking, Surrey.**

● Manufacturers' chip numbers, like computer machine code instructions, contain several fields. There is normally the chip type number, in this case 6264. Then there is a manufacturer's identifier, for example Hitachi chips use HM.

There is also information about the type of package, normally P for plastic and C for ceramic, as well as access speed given as a number after a dash. Finally a letter after the access speed gives information about the temperature range.

Hence HM6264LP-15K would be an Hitachi 8k ram chip with a plastic package, 150ns access time working between 0°C and 80°C. The L might well stand for low power.

This memory will be sideways ram. The board is designed so that any write to sideways rom space is directed into this ram, thus you can load rom images into them by simply using *LOAD name 8000. Some boards have their own specialised commands for loading rom images.

Product: The PCATS Graphics Enhancer Module
 Price: £179+VAT Archimedes version, £189+VAT A3000 version
 Supplier: The Serial Port, Burcott Manor, Wells, Somerset BA5 1NH.
 Tel: 0243 531194
 Requirements: BBC A3000 or Archimedes range

THE biggest fault with Acorn's ARM-based micros has always been the colour limitations. Coming from the BBC Micro, 4096 definable colours in 2 to 16 colour modes, or a fixed 256 colour mode might seem generous.

But in the professional world you can't do without 16 million colours. Can this new expansion card solve that problem?

My first impression of the board was very favourable because of the quality of its construction. Installation wasn't too difficult: *Solder in a dual-in-line (DIL), plug in the card, connect two video cables and off you go.*

The only noticeable difference between the normal Archimedes video and the Graphics Enhancer version at



Beyond the rainbow

this point is the power-on message. For the nervous, The Serial Port will fit the board into your Archimedes at no extra cost, though you'll be without your machine for two to three days.

The board provides a number of new modes selected from the usual palette icon. Mode 125, for instance, gives a resolution of 1664 by 328 pixels at 4 bits per pixel with 208 characters across the screen and 41 lines. Despite the enormous 267k of ram required, it is extremely fast at updating the screen and moving windows. The accompanying software has a

number of additional utilities. Particularly worthy of mention are the Extended Colour Palette Utility and a new version of the ColourTrans module which allows properly written multi-tasking software to function correctly with the new colours.

With hardware added and cables connected to the Video Out and In ports you are ready to run. A relocatable module is loaded when the machine is switched on and this controls all the video output to the monitor – whether you have a standard or multi-sync system. This module also

Taking the lid off his Archimedes, Geoff Gallacher revels in a new world of modes and colours

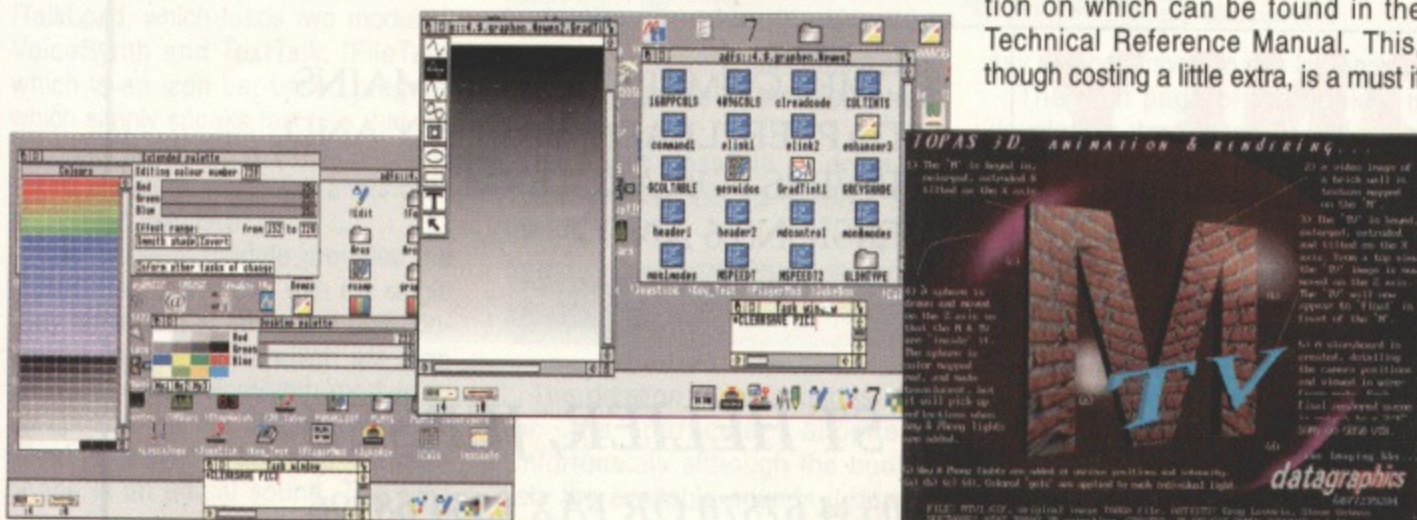
contains a list of star commands to control the video effects and complementary set of SWIs, further information on which can be found in the Technical Reference Manual. This, though costing a little extra, is a must if

you want to learn to program the video displays.

The technology used on this board allows up to 16 bits per pixel – 65536 colours – from a range of 16 million. The DeskTop will only allow you a 8 bits per pixel maximum but you can still choose these from the 16 million rather than the 4096 range of colours provided by VIDC.

Using these new modes and colour ranges, artwork produced should be near photographic quality.

You'll also find that this board supports Atomwide's VIDC-Enhancer, all the new modes invented by Computer Concepts for Impression and Beebug





for Ovation plus a few modes of its own which are all DeskTop compatible. In fact almost all screen modes – 127 – have been defined, although some are only available on the A540.

Summing up

With the promise of new programs to take advantage of the new high resolution modes and extended colour palette, this board is an essential peripheral – especially if you use art or graphics packages.

If you ever need to import some of the high resolution images which can be found on most of the bulletin boards the addition of the Graphics Enhancer to your Archimedes can provide a professional quality video output for a very realistic price.

The video output is outstanding on the standard Acorn/Philips colour monitor, but using all the modes to the full you'll need a multi-sync monitor for truly professional results.

The Serial Port are working on an enhancement and also a professional system supporting full genlocking and transparencies. I can't wait.

Definitions

Resolution: The number of individual dots which the video chip (VIDC) produces for each scan line. Described as x pixels (picture elements) by y pixels. The x value is how many pixels are seen horizontally across the screen and the y value is how many are seen in the vertical plane.

The standard VIDC chip running at a clock frequency of 24MHz can produce a number of different resolutions from 160 horizontal pixels by 256 vertical pixels to 640 by 512 pixels. Generally the lower the resolution the bigger the pixels appear on screen.

With the Graphics Enhancer board fitted, the highest resolution is increased to 1664 by 328 pixels and the VIDC clock is increased to 36MHz. Although it is worth noting that some VIDC chips run at up to 48MHz.

Bits per pixel: The number of bits the colours are stored in. If the

selected mode has 4 bits per pixel it can display one of 16 different colours for each pixel – 0000 to 1111 in binary. If the mode uses 8 bits per pixel it can use 256 different colours for each pixel – 00000000 to 11111111 in binary.

The standard VIDC chip can display up to 256 colours for each pixel and as few as two colours – in Mode 15 or 0 respectively. The Graphics Enhancer can be programmed to display up to 65536 colours per pixel when set to 16 bits per pixel. Unfortunately this mode isn't DeskTop compatible although the results are stunning.

Palette Entries: The number of possible options for any one of the colours of an individual pixel. The standard VIDC has a *colour look-up table* with 4096 entries. This means that any pixel can be coloured in any one of 4096 colours across the spectrum from black to white.

This is much better than most other

computer systems can provide, but the Enhancer Board extends this still further to over 16 million different colours, the standard for professional graphics workstations.

Perceived resolution: What the human eye can see and resolve in the mind. Assuming you use the VIDC colour look-up table you'll be able to see a colour image 640 by 256 pixels in 16 colours when in Mode 12. But if there is another image alongside with the same resolution of 256 colours in Mode 15 you'll perceive the second image to be of better quality.

Using the Graphic Enhancer's colour look-up table on a third image of the same resolution but with a better range of 256 colours this image will look sharper still.

Even reducing the resolution of the other image with 65535 colours it will be seen to be better than all the others without taking any more disc space than the third image.

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.22BLS

ELEGANT DESIGN

COMPACT SIZE

MAINS OR BATTERY
POWERED

LONG BATTERY LIFE

**ONLY
£169!**

COMES COMPLETE WITH MAINS
ADAPTER, LEADS, BATTERY AND
DRIVERS FOR ARCTERM
VERSIONS 6 AND 7

RTFM, 43 HILL STREET, ST HELIER, JERSEY

FOR CREDIT CARD ORDERS PHONE: 0534 67870 OR FAX 0534 68996

Join the

*Three speech synthesisers have appeared in the Archimedes market
— Steve Turnbull investigates*

Arc

Chat Show

SPEECH output from a micro – the idea of a machine talking back to you – has always had a science fiction connotation. Unfortunately that particular concept also requires an *intelligent* machine and the truth of speech output is far less romantic.

Nearly all of the many speech units produced since before the birth of the 8 bit BBC Micro had to be sent phonemes to speak. A phoneme is a sound that can be made by a human voice system and it has very little to do with the alphabet.

For example the word *emphasise* breaks down into:

e	as in egg
m	as in mother
f	as in father
a	as in father
s	as in sing
i	as in i
z	as in zoo

Notice how the two s's are pronounced differently depending on

their position.

The next breakthrough pre-1982 was the Votrax Type'n'Talk which plugged into the serial port and behaved like a printer. Quite a sophisticated unit, it managed to translate written English into understandable speech using a set of built-in rules and an exception dictionary for special cases.

It had an American accent, but this was a small price to pay for the ease of use – although it could take a little while to get tuned in to its pronunciation.

Apart from the infinite vocabulary speech units, some fixed vocabulary devices provided sampled sounds which could be output directly. The famous Kenneth Kendal chips for the BBC Micro were of this type, but they never really caught on.

The tiny vocabulary limited their application – unless you had someone who was dedicated enough to use the basic building blocks of these chips to produce new words.

Progress for micros then stopped as the necessary technology existed

for all the specialised tasks that required speech output, like computer software for the visually-impaired.

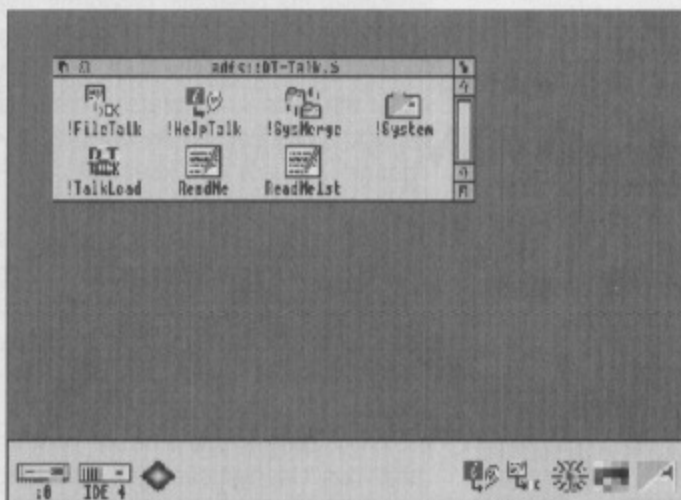
Then Superior Software launched Speech! for the BBC Micro. This revolutionary piece of software required no additional hardware, producing its sounds by built-in sound chips.

Now three companies have released similar software for the Archimedes – with a fourth waiting in the wings. So let's listen to what's available.

Product: DT-Talk

Price: £15.00

Supplier: DT Software, 13 Northumberland Road, Leamington Spa, Warks.



The DT-Talk disc contents

THIS was the first of the speech synthesisers to hit the streets, back in September 1990. The package is composed of an A6 booklet of 16 pages and the disc of software. There are three major applications: !TalkLoad, which loads two modules, VoiceSynth and TextTalk, !FileTalk, which is an icon bar-based program which simply speaks text files that are dragged to it, and a PD application called !HelpTalk which will announce application help files.

The TextTalk module provides the higher level entry point with the single *Say command. It takes text and converts it to phonemes which are then passed to the VoiceSynth module to be spoken via the single SWI command VoiceSynth_Allophone – an allophone is an actual sound. The SWI

command accepts a pointer to a string containing a code for the allophone to be spoken.

It is also possible to drive the VoiceSynth module via SOUND commands, like this:

```
*ChannelVoice 1 VoiceSynth
*SOUND 1 0 0 255
```

The duration of the sound is used for the particular allophone. Unfortunately although the booklet lists the available sounds it doesn't

say which numbers to use for them.

The final page of the booklet is devoted to the license conditions of the software which essentially says that you are allowed to use it on your non-networked machine as long as you don't rip it off.

Sound quality is quite poor, being extremely artificial and mechanical. You can use the allophone entry point to produce more comprehensible speech, but that rather defeats the object of the text-to-speech translation.

Product: SpeechSystem

Price: £25.00 (inc. P&P)

Supplier: PEP Associates, 55 St Pauls Drive, Chatteris, Cambs PE16 6DG

NEXT out of the programmer's bag came the SpeechSystem, comprising a much more weighty 55 page A5 manual with nice page styling and a comprehensive index. The single disc contains three applications and a couple of demos.

The applications are !PEP-Lib which contains the modules for the SpeechSystem, !PEP-Text which will speak text files and !PEP-Word for creating words that require special pronunciation.

The PEP software is protected by an ID system: When it's first run you must enter a personal identity string which is then encoded into the software.

A copyright message comes up when the speech modules are loaded, which



is fine. My only complaint is that the window stays up too long. All the software and the manual demonstrate a high level of professionalism but some details have been missed. !PEP-Text loads on to the iconbar and when a text file is dragged on to it brings up a window containing the words with a video-style control panel. There is no word-wrap on the text, so paragraphs extend horizontally until the next Return.

!PEP-Text has extensive additional hooks into the operating system allowing it to intercept the interactive help, speak letters or complete words as they are typed. It can also speak text under the mouse pointer as long as it's in the system font.

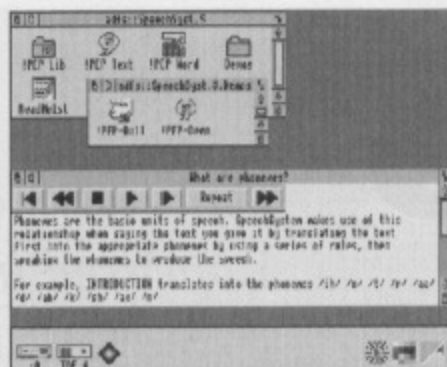
Further options allow you to disable specific characters from being spoken when either read or typed. I'm not sure of the practical advantages of these hooks as a window-based multi-tasking environment is not really the best place for this type of aid. A second, optional, module allowing these hooks to be included would have been more appropriate.

!PEP-Word allows an exception dictionary to be built up, but surprisingly no examples are provided in the initial system. Editing is provided by a menu dialogue box which vanishes if you click anywhere else, which I found irritating.

Also the editing method was extremely awkward and it was impossible to have the word spoken in its text form to see what corrections might be needed, if any.

The demos provided include !PEP-Bull, the infamous !Bullwink modified to speak its words of wisdom, and !PEP-Demo which includes a version of !PEP-Text on four specific subjects.

The SpeechSystem has three star commands: Utter, Shutup and SpeechInfo. The first speaks the string that follows, it doesn't translate strings of digits into their ... *hundred and* ... type equivalents. Phonemes can also



be included enclosed in double curly brackets. Speech is processed in the background and the *Shutup command forces it to cease while SpeechInfo provides the current status.

One point of note is that the Atomwide VIDC Enhancer does naughty things to the sound system. Alone among the speech software SpeechSystem allows you to compensate for this.

For the programmer there are 12 SWI calls allowing access to all the main features of the system, including the ability to convert a text string into its phoneme equivalent without it being spoken.

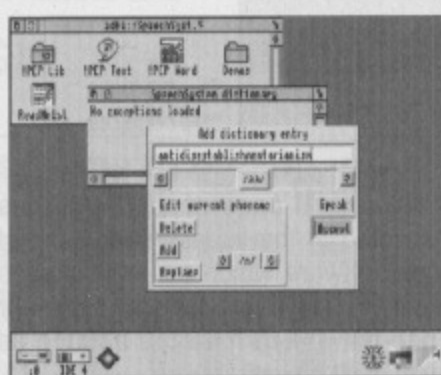
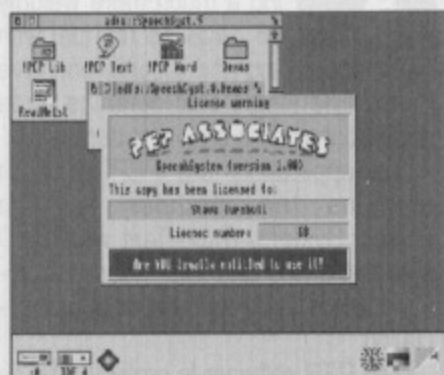
An interesting pair of SWIs are RegisterUser and DeregisterUser, which the module employs to keep track of the number of applications using it.

When a user starts up it registers with the module and on closedown it deregisters, and it is also given the count of remaining users. If this value is zero – no more users – the quitting user can also RMKill the module.

This helps to keep the machine's memory clear of unwanted modules. It's a practice that could certainly be emulated by other software writers.

The manual contains a highly legalistic two-page licence agreement which, if you run the ID installation process, you are assumed to have conformed with.

The speech quality of SpeechSystem is better than that of DT-Talk, being slightly more comprehensible – but it's still rather stilted and mechanical.



Product: Speech!
Price: £19.95
Supplier: Superior Software, P.O. Box 6, Brigg, S. Humberside DN20 9NH.
Tel: 0652 58585

F fairness came into business you could say that Superior have an unfair advantage – the author of Archimedes Speech! wrote the original BBC Micro Speech! so he had a head start. But what it really means is that this should be the best of the three packages. So let's see:

What you get looks like a game. The packaging is the same as for all Superior Software's products, a plastic case with an inlay and a disc. The inlay in this case is crammed with instructions, but that is all the written documentation provided.

On the disc are four applications: !Speech! which contains the code, !Sp_Demo, !Sp_Dict and !Sp_Spell. The demonstration is a highly effective, humorous and graphically excellent production with the Speech! Genie speaking on screen with lip movements correctly synchronised – it's a lot better than most TV cartoons.

!Sp_Spell is a spelling tester, once again using the Genie, this is, of course, the way spelling testers ought to be – the word is spoken and the testee types in the answer. There are a number of word sets and you can input your own.

Unlike the other two programs, the pronunciation rules for !Speech are not fixed. Using !Sp_Dict you can alter the rules if you prefer a different accent – or a completely different language. There's no exception dictionary, it's all included in the !Sp_Dict.

The process for altering the rules is not quite so straightforward: Having printed out the !Sp_Dict.Help file you can load the file !SP_Dict.Dictionary into !Edit and begin to make alterations.

Considering the amount of time that has clearly been spent creating the demo and spelling programs I'm amazed at how low-tech this solution is.

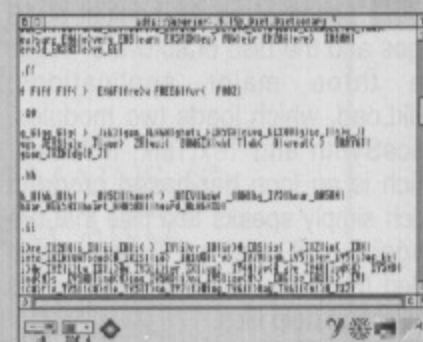
Once the changes have been made you must double-click the !Sp_Dict application and a new version of the !Speech module is created

ready to be dragged to some location other than the original disc.

The programming interface is very extensive with controls for altering the speed and pitch of the spoken text, as well as modifying the way the mouth forms the words, thus changing the style of pronunciation.

Documentation is limited on this, but the !Speech!.Help file contains just enough information, although there's no hand-holding.

The speech quality is vastly superior to the other two systems and much more realistic. The wide range of controls make it possible to produce singing as well as a multitude of other effects. Unquestionably the best buy.



Name	Output quality	Output controls	Rules	Exceptions	Documentation	Support software	Price
DT-Talk	Poor	None	Fixed	None	Poor	Poor	£15.00
SpeechSystem	O K	None	Fixed	Alterable	Excellent	Excellent	£25.00
!Speech	Good	Extensive	Alterable	Alterable	Poor	Good	£19.95

How the products compare

The Sampler and MIDI Card

£69 exc VAT - Econet Version

The sampler and MIDI card opens up the exciting world of sound manipulation and control at a price that allows everyone to join in.

The card fits neatly in the Econet socket inside your machine thus leaving your podule slots free for other upgrades. It has no unsightly cables protruding from the machine - all leads connect via an adapter directly to the standard Econet socket.

Even though the cost may be low, specification and quality haven't been skimped on. The board is an 8-bit sampler with variable sample rate capable of sampling at up to 250 KHz with input via a 3.5mm jack allowing connection to Hi-Fi's, CD players, Walkmans etc. The software supplied supports a range of features including over-sampling, sample rate conversion, and software filtering. Waveform editing is possible with facilities to view the waveform (including real-time analysis), fade in/fade out, and cut and paste features. The samples produced are perfect for use in other packages such as Tracker and Armadeus.

The MIDI side provides 16-channel MIDI IN and MIDI OUT and the supplied software emulates the latest version of Acorn's MIDI software. This allows it to work with programs that can run using Acorn's podule and their software.

Tracker

£49.95 inc VAT

Tracker is the perfect compliment to the Sampler and MIDI card. It is a full 8 channel sequencing package that creates stand-alone music modules which will play on any Archimedes without any need for extra hardware. Using the supplied samples (over 150 of them!) or your own, you can create complex pieces of music using Trackers many advanced features including:

- Pitch bend (portamento) • Arpeggio • Stereo Panning • Volume Slide • Track Swapping and Mixing •
- Note entry either via the Archimedes or a MIDI keyboard •

A number of complete songs are supplied together with a comprehensive manual explaining all the facilities in detail. Extra music disks (Numbers 2-10) are available at £4 each.

SPECIAL OFFER: SAMPLER/MIDI CARD + TRACKER FOR ONLY

£99 exc VAT

The Joystick Interface

£23.95 exc VAT

- Plugs into the parallel printer port • No special support necessary • Control modules supplied for most games •
- Comes complete with software to mimic key presses • Programming language supplied for complex modules •

"The programming language and the compiler enables the joystick....to be used to control virtually any piece of software. Since the RTFM interface does not do this, The Serial Port's effort is the best buy of the two."

Acorn User February 1991

The Serial Port, Burcott Manor, Wells, Somerset BA5 1NH

Tel: 0243 531194 Fax: 0243 531196

WeServe of Hampshire

Best for service

Star

LC10 ribbon £4.70 inc.
Black ribbon £6.40 inc.
Colour ribbon £12.90 inc.



LC10 Mono
£149.00 (£126.81 + VAT)

LC200 Colour
£209.00 (£177.87 + VAT)
(with Cable and Paper)

Star LC2410
(24 pin) with cable & paper
£199.00 (£169.36 + VAT)

Samsung SF1000
Group 3 FAX
£292.58 (£249.00 + VAT)

Star LC24200
(24 pin) with cable and paper
£249.00 (£211.91 + VAT)

Panasonic KXP1123
(24 pin) with cable & paper
£195.00 (£165.96 + VAT)

Star LC24200 Col.
(24 pin) with cable and paper
£299.00 (£254.47 + VAT)

NEC P20
(24 pin) with cable & paper
£234.00 (£199.15 + VAT)

Citizen 120D+
with cable and paper
£128.00 (£108.94 + VAT)

Atari 520ST
£245.00 (£208.51 + VAT)

Citizen Swift 24
(24 pin) with cable and paper
£265.00 (£225.34 + VAT)

Amiga 500
£315.00 (£268.09 + VAT)

PRINTER RIBBONS
Ex VAT Inc VAT
LX800 & FX800 Print Ribbon.....2.29 2.69
LC10 Print Ribbon.....4.00 4.70
120D Print Ribbon.....4.00 4.70
Taxan/Canon Ribbon.....3.22 3.78
Juki 6100 Print Ribbon.....1.60 1.88

Phone for full range 100 + original & Compatible ribbons - Bulk discounts

Taxan 775
with cable
£450.02 (£383.00 + VAT)

Taxan 795-A
with cable
£505.25 (£430.00 + VAT)

ROMS/SOFTWARE

Ex VAT Inc VAT
Inter-Word Rom.....35.75 42.00
Spell Master Rom.....40.00 47.00
View 3 Rom.....40.00 47.00
DTP-Acorn.....120.00 141.00
Real McCoy.....22.04 25.90

Phone for BBC/Archimedes Software catalogue 100's of titles inc. Educate

UPGRADES/8271

Ex VAT Inc VAT
27128A 250nS 12.5v.....3.00 3.52
8271 controller.....38.26 44.95
6264 LP 150nS.....3.00 3.53
Acorn 8271 DFS.....44.26 52.00
Acorn 1770 DFS.....45.11 53.00
A3 Concept Keyboard.....139.00 163.32
Master Keyboard.....50.21 59.00
Acorn Tracker Ball.....38.30 45.00

Interdictor 1 Fli/Sim
£19.50 (£16.60 + VAT)

VOLTMACE JOYSTICKS
Archimedes Delta Cat.....23.83 28.00
Delta 3B single.....11.87 13.95
Delta 3B twin.....17.83 20.95

A3000 TV Modulator
£29.90 (£25.45 + VAT)

A410 + 4M + 40M HD
£1410.00 (£1200.00 + VAT)

40M Hard Disc
£257.53 (£219.00 + VAT)

A420LC + Colour
£1492.25 (£1270.00 + VAT)

A540 + Multisync
£3337.00 (£2840.00 + VAT)

A3000 + 2m RAM
£678.00 (£577.02 + VAT)

A3000 LC + 2m RAM
£778.00 (£662.13 + VAT)

A3000 1M UPGRADE
1m fitted upgradeable to 4m
£79.00 (£67.23 + VAT)

DISKETTES

(lifetime warranty)
(100% certified error free)

Inc VAT
10 5.25" Banana Reversible.....9.95
10 5.25" DS/DD 96tpi.....5.95
50 5.25" DS/DD 96tpi.....20.15
100 5.25" DS/DD 96tpi.....37.72
10 3.5" DS/DD.....5.95
50 3.5" DS/DD.....19.80
100 3.5" DS/DD.....37.95
250 3.5" DS/DD.....82.25
1k 3.5" DS/DD.....309.03
50 x 3.5" Disk Box with lock.....5.99
100 x 3.5" Disk Box with lock.....7.50

SONY branded Inc VAT
10 3.5" DS/DD.....7.50
50 3.5" DS/DD.....32.30
100 3.5" DS/DD.....59.93
1k 3.5" DS/DD.....540.50

3M branded Exc VAT
10 3.5" DS/DD 135tpi.....7.00
10 3.5" DS/DD.....13.50
10 5.25" DS/DD 48tpi.....5.00
10 5.25" DS/DD.....9.00

Phone for our 40 page catalogue
EDUCATIONAL AND GOVERNMENT ORDERS WELCOME

All products have a 30 day money back & 12 month warranty.
Prices subject to variation without prior notification.
Established 6 years. We are closed Saturday afternoons.
Free parking 2 minutes from M27 junction 11
Postage 94p (80p + VAT) Securicor £7.05 (£6.00 + VAT)



WeServe
Larger items delivered
by Securicor



Micro Dept
40-42 West Street,
Portchester, Hants.
PO16 9UW
Tel: 0705 325354

ZERO FINANCE

(LEARNING CURVE ONLY)

0%

£59/MONTH A3000 LC

£109/MONTH A420 LC

A540£3075

A440£1875

PRINTERS£POA

MONITORS.....£POA

ALL SOFTWARE -15%

PRICES INCLUSIVE OF VAT
AND FREE PD SOFTWARE

Microfix

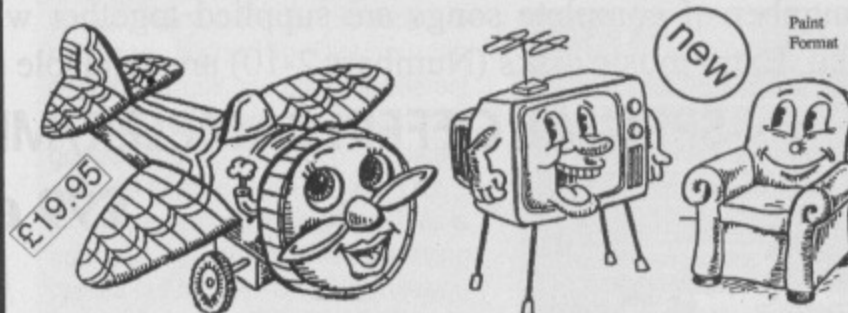
0227-771419

Micro Studio

22 Churchgate St. SOHAM Cambs CB7 5DS Tel. 0353 720433

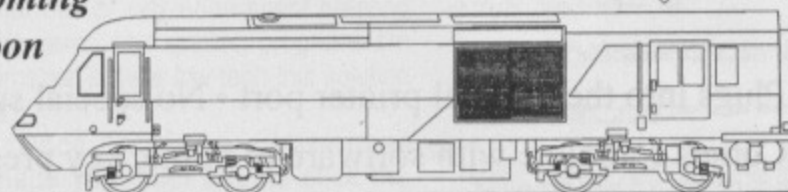
THE CARTOON COLLECTION

GRAPHICS LIBRARY PACK FOR THE ARCHIMEDES and BBC A3000

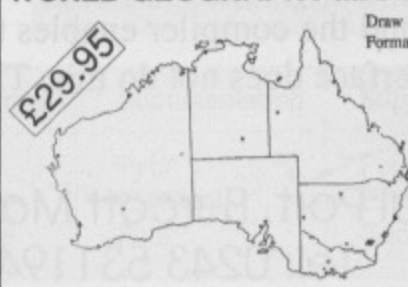


TRANSPORT

Coming
Soon

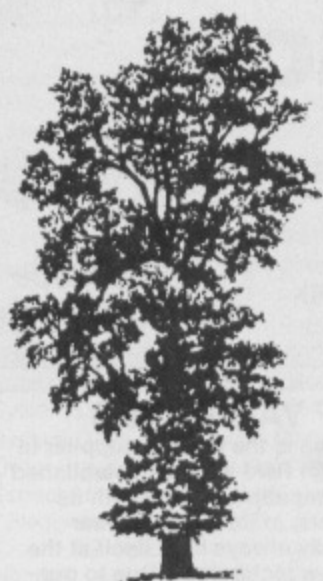


WORLD GEOGRAPHY MAPS



ALSO AVAILABLE NOW

WORLD WILDLIFE £19.95
HISTORY: Costume £19.95
NATURE PACK £19.95
DECORATED ALPHABET £19.95
TOOLS PACK £20.05
PREHISTORIC ANIMALS £19.95
CHILDRENS GRAPHICS £19.95
DTP GRAPHICS LIBRARY £29.95



The ClipArt Collection



Produced
by



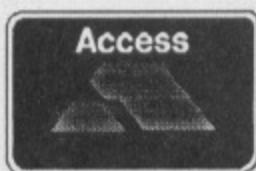
The Graphics Factory

Five Megabytes

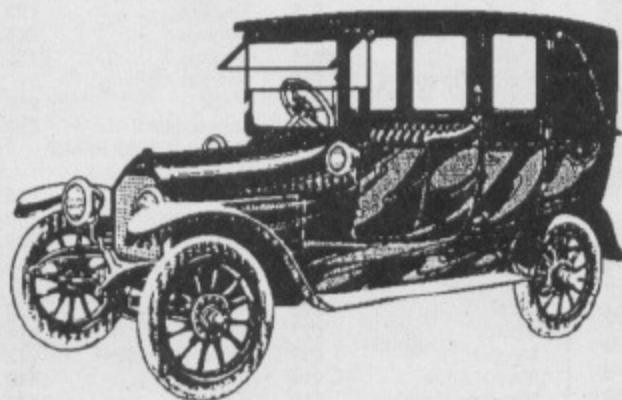
of High Quality Clipart. Over 350



Mono Images compressed onto
4 disks with Topics ranging
from Animals to Signs to Trees!



Only
£19.95
ex. VAT



The Graphics Factory
Units 18e & 18f
Boxer Place
Moss Side Employment Centre
Leyland, Preston, PR5 3QL
Telephone (0772) 623000
Fax (0772) 622917
Educational & Government Orders Welcome
No Carriage Charges in UK



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) 37774 Tlx: 8956095 Fax: (0923) 33642



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
410/1	£1099	£1159	£1278
420/1	£1299	£1359	£1478
440/1	£1699	£1759	£1878
540/1	£2995	£3065	£3178

Archimedes A3000

12 MONTHS
FREE MAINTENANCE
ON SITE

- A3000 Microcomputer **£599**
- A3000 + Learning Curve pack **£699**
- 3.5" External Drive **£99**
- Monitor Stand **£16**
- External Podule Case **£13**
- Serial Upgrade **£17**
- Technical Manual **£60**
- SCSI Card **£149**
- Dust Cover Micro only **£5**
- Dust Cover for Micro + Monitor **£9**
- User port/MIDI upgrade **£45**
- UHF TV Modulator **£30**

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	Upgraded to 2MB RAM & a 20MB Hard Disc, (A420)
A420/1	Upgraded to 4MB RAM 40MB Hard Disc (A440), MK II Learning Curve pack and Acorn DTP pack
A440/1	High Res 14" Multiscan Colour Monitor
540/1	High Res Multiscan Monitor & Panasonic KX-P1180 Printer
A3000	Upgraded to 2 Megabyte of RAM & a A3000 Monitor plinth.

+ 12 months FREE On-Site Maintenance
(P.S. Instead of the above Hardware upgrades on A410/1 & A420/1, we will fit the 30MHz Turbo Board if required. Please specify your requirement when ordering.)

Archi Accessories

- NEW Multitasking RISC OS **£29**
- 3.5" 800K 2nd Floppy Drive (305/310) **£118**
- 5.25" 800K external Floppy Drive **£85**
- I/O Podule (with Analogue port, User port, & 1MHz bus) **£76**
- MIDI add-on to I/O Podule **£29**
- MIDI Expansion Card **£65**
- Sound Sampler Mono (Armadillo) **£129**
- Sound Sampler Stereo /Midi (Armadillo) **£186**
- Chromalock Podule (Wild Vision) **£275**
- Econet Network Board **£44**
- Archimedes IEEE Interface Adaptor **£269**
- Dual RS232 Podule **£195**
- 16 bit parallel I/O Card **£195**
- Archi replacement mouse – New design **£32**
- PC Emulator NEW Faster Version **£62**
- Software Developers Toolbox **£149**
- Floating Point Unit **£455**
- SCSI Adaptor Expansion Card **£162**
- Keyboard Extension Lead **£6**
- 2 Podule Backplane **£25**
- 4 Podule Backplane **£38**
- Fan for above backplanes **£8**
- Risc Os Extras Software Disc **£5**
- Smoked Perspex Low profile Keyboard Cover **£8**
- Ethernet Card **£220**

0% Finance Now Available

On Acorn Archimedes A3000 and A420/1 with learning curve packs.
(Please telephone for details)

8 Meg RAM Upgrades

- R810 – A410/1 upgraded to 8MB **£740**
- R820 – A420/1 upgraded to 8MB **£689**
- R840 – A440/1 upgraded to 8MB **£579**
- R814 – R140 upgraded to 8MB **£579**

Turbo Charge Your Archimedes

Increase the speed of your Archimedes by a factor of THREE to SIX times (depending on the software you are running), with Watford's ARM3 Upgrades.

- ARM-3 20MHz Upgrade Board **£325**
- ARM-3 30MHz Upgrade Board **£375**
- MEMC 1A Upgrade **£42**

(ARM 3 price includes a FREE Chip extraction tool)
(Special Offer – If purchased together with an Archimedes Micro, then not only will we fit the card Free of Charge but we will also reduce the price by £40 i.e. You pay only £285 for ARM3 20MHZ & £335 for ARM3-30MHZ)

Archimedes RAM Upgrade

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

- R302-A3000 – to 2MB RAM Upgrade **£52**
- R304-A3000 – to 4MB RAM Upgrade **£169**
- R311-A305 – to 1MB RAM Upgrade **£50**
- R312-A305/310 – to 2MB RAM Upgrade **£235**
- R314-A305/310 – to 4MB RAM Upgrade **£425**
- R412-A410/1 – to 2MB RAM Upgrade **£39**
- R413-A420/1 – to 4MB RAM Upgrade **£75**
- R414-A410/1 – to 4MB RAM Upgrade **£105**

Archimedes Hard Disc

Watford's ST506 Hard disc drives for A310 & A410 series fit internally into the space provided. The 'simple to follow' fitting instructions supplied makes drive fitting very easy. All disc drives are auto parking. 40Meg & 53Meg drives are fast 24ms type, while 20MHz are 28ms.

P.S. A310 upgrades require a backplane and a fan.

- 3HDP – Hard Disc Podule only **£135**
- 3HD20 – 20Meg H' Disc + Podule for 310 **£209**
- 3HD40 – 40Meg H' Disc + Podule for 310 **£389**
- 3HD50 – 53Meg H' Disc + Podule for 310 **£474**
- 4HD20 – 20Meg Hard Disc for 410 **£165**
- 4HD40 – 40Meg Hard Disc for 410 **£245**
- 4HD50 – 53Meg Hard Disc for 410 **£335**
- A3000 20Meg Hard Disc + Podule **£345**
- A3000 40Meg Hard Disc + Podule **£459**

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

- UP10 – to 2MB RAM + 20MB Hard Disc **£210**
- UP15 – to 2MB RAM + 40MB Hard Disc **£315**
- UP20 – to 4MB RAM + 20MB Hard Disc **£265**
- UP30 – to 4MB RAM + 40MB Hard Disc **£345**
- UP40 – to 4MB RAM + 53MB Hard Disc **£475**

Silicon Vision

- Gerber Plot **£95**
- Solid CAD **£120**
- Super Plot **£30**
- Arc PCB Professional **£275**
- Realtime Solids Modeller **£138**
- Super Dump **£22**
- Solids Render **£120**
- Solid Tools **£279**
- Realtime Solids Modeller **£138**

STAFF VACANCIES

Watford Electronics is the leading supplier in the Acorn computer field and has established itself in the PC compatible market with its Aries PC computers. In its eighteen year history, Watford has always kept itself at the forefront of the new technology. Due to our latest expansion, we require staff to man our BBC/Archimedes and PC Technical Departments. Applicants will be required to be familiar with BBC/Archimedes hardware and software, and PC staff will need to be familiar with PC computer hardware. Good rates of pay, excellent prospects. Subsidised company accommodation is available to single persons if required. Telephone Keith Archer or Shiraz Jessa for interview, or write to us enclosing your CV.

Archi Mouse Port Splitter

Continuous plugging and unplugging of the mouse is not only inconvenient but can also damage your micro. Our handy little Archi mouse port splitter unit eliminates this risk by allowing you to connect a mouse and a joystick or a tracer ball simultaneously to your Archimedes micro. The miniature slide switch on the box enables you to select the socket to be used.

£15

Graphics, Art, Design & Games

GRAPHICS		Manchester United	
Atelier	£65	Nevryon	£14
Artisan II	£47	Olympics	£15
Artisan Gallery	£16	Pipe Mania	£19
Autosketch II	£68	Pirate	£16
Craftshop 1 & 2	£28	Power Band	£20
Euclid 2	£52	Punchman 1 & 2	£16
Graph Box	£59	Punchman 3 & 4	£16
HotLink Presenter	£42	Pysanki	£15
Kermi	£46	Real McCoy	£22
Mogul	£19	Real McCoy 2	£23
Poster	£79	Redshift	£14
Pro Artisan	£72	Return to Doom	£16
Render Bender	£58	Revelation	£54
Snippet	£26	Repton 3	£15
Tween	£25	Rotor	£20
GAMES		Splice	£25
ArcPinball	£18	Sporting Triangles	£24
Apocalypse	£21	Star Trader	£14
Arcade 3 Compil.	£12	Superior Golf	£15
Arcade Soccer	£15	Talisman	£12
Arc Pinball	£18	The Pawn	£19
Arc Trivia	£18	Thundermonk	£11
Avon	£16	Timewatch	£24
Ballerina	£16	Trivial Pursuit	£23
Blowpipe	£16	Twin World	£17
Break 147	£20	U.I.M.	£23
Bug Hunter	£14	White Magic	£15
Caverns	£14	White Magic 2	£15
Chess 3D	£17	Wimp Game	£15
Chocks Away	£18	Worldscape	£16
Conqueror	£18	Miscellaneous	
Cops	£14	Ancestry	£59
Corruption	£18	Arccomm Pack	£24
Crisis	£23	Arcterm 7	£69
Drop Ship	£15	Armadeus Sound	£60
Enthar Seven	£22	BBC DFS Reader	£6
E-Type	£17	Equasor	£40
E-Type Designer	£15	FlexiFile	£98
E-Type Extra 100 miles	£15	Genesis	£65
Family Favourites	£15	Genesis 2	£125
Fireball 2	£19	Hearsay Comms	£50
Holed Out Designer	£15	Investigator 2	£22
Holed Out Golf	£15	JX Archi Colour Printer	
Hostages	£15	Driver for Citizen & Star	£15
Ibix the Viking	£14	Numerator	£66
Inertia	£15	Presenter 2	£35
Inter Dictor 2	£26	Presenter Story	£145
Iron Lord	£15	Revelation	£62
Jet Fighter	£10	Rhapsody in Blue	£39
Jiglet	£25	Speech!	£16
Jigsaw	£27	Toolkit (Clares)	£42
Magpie	£39	Touchtype	£40
Man at Arms	£16	Tracer	£46
MahJong Patience	£15		

LANGUAGES (Archimedes)

ISO-PASCAL; FORTRAN 77	£77 each
Assembler; LISP; Prolog X	£149 each
ANSI C Rel. 3	£125
Cambridge Pascal	£60
Macro Assembler	£40
Robo Logo	£69
BASIC Compiler	£77
Logotron Logo	£55
Risc Basic	£120
Risc FORTH	£110

Minerva's Archimedes Software

Home Accounts*	£36	Sales Ledger*	£53
Stock Manager*	£53	Purchase	
Nominal Ledger*	£53	Ledger*	£53
Ancestry	£59	Reporter	£29
System Delta+	£55	Mailshot*	£29
System Delta + Reference Manual			£25
Order Processing/Invoicing*			£53
School Administrator			£118

* Requires System Delta

NEW Business Accounts Packages
Nominal Ledger, Order Processing/Invoicing,
Purchase Ledger, Sales Ledger & Stock Control
Price: £78 per Module or
£299 for the complete Software Suite

ULTIMUM – Archimedes A3000 Podule Racking System



THE ONLY LOGICAL WAY TO EXPAND YOUR A3000 COMPUTER

The accepted standard for Archimedes computer expansion is the Acorn Podule, designed initially to fit the old 310, and also for the later A400 and A400/1 series micros. The podules fit inside these computers up to four at a time. The A3000 is the little brother of the family, but can only have one podule at a time, plugging into the back of the computer.

Other attempts have been made to expand the A3000 by trying to introduce a 'mini-podule'. This is impractical for many reasons, amongst which is the reluctance of manufacturers to produce them. Nobody wants to re-design podules already produced. Some cannot be produced on a 'mini-podule' as they are far too complicated and simply wouldn't fit.

Watford Electronics listens to the demands and requirements of its customers, and we are glad to say that we have come up with the only real solution to the A3000 expansion problem. The ULTIMUM Podule Racking System allows up to three FULL SIZE standard Archimedes 300/400 series podules to be fitted to the computer. In addition, there is also provision for a hard disc drive and a podule to be fitted internally.

Since the ULTIMUM Podule Racking System takes proper full size podules, you will be able to use any of the currently available peripheral equipment, from companies like Computer Concepts, Armadillo, Acorn and of course, our own brand. Fitting the podules to 'ULTIMUM' is simple. They are neatly fitted inside the metal case of the rack, avoiding the previously untidy method of hanging the podule off the back of the computer, risking damage to both, it and to the computer.

'ULTIMUM' has its own power supply, so no strain is put on the A3000 power supply. There is also an IEC mains output socket for an Acorn type monitor so reducing the number of plugs required to go to the mains. The ULTIMUM is rigidly clamped over the top and under the computer, and allows direct access to the floppy disc drive and reset button, rather than obstructing access as on other systems. The mounting method employed is so firm that the computer could even be safely transported without the assembly falling apart.

Price: £125

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

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

RRP: £1030

Offer Price: £475

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"/3.5" 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

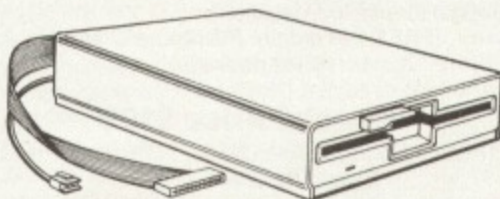
Special Education Prices

All education establishments qualify for special education prices on micros, etc. Please write in or telephone (0923) 37774 or 50335 for written quotation.

BBC MASTER

MASTER 128K Micro incl. Acorn's View, Viewsheets, ADFS, BASIC Editor & TERMINAL plus FREE OFFER (see below) **£399 (carr £7)**

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 June**

ADD-ONS & ACCESSORIES

Turbo 65C102 Add-on Module	£115
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 ATS Rom	£99
Ecolink	£270



**CREDIT CARD 24 HOUR
Ansaphone Hot Lines
(0923) 50234 or 33383**

Desk Top Publisher

Acorn's Archi DTP Package	£125
Impression 2 DTP Pack	£135
Impression Junior	£79
Tempest DTP Package	£95

Archi Wordprocessors

Pendown Archi	£49	Archie Spell Master	£39
Wordwise + Disc	£24	PD Spellchecker	£40
Image Writer	£25	View	£45
Interword Disc	£24	Graphic Writer	£23
1st Word Plus - 2	£69	EasyWord	£30

Databases

AlphaBase	£36	Multistore	£195
Knowledge Organiser	£45		

Spreadsheets

Intersheet Disc	£24	Viewsheets	£45
Sigmatasheet	£39	Schema	£92

Business Graphics

GammaPlot	£39	SigmaPlot	£39
Interchart Disc	£20		

Integrated Packages

- Logistix £79 • Pipedream 3 £119
- Desktop Office – Database, Graphs & Charts, Wordprocessor Spreadsheet, Communications £98
- Desktop Folio – Wordprocessor, Desktop & Interactive Publishing. Ideal for school environment. £85

Watford's Scottish Dealer

We are pleased to announce the appointment of Messrs Computer Depot as Watford's official Scottish Dealer. The full range of our BBC/Acorn products is now available from their Dundee, Edinburgh & Glasgow shops. Their technical staff will be very happy to discuss all your peripherals' requirements.

Education Software

- Advanced Folio: 7-14 years. Has the simplicity of a basic wordprocessor with the presentation quality of a Desk Top Publisher £38
- Colourcopter & Numbercopter: 4-7 years. Flying start in pre-reading and pre-number skills
- Colourcopter includes 7 programs to develop matching, sorting, coordination, letter & word recognition £28
- Numbercopter: Includes 8 programs to develop memory, sequencing, logic, number, more and gone away, word order and rhythm skills £28
- Best Four languages 5-11 years: Four best selling programs which encourage children to work together to improve their linguistic ability £33
- Hands on Spelling 5-11 years: Promotes a visual approach to mastering spelling, linking the skill with other National Curriculum areas as hand writing, talking and reading. £30
- Asian Folio – Gujarati 80T £45
- Best Four Languages £35
- Best Four Maths £35
- Frieze 7-16 years £37
- Kaleidoscope 7-16 years £37
- Merlins Castle £22
- Maths 9-13 years £25
- Number in the National Curriculum £55
- Screenprint pack of 5 5-16 years £150
- Time Traveller 7-16 years £40
- The Lost Frog £22
- World Map Study 7-16 years £35

(More Educational software on page 10)

Continued → → → → → → → → →

Archi A4 Scanner



This new A4 image scanner from Watford Electronics 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.

Introductory Prices:

Archi A4 Scanner	£349
Sheet Feeder for above	£95
Scanner + Sheet Feeder	£419

Z88 Portable Micro



£185

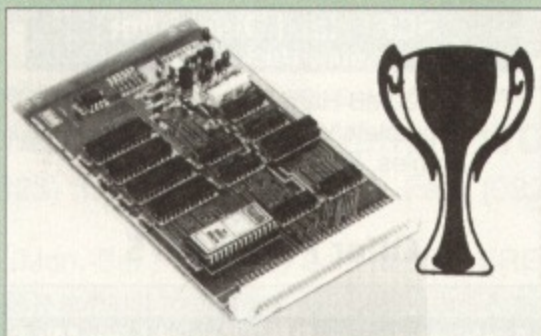
FREE

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	£18.00
• 128K RAM Pack or 128K EPROM Pack	£42
• 512K RAM Pack	£175
• Z88 Eprom Eraser Unit	£33
• Z88 Spellmaster for Pipedream	£51
• 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	£25
• Z88 to Archi Link	£15
• Z88 to BBC Link	£20
• Z88 to PC Link II	£30
• Z88 to Macintosh	£52
• Z88 Mains Adaptor	£9
• Z BASE	£56
• Z TAPE	£42
• Z TERM	£42
• Z88 Modem	£149

Archi Real-Time Digitiser



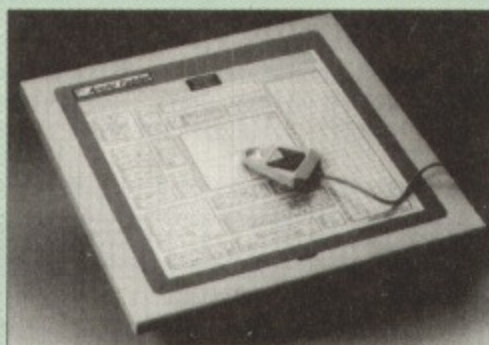
Now supplied with NEW RISC OS Version Software

Watford's 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 £175

A Set of Colour Filters for colour image grabbing using a video camera	£16
New Risc-OS Software Upgrade	£39

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 £199

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

Archi Graphic Tablet Junior. Working area 9" x 6". Price includes Stylus £125

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.
- New low 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	£11
• 10 x 3.5" S/S D/D 40/80 Track	£7
• 10 x 3.5" D/S D/D 40/80 Track	£8
• 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	£12
• M2 3" Double Sided	£2.50 each



CREDIT CARD 24 HOUR
Ansaphone Hot Lines
(0923) 50234 or 33383

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.

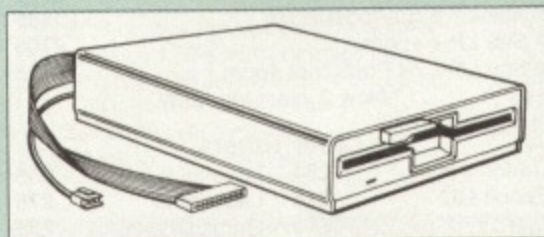
If you look around the popular BBC micro press, you will find that the prices we quote for the top quality, new slimline disc drives are, virtually without exception, are the best around. These prices, coupled with the backup of one of the country's largest distributors of BBC peripherals provides a 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	£72
• CLD800S:	Twin, 40/80 track, 800K Double sided Drives	£142
Disc Drive with PSU		
• CS400S:	Single, 40/80 track, 400K Double sided Drive	£82
• CD800S:	Twin, 40/80 track, 800K Double sided Drives	£155

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

Disc Drive/DDFS Offer



- The popular CLS400S 40/80 track switchable disc drive.
 - Watford's popular Mk II DDFS Interface (allows up to 720K storage). Will run both in single & double density modes.
 - A comprehensive DFS Operating manual
- Bargain at Only £119** (Offer valid until stocks last)

3.5" DISC DRIVE

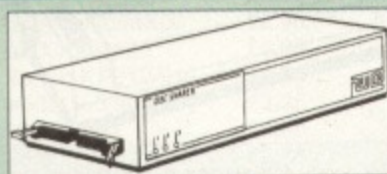


These top quality 3.5" Double sided, 80 track, are attractively finished in BBC beige. They are supplied complete with all cables and a Utilities Disc.

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

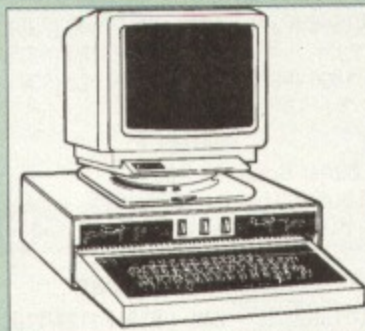


(Ideal for educational establishments)

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".

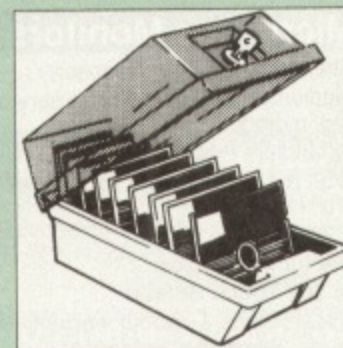
£154

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

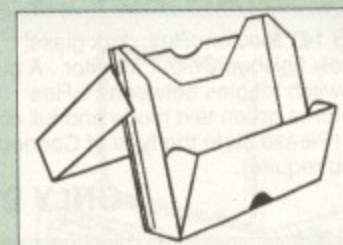
Antistatic Lockable Disc Storage Units



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**
 - **M10** – holds 8 of No. 10 Data Cartridges **£15**
- * Not lockable

Plastic Library Cases



- Holds up to 10 x 3.5" Discs. **£1.50**
- Holds up to 10 x 5.25" Discs. **£2.00**

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 in black leather-look vinyl. Stores up to 20 discs. Each disc can be seen through the clear view pocket.

£4

Special Bulk Offer on Discs

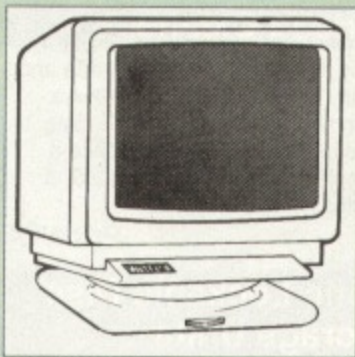
(Supplied packed in Anti-Static Lockable Storage Units)
(Lifetime warranty on Discs)

PRICES SLASHED

BULK PACK DISCS in lots of 100

Type	S-S 40T	D-S 40T	D-S 80T
• Without Sleeves 5.25"	£30	£35	£40
• With Sleeves 5.25"	£33	£38	£43
• 3.5" D/G D/D	£20 for 50		£52 for 100

Continued → → → → → → → → → →



12 months
FREE
maintenance
on site

Microvitec Monitors

- 1431 - Standard Resolution Monitor £169
 - 1451 - Medium resolution, suitable for word processing in mode 0 £209
 - Cub3000 Medium Res for A3000 £189
 - 1441 - High res, exceeds the capabilities of the BBC Micro £359
 - 2040 CS 20" Hi Res £675
 - 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
 - Eizo 9070S £579
 - NEC 2A £255
 - NEC 3D £345
 - NEC 4D £679
 - VIDC Enhancer Board £25
 - NEC 5D £1299
 - Taxan 770LR £379
 - Taxan 775 £375
 - Taxan 795-PC £425
 - Taxan 875 £725
- (P.S. Taxan 795 monitor is supplied with a FREE VIDC enhancer board)

Philips

- BM7502 12" Hi-res Green Monitor £70
- CM8833 14" Med. Res Colour Monitor £178

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 £176

- Dust Cover for Philips Monitors £6
- (Securicor carriage on Monitors £7)

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

Canon Bubblejet Printers

Printer	CSF	D'ble Bin	Ink Cart
BJ10E	£205	£54	£18
BJ300	£354	£88	£12
BJ330	£399	£110	£12

• Spare Battery pack for BJ10E £33

NEC Pinwriter Printers

- P20 £198
- P30 £257
- P60 £379
- P70 £485
- P90 £655

Be Satisfied Before You Buy

We have on display, various Micros, Printers, Disc Drives, Monitors, etc. Call in at our showroom to evaluate before you buy.

Concept Keyboards

- Standard A3 Keyboard with BBC Software £143
- Standard A4 Keyboard with BBC Software £117
- Archi A3 Keyboard £144
- Archi A4 Keyboard £118

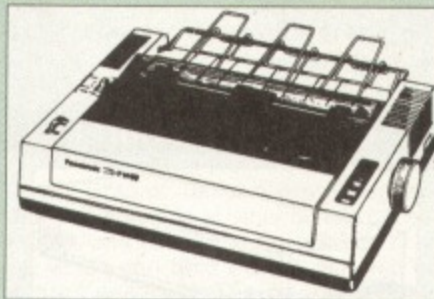
FREE On-Site Maintenance

This month we are also offering at no extra cost to all our customers, 12 months, On-Site Maintenance on all Multiscan colour monitors, all Panasonic printers, and all Laser Printers, Roland Plotters and of course the full range of Archimedes micros. Should the machine fail, simply telephone the maintenance engineer, who will call in within 12 working hours. (Offer applicable only when bought at prices advertised in this advert. UK mainland only).

Hewlett-Packard Printers

- # Desk Jet 500 £309
- Desk Writer (Mac) £482
- Desk Jet Cartridge £15
- Paint Jet Colour £589
- # Now 3 years extended Parts & Labour warranty
- Paintjet XL £1125
- Quiet Jet Plus £359
- HP Think Jet £239
- Rugged Writer £839
- Paintjet Cartridges Black £19; Colour £25
- Desk Jet 500 256K RAM cartridge £129
- HP Epson FX Emulation Cartridge for Desk Jet £59
- HP Apple Talk Interfaces for Scan Jet £299
- Desk Jet Unlimited (Book No VAT) £19.75

Panasonic Printers



FREE with every KX-P1081 & KX-P1180 Printers: A printer lead (please specify type required) and a Dump Out 3 ROM for the BBC Micro or 1,000 sheets of paper for other micros (please specify)

- KX-P1081 9pin 80col. 144/28 cps £122
- KX-P1180 9pin 80col. 192/38 cps £129
- KX-P1123 24pin 80col. 192/63 CPS £158
- KX-P1124i 24pin 80col. 192/63 CPS £215
- KX-P1624 24pin 132col. 192/63 CPS £299
- KX-P1695 9pin 132col. 330/86 CPS £299
- KX-P1654 24pin 132col. £429

Above prices include FREE, Watford's 12 months on-site maintenance

Panasonic Accessories

Cut Sheet Feeders

- KX-P1592/1595 (P32) £175
- KX-1124 (P36) £85
- KX-P1624/1695 (P38) £124
- KX-P1540 (P35) £175
- KX-P1180 (P37) £79
- KX-P1123 (P37) £79

Buffers

- P12 4K buffer Board for 1081 £55
- P42 32K buffer Chip for 1592/1595 £16
- P43 32K Buffer Chip for 1540/1124/1180 £16

Serial Interfaces

- P17 P1081/1592 £32
- P19 P1124/1180 £55

Citizen Printers

- 120D Plus £96
- Produt 9 £205
- Produt 9X £245
- Swift 9 £138
- Produt Cut Sheet Feeder £120
- Swift 24 Colour Option £29
- Swift 24 Ribbons Black £4
- Special Offer this month - A FREE Colour option cartridge with every Swift 24 printer purchased from us.
- 124D Printer £138
- Produt 24 £225
- Swift 24# £205
- Swift 24X £279
- Colour £13

Star Printers

- LC10 9pin 80col. 144/36 CPS £112
 - LC15 9pin 136col. 180/45 CPS £180
 - LC24-10 24pin 80col. 180/60 CPS £150
 - LC24-15 24pin 136col. 200/67 CPS £295
 - *FR10 9pin 300/76 CPS 31K 16 fonts £229
 - FR15 Wide carriage version of above £290
 - *XB24-10 24pin 80col. 240/80 CPS £299
 - XB24-15 24pin 80col. 240/80 CPS £365
 - XB-24 Colour Kit £29
 - LC-200 Colour 9pin 80col. 180/45 CPS £158
 - LC-24-200 24pin 80col. 222/67 CPS £189
 - LC24-200 Colour 24pin 80col. 222/67 CPS £222
- *FREE Colour Ribbon with these printers

Star Accessories

Cut Sheet Feeder

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

Serial Interfaces

- SPC-10 LC10; LC10-II; LC10-Col; LC15; LC24-10; LC24-15; LC-200; LC24-200 £49
- 8K Ser LC-200; LC24-200; FR10; FR15; XB24-10; XB24-15 £64

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

- Canon LBP-4 4ppm £655
- Canon LBP-8 IIIR 8ppm £1505
- Canon LBP-8 IIIT 8ppm £1389
- Epson EPL7100 6ppm £689
- HP Laserjet III 8ppm £1025
- HP Laserjet IIID 8ppm £1539
- Laserjet IIIP 8ppm £689
- Panasonic KX-P4420 8ppm* £648
- Panasonic KX-P4450i* 11ppm* £1025
- Panasonic KX-4455 Postscript 11ppm* £1699
- Qume Crystal Print Publisher 2 £1899
- Star LP-8 III £979
- Star LP-8 Star(post)script £1195
- Star LP-4 4ppm £705
- Star LP-4PS Postscript 4ppm £875

* Now 2 years warranty

Laser Toners

- Canon 2 & 4 £54
- Epson GQ £18
- Star LP-8 £69
- KX-P4420/50 £22
- Laserjet II & IIP £55
- Laserjet III £75
- Qume Crystal £56

Laser RAM Upgrades

- IIP & III 1MB £74
- IIP & III 2MB £109
- II & IID 1MB £76
- II & IID 2MB £112
- II & IID 4MB £299
- Canon LBP4 1M £175
- Canon LBP8 2M £150
- EPL7000 2M £365
- GQ5000 512K £95
- KX4420/50 1M £115
- KX4420/50 2M £159
- KX4420/50 4M £349
- Star LP8 1M £143
- Star LP8 2M £285

Laser Drum & Developer

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

Jetpage Postscript Cartridge

- HP IIP/III £255
- IID & IIID £265

NEW - HP Laserjet

- Various Font Cartridges £45
- Superset Font £195

Integrex Colour Jet

- Colour Jet 132 Printer £515
- Paper Roll £6.50
- BBC Screen Dump Software £10
- Colour Cartridge £19.50
- Black Cartridge £11.25
- 100 A4 OHP transparencies £55
- 8K Serial Interface Optional £123

**Watch this space
for our
NEW LAUNCH
for Archimedes
micro products**

Epson Printers

DFX5000	£1089	LQ860 Colour	£465
DFX8000	£1999	LQ1050+	£475
EX1000	£456	LQ1060	£599
FX850	£283	LQ2550+	£709
FX1050	£358	LX400	£109
FX1060	£599	LX850	£150
LQ400	£166	SQ850	£439
LQ550	£209	SQ2550	£645
LQ850+	£385		

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	£32	RS232 + 2K Buffer	£52
IEEE 488	£95	RS232 + 8K Buffer	£75

Printer Leads

BBC Centronics 4' long	£5
BBC Centronics 6' extra long	£7
Compact's Special Centronics Lead	£7
Archimedes Printer Lead 6'	£6
Nimbus Centronics Lead	£6
IBM/Archimedes Parallel Lead 6'	£6
IBM/Archimedes Parallel Lead 5 metres	£13
IBM/Archimedes Parallel Lead 10 metres	£19
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

Plotters

• HP7440	£425	• HP7475	£599
Roland Plotters			
• DXY1100	£515	• DXY1200	£645
• DXY1300	£845	• DXY2500	£2375
• DPX3500	£3289	• Sketchmate	£379
• Roland plotter Pens, Fibre tip			£7.50

Roland SketchMate

The Intelligent Graphic Plotter

It is very compact and lightweight. In restricted space, it can be operated in a tilted position. Is compatible with virtually all CAD software as well as a wide range of business softwares. Specifications: Plotting area: 297 x 216mm. Number of Pens - 8. Magnetic Paper holder. 5K Buffer. Parallel and RS 232 Serial interfaces. Accessories: 8 pens, AC Adaptor, 4 x Magnetic paper holders, User manual, marking sticker, Rubber sticker, 10 x A4 test paper, 2 x A4 OHP transparency film. Dimensions: 360(W) x 410(D) x 105(H)mm. Weight 2.6 Kgs.

£379



**CREDIT CARD 24 HOUR
Ansaphone Hot Lines
(0923) 50234 or 33383**

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

Special Offer

Hitachi/Acorn 12" High Resolution, ergonomically designed Colour Monitors. Supplied complete with a swivel base and a BBC lead.

Only: £145 (While stocks last)

Printer Ribbons & Various Dust Covers

Type	Ribbons	Dust Covers
Brother HR15/20	£6.00	-
BBC Micro	-	£3.50
BBC Master	-	£4.00
Archimedes Micro pair	-	£9.00
Citizen 120D	£2.75	£4.50
DMP2000	£2.75	£4.75
EX800/1000	£3.50	£5.00
RX/FX80/85/800/MX80	£2.95	-
FX/MX/RX100/1000	£3.95	-
Kaga/Taxan KP810/815	£3.25	£5.00
LQ400/500/550/800/850	£3.25	£6.00
LQ1050/LQ2500	£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	£7.50	£5.00
SQ2500	£23.00	£5.50
Star LC10/NL10	£2.75	£5.00
Star LC24-10	£2.95	£6.00
Olivetti Ink Jet		
Cartridges (set of 4)	£9	

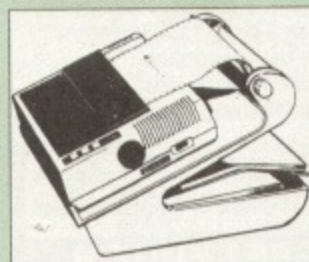
Our attractive Dust Covers are manufactured from translucent PCV. The seams are stitched and edges are taped to prevent splitting due to continuous use.

Original Panasonic Ribbons

Guaranteed to last 3 million characters

P110 for KX-P1081, 1592 & 1595	£7
P115 for KX-P1180	£7
P145 for KX-P1124	£7
P140 for KX-P1540	£8
P155 for KX-P1624	£10
Colour Ribbons for KX-P1081, 1592 & 1595	
Brown, Blue or Red	£9.95 each

Professional Printer Stand



effectively halved. Its ergonomic design ensures smooth paper flow and automatic refolding.

**80 Column version £24 (carr. £3)
132 Column version £29 (carr. £4)**

Universal Printer Sharers/Changer

Connect up to 5 Micros to 1 printer or 5 Printers to 1 Micro with our combined, Sharer/Changer. These Units are made to a very high standard. For extreme reliability, they all have Printed Circuit Boards mounted inside the case, (not a Spaghetti Junction of wires). Internal connection is made via high quality ribbon cables.

(Ideal for School environments)

Connects	Serial	Centronics
2 to 1	£16	£17
3 to 1	£22	£24
5 to 1	£32	£36

(Cables extra at £6 each. Please specify type required when ordering)

2 Way Compact Printer Switch

A handy 2 way printer switch. Enables one micro to be connected to 2 printers or vice versa.

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

Auto Printer Sharer Switch

Connects	Serial	Centronics
2 to 1	£40	£45
4 to 1	£62	£59
8 to 1	-	£89

256k Multi Spooler

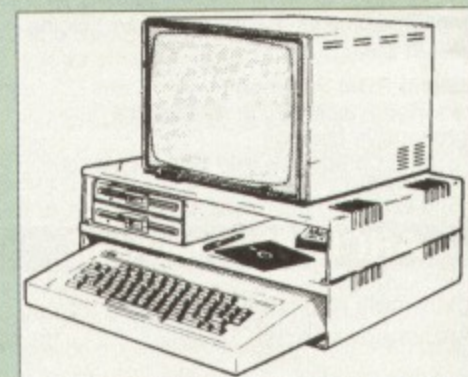
These Auto Centronics Printer Sharers have built-in 256K of Printer Buffers. They can be used as Auto Sharers, Printer Buffers or both.

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

Compact Converter Units

Serial to Parallel	£36	Parallel to Serial	£37
--------------------	-----	--------------------	-----

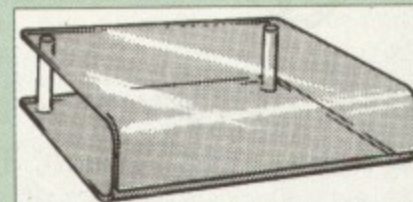
Plinths for the BBC B & Master 128K Micros



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 & stationary. 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)		

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 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



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 principal even further, by utilising the otherwise normally incompatible Sideways RAM facility by holding pictures in them.

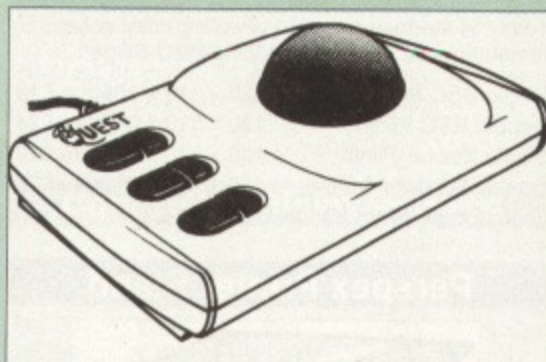
ConQuest ROM Package £30
(Price includes software in ROM and a comprehensive Manual).
(Not Compatible with BBC Compact)

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 £27
QT-20 Archimedes Version £30

RB2 Marconi TRACKER BALL

RB2 (AMX/Quest compatible) £45
RB2 including Quest Paint £75
RB2-A for Archimedes £46

THE NEW Mk III AMX MOUSE

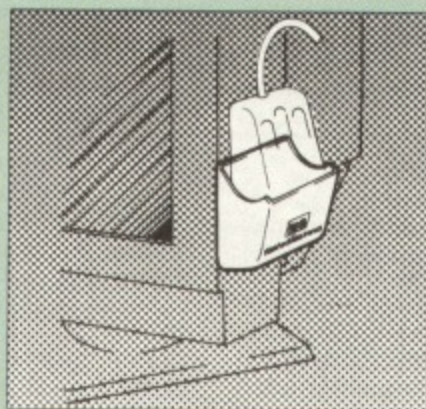
Inc. Super Art package

ONLY: £59 (carr £3)

(Please specify for BBC, Master or Compact)

MOUSE MAT	£3
AMX MOUSE ONLY	£29
AMX SUPERART Package	£34
AMX STOP PRESS – A Desktop publishing software. Works with Keyboard, Joystick or a mouse	£32
PAGE-FONTS – Over 20 Fonts for use with AMX Pagemaker	£13
AMX DESIGN (ROM)	£55
AMX XAM Educational	£15
AMX EXTRA EXTRA	£16
AMX MAX A gem of desktop (ROM)	£20

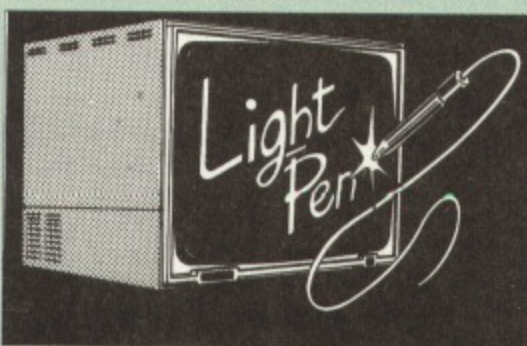
WE Mouse House



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 £4



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 £21

FLEET STREET EDITOR

Software pack for BBC Micro	£33
Software pack for the Master	£39
Admin Xtra Disc Utility	£13
Fonts N Graphics Disc Utility	£13

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.

£109 (Carr. £5)

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

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

The Beeb HandScan

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 £135



**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 GXR). 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, ellipse, 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 Digitiser.

Wapping Editor Software Pack £69
Wapping Editor plus Mouse £89

(Wapping Editor only works with Master Compact if a Mertec Expansion box is fitted)

NEW

At the request of many of our customers we are now able to offer training in the use of Wapping Editor DTP package. For further information please telephone 0923 37774 and ask for Tim or Shiraz

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

Laser Direct



By using the power of the Archimedes RISC processor, it offers the best of both worlds – print speed up to 5 times faster than typical Laserjet compatibles – uses outline fonts so that any font can be scaled to any size – works with all programs that use RISC OS printer drivers. Ideal for use with Genesis, IDraw, Acorn DTP, Impression, etc. Includes 50 sheet paper tray and a single sheet/envelope tray. Requires one expansion slot and at least a 2Mbyte Archimedes. A very compact printer, a very low initial cost and very low running costs.

Special Price: £849

- Special High Res Laser Direct Card 600 DPI for Canon LPB4 Laser Printer **£325**
- LPB4 Printer plus High Res Card **£1025**

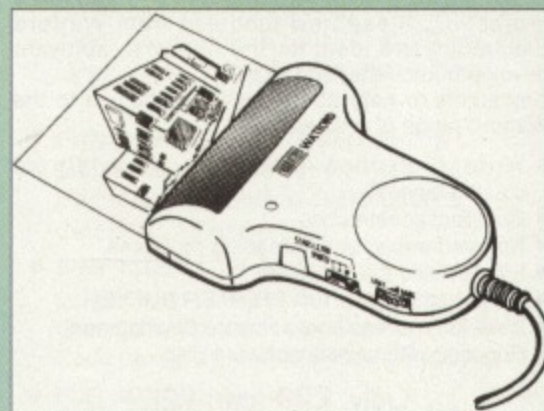
(For demonstration, call in at our retail shop)



**CREDIT CARD 24 HOUR
Ansaphone Hot Lines
(0923) 50234 or 33383**

**All prices are exclusive of
VAT**

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 (module) 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 £149

AHS-3 Archi A3000 Version £175

Continued → → → → → → → → →

16K Disc Ram Module

(16K Sideways RAM Module)

Complete with such features as read and write protection, these new modules from Watford Electronics are ideal for the hobbyist, software developer and ROM collector. Key points to note about this new addition to the Watford range of products are:

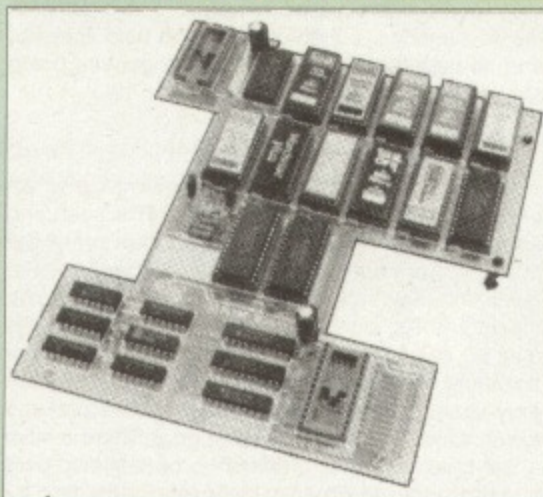
- Write protection (useful in a variety of circumstances)
- Compact construction
- No overheating or overloading problems.
- Free utilities disc supplied
- Can be used as a 16K PRINTER BUFFER.
- Ideal for professional software development.
- Supplied with utilities software disc.

Only: **£29** (carr £2)

Optional Battery back-up fitted

£3

Solderless Sideways ROM Socket Board



The key features of this new, no fuss, easy to install quality product from BBC leaders Watford Electronics are as follows:

- Increase your BBCs capacity for ROMs from 4 to 16.
- **No soldering required.**
- Very low power consumption.
- Minimal space required.
- 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 **£8.50**
(carriage £3)

- 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**

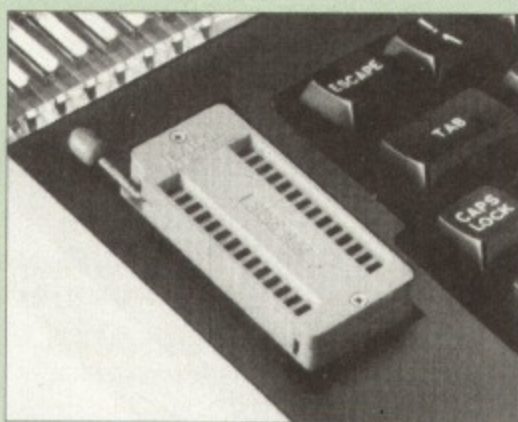
User Port Splitter Unit



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** (carr £2)

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** (carr £3)

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

Twin **£9**; Quad **£14**

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.

Launch 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: **£69** (carr. £3)

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 (Carr £3)

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**

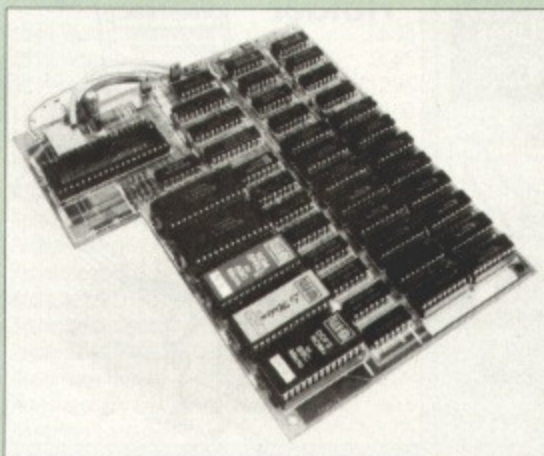
Delta Base B



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 7 years ago. Following the success of this board, we have designed what probably represents the ultimate in expansion boards, the new Watford Electronics ROM/RAM board. This highly versatile and sophisticated board represents the latest in "2nd generation" sideways ROM technology for the BBC micro, designed to satisfy the serious BBC user.

- NO SOLDERING required to fit the board.
- NO User Port corruption (avoids problems with the mouse, modems, Eprom 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 dynamic RAM **£48**
- ROM/RAM card with 64k dynamic RAM **£65**
- ROM/RAM card with a massive 128k dynamic RAM **£109**
(carriage on ROM-RAM Card £3)

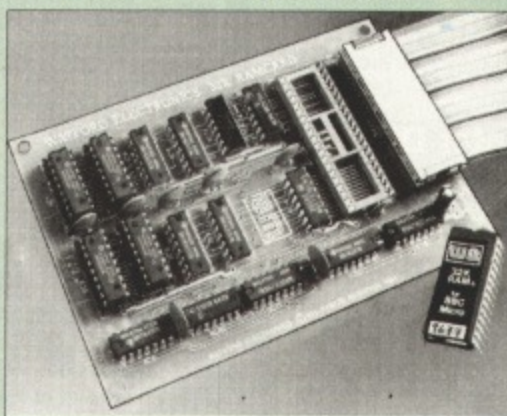
OPTIONAL EXTRAS:

- 16k plug-in Static RAM kit **£9**
- 16k Dynamic RAM for Upgrade **£13**
- Battery backup **£3**
- Read and Write protect switches **£2 each**
- Complete ROM-RAM board **£115**
- All options installed

P.S.

IS your existing ROM Board overflowing with ROMs? Do you need more Sideways RAM? Is your Board unreliable? Then upgrade to Watford, ROM/RAM Board and pay £5 less.

32K Shadow RAM/Printer Buffer Card Expansion Board



A MUST FOR WORD PROCESSING

Don't throw away your BBC B for a BBC B Plus or BBC Master. Just plug the ribbon cable into the 6502 processor socket, and fit the compact board inside the computer. Immediately you will gain not 16k or even 20k, but a massive 32k of extra RAM!!!

• IMPROVE your WORD PROCESSING system, whether disc or cassette based. Don't wait for a slow printer - type in text while printing. TWO JOBS DONE SIMULTANEOUSLY and £100+ saved on a printer buffer.

• "VIEW" Wordprocessor users can now type in letters in 80 columns and have up to 28,000 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 for PARALLEL or SERIAL printers, sound channels, RS432 etc. Print large text files while running long graphics programs, and have all your buffer options available as well (*FX15,21,138, 145,ADVAL etc). Please note only a 12k printer buffer can be used with Wordwise or Wordwise-Plus, due to the way they are written.

• Unique facility to turn ROMs off and on again. Unlike all other ROM managers, this feature does not use 'unofficial' memory. Two bytes of normally user-inaccessible memory on the RAM card are used to ensure ROMs are disabled WHERE OTHER ROMS FAIL.

Only £59 (carr £3)

(Price includes a comprehensive manual and the ROM)

BBC SOFTWARE'S Popular 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**
- Introducing Geography 11-17 years **£17.50**
- 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**

More Educational Software

- **FUN SCHOOL 2 - Red:** Under 6 yrs - 8 programs on Discs, Shape Snap, Find the Mole, Teddy Count, Write a Letter, Colour Train, Pick a Letter, Spell a Word & Teddy Bears Picnic. **£12.00**
- **FUN SCHOOL 2 - Green:** 6-8 yrs - Eight programs on Disc, Number Train, Shopping, Maths Maze, Treasure Hunt, Bounce, Packing Caterpillar, 3 Number jump **£12.25**
- **FUN SCHOOL 2 - Blue:** Over 8 yrs - Eight programs on Disc, Build a Bridge, Passage of Guardians, Unicorn, Logic Doors, Souvenirs, Code Boxes, Mystery Machine & Escape. **£12.50**
- **FUN SCHOOL 3 - Red** **£19.95**
- **FUN SCHOOL 3 - Green** **£19.95**
- **FUN SCHOOL 3 - Blue** **£19.95**
- 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
Puncman 1 & 2 for 7 - 13 years **£15**
Puncman 3 & 4 for 8 - 14 years **£15**
Puncman 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

- Bookbinder **£43**
- BUMPER DISC **£14**
- Bumper Disc 2 **£14**
- Craftshop 1 **£26**
- Craftshop 2 **£26**
- Desktop Stories **£27**
- 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**
- DigiSim **£35**
- Droom **£17**
- Jiglet **£27**
- Jigsaw **£28**
- Numerator **£60**
- Snippet **£26**

Continued → → → → → → → → →

Computer Concept's ROMS

Communicator	£49
Disc Doctor	£28
Inter BASE	£49
Inter CHART	£25
Inter SHEET	£37
Inter WORD	£36
Mega-3 ROM	£76
Spell Master	£42
TERMI	£25
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 has been 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
View Professional	£50
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

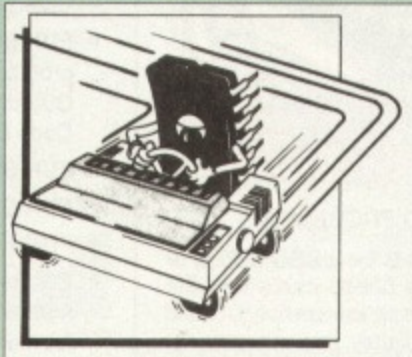
(When ordering please specify for which Micro & 40 or 80 track Disc)

All prices are exclusive of VAT

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 £33



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.

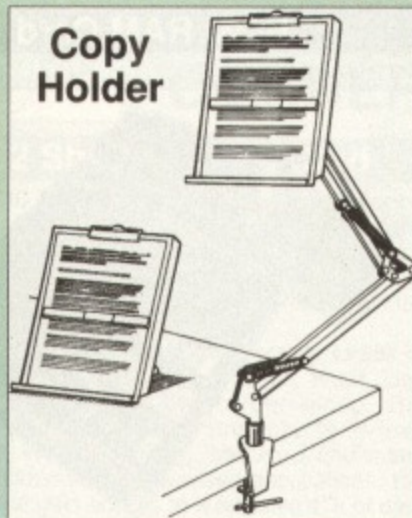
SPREADSHEET – Offers many calculation and editing features

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. (for resting books or magazines, the desk top version is recommended).

Desk Top £7 (carr. £3)

Angle poise £12 (carr. £3)

The Epson RX/FX/KAGA Printer Commands Revealed Handbook

Printer Commands Revealed

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)

ALL PRICES EXCLUDE VAT

BOOKS (No VAT on Books)

15 Hr Wordprocessing BBC/View	£6.95
15 Hr Wordprocessing BBC/WW & WW+	£6.95
30 Hour BASIC (BBC Micro)	£12.95
1st Word Plus Ref. 2 Manual	£10.00
A3000 Technical 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 DTP Manual	£10.00
Archimedes Operating System	£14.95
Archimedes Risc-Os Programmers Reference Manual	£79.00
Arm Assembly Lang. Prog. Manual	£15
Assembly Language Quick Ref.	£21.95
BASIC 2 - User Guide	£2
Basic V - A Dabhand Guide	£9.95
BBC Basic Guide (Archimedes)	£19.95
BBC Computer Handbook - The Complete	£14.95
BBC Micro - Within the	£11.95
BCPL User Guide	£9
C Big Red Book of	£8.95
C - A Dabhand 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
Hackers Handbook - New	£9.95
ISO-PASCAL Reference Manual	£9.95
Mastering Interpreters & Compilers	£14.95
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
Mathematical Programs in BBC BASIC	£9.95
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 on the BBC Micro	£9.50
PASCAL Programming	£10.95
RISC Technical Manual 260 pg	£14.95
The Epson FX-KAGA PRINTER Commands REVEALED	£5.95
Understanding Interword - A Beginners Guide	£6.50
View 3.0 User Guide	£10
View Guide (View 2.1)	£5.00
View, Viewsheets & Viewstore - Mastering	£12.95
Viewsheets & Viewstore Dabhand Guide	£12.95
VIEW Dabhand Guide	£12.95
Viewsheets User Guide	£10
Viewstore User Guide	£10
Z88 - A Dabhand Guide	£14.95
Z88 Computing	£9.95
Z88 Magic	£14.95
Z88 Using Your	£9.95

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.	£20.95
1-2-3 Quick Reference	£7.95
1-2-3 Special Edition (QUE) - Using	£22.95
1-2-3 Using - Rel. 3	£25.95
8086/8088 Assembly Language Prog.	£8.45
8086/8088 Programming the	£17.95
Ability - Using	£12.95
Accountancy software in Business - Using	£14.95
Agenda - Using	£21.95
Aldus PageMaker - Using	£21.45
Amstrad 1512/1640 Step by Step - Using the	£POA
Amstrad Basic 2 User Guide	£9.95
Amstrad PC Programmers Ref Guide	£7.50
Amstrad PC1512-1640 Step by Step - Using	£10.95
Assembly Language - Quick Ref.	£7.95
Autocad 4th Ed - Mastering	£31.50
Autocad - Mastering Through Rel. 10	£28.95
Autocad - Using Release 10	£27.95
C Introducing	£12.95

C Programming Language 2nd Ed	£26.95
Clipper - Using	£22.95
Computer Users Dictionary	£9.95
Corel Draw Quick Ref Thro V1.2	£7.95
Corel Draw made easy	£24.95
dBase III Plus - Complete Reference	£19.95
dBase III Plus Handbook 2nd Edition	£22.95
dBase Instant Reference (III & III+)	£10.95
dBase IV - Handbook	£21.95
DOS & BIOS Function - Quick Ref Guide	£7.95
DOS Instant Reference (up to 3.3)	£6.95
DOS Power Tools (includes a disk)	£45.95
DOS - Programmers Ref. Manual 2nd Ed	£25.95
Excel IBM Version - Using the	£22.95
FAX - Managing with	£12.95
Framework III - Mastering	£22.95
GW Basic - Quick Prog. Ref	£8.95
GW Basic Users Guide & Ref	£12.95
Hard Disc management - Quick Reference Guide to	£4.95
Hard Disc - Using Your	£27.45
IBM PC & PS/2 3rd Ed	£21.70
Microsoft GW BASIC	£12.95
Microsoft Windows 3 - Using 2nd Ed	£20.95
Microsoft Word 5 - Using	£20.45
MS-DOS - ABC's of 2nd Ed.	£17.95
MS-DOS Bible 3rd Edition	£24.95
MS-DOS First Book	£15.50
MS DOS for Beginners	£14.95
MS-DOS Quick Prog Ref Guide	£8.95
MS-DOS Masters - Tricks of 2nd Ed	£24.95
MS-DOS - Running 4th edition	£19.95
MS-DOS - Supercharging 2nd Edition	£17.95
MS-DOS Users Guide 3rd Edition	£27.95
MS-DOS - Using	£19.95
MS Windows 3 2nd Ed - Using	£22.95
Network User Guide	£22.95
Networking Personal Computers 3rd Ed.	£20.95
Norton Utilities - Inside the	£21.95
Novell Network - Mastering	£27.95
Novell Network - The ABC of	£21.95
Novell Network - Using	£22.95
PageMaker on IBM PC - Using	£22.95
Pagemaker - Using	£22.95
PCs & Compatible Computers for Beginners	£14.95
PC Crash Course 2.0 2nd Edition	£19.95
PC Tools - Quick Ref	£7.95
Programming Guide to EGA & VGA Cards	£24.95
Quattro - Mastering	£21.95
Quattro Pro VI - Using	£22.95
Smart - Using	£21.45
Smartware II - Using	£22.95
Smart, tips, tricks and traps (QUE)	£22.95
Supercalc 5 - Using	£27.50
Supercalc Professional	£17.95
Symphony Made Easy	£19.95
Symphony - Using Special Ed.	£27.45
Symphony 4th Edition - Mastering	£24.95
Timeworks Publisher Companion	£12.95
Turbo C Bible	£27.95
Turbo C++	£22.95
Turbo Pascal 5 - Using	£22.95
Turbo Pascal - Advance Techniques in	£20.85
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 - Tips & Tricks 2nd Ed.	£24.95
Window Programming 2nd Ed	£27.95
Window 3.0 Programming	£27.95
Window 3.0 Quick Ref.	£7.95
WORD for Windows - Using	£22.95
Wordperfect 5 - Using	£24.95
Wordperfect - Quick Reference V5	£8.95
Wordperfect 5.1 - ABC's of	£18.95
Wordperfect 5.1 - The ABC of	£7.50
Wordperfect 5.1 - 1st Book of	£14.95
Wordperfect 5.1 - Mastering	£24.95
Wordperfect 5.1 Quick Start	£18.45
Wordperfect 5.1 - Using Special Ed	£22.95
Wordstar & CPM Made Easy	£15.75
Wordstar Using 5.5 & 6 3rd Ed	£25.95
Wordstar 6.0 Made Easy	£19.95
Wordstar 6.0 - Using	£25.95

Carriage on Books vary between £2 to £3.50, 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: £15.95 (No VAT)

The Complete BBC Computer User Handbook

If you own a BBC B, B+, Electron, Master 128 or Master Compact, or Archimedes, then this is the book for you. It shows how to get the best from your machine, and how 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 → → → → →

Panafax Facsimile

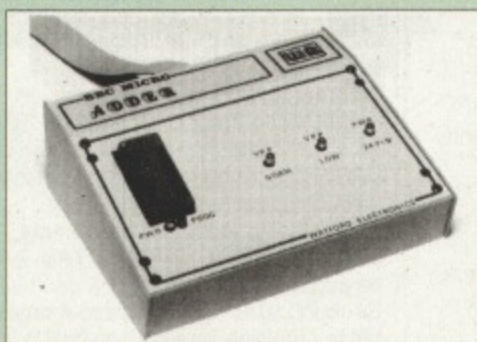
Top quality Panasonic Fax machines, at Watford's budget prices. Ideal for Schools, Colleges, Home & Offices. Supplied complete with telephone handset & 12 months on-site maintenance warranty.

- UF120 £339 • UF121 £349
- (P.S. We stock full range of Panafax)

Watford Electronics are:

- Acorn Qualified Dealer & Econet Referral Centre
- ARIES PC Dealer/Distributor
- Canon Authorised Printer Dealer
- Cambridge Computer Dealer
- Computer Concept Premier Dealer
- EIZO Monitor 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

ADDER



The Adder unit connects to the User Port and draws its power from there too. The EPROM is mounted in a top quality ZIF socket. There are no switches or controls as Adder is entirely software controlled.

The Adder software provides sophisticated facilities for programming EPROMs from a RAM image produced by loading disc files. The software is menu driven and designed for ease of use.

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.

£65 (£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. £32(carr £3)
- **ERASER GT** - Deluxe version erases up to 18 chips. Has automatic safety cut-off to switch off the UV lamp when opened. £35 (carr £3)
- Spare UV tubes. £12



**CREDIT CARD 24 HOUR
Ansaphone Hot Lines
(0923) 50234 or 33383**

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

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	£49	Power Supply	£59
Replacement Flexible 17 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 lightening 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

£14.95

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

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**

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 **£6**

Miscellaneous Connectors

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

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 ZIP D-RAM	£4.90
256K x 4-8 DIP	£4.75
256K x 4-8 ZIP	£4.80
DS3691	£4.50
DS88LS120	£5.25
LM324	£0.45
SN76489	£5.50
SAA5050	£8.75
UPD7002	£6.00
2764-250nS	£3.00
27128A-250nS (12V5)	£2.50
27128-250nS (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
65C12	£9.00
6512A	£10.00
6522	£4.00
6522A	£5.00
62256ALS-15	£10.00
62256P-12	£8.50
6818	£4.00
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
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
Beebmon	£22
Buffer & Backup	£20
Communicator	£49
Dump Out 3	£25
EPSON 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
NLQ DESIGNER	£25
Numerator - Archi	£69
Numerator - BBC	£39
Pendown ROM	£32
Rom Manager	£20
ROMIT	£29
SERIAL ULA	£13
TED	£35
Termulator B. B+	£28
Termulator Master	£32
Video ULA	£14
ULTRACALC II	£26
1Mb OS ROM	£39

ARIES PC 386-SX



The Aries PC 386-SX combines many of the powerful features of the 386 system with the frugality of a price tag more at home on a 286 system. With 8/16MHz CPU, this system provides virtually full 386 performance, including the more convenient scheme of memory control that allows easy configuration of expansion RAM as EMS for DOS application.

Features:

- 80386-SX CPU with optional 80287/80387 Maths Co-Processor
- 8/16 MHz selectable speed
- Legal Bios with built-in Setup routine
- OS/2 and XENIX compatible

Specifications:

- 1MB RAM on-Board expandable to 16Meg
- 1 x 5.25" – 1.2Meg Drive fitted
- 1 x 3.5" – 1.44Meg Drive fitted
- 40Meg 28mS Hard Disc Drive fitted (1:1 interleaved)
- HDD/FDD Controller Card
- 102 Key Keyboard
- Case with Keylock
- Eight expansion slots
- Two Serial and One Parallel Ports
- Logitech mouse
- 12 months On-Site maintenance
- £300 worth of Software, (MS DOS 3.30, GW BASIC 3.21, Digital Research's GEM, Finesse 1.1 DTP pack, Multiwriter Wordprocessor & Spellchecker, PC Organiser), **FREE** with every micro.

New Low prices:

- **System 1** – Specification as above plus a 14" High Resolution Flat Screen mono monitor **£995**
- **System 2** – As system 1 plus a 14" High Resolution Flat Screen EGA Monitor and Card **£1045**
- **System 3** – As system 1 plus a 14" High Resolution Flat Screen VGA Monitor and Card **£1095**
- **System 4** – As system 3 (VGA) with 80MB 28mS fast Hard Disc Drive fitted **£1245**
- **System 5** – As system 3 (VGA) with 155MB 16mS super fast Hard Disc Drive fitted **£1479**

PC External Disc Drives

(for IBM PC, Amstrad 1640 & Compatibles. Supplied complete with case, cables and power supply. Ready to plug)

PCS-3L5	3.5" – 720K Cased Drive	£85
PCS-3H5	3.5" – 1M44 Cased Drive	£95
PCS-5L2	5.25" – 360K Cased Drive	£86
PCS-5H2	5.25" – 1M2 Cased Drive	£99

Our December 1990 catalogue now available.
Please write in for your **FREE** copy

Aries Notebook PC XT & Notebook PC NB286-12

Full Desktop PC Power for People On The Move



Aries Notebook PCs are equipped with a full complement of 6 built-in ports; 2 x RS232 Serial; 1 x Printer; 1 x External floppy drive; an external Keyboard and a CGA colour monitor. The obvious benefits include the ability to connect directly to a printer, and to a full size desktop computer to transfer data or text, etc, or to a modem for communications.

Multiwriter 2 Word processor/spell checker, and PC Organiser diary software is supplied with all Notebook PCs to get you started, so now you can take computing power with you where you want to go, in the office, workshop or laboratory, on site, on the train, plane, or at home.

Aries Notebook I, II and III

These Aries Notebook PCs have energy-efficient 80C88 processor chips running at 10 MHz.

In his independent review (Computer Shopper) the reviewer writes, 'The Aries Portable offers exceptional value for money . . . The computer itself is very much what you'd expect a notebook to be, small, with a cramped but very usable keyboard and a respectable backlit display. It is nice to see that you can actually use the extra 384K as EMS memory – there is even a utility that can turn the EMS into a RAM drive for you.'

In his final verdict he writes, 'Overall, the single most outstanding feature has to be the price tag. A notebook PC with hard disc for under £1,000 has no competition at the moment. If you have a small briefcase, weak arms, or just like the concept of a truly portable computer, then this is your man'.

Aries Notebook NB286-12

The New Aries NB286-12 has a faster, high efficiency 80286 processor running at 12MHz.

' . . . the strongest feature of the Aries is its Hard Disc, with a data transfer rate that would put most desktops to shame . . . the only notebook reviewed that incorporates a 16MHz processor (landmark speed). These two factors combine to make it the strongest performer . . . '

'In terms of value, the Watford comes up on top . . . '

'**VERDICT:** Excellent specification and performance. This has to be THE choice based on price and ability'.

Computer Shopper Jan. 1991

Specifications

- **Processor:** 80286 running at 10MHz (Notebook I, II & III); 80286 (Notebook NB286-12) running at 12MHz – Zero Wait State – Real Time Clock/Calendar
- **Memory:** 1MB RAM – 640KB + 384KB LIM/EMS
- **Drive:** Internal: 3.5" Floppy Drive (Notebook I) – 2.5" 20MB Hard Disc (Notebook II & Notebook NB286-12); Notebook III has an internal 2.5" 40MB Hard Drive all 28mS Access speed – Optional external 3.5" or 5.25" floppy drive
- **Display:** Electro-luminescent (EL) backlit transfective supertwist LCD – 80 x 25 characters – 640 x 200 bit mapped IBM CGA compatible
- **Keyboard:** Full size Qwerty layout – Integrated Numeric Keypad
- **Power:** Internal NiCad battery – External 12V DC – Mains Adaptor provided Standard
- **Interfaces:** Parallel Printer Port – Twin RS232 Serial Ports – External Disc Drive Port – CGA Colour Monitor Port – External Keyboard or PS/2 Mouse Port
- **Dimensions:** 300mm (W) x 220mm (D) x 61mm (H)
- **Bundled Software:** MSDOS 3.3; GWBASIC; Word Processor software – PC Organiser Software – Desk Diary & Calendar
- **Optional Extras:** External 3.5" Disc Drive – External 5.25" Disc Drive

- **Notebook I** – Internal 3.5" Floppy Drive (Optional external 3.5" or 5.25" Floppy Drive) **£499**

- **Notebook NB286-12** – with Internal 3.5" – 1.4MB Floppy and 28mS 20MB 2.5" Hard Disc **£798**

- **NB 386SX-20** – 3.5" 1.44M Floppy; 20MB H/D; VGA **£1195**

- **NB 386SX-40** – 3.5" 1.44M Floppy; 40MB H/D; VGA **£1495**

Accessories

- External 3.5" 1.44MB Floppy Drive **£89**
- External 5.25" 1.2MB Floppy Drive **£89**
- Spare Battery Pack **£29**
- Car Cigar Lighter Adaptor **£35**
- Carrying Case **£28**

Watford Electronics

250 Lower High Street, Watford WD1 2AN, England

Tel: 0923 37774/240588 Fax: (0923) 33642 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 inquiries welcome. Government and Educational Establishments' OFFICIAL ORDERS Accepted. Shop Hours: 9.00am to 6.00pm, Monday to Saturday. Thursdays 9am to 6pm. (Free Customer's Car Park). VAT: UK customers please add 17.5% VAT to cost incl. Carriage. CARRIAGE: Unless stated otherwise, minimum £2 on all orders. £3 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. Please ring for latest delivery situation.

256

Grey-Level scanning

At last, photographic quality, true grey-level scanning for Archimedes owners. Not only is the quality a significant step forward from 16 grey-levels, the best previously available, but it costs around half the price of the only other true grey-level scanner for the Archimedes. In fact, to the best of our knowledge, this is the lowest priced true grey-scale scanner in the world.

***The new Scan-Light Junior 256 -
£220 +VAT***



An example scanned picture, reproduced actual size.



Computer Concepts Ltd

Gaddesden Place, Hemel Hempstead, Herts, HP2 6EX Tel 0442 63933 Fax 0442 231632



HAVE you ever wondered how the games experts create those amazing sideways scrolling shoot-'em-ups? Well now you can join their ranks.

The listing shown here will enable you to create landscapes out of a matrix of sprites and scroll through them without so much as a flicker.

Most scrolling techniques you see in games like Repton use the hardware to scroll the screen and update it while it's being viewed, which results in flicker.

But this method is better. It uses two screens, one being displayed while the other is kept hidden and updated.

The algorithm goes like this:

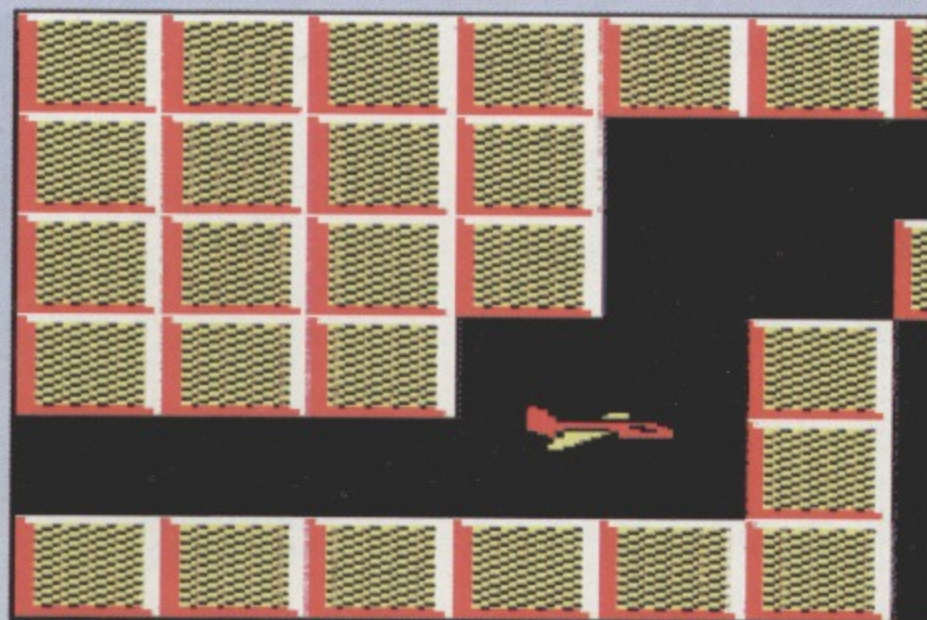
```
Screen 1 = X
Screen 2 = Y
REPEAT
Display   X
Hide      Y
Update    Y
Hide      X
Display   Y
Update    X
UNTIL FALSE
```

If you play a hard scrolled game you will often notice flickering at the edge of the screen every time it scrolls. This is mainly caused by the wrapping around of data that is about to be scrolled off the screen.

After it has wrapped around to the other side there is a short delay before it can be overwritten with the new screen data.

Even though flicker is produced, this method is very fast because only one column of sprite data needs to be re-drawn each time the screen is scrolled. Flicker areas can be blanked out but this is not easy and requires precision timing.

Another disadvantage is that any sprites you decide to have on the screen which are separate from the scrolling map – for example a spacecraft, bouncing monsters, the score and so on – will be scrolled too. To stop this happening all foreground sprites have to be moved against the direction of the scroll. The software



scroll avoids this nuisance but does have other drawbacks, the most noticeable being the amount of processing time as the entire screen is re-drawn one scroll position onwards.

It's not practical to use this technique with a full-sized Mode 2 screen because 40k would be needed. However it can be done by using two half-size screens.

For simplicity the routine here works in Mode 5. This means that you can have larger maps because of the lower claim on memory and the re-drawing time is reduced because there are fewer bytes to draw. The main disadvantage is that the minimum scroll distance is four pixels horizontally because each byte represents four pixels. In Mode 2 we could have scrolled two pixels at a time which would have looked smoother, though slower.

The routine has several constants which can be changed to tailor the routine to your needs. The most important ones are *MapDepth* and *MapWidth*, which specify the size of the map in sprites. If you make them smaller the screen scrolls more smoothly.

MapTopGap and *MapLeftGap* allow you to set the size of the gaps to the left of the scroll area and above it, measured in sprites. This makes it easy to centre a small scrolling area into the middle of the screen. *SprWidth* and *SprDepth* specify the size of the individual sprites.

The pattern of sprites scrolled across the screen is governed by the

contents of the map table. This can be found towards the end of the listing.

It is important that you have *MapWidth* characters in each line of the map data or else you will get a garbled mess of data scrolling across your screen. Notice that the table is rotated 90 degrees when it is plotted on to the screen as sprites.

Each sprite has an Ascii code, so to make a new map just place the Ascii characters where map data should be, in the desired order. The sprite corresponding to the Ascii character can be found by referring to another table called *sptable*. If you want to add new

sprites it is simply a matter of putting their character symbol and start address in this table. You will then be able to use the symbol in the map data.

The routine uses standard column by column sprite plotting so most of the sprite editors around, including the one in the Arcade Game Creator package, should be able to cope as long as you remember to save the sprites out in the correct size. The default size is set to 4 columns by 32 rows.

You can have a maximum of 85 sprites in the map, if you can fit them into memory. You will only be able to fit a small amount in at the moment because of the space used up by the Basic program. To get round this I advise you to get hold of a disc-based assembler and perhaps the Public Domain small C compiler to write the programs in.

To give an example of how the scroller can be used I have included a demonstration, making it into a mini-game.

The keys to control your spacecraft are X and Y for left/right, : and / for up/down. All you have to do is avoid crashing into the walls.

If you find the game too difficult you can set the cheat location to TRUE right at the beginning of the program. Happy scrolling!

```
10 REM Software Scroller
20 REM by Paul Bedworth
30 REM (c) The Micro User
40 REM Save this program be
fore
50 REM running it.
60 cheat=&84
70 ?cheat=FALSE
80 *TV 255
90 MapDepth=6
100 MapWidth=7
110 MapTopGap=1
120 MapLeftGap=1
130 SprWidth=4
140 SprDepth=32
150 IncNr=&140*SprWidth
160 IncNc=&8*SprWidth
170 osbyte=&FFF4
180 oswrch=&FFEE
190 :
200 AL1=MapTopGap*IncNr
210 AL2=MapLeftGap*IncNc
220 ALIGN=AL1+AL2
230 :
240 REM screen start address
es
250 REM - screen 1 must be l
ower
260 REM than screen 2 -
270 screen1=&3000
280 screen2=&5800
290 :
300 REM zero page pointers
310 addr=&80
320 topaddr=&82
330 data=&76
340 :
350 FOR P=0 TO 2 STEP 2
360 P%=&1100
370 LOPT P
380 JMP scroll
390 .xydata
400 OPT FNxydata
410 .calc LDY y:LDA xydata,Y
420 STA a:LDA xydata+32,Y
430 STA a+1
440 LDA x:BEQ endit:TAY
450 .cl LDA a:CLC:ADC #8:STA
```

Scrolling landscape

Paul Bedworth explains how to create some really amazing games



```

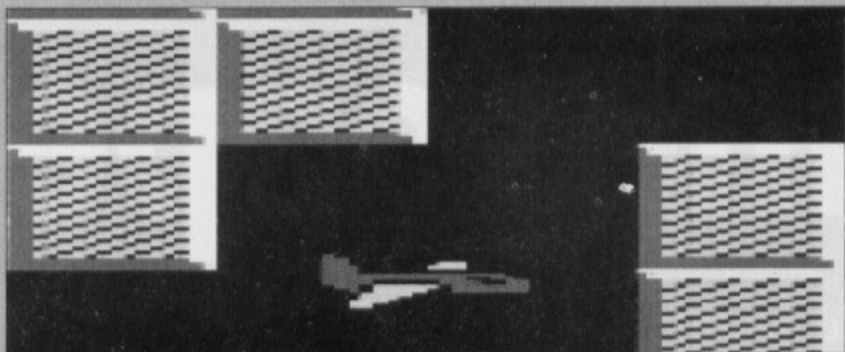
a
460 LDA a+1:ADC #0:STA a+1:
DEY:BNE cl
470 .endit
480 LDA sn:CMPI #2:BNE endit
2
490 LDA a:SEC:SBC #2800 MO
D 256
500 STA a
510 LDA a+1:SBC #2800 DIV
256
520 STA a+1
530 .endit2
540 RTS
550 .demo
560 LDA cheat
570 BNE cheaton
580 LDA deathflag
590 BNE dead
600 .cheaton
610 LDX #89E:JSR key
620 BNE notleft
630 LDA x:CMPI #5:BCC notlef
t
640 DEC x
650 .notleft
660 LDX #8BD:JSR key
670 BNE notright
680 LDA x:CMPI #24:BCS notri
ght
690 INC x
700 .notright
710 LDX #897:JSR key
720 BNE notdown
730 LDA y:CMPI #25:BCS notdo
wn
740 INC y
750 .notdown
760 LDX #8B7:JSR key
770 BNE notup
780 LDA y:CMPI #5:BCC notup
790 DEC y
800 .notup
810 LDA #ASC("P")
820 JSR choose
830 JSR calc
840 LDA #4:STA cols
850 JSR plot
860 RTS
870 .dead
880 LDA deathflag:CMPI #1:BN
E novdus
890 LDY #255
900 .vl
910 LDX #2
920 .v19l
930 LDA #19:JSR oswrch
940 LDA #0:JSR oswrch
950 TXA:JSR oswrch
960 LDA #0:JSR oswrch
970 JSR oswrch:JSR oswrch
980 DEX
990 BNE v19l

1000 DEY:BNE vl
1010 .novdus
1020 INC deathflag
1030 JSR wait
1040 RTS
1050 .key
1060 LDA #129
1070 LDY #255
1080 JSR osbyte
1090 CPY #255
1100 RTS
1110 .welldone
1120 JSR wait
1130 LDX #0
1140 .msg
1150 LDA text,X
1160 JSR oswrch
1170 INX
1180 CMP #0
1190 BNE msg
1200 LDA #21
1210 LDX #0
1220 JSR osbyte
1230 RTS
1240 .wait
1250 LDX #255
1260 .w1 LDY #255
1270 .w2 NOP:NOP:NOP:NOP:
NOP
1280 DEY
1290 BNE w2
1300 DEX
1310 BNE w1
1320 RTS
1330 .text
1340 OPT FNequb(22)
1350 OPT FNequb(5)
1360 OPT FNequb(31)
1370 OPT FNequb(2)
1380 OPT FNequb(4)
1390 OPT FNequs("Well Done!")
)
1400 OPT FNequb(31)
1410 OPT FNequb(2)
1420 OPT FNequb(6)
1430 OPT FNequs("Level 1 Com
pleted!")
1440 BRK
1450 .plot LDA addr:PHA:LDA a
ddr+1:PHA
1460 LDA a:STA addr:LDA a+1:
STA addr+1
1470 JSR eorsplot
1480 PLA:STA addr+1:PLA STA
addr
1490 RTS
1500 .splot \ plot spri
te
1510 LDA addr
1520 PHA
1530 STA tcaddr
1540 LDA addr+1
1550 PHA
1560 STA tcaddr+1
1570 .l1

1580 LDY #0
1590 LDX #4
1600 .l2
1610 LDA (data),Y \ This is
not
1620 STA (addr),Y \ bad prog
ramming!
1630 INY \ Makes it
faster
1640 LDA (data),Y
1650 STA (addr),Y
1660 INY
1670 LDA (data),Y
1680 STA (addr),Y
1690 INY
1700 LDA (data),Y
1710 STA (addr),Y
1720 INY
1730 LDA (data),Y
1740 STA (addr),Y
1750 INY
1760 LDA (data),Y
1770 STA (addr),Y
1780 INY
1790 LDA (data),Y
1800 STA (addr),Y
1810 INY
1820 LDA (data),Y
1830 STA (addr),Y
1840 INY
1850 LDA addr
1860 CLC
1870 ADC #838
1880 STA addr
1890 LDA addr+1
1900 ADC #1
1910 STA addr+1
1920 DEX
1930 BNE l2
1940 LDA data
1950 CLC
1960 ADC #SprDepth
1970 STA data
1980 LDA data+1
1990 ADC #0
2000 STA data+1
2010 LDA tcaddr
2020 ADC #8
2030 STA addr
2040 *STA tcaddr
2050 LDA tcaddr+1
2060 ADC #0
2070 STA tcaddr+1
2080 STA addr+1
2090 DEC cols
2100 BNE l1
2110 PLA
2120 STA addr+1
2130 PLA
2140 STA addr
2150 RTS
2160 .splot2 \ to enab
le
2170 LDA #SprWidth \ reverse
2180 SEC \ sprite-
clipping
2190 SBC cols
2200 TAY
2210 BEQ dosplot
2220 .s2l
2230 LDA data
2240 CLC
2250 ADC #SprDepth
2260 STA data
2270 LDA data+1
2280 ADC #0
2290 STA data+1

2300 DEY
2310 BNE s2l
2320 .dosplot
2330 JMP splot
2340 .eorsplot
2350 LDA addr
2360 PHA
2370 STA tcaddr
2380 LDA addr+1
2390 PHA
2400 STA tcaddr+1
2410 .el1
2420 LDY #0
2430 LDX #4:STX cd
2440 .eel2 LDX #8
2450 .el2
2460 LDA (data),Y:BEQ black
2470 PHA:LDA (addr),Y:BEQ no
hit
2480 LDA #1:STA deathflag
2490 .nohit
2500 PLA
2510 .black
2520 EOR (addr),Y:STA (addr)
,Y:INX
2530 DEX:BNE el2
2540 LDA addr:CLC:ADC #838:S
TA addr
2550 LDA addr+1:ADC #1:STA a
ddr+1
2560 DEC cd
2570 BNE eel2
2580 LDA data
2590 CLC:ADC #SprDepth:STA d
ata
2600 LDA data+1:ADC #0:STA d
ata+1
2610 LDA tcaddr:ADC #8:STA a
ddr
2620 STA tcaddr
2630 LDA tcaddr+1:ADC #0:STA
tcaddr+1
2640 STA addr+1
2650 DEC cols
2660 BNE el1
2670 PLA:STA addr+1
2680 PLA:STA addr
2690 RTS
2700 .switch1 \ change scr
een
2710 LDA #19 \ start addr
ess
2720 JSR osbyte \ to screen
1
2730 LDA #13
2740 STA &FE00
2750 LDA #(screen1 MOD 2048
DIV 8)
2760 STA &FE01
2770 LDA #12
2780 STA &FE00
2790 LDA #(screen1 DIV 2048)
2800 STA &FE01
2810 LDA #1:STA sn
2820 RTS
2830 .switch2
2840 LDA #19 \ change scr
een
2850 JSR osbyte \ start addr
ess
2860 LDA #13 \ to screen
2
2870 STA &FE00
2880 LDA #(screen2 MOD 2048
DIV 8)
2890 STA &FE01
2900 LDA #12

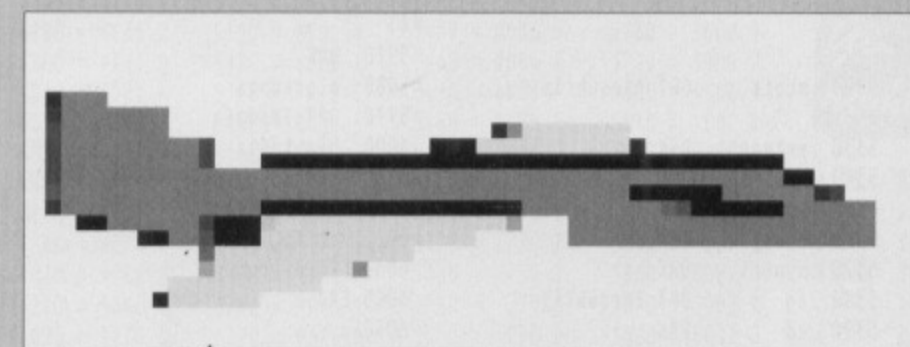
```





```
2910 STA &FE00
2920 LDA #(screen2 DIV 2048)
2930 STA &FE01
2940 LDA #2:STA sn
2950 RTS
2960 .scroll
2970 LDA #22
2980 JSR oswrch
2990 LDA #5
3000 JSR oswrch
3010 LDA #23:JSR oswrch
3020 LDA #0:JSR oswrch
3030 LDA #10:JSR oswrch
3040 LDA #32:JSR oswrch
3050 LDA #0:JSR oswrch:JSR o
swrch
3060 JSR oswrch:JSR oswrch
3070 JSR oswrch:JSR oswrch
3080 LDA #0 \ clear break f
lag
3090 STA &FF
3100 STA deathflag
3110 LDY #0
3120 LDA #83000 MOD 256
3130 STA &90
3140 LDA #83000 DIV 256
3150 STA &91
3160 .bloop
3170 LDA #0
3180 STA (&90),Y \ clear bot
h
3190 LDA &90 \ of the sc
reens
3200 CLC \ -NB- this
will
3210 ADC #1 \ clear fro
m the
3220 STA &90 \ start of
screen1
3230 BCC nc \ all the w
ay to
3240 INC &91 \ &7FFF
3250 .nc
3260 LDA &90
3270 CMP #88000 MOD 256
3280 BNE bloop
3290 LDA &91
3300 CMP #88000 DIV 256
3310 BNE bloop
3320 LDA #map MOD 256 \ init
ialise
3330 STA &70 \ poin
ters to
3340 LDA #map DIV 256 \ map
data
3350 STA &71
3360 .scrloop \ control
loop
3370 JSR demo
3380 JSR switch1 \ switch t
o screen 1
3390 CMP #8EA
3400 LDA #screen2 MOD 256
3410 CLC
3420 ADC #ALIGN MOD 256
3430 STA maptop
3440 LDA #screen2 DIV 256
3450 ADC #ALIGN DIV 256
3460 STA maptop+1
3470 JSR plotmap \ plot map
over scr 2
3480 CMP #8EA
3490 BNE cont1
3500 JSR welldone
3510 RTS
3520 .cont1
3530 JSR demo
```

```
3540 JSR switch2 \ reveal ma
p on scr 2
3550 LDA #screen1 MOD 256
3560 CLC
3570 ADC #ALIGN MOD 256
3580 STA maptop
3590 LDA #screen1 DIV 256
3600 ADC #ALIGN DIV 256
3610 STA maptop+1
3620 JSR plotmap \ plot map
over scr 1
3630 CMP #8EA
3640 BNE cont2
3650 JSR welldone
3660 RTS
3670 .cont2
3680 LDA deathflag
3690 CMP #2
3700 BCC notdeadyet
3710 JMP scroll
3720 .notdeadyet
3730 BIT &FF \ test for
break
3740 BEQ scrloop
3750 BRK
3760 OPT FNequb(27)
3770 OPT FNequs("Escape")
3780 BRK
3790 .plotmap \ plot a s
creen
3800 INC counter \ from the
map data
3810 LDA &70
3820 STA old70
3830 LDA &71
3840 STA old70+1
3850 LDY #0
3860 STY mcol
3870 LDA maptop
3880 STA addr
3890 LDA maptop+1
3900 STA addr+1
3910 .ml
3920 LDY #0
3930 LDA addr
3940 STA topaddr
3950 LDA addr+1
3960 STA topaddr+1
3970 .pml
3980 LDA (&70),Y \ load ma
p symbol
3990 CMP #8EA
4000 BNE noteod
4010 RTS
4020 .noteod
4030 JSR schoose \ and cho
ose the
4040 LDA mcol \ corresp
onding
4050 BEQ doclip \ sprite
4060 LDA #SprWidth
4070 STA cols
4080 JMP overdoclip
4090 .doclip
4100 LDA ncols \ only pr
int
4110 STA cols \ 'ncols'
columns
4120 .overdoclip \ of the
sprite
4130 STY ystore
4140 LDA mcol \ if nc
t last
4150 CMP #MapWidth-1 \ colum
n then do
4160 BNE dosplot2 \ a rev
erse clip
```



```
4170 LDA #SprWidth
4180 SEC
4190 SBC ncols
4200 BNE goon
4210 LDA #SprWidth
4220 .goon STA cols
4230 JSR splot \ do the
clip the
4240 JMP oversplot2 \ other
way around
4250 .dosplot2
4260 JSR splot2
4270 .oversplot2
4280 LDY ystore \ go on
to next
4290 LDA addr \ map ro
w
4300 CLC
4310 ADC #IncNr MOD 256
4320 STA addr
4330 LDA addr+1
4340 ADC #IncNr DIV 256
4350 STA addr+1
4360 INY
4370 CPY #MapDepth
4380 BNE pml
4390 LDA mcol
4400 BNE ok
4410 LDA #4
4420 SEC
4430 SBC ncols
4440 BEQ ndec
4450 TAY
4460 .decl
4470 LDA topaddr
4480 SEC
4490 SBC #8
4500 STA topaddr
4510 LDA topaddr+1
4520 SBC #0
4530 STA topaddr+1
4540 DEY
4550 BNE decl
4560 .ndec
4570 DEC ncols
4580 BNE ok
4590 LDA #SprWidth
4600 STA ncols
4610 .ok
4620 INC mcol
4630 LDA &70
4640 CLC
4650 ADC #MapDepth
4660 STA &70
4670 LDA &71
4680 ADC #0
4690 STA &71
4700 LDA topaddr \ g
o on to
4710 CLC \ n
ext map
4720 ADC #IncNc MOD 256 \ c
olumn
4730 STA addr
4740 LDA topaddr+1
```

```
4750 ADC #IncNc DIV 256
4760 STA addr+1
4770 LDA mcol
4780 CMP #MapWidth
4790 BEQ nml
4800 JMP ml
4810 .nml
4820 LDA counter \ decide
whether
4830 CMP #4 \ to go
onto next
4840 BNE notc4 \ column
of data
4850 LDA old70 \ or to
keep
4860 CLC \ scroll
ing
4870 ADC #MapDepth \ curren
t data
4880 STA &70
4890 LDA old70+1
4900 ADC #0
4910 STA &71
4920 LDA #0
4930 STA counter
4940 JMP overnotc4
4950 .notc4
4960 LDA old70
4970 STA &70
4980 LDA old70+1
4990 STA &71
5000 .overnotc4
5010 RTS
5020 :
5030 .schoose
5040 STA symbol
5050 STY ystore
5060 LDY #0
5070 .searchl
5080 LDA sptable,Y
5090 BEQ notfound
5100 CMP symbol
5110 BEQ foundit
5120 INY:INX
5130 INY
5140 JMP searchl
5150 .foundit
5160 LDA sptable+1,Y
5170 STA data
5180 LDA sptable+2,Y
5190 STA data+1
5200 LDY ystore
5210 RTS
5220 .notfound
5230 LDA sptable+1
5240 STA data
5250 LDA sptable+2
5260 STA data+1
5270 LDY ystore
5280 RTS
5290 .cols BRK
5300 .tcaddr BRK:BRK
5310 .maptop BRK:BRK
```




```
5320 .ncols OPT FNequb(Sp
rWidth)
5330 .ystore BRK
5340 .mcol BRK
5350 .counter BRK
5360 .old70 BRK:BRK
5370 .symbol BRK
5380 .sn OPT FNequb(1)
5390 .cd BRK
5400 .deathflag BRK
5410 .x OPT FNequb(10)
5420 .y OPT FNequb(10)
5430 .a BRK:BRK
5440 .map
5450 OPT FNequs("0 ")
5460 OPT FNequs("0 ")
5470 OPT FNequs("0 ")
5480 OPT FNequs("0 ")
5490 OPT FNequs("0 ")
5500 OPT FNequs("0 ")
5510 OPT FNequs("0000 0")
5520 OPT FNequs("0000 0")
5530 OPT FNequs("0000 0")
5540 OPT FNequs("0000 0")
5550 OPT FNequs("0000 0")
5560 OPT FNequs("0000 0")
5570 OPT FNequs("000 0")
5580 OPT FNequs("0 0")
5590 OPT FNequs("0 000")
5600 OPT FNequs("0 0 ")
5610 OPT FNequs("0 0000")
5620 OPT FNequs("0 0 ")
5630 OPT FNequs("0 0 ")
5640 OPT FNequs("0000 0")
5650 OPT FNequs("0000 0")
5660 OPT FNequs("00 0")
5670 OPT FNequs("00 00")
5680 OPT FNequs("0 000")
5690 OPT FNequs("0 000")
5700 OPT FNequs("00 00")
5710 OPT FNequs("00 0")
5720 OPT FNequs("0000 0")
5730 OPT FNequs("0000 0")
5740 OPT FNequs("0 0")
5750 OPT FNequs("0 00 0")
5760 OPT FNequs("0 00 0")
5770 OPT FNequs("0 00 0")
5780 OPT FNequs("0 00 0")
5790 OPT FNequs("0 00 0")
5800 OPT FNequs(" 00 ")
5810 OPT FNequs(" 00 ")
5820 OPT FNequs(" 0000 ")
5830 OPT FNequs(" ")
5840 OPT FNequs("00 00")
5850 OPT FNequs("00 00")
5860 OPT FNequs(" ")
5870 OPT FNequs(" ")
5880 OPT FNequs(" ")
5890 NOP
5900 .sptable
5910 OPT FNequs(" ")
5920 OPT FNequs(blankdata)
5930 OPT FNequs("P")
5940 OPT FNequs(blockdata)
5950 OPT FNequs("0")
5960 OPT FNequs(blockdata+32
```

```
*4)
5970 BRK
5980 .blockdata
5990 OPT FNsdata
6000 .blankdata
6010 OPT FNequs(STRING$(4*32
,CHR$(0)))
6020 J:NEXT
6030 PROCexecute
6040 END
6050 :
6060 DEFFNsdata
6070 RESTORE
6080 FOR IX=1 TO ((SprWidth*S
prDepth)/4)*2
6090 READ d$
6100 [OPT P:OPT FNequs(EVAL("
&" + d$))]
6110 J:NEXT:=P
6120 :
6130 DEFFNxdata
6140 RESTORE 6240
6150 FOR IX=1 TO 64/4
6160 READ d$
6170 [OPT P:OPT FNequs(EVAL("
&" + d$)):]
6180 NEXT:=P
6190 :
6200 DATA 0,EOCOC08,F0F0F0E,1
0100206,3030,0,0,0,0,0,F0F00,C
0E0F0F0,80,0,0,0,0,0,EO600000,70
EOF00,383,0,0,0,0,0,0,3060C00,
F0F,0,0,0,0
6210 DATA 3C7F7FFF,2C3C1C2C,1
C2C3C1C,3C1C2C3C,2C3C1C2C,1C2C
3C1C,3C1C2C3C,F0F0F2C,60FFFFF
,0060B0D0,00D060B0,60B0D060,D0
60B0D0,00D060B0,60B0D060,F0F0F
D0,D0FFFFF,B0D060B0,60B0D060,
D060B0D0,00D060B0,60B0D060,D06
0B0D0,F0F0F0B0,B3FFFFF
6220 DATA73B3F373,F373B3F3,B3
F373B3,73B3F373,F373B3F3,B3F37
3B3,1F1F3F73
6230 :
6240 DATA C0804000,C0804000,C
0804000,C0804000,C0804000,C080
4000,C0804000,C0804000,5B5A595
8,605F5E5D,65646362,6A696867,6
F6E6D6C,74737271,79787776,7E7D
7C7B
6250 :
6260 DEFFNequs(s$)SPX=s$:PX=P
%+LENS$:=P
6270 DEFFNequs(BX)?PX=BX:PX=P
%+1:=P
6280 DEFFNequs(WX)!PX=WX:PX=P
%+2:=P
6290 DEFFNequs(DX)!PX=DX:PX=P
%+4:=P
6300 :
6310 DEFPROCexecute
6320 s$="CALL scroll"+CHR$(13
)
6330 FOR L=1 TO LEN(s$)
6340 XX=0:YX=ASCID$(s$,L)
6350 AX=138:CALL osbyte
6360 NEXT:ENDPROC
```

```
10 = 0 0
20 = 0 0
30 = 0 0
40 = 0 0
50 = 0 0
60 = D964 4
70 = 41B9 9
80 = 3327 9
90 = DB8C 2
100 = A2EB 3
110 = 8CD3 0
120 = 888A 2
130 = 891 8
140 = 2401 8
150 = 967F 3
160 = A4F3 1
170 = 7966 1
180 = 78 C
190 = 9719 3
200 = A1B5 2
210 = 29F6 B
220 = 47D6 3
230 = 9719 F
240 = 0 F
250 = 0 F
260 = 0 F
270 = 1294 F
280 = 442E E
290 = 9719 9
300 = 0 9
310 = 236D 2
320 = 5F87 6
330 = 9280 7
340 = 9719 3
350 = 71C1 8
360 = E3C5 5
370 = 6C81 6
380 = C5F8 5
390 = 2638 5
400 = BC45 2
410 = 9E7C 3
420 = 22E6 D
430 = 9862 5
440 = 90C 9
450 = 70F1 B
460 = 68A2 F
470 = BCA2 1
480 = 8303 0
490 = 6685 6
500 = 14D6 2
510 = 9DBE 1
520 = 9862 4
530 = D246 E
540 = 9843 F
550 = C49B 9
560 = 1E7D 4
570 = 426E 0
580 = 6742 5
590 = 4036 B
600 = 5BE2 6
610 = 46CC 0
620 = 8A18 0
630 = 5691 3
640 = F733 C
650 = 9394 9
660 = 89EA C
670 = E33F C
680 = B95B A
690 = C856 2
700 = EC27 4
710 = 2B70 5
720 = 4B23 D
730 = 31B0 7
740 = D877 F
750 = 52AF 0
760 = F75 C
770 = B687 C
780 = 388A C
790 = E712 F
800 = 6310 F
810 = 4C8E 8
820 = 2D06 6
830 = DA0E 9
840 = 82E0 D
850 = 2FA1 6
860 = 9843 A
870 = 309D 8
880 = 8979 D
890 = 504E 3
900 = 9212 D
910 = CA07 9
920 = 4242 3
930 = 3863 A
940 = 7D3F B
950 = E6B8 1
960 = 7D3F B
970 = 8742 E
980 = E8A9 1
990 = 32E9 D
1000 = ABCE 0
1010 = 64FF 6
1020 = 9A7D E
1030 = 967B 9
1040 = 9843 9
1050 = E5EF C
1060 = 46C3 A
1070 = 504E 6
1080 = 8E7E A
1090 = 7F31 6
1100 = 9843 7
1110 = 9F71 6
1120 = 967B F
1130 = EA45 7
1140 = D65 6
1150 = AB19 0
1160 = 9224 1
1170 = 7602 4
1180 = 2F9 B
1190 = CABD D
1200 = F552 B
1210 = EA45 1
1220 = 8E7E B
1230 = 9843 6
1240 = F7BE 3
1250 = 15EE 8
1260 = D975 9
1270 = 1BAA D
1280 = F888 C
1290 = EC50 A
1300 = E8A9 0
1310 = DC33 E
1320 = 9843 E
1330 = 80E0 B
1340 = E1A1 0
1350 = 9A2C B
1360 = 83C2 5
1370 = 3BB 9
1380 = A91D 4
1390 = 844B 5
1400 = 83C2 B
1410 = 3BB 7
1420 = CF7F 9
1430 = 2A3B 1
1440 = E2BF 1
1450 = 7FC3 8
1460 = 83C4 A
1470 = 7EEF F
1480 = 3077 F
1490 = 9843 E
1500 = 20DB 2
1510 = 2DBF 1
1520 = 824E 1
1530 = 5DBB D
1540 = DAEO E
1550 = 824E 6
1560 = 923D A
1570 = F5F2 5
1580 = 9CF1 3
1590 = AAC1 5
1600 = C591 9
1610 = 71E4 6
1620 = 5047 8
1630 = 97CF 2
1640 = 423D A
1650 = 8D34 E
1660 = 6623 5
1670 = 423D B
1680 = 8D34 8
1690 = 6623 C
1700 = 423D A
1710 = 8D34 6
1720 = 6623 8
1730 = 423D 9
1740 = 8D34 8
1750 = 6623 F
1760 = 423D 0
1770 = 8D34 E
1780 = 6623 1
1790 = 423D E
1800 = 8D34 1
1810 = 6623 0
1820 = 423D 3
1830 = 8D34 C
1840 = 6623 8
1850 = 2DBF 3
1860 = 74FB A
1870 = 7E04 E
1880 = FEB2 5
1890 = DAEO B
1900 = B19F 0
1910 = 4B39 7
1920 = E8A9 1
1930 = 33D9 7
1940 = 5B2B 9
1950 = 74FB 1
1960 = 85D3 1
1970 = 8826 3
1980 = BB22 9
1990 = A1BE B
2000 = 2AFB 2
2010 = CC62 2
2020 = 20B6 B
2030 = FEB2 F
2040 = 5DBB 8
2050 = E3B3 1
2060 = A1BE 3
2070 = 923D 4
2080 = 4B39 9
2090 = 8455 7
2100 = 3BA B
2110 = 4E8A 4
2120 = 4B39 A
2130 = 4E8A E
2140 = FEB2 6
2150 = 9843 B
2160 = CBED 8
2170 = D313 9
2180 = 2D8F 9
2190 = 67B0 4
2200 = 772F 0
2210 = 5A8B 4
2220 = DA91 B
2230 = 5B2B E
2240 = 74FB C
2250 = 85D3 C
2260 = 8826 9
2270 = BB22 5
2280 = A1BE 9
2290 = 2AFB 5
2300 = F888 6
2310 = 1D48 B
2320 = 7792 C
2330 = B546 7
2340 = 9C8E E
2350 = 2DBF 8
2360 = 824E 3
2370 = 5DBB A
2380 = DAEO 7
2390 = 824E 6
2400 = 923D B
2410 = 8DBA A
2420 = 9CF1 2
2430 = 4137 A
2440 = 1104 C
2450 = BDD9 4
2460 = 1B85 C
2470 = CB8C F
2480 = 7A81 B
2490 = 5388 1
2500 = 4E8A 8
2510 = D1FB C
2520 = C1B6 4
2530 = 2D80 7
2540 = FBC7 0
2550 = 63A5 6
2560 = 5F53 A
2570 = 7AED F
2580 = 5B2B A
2590 = 6245 2
2600 = 56AB 6
2610 = A27A A
2620 = 5DBB 2
2630 = 92F0 A
2640 = 4B39 3
2650 = 8455 D
2660 = 4A63 6
2670 = D119 D
2680 = A57B 6
2690 = 9843 C
2700 = F7CC 0
2710 = 4C67 7
2720 = 2A24 2
2730 = 8043 C
2740 = FC40 3
2750 = C5F3 F
2760 = EC61 B
2770 = 9062 3
2780 = FC40 D
2790 = CFC D
2800 = EC61 0
2810 = 6C9A 9
2820 = 9843 E
2830 = 5BCA 2
2840 = 4C67 F
2850 = 2A24 E
2860 = AC9 F
2870 = FC40 2
2880 = A56 A
2890 = EC61 F
2900 = 9062 A
2910 = FC40 A
2920 = 21B8 5
2930 = EC61 C
2940 = A4EF 3
2950 = 9843 D
2960 = DB26 D
2970 = C531 1
2980 = 9224 C
2990 = 5230 D
3000 = 9224 C
3010 = EA84 D
3020 = 7D3F 8
3030 = 20BE F
3040 = AC92 F
3050 = 466 3
3060 = 8742 5
3070 = 8742 6
3080 = 97FA 5
3090 = 7359 6
3100 = 87F4 C
3110 = 9CF1 8
3120 = DF80 3
```




3130 = 756F A	3460 = 8D62 6	3790 = E8D7 0	4120 = B2BF 3	4450 = 772F F	4780 = A7E9 1	5110 = 4D17 4	5440 = AA2 5	5770 = 300B F	
3140 = 9B33 5	3470 = 8938 1	3800 = 9A80 8	4130 = A8DC 0	4460 = D7F7 5	4790 = 4C05 2	5120 = 83BC 4	5450 = 6DB6 3	5780 = 300B 9	
3150 = 654E F	3480 = 434B E	3810 = F176 5	4140 = A73 1	4470 = 946D 8	4800 = FFA1 D	5130 = 6623 F	5460 = 6DB6 A	5790 = 300B 7	
3160 = 2CCD 4	3490 = 788B 0	3820 = 32D0 F	4150 = 4477 C	4480 = 8D00 9	4810 = C522 A	5140 = 7A7E E	5470 = 6DB6 F	5800 = 4EDC A	
3170 = 295 5	3500 = 7D10 F	3830 = E157 A	4160 = B4E8 2	4490 = 7CF7 F	4820 = E60D A	5150 = 600E 6	5480 = 6DB6 E	5810 = 4EDC D	
3180 = 73B9 B	3510 = 9843 1	3840 = 54E4 D	4170 = 54ED 3	4500 = DEF5 6	4830 = 6304 1	5160 = 3E5B 3	5490 = 6DB6 0	5820 = 6200 F	
3190 = 59DB C	3520 = AD1C E	3850 = 9CF1 E	4180 = 8D00 0	4510 = 954A 0	4840 = 3CAC 4	5170 = 8826 B	5500 = 6DB6 1	5830 = 5002 6	
3200 = 80C4 3	3530 = A55E E	3860 = CD3 1	4190 = CBED 4	4520 = FDF7 B	4850 = EA31 5	5180 = 670B 6	5510 = 770 2	5840 = 209 7	
3210 = 53CF A	3540 = E79D 7	3870 = 84F 5	4200 = 9E6E 9	4530 = 75FC 4	4860 = 802D E	5190 = 2AFB 6	5520 = 770 7	5850 = 209 B	
3220 = 2855 7	3550 = 56E7 7	3880 = FEB2 0	4210 = 54ED E	4540 = F888 8	4870 = A7EE 2	5200 = 3905 6	5530 = 770 2	5860 = 5002 6	
3230 = 552D A	3560 = 74FB E	3890 = CCEC 7	4220 = AA5D D	4550 = A75C 1	4880 = 5660 8	5210 = 9843 1	5540 = 770 F	5870 = 5002 4	
3240 = CE6D 6	3570 = F6D9 6	3900 = 4B39 4	4230 = 66CD 7	4560 = D325 5	4890 = 1E7C D	5220 = D376 B	5550 = 770 D	5880 = 5002 2	
3250 = E927 1	3580 = 9996 7	3910 = 4D9B D	4240 = 1849 0	4570 = EEAD 9	4900 = A1BE 0	5230 = 8FE4 D	5560 = 770 B	5890 = 41AB 3	
3260 = D279 2	3590 = 1264 E	3920 = 9CF1 1	4250 = 8A61 8	4580 = AD56 4	4910 = 4641 B	5240 = 8826 8	5570 = 32A D	5900 = COAF 9	
3270 = 6901 D	3600 = B25A F	3930 = 2DBF 5	4260 = 840 4	4590 = 54ED 3	4920 = 295 7	5250 = BF87 4	5580 = 2ED5 3	5910 = 4C3E 9	
3280 = F95A F	3610 = BD62 C	3940 = DEF5 2	4270 = D1BD F	4600 = 167C 3	4930 = 7721 2	5260 = 2AFB 8	5590 = 3128 1	5920 = 6721 5	
3290 = C258 0	3620 = 8938 D	3950 = DAEO 5	4280 = 836F D	4610 = 5B1E C	4940 = 1819 F	5270 = 3905 F	5600 = 7732 6	5930 = 9436 0	
3300 = 2D82 4	3630 = 434B 5	3960 = 75FC B	4290 = 7A15 A	4620 = F8A8 A	4950 = C285 F	5280 = 9843 2	5610 = 2BAC D	5940 = 133A 7	
3310 = F95A 5	3640 = 48E8 1	3970 = 9D40 E	4300 = 74FB 6	4630 = F176 C	4960 = C4CE E	5290 = 4CDA 4	5620 = 2ED5 7	5950 = F5D 1	
3320 = 9B56 E	3650 = 7D10 7	3980 = 9C43 0	4310 = A95B B	4640 = 74FB 2	4970 = 5660 C	5300 = CF83 2	5630 = 2ED5 0	5960 = 3B2A 5	
3330 = 48C9 C	3660 = 9843 5	3990 = 434B 3	4320 = FEB2 4	4650 = 222C E	4980 = 1E7C D	5310 = E28D A	5640 = 770 B	5970 = E2BF E	
3340 = 1016 9	3670 = 9D7F 3	4000 = 3C11 6	4330 = DAEO 5	4660 = 5660 4	4990 = 4641 5	5320 = C731 B	5650 = 770 4	5980 = 78FE E	
3350 = 4641 8	3680 = 6742 B	4010 = 9843 7	4340 = EDD8 8	4670 = E157 9	5000 = 2300 4	5330 = AAB 2	5660 = 19AE D	5990 = 11CC 3	
3360 = CC87 E	3690 = 22BB 9	4020 = 30C9 9	4350 = 4B39 C	4680 = A1BE 9	5010 = 9843 9	5340 = 644A D	5670 = 209 9	6000 = 435 2	
3370 = A55E C	3700 = 5560 9	4030 = CA73 8	4360 = 6623 F	4690 = 4641 C	5020 = 9719 F	5350 = DB5F 0	5680 = 3128 8	6010 = 1B50 F	
3380 = 6DFB 9	3710 = C5FB 3	4040 = 1BB5 B	4370 = C56E 3	4700 = B7AD D	5030 = 68FC 0	5360 = EE38 D	5690 = 3128 F	6020 = DA42 0	
3390 = 434B 2	3720 = 96CD 3	4050 = 3FE3 A	4380 = 5A99 7	4710 = B7AD 8	5040 = 599 1	5370 = 6570 1	5700 = 209 5	6030 = 73AB 1	
3400 = 8E65 9	3730 = F2DE E	4060 = 54ED 1	4390 = C818 1	4720 = D621 A	5050 = A8DC 8	5380 = C556 1	5710 = 19AE 8	6040 = FD2E 4	
3410 = 74FB 1	3740 = 9847 F	4070 = 7AA3 2	4400 = AD56 B	4730 = FEB2 3	5060 = 9CF1 A	5390 = B2B2 2	5720 = 770 6	6050 = 9719 5	
3420 = F6D9 E	3750 = E2BF B	4080 = 6CF4 8	4410 = 4211 5	4740 = 954A 5	5070 = 5481 D	5400 = 7A5C 5	5730 = 770 B	6060 = 38DB E	
3430 = 9996 2	3760 = 1E54 1	4090 = 9AC3 2	4420 = 8D00 8	4750 = 62C2 D	5080 = FBDD 1	5410 = AA4 2	5740 = 2ED5 6	6070 = 9FF8 0	
3440 = CAE6 D	3770 = 3BBE 0	4100 = 140E 5	4430 = CBED 2	4760 = 4B39 9	5090 = 3FB9 A	5420 = A458 C	5750 = 300B 5	6080 = E910 6	
3450 = B25A 5	3780 = E2BF E	4110 = A998 8	4440 = F484 D	4770 = C818 A	5100 = 7A4A F	5430 = 7526 E	5760 = 300B 5	6090 = 215F 0	
								6100 = 8890 F	
								6110 = E2A3 0	
								6120 = 9719 2	
								6130 = 1E0E 4	
								6140 = A44D 2	
								6150 = E9FA 6	
								6160 = 215F 1	
								6170 = 708E A	
								6180 = 9634 8	
								6190 = 9719 D	
								6200 = B4A7 9	
								6210 = DF89 5	
								6220 = 3E21 B	
								6230 = 9719 1	
								6240 = 1E24 8	
								6250 = 9719 0	
								6260 = E4D6 F	
								6270 = 9872 B	
								6280 = 517A 0	
								6290 = 915A 9	
								6300 = 9719 A	
								6310 = 9E0D C	
								6320 = E90F 9	
								6330 = F9D 3	
								6340 = F1F5 C	
								6350 = 75EE 0	
								6360 = E531 3	

Get it right ✓

TRAINING COURSES

After running successful PC based courses locally we are now extending our range of courses to cover the Archimedes & A3000 together with the major software products available.

1/2 and full day courses are available

eg. Impression, MultiStore, Atelier

Timetabler, Minerva Accounts

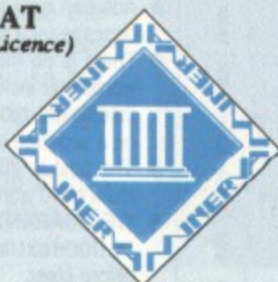
Pipedream, FlexiFile

Archimedes Awareness

PrimeArt

PrimeArt is a 256 colour art package designed for use with Primary and Special Needs children. Teachers can tailor the menus to suit the ability of each class or child.

£79.95 + VAT
(inc Primary Licence)



ACCOUNTS
ANCESTRY
ATELIER
DESKTOP OFFICE
EASIWORD
FLEXIFILE
GAMES
GAMMAPLOT
GRAPHBOX
HOME ACCOUNTS
MULTISTORE
PC ACCESS
PRIMEART
SIGMASHEET
SYSTEM DELTA
TIMETABLER

MINERVA SOFTWARE, MINERVA HOUSE, BARING CRESCENT, EXETER, EX1 1TL
Tel. 0392 43715
Please send me your brochure for Software ☐ Training ☐
Name.....
Address.....
Ref ID: MUser

**Has upgrading your BBC Micro given you hardware you no longer need?
Or have changing interests left you with unwanted software?**

MICRO USER CLASSIFIEDS

This is THE place to advertise your surplus items. Our 105,000 readers are always on the lookout for a bargain and this is the first place they'll look!

● BBC B, Solidisk DDFS, Watford 40/80 disc drive, Interword and manual. Brother M1009 printer. Watford 32k rom/ram board. £300. Tel: 091 259 1839.
● 49 Electron + BBC tapes including Last Ninja 2, Sam 13 perplexity and joystick with interface, offers around £60. Phone 0228-49185.
● Master compact games. All original, send SAE for details to Julian Boreham, 43 South Hall Avenue, Thorpe Hesley, Rotherham, S.Yorks S61 2QJ.
● BBC "B" O.S.1.2, Acorn DFS, View, Viewdata, Viewsheets roms, Watford 32k Shadow ram, Dump 3, DTP rom + mouse, Sideways rom. 2 off 40/80DS disc drives, Cassette, Panasonic KX1081 Printer, TV Monitor, All manuals £350 Tel: 0293-883751
● Electron 64k Turbo Plus 1 Advanced Plus 3.5 ADFS disc drive T2P3 View ABR mode 7 simulator Brother M1009 Printer Games etc £250 Phone 0404 44607 after 6pm.
● Prisms 1200/75 acoustic modem with software £20 ono. Solidisk DFDC £10 ono. Linkword French (T), Spellcheck II (Epm). Basic ROM user guide (+ tape) £5 ono each. 0272 249780
● BBC B, 40T Cumana drive, Dustcover, Software books, Leads, Disc box £180. Ashford Middx 0784 255210
● BBC-B 1770DFS 80/40t drive Monitor Software Superart Tape Recorder £350 ono Tel: 0620 2047
● BBC Games + Joystick, mostly Tape BARGAINS Tel: 0243 374547 After 4. Ask for Jonathan
● Electron 640 ACP+1 £30 Acorn+3 £70 New keyboard £20 3 Inch Drive £20 E-user 86/90 Sheffield 655582 Evenings
● BBC, B Data recorder, Twin joysticks, lots of software, Full set of input magazine, all for £180 Tel: 0803-326617
● Master 512 Twin 40/80 Disc Drives with PSU original packing + all manuals + additional software, Manuals, ROM board including mini office II Driver. £600 o.n.o serious offers only. Tel: 081 679-1494 After 7.00pm
● Bargain! Excellent condition BBC "B", 144k sidewaysram, DDFS, dual DSDD 4080 drives, modem, printer, interword and loads of manuals, magazines, software + roms. £450 ono Tel: James (0923) 896666 after 7pm (Rickmansworth)
● Simmons FM Synth module, Great Bass Sounds, Fully Programmable, Ideal for music 2000, EMR £85 Phone after 7pm: Warren 071-228 1390
● Electron, Plus1, Cumana DFS/ADFS Disc Interface Vigen 40/80 DSDD, Cassette, Monitor, "VIEW", "VIEWSHEET", all leads and manuals £175. Chingford: 081-523-0132
● BBC B, Watford DFS, Rom/Ram Board, dual 40/80 disc drive, colour monitor/TV, Wordwise, books, games etc. £325 ono. Canterbury (0227) 831196
● Microvitec 1451 RGB £100 ono. Data recorder software leads etc £10 Tel: 081 390 0582 Surrey.
● Master 128, twin 80 teacs, Microvitec cub, Epson FX85, joystick, mouse, interword, AMX pagemaker, £650. 0344 882841.
● BBC B 64k Watford DFS Cumana 40/80T DSDD Drive Shadow Sideways RAM. Replay ROM Joysticks 80 Games All manuals £300 o.n.o. Taxan Hi-Ries colour monitor £150 o.n.o. Tel: 0543 432784
● BBC-B computer, dual disk drive, printer, second processor ROM/ROM board, interword, plus loads of other hardware and software: Educational, Business, Games. Only £500 (Worth at least twice as much). Telephone: 0483 64345
● Torch Graduate Twin Drive co-processor unit (640k RAM installed) turns beeb into an IBM plus BBC model B. £275 ono will split (0926) 56546 Eve
● Master 128, £300. 65C102, £65. Econet starter kit, £70. dual disc drive, £90. 30MB hard disc, £320. Leads, Manuals, Mags, £50. Many games, £50. Phone 081-841 8172, Eves.
● BBC B computer, opus Challenger D/D, Cassette player, Joysticks, Games, Literature. All very little used. £195 The lot. 081-390 1664
● Epson FX1000 NLQ wide carriage etc, £175 ono. Also Micro User mags. March 1983 to July 1990 good cond. offers. Tel: 0203 348241
● Wanted BBC Master games type joystick for disabled user, auto fire, suckers 0922 478709
● A3000 Archimedes, Colour monitor and software. Monitor case slightly damaged but all in working order. £650 the lot. Tel: Stephen

Homan-Berry on 071-283 7500, Ext. 5790 - 10am-4pm weekdays only.
● Archimedes solidtools software, comprises solidcad, filmaker, solidrender, realtime graphics language, superdump, superplot, £100 Telephone Steve Newport 892645
● Archimedes 310m colour, Risc-os, External 5.25 drive, manuals and original computer boxes, PC Emulator, Artisan + Games, Disk box + blank disks. £700 o.n.o (0272) 244412
● BBC Teletext Adaptor + ATS ROM + manuals V.G.C. £50 Tel: (0874) 730751 (BRECON)
● A310 1mb RAM RISC-OS colour monitor Panasonic KX-P1081 Printer 1500 Sheets Fanfold paper 1000 printer labels interdictor one PD disc's all manuals printer lead original packing boxes £650 o.n.o reason for sale upgrading Phone Geoff (0722) 412 464 after 6pm
● Archimedes A400 Series Programmers reference manual and/or ANSI C Compiler wanted, Call Mark Lincoln 521606 Evenings
● BBC B Accessories, Watford sideways ROM Board and 16k sideways RAM £30. Dumpout 3 £15. Watford 1.44 DFS Kit £45. 0993 843774.
● Master 512k, 3.5/5.25" Drives, Hi-res green monitor, Centronics GLP II Printer, some software, good condition, £499 or offers. Winchester (0962) 862844.
● BBC/Electron Software from only 50p, EG holed out/Trivial Pursuit, £5, Beach Head 50p. Etc Send SAE to C M Harper, 8, Briar Close, Nailsea, Bristol, BS19 1QG
● NEC PC-8023 BE-C Printer £300 ono New Star sheetfeeder SF100 to fit N-series printers £45. Peter Eisey Tel: 081-850 7678 Ext. 219 Daytime only.
● Master 128k, Dual DD/DS plinth disc drive, AMX + software, lightpen, Many utilities/ROMs including: ADT, Dumpout 3, Advanced 1770 DFS, 256k memory expansion cartridge and over 250 games £500 o.n.o 081 363-1477.
● Master 512k Watford 40/80t dual drives Morley teletext adaptor, Vine micro's replay ROM, User port splitter, Joysticks, ATPL mouse with paint software, Many manuals, Magazines, Host of games/educational software, Database, Spreadsheet, Word processors, Lul echo keyboard may split, offers 0782-395900
● BBC-B.40T Disc Drive, ROM board (W.E.), Enigma DISC Imager, Basic Editor, VIEW, ADE, Help ROM, Spellcheck II, ADT, Toolkit, Monitor plinth, Joystick Teletext Adaptor, 16k Sideways RAM, 100's disc games, Blank Discs, 50 tapes, Datarecorder, Disc boxes, Dustcover, + More! £415 o.n.o Tel Ascot (0344) 26703 after 5pm
● WANTED URGENTLY: Software ROMS and Colour Monitor for BBC B. FOR SALE/EXCHANGE: Electron, Plus3, 5.25 Drive/PSU, Toolkit ROM, Elite, Firstbyte Printer Interface. Will split. 081-950-3406
● Wanted ADC1208 Interface for Archimedes: Will negotiate price Phone (0533) 674927 (Evenings)
● BBC-B, O.S.1.20, VIEW, 40/80t drive, Green screen, All manuals, £300 o.n.o. 0202 699379.
● BBC Model B twin 5.25" floppy drives microvitec colour monitor and stand 10 Mbyte winchester joysticks manuals plus lots of games £420 0223 836313
● BBC B+ 64k, 1770 DFS watford electronics wapping editor, quest paint (both mouse driven), dumpout 3, many games, modem +ROM. Bargain £484. Phone Southampton (0703) 260088
● Z88 excellent condition with spellmaster 32k RAM, 32k eeprom BBC link, £110, also panasonic printer kxp1080. £65, Tel: 081 675 3883.
● Wanted Acorn 6502 system1 eurocard and handbook. Phone 091 284 6294 Evenings.
● Electron, H.Res Monitor, Epson Printer, Plus 1, AP4, 40/80 Disc Drive 7months old, disc games, tapes, NTQ, ADT, ROMS, View, Viewsheets, Pascal, Lisp, cartridges, Manuals, Books. Will split. £290 ono Tel: 0750 20754
● BBC B, 32k swr, 40/80T D/Drive, tape recorder, joystick, loads of software, books. Offers? Phone 0204 594597 evenings.
● BBC-B+ 64k plus Acorn medium res colour monitor. All as new. £250 Tel: 051 724 4508 eves.
● Master compact, keyboard and disc drive, £120 ono Tel: 0734

429063 Evenings.
● Master 128 Twin 40/80 Disc drives med res cub monitor mega 3 ROM spec ROM max mouse AMX Art DTP software, Games joysticks All master reference magazines Viewstore comstar repton rev's elkor ravenskull thrust etc accounts printer driver worth £2000 £500 (0753-888994) Mike
● Master 128 software stop press, watfords quest mouse, folio, wordwise + £300. Winchester (0962) 854133
● Master compact TV system, RS232, solidisk DFS, joystick. £330 ono. Northwich 46125
● Archimedes 400 2MB RAM 40MB hard disc A5 scanner, printer, scsi. Also original software impression ANSI C atelier First word plus + others. Under half price. Will split. Phone 0923 855853 after 6pm.
● BBC B single D Drive 40 track joystick manuals data recorder plus £300 taped games £400 ono. Tel: 0621 892146.
● Wanted BBC Master 65C102 turbo add on module cash waiting Phone Dave on 0734 691497.
● Watford Beeb handscan includes scanner, interface, software on ROM. Phone Tim on 07375 57477 after 6pm.
● Wanted! Back issues of Micro User in good condition: May to Sept. 1987 inclusive Tel: 0332 663205.
● Master 128, Disc Drive, Colour Monitor, Juki Printer, Books, Mags, Software, £450 After 7pm 081-360 4499.
● Watford electronics Beeb handscan. Boxed as new. £100 Tel: 081-500-5689.
● Archimedes A310 4MB upgrade 40MB hard disc 5.25" external drive CC ROM/ROM module P.C. Emulator interword logistix impression view viewstore worracad and many other programmes £999 ono the lot Barker 021-705 1611 (Solihull).
● BBC B World Comp. ROM/ROM card (128k) + shadow RAM card (32k), i-word, i-sheet, i-chart, spellmaster, ww+word aid, AMX super art, dumpout3, printer, 40/80t ds dd disc drive, software, p.paper, disks, joysticks, mags, programming books, perfect condition, + lots more, worth over £2000, your for £650 ono call 081 777 0375 after 6pm.
● Games: Apocalypse real McCoy, £20 each. Free postage. Phone 0259 61410.
● A3000 1mb upgrade, £50 ono, Phone Surjit 081-518 5579.
● Acorn BBC, Archimedes, Hardware and software for sale. Telephone 081-743-1579 (Evenings) for list.
● Master 128 dual teac 80T Microvitec colour monitor Epson FX80 mouse joystick pascal AMX pagemaker interword 600. 0344 882841
● Back issues Micro User April 83 Dec 90. Acorn User May 84 Dec 90 £70 ono Tel: Dave 0533 884400 after 6pm.
● Archimedes A310 colour, riscos, Citizen 1200 printer. Games software and lots of books and magazines £800. Phone Peter 0706 225778.
● MCIUO Multitasking notepad computer for sale including touch pad + system disk with all necessary application + three solid state epron disk + mains adaptor + original manual + warranty + connecting cable to IBM phone Gul Davis 071-226 7050.
● BBC-B 40/80T drive 1770 DFS dumpout-3 wordwise data recorder Micro Users 89-91 and subscription tapes/discs over £350 of software. Phone Paul: 041 639 5564.
● Master 128, spellmaster, ROM cartridges etc £250. 5.25" 80T disc drives with PSU, £55 each. 3.5 drive £55 0276 32358.
● A540, as new, boxed, offers over £3000, 0225 426662 anytime.
● BBC B, Disc drive, Printer, View ROM, Desk top publishing and music software £275. Amersham (0494) 726297.
● Master 128 fitted 512 board twin 5.25" 40/80T did acorn colour monitor abundant software £550 ono 0279 724162.
● Beebealc ROM £10. Replay ROM (8271 DFS) £10 suitable BBC B Phone 0926 495691 Evenings.
● WANTED: Archimedes A420 or A440 computer. £500 cash limit. Phone: 0298-871633 Evenings.
● Archimedes 420/1 with colour monitor, manuals and a variety of software including PC emulator £1200 ono Phone 06333 2668 after 5.30pm.

● Acorn cambridge workstation with 20mb hdd, floppy and colour monitor, 2nd processor with 4mb memory, working, with software £395. 0522 521606 Evenings
● Archimedes 310 colour monitor two disk drives riscos C compiler assembler twp twin games other software £650 ono. Tel: 0223 891 302
● Master 128, Microvitec 452 monitor, double 40/80 drives, Brother M1409 printer, cut sheet feeder, AMX mouse Mk.III all g.c.stop press, ELITE, EXILE, loads of original software and games. Cost £1700+ sell £600 o.v.n.o. quick sale phone Richard 081 504 2889
● Micro User complete set of volumes 1 to 8 with binders. 0733 72143 Evenings.
● HCR ROM/ROM box, with second board providing twenty ROM spaces, 64k S/RAM. £80.00 Phone 061-720-8036.
● BBC B OS1.2 issue7, DFS 40/80T D/S drive, bat-backed RAM/ROM 30+ disks, mini office II, restart ROM, utils, many mags & books £350 ono would split. RGB monitor £200. 0730 86362.
● WANTED VERY URGENTLY: ROM software for BBC B. Programming Languages, Utilities, applications etc. FOR SALE: Electron, plus 3, 5.25" drive/PSU, software, Books etc. Bargain price. Telephone: 081-950 3406.
● Master 512, Cumana DSDD disk drive, Citizen 1200 printer, AMX mouse + pagemaker, interword, full documentation, over £300 worth of software, inc IBM software. Only £475. Tel: 0482 505860.
● Master 128k, with both view-store and view-spell ROMS + Brother HR-20 printer + various books. Worth at least £650 will take £500 the lot! M. Allen, 50 Wellstone Garth, Leeds LS13 4HL.
● BBC B 32k sideways RAM DDFS 12" green monitor, twin s/s 40/80T 5.25" d/d. Interword Viewsheets Viewstore, £285 ono. phone Borehamwood, Herts 081-207 6891.
● Micro User and Acorn User magazines 1985 to 1989 any reasonable offer accepted. 0483 728250.
● BBC B Vigen 40/80T disk, manuals, joysticks and software £200 0483 728250.
● Help wanted. Instructions for wordwise, BBC compatible ROM sale or loan. 0843 585 623
● BBC ROMs, Beebugs toolkit plus £10, ROMIT £10, Exmon £7.00, Solidisk 1770/8271 DFDC board with ADFS and DFS ROMs £30 Tel: 0420 475229
● BBC B 8271 DFS, 80T D/S drive + disks, dot matrix printer, software, manuals, cover + leads £345 ono Tel: 0604 701882 after 6pm
● For sale E-type £8 Exile £1 for master compact Tel: 0883 348081
● Micro User complete set to June 1991 except Sept 1989. Offers 0392 832308.
● The very first Micro User also Vol 1 Nos 6 to 12, Vol 2 Nos 1 to 4, Vol 4 Nos 1 to 12, Vol 3 No 2 and Vol Nos 4 to 12 Also Acorn User Nos 18 to 44. Offers. 0706 852581.
● Wanted Archimedes A310/A300 or Master 128k any condition considered good price paid will collect 0332 281829.
● Archimedes 310, Acorn colour monitor PC Emulator signwriter other software. Excellent condition £695 o.v.n.o. 0332 672915.
● Master turbo. Coproc. Mono monitor. SS 49T disk drive. Lots of ROMs, software, cartridges, manuals. £300 081-801-7363.
● Citizen 1200 £75, compact digimouse & artroom software £25, 4 compact games including Exile £15 vlot Tel: 081 508 7648.
● BBC B, 40/80T disc drive, View, quest, stop press dumpmaster many many games £210 0732 62142.
● Hybrid music 5000 synthesiser, 4000 keyboard, software and sustain pedal £200 ono Tel. Geoff 081-809 3537.
● Okimate colour printer boxed as new £100 Tel: Steven on 0792 206192 after 4pm.
● BBC Master pace 40/80 DS disk drive, Philips green monitor, AMX mouse with superart, wordwise+, masterfile, 12 quality games. £300. Buyer collects from London or West Wales. Tel: 0970 86231.
● BBC B with dual floppy drives, monitor (mono) plus Hybrid. Technology music 5000 synthesiser £250 Norwich (0603) 617387 evenings/weekend.

PLEASE PRINT THIS AD IN THE NEXT MICRO USER

Name _____
Address _____
Daytime Tel: _____
POST TO: Micro User Classifieds, Europa House, Adlington Park, Adlington, Macclesfield SK10 4NP

Cheque enclosed for £
(minimum £2 for 10 words)

I certify that any software offered for sale
is original and not a copy
Signed _____

CONDITIONS

- This service is EXCLUSIVELY for the use of private readers. No trade ads will be allowed.
- To avoid encouraging software piracy, all ads will be carefully vetted before they are accepted.
- Ads can only be accepted on the form opposite (or a photocopy of it).
- There is no maximum to the number of words you include in your ad. if there is insufficient room on the form, continue on a separate sheet of paper.
- The cost is 20p per word, with a minimum of 10 words.
- WE GUARANTEE your ad will appear in the next available issue of *The Micro User*.

WE looked last month at the Duffing oscillator, which is basically a two dimensional attractor. However, most strange attractors occupy multidimensional space, a good example being the Lorenz attractor.

Lorenz was one of the discoverers of strange attractors. Working in the early sixties on trying to model atmospheric movement, he would start out with some initial values representing the current weather and plug them into some formula and see what happened.

Computers in those days were quite slow and he would often halt a run and resume it later. However he noticed that some repeat runs developed very differently from others, despite having the same initial conditions.

What was in fact happening was that the initial conditions were not the same, as the computer was rounding its numbers before printing it out.

Lorenz had discovered that systems can be extremely sensitive to initial conditions. This was quite important because it proved that we could never precisely predict the weather, as we could never know the initial conditions accurately enough.

The attractor named after Lorenz was derived from a simplified form of the equations he was working on. It is a fractal curve occupying three dimensional space.

The remarkable feature is that although it occupies a finite space the curve is infinitely long and never crosses itself.

Many programs have been published to show a simple two dimensional projection of this curve, but never to allow it to be examined in three dimensions.

The program in Listing 1 will do this, drawing four views simultaneously – front elevation, end elevation, plan and isometric projection, thus giving as close to a three dimensional representation as you can get.

This form of representing three dimensional objects is well known to practitioners of engineering and technical drawing. The curve changes colour every 60 points. Not only is this colourful but it makes it easier to see the 3D structure.

While the curve is plotting you can use the function keys to change the scale and shift the curve. The instructions show you what keys to use but you might like to make a strip to go across the function keys.

Lines 190 to 210 define the increment to use in making a new 3D point from the old one. These in effect

define the attractor. The variable INC in line 110 is used to determine the distance on the attractor between plotted points. The default value is fine on the 32 bit machine, but on 8 bit ones should be changed to 8E-3, that's 0.008.

In order to convert the program to run on the Model B or Master, change the Mode to 0 in line 30 and delete lines 180, 510 and 880. On an Archimedes or BBC A3000 make sure you are in Mode 15 before you start.



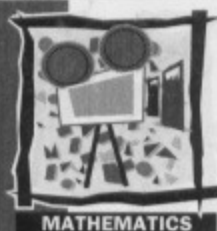
The Lorenz attractor in 3D

3D Attractors

In the final part of this series Mike Cook examines a multi dimensional strange attractor

```

10 REM > <BasicSave$Dir>.Strange3D
20 REM 3D View of The Lorenz Attractor
  By Mike Cook
30 MODE 15
40 VDU23,137,&18,&14,&F2,&81,&F2,&14,
&18,&800:REM Right arrow..
50 VDU23,138,&3C,&24,&24,&E7,&42,&24,
&18,&800:REM Down arrow...
60 VDU23,139,&18,&24,&42,&E7,&24,&24,
&3C,&800:REM Up arrow....
70 C1=0.707107:C2=0.408248
80 C3=0.816597:C4=-C2
90 S=8:SX=28
100 NX=70
110 INC=1E-3
120 SX=200:SY=200:SZ=0
130 CX=5:CY=5:CZ=5
140 P1=10:P2=28:P3=2.66666
150 PROC_INTRO
160 REPEAT
170 NX=NX+1
180 IF NX>60 THEN NX=0:GCOL 0,RND(63)
190 D1=P1*(Y-X)
200 D2=P2*X-Y-X*Z
210 D3=X*Y-P3*Z
220 X=X+D1*INC
230 Y=Y+D2*INC
240 Z=Z+D3*INC
250 PROC_VPLOT(X,Y,Z)
260 IF INKEY(-114) THEN S=S+10:PROC_
  AXIS
270 IF INKEY(-115) THEN S=S-10:PROC_
  AXIS
280 IF INKEY(-116) THEN SX=SX+50:PRO
  C_AXIS
290 IF INKEY(-21) THEN SX=SX-50:PROC
  _AXIS
300 IF INKEY(-117) THEN SY=SY+50:PRO
  C_AXIS
310 IF INKEY(-118) THEN SY=SY-50:PRO
  C_AXIS
320 IF INKEY(-23) THEN SZ=SZ+50:PROC
  _AXIS
330 IF INKEY(-119) THEN SZ=SZ-50:PRO
  C_AXIS
340 IF INKEY(-120) THEN X=CX:Y=CY:Z=CZ
  :PROC_AXIS
350 IF INKEY(-86) THEN AS=GET$:PROC_IN
  TRO:PROC_AXIS
360 UNTIL FALSE
370 END
380 :
390 DEF PROC_VPLOT(X,Y,Z)
400 XX=X*S:YY=Y*S:ZZ=Z*S
410 X=X+SX:Y=Y+SY:Z=Z+SZ
420 IF X<430 AND X>=0 AND Z<430 AND
  Z>=0 THEN PLOT 69,XX+88,520+ZZ
430 IF X<430 AND X>=0 AND Y<430 AND
  Y>=0 THEN PLOT 69,XX+88,440-YY
440 IF Y<430 AND Y>=0 AND Z<430 AND
  Z>=0 THEN PLOT 69,600+YY,520+ZZ
450 PROC_TRANS(XX,ZZ,YY,69)
460 ENDPROC
470 :
480 DEF PROC_INTRO
490 REPEAT
500 CLS
510 GCOL 0,63
520 PRINT TAB(12,0)"3D View of The Lor
  enz Attractor By Mike Cook"
530 PRINTTAB(0,2)"F Key Effect"
540 PRINT" 1 - Zoom in"
550 PRINT" 2 - Zoom out"
560 PRINT" 3 - Shift X right"
570 PRINT" 4 - Shift X left"
580 PRINT" 5 - Shift Y right"
590 PRINT" 6 - Shift Y left"
600 PRINT" 7 - Shift Z left"
610 PRINT" 8 - Shift Z right"
620 PRINT" 9 - Restart curve"
630 PRINT
640 PRINT"Increment is ";INC;" PRESS I
  
```

upgrading your BBC Micro given
hardware you no longer need?
have changing interests left you

```

to alter"
650 PRINT
660 PRINT "Current Start Point PRESS S
to alter"
670 PRINT "Start X ";CX
680 PRINT "Start Y ";CY
690 PRINT "Start Z ";CZ
700 PRINT
710 PRINT "Parameters PRESS P to alter"
720 PRINT "P1 ";P1
730 PRINT "P2 ";P2
740 PRINT "P3 ";P3
750 PRINT
760 PRINT "SPACE BAR TO PLOT"
770 PRINT "PRINT N to return here for a
New plot"
780 AS=GET$
790 IF AS="P" OR AS="p" THEN INPUT "New
Parameters are:- "P1,P2,P3
800 IF AS="S" OR AS="s" THEN INPUT "New
Start Point is:- "CX,CY,CZ
810 IF AS="I" OR AS="i" THEN INPUT "New
Increment is:- "INC
820 UNTIL AS=" "
830 X=CX:Y=CY:Z=CZ
840 :

```

```

850 DEF PROC_AXIS
860 CLS
870 PRINT TAB(12,0)"3D View of The Lor
enz Attractor By Mike Cook"
880 GCOL 0,63
890 VDU5
900 MOVE 80,494
910 PRINT " X";SPC(1);CHR$(137)
920 MOVE 0,588
930 PRINT " Z"
940 MOVE 24,620
950 PRINTCHR$(139)
960 MOVE 0,400
970 PRINT " Y"
980 MOVE 24,368
990 PRINTCHR$(138)
1000 MOVE 600,498
1010 PRINT " Y";SPC(1);CHR$(137)
1020 VDU 4
1030 MOVE 80,512
1040 PLOT 1,0,16*S%
1050 MOVE 80,512
1060 PLOT 1,16*S%,0
1070 MOVE 592,512
1080 PLOT 1,16*S%,0
1090 MOVE 592,512
1100 PLOT 1,0,16*S%

```

```

1110 MOVE 80,0
1120 PLOT 1,0,16*S%
1130 PLOT 1,16*S%,0
1140 PROC_TRANS(0,100,-100,69)
1150 PROC_TRANS(200,100,-100,5)
1160 PROC_TRANS(0,100,-100,69)
1170 PROC_TRANS(0,300,-100,5)
1180 PROC_TRANS(0,100,-100,69)
1190 PROC_TRANS(0,100,100,5)
1200 REPEAT
1210 A=INKEY(50)
1220 UNTIL A=-1
1230 ENDPROC
1240 :
1250 DEF PROC_TRANS(X,Y,Z,D%)
1260 LOCAL XX,YY
1270 YY=(C2*X+C3*Y+C4*Z)
1280 XX=(C1*X+C1*Z)+640
1290 IF XX>530 AND YY<512 THEN PLOT D%,
XX,YY
1300 ENDPROC

```

430 = 1A60 B
440 = F817 5
450 = AB18 7
460 = E0DF 1
470 = 9719 6
480 = 4A08 7
490 = BFBA B
500 = 7A16 0
510 = 7820 9
520 = 7ECA 5
530 = 85F6 B
540 = 7729 3
550 = 9EE1 B
560 = FFFE 6
570 = 2010 7
580 = 5C2D 4
590 = 2E2D B
600 = 4081 9
610 = 9266 E
620 = C558 B
630 = FF3E 7
640 = 4DBE 5
650 = FF3E C
660 = 14B0 A
670 = 7F67 3
680 = 2AE6 7
690 = D465 A
700 = FF3E 3
710 = EB60 E
720 = 4434 9
730 = BA87 9
740 = EF36 E
750 = FF3E B



760 = 2CC2 1
770 = 9280 7
780 = 77F2 F
790 = 46B0 5
800 = 8299 C
810 = 126B A
820 = 2412 8
830 = 84D7 D
840 = 9719 F
850 = 56C5 8
860 = 7A16 3
870 = 7ECA 4
880 = 7820 5
890 = 667A 4
900 = 899B 3
910 = 3890 A
920 = 1E20 B
930 = 2CB3 2
940 = 7481 3
950 = E461 E
960 = 21B1 8
970 = 79E0 0
980 = D2BD 8
990 = D750 A
1000 = 3B6A 1
1010 = 43F1 6
1020 = FC31 1
1030 = 57C4 8
1040 = DA4E A
1050 = 57C4 0
1060 = 8559 5
1070 = F05A 8
1080 = 8559 F
1090 = F05A 3
1100 = DA4E D
1110 = 9138 2
1120 = DA4E E
1130 = 8559 B
1140 = 8E7A F
1150 = 55AA 0
1160 = 8E7A 8
1170 = F7F8 5
1180 = 8E7A 8
1190 = E780 7
1200 = BFBA 4
1210 = CFA5 6
1220 = 1E5F A
1230 = E0DF 1
1240 = 9719 F
1250 = F71A 3
1260 = 71F6 5
1270 = 69D1 E
1280 = B2D7 2
1290 = E869 8

10 = 00
20 = 00
30 = 4C61 1
40 = 9726 D
50 = B819 B
60 = 4EF6 4

70 = 6E0A 3
80 = B214 8
90 = 71C6 4
100 = 786E 5
110 = 1353 2
120 = 5E0C 0

130 = EE02 9
140 = 3E65 5
150 = DCC6 A
160 = BFBA 8
170 = E967 1
180 = E512 C

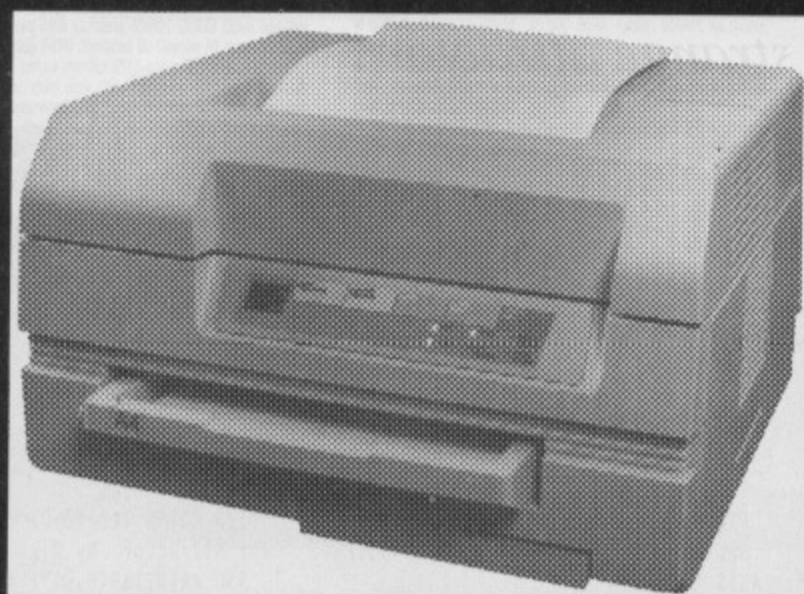
190 = 9EE0 1
200 = BE57 E
210 = 115 1
220 = B622 6
230 = 7066 3
240 = A38D D

250 = 18ED B
260 = 271B 2
270 = 1996 C
280 = 2CD8 8
290 = 77EC D
300 = EA51 4

310 = D664 D
320 = 9960 F
330 = 566E A
340 = 6AB2 6
350 = 8A1D F
360 = 226C D

370 = FD2E F
380 = 9719 E
390 = 1BD9 3
400 = 1A3F 1
410 = 74D0 2
420 = F24 3

ARCLASER



The ARCLASER represents a price/performance breakthrough – Printer (including drum and toner kit), cable, interface and software for £969 + carriage and VAT.

Find out more about this amazingly versatile printer:
write or phone for your ARCLASER information pack...

The best value in direct
drive page printers at just
£969

- Compatible with all Archimedes applications, including FirstWord+
- High speed data interface – an A4 page is transferred in 6 seconds
- Prints outline font text at any size and half-tone graphics at full 300dpi resolution
- Feature packed printer driver and Epson emulation
- Can be used as an Econet printer server, with BBCs, Masters or Archimedes
- Compact, quiet and reliable
- Ultra fast – 5 to 15 times faster than conventional laser printers!

Calligraph Limited
FREEPOST (CB282)
CAMBRIDGE CB2 1BR
Tel (0223) 461143 Fax (0223) 316144



Chess3D

(requires RISC-OS and 1Mb memory)



**"QUALITY
ARCHIMEDES
SOFTWARE FROM
MICRO POWER –
the Publishing House
that brought you over
70 superb programs
for the BBC Micro
and over 40 for the
Acorn Electron".**



The Display. Single-screen presentation with superb 3D graphics, using shading and vanishing point perspective. Board rotation at any point in the game and additional icon-type board for quick moves. Moves and responses are listed in a window allowing review of the game so far.



Options include player v computer, player v player and even computer v computer. A book of standard openings is available, to which you may add if you wish. Learners can cheat by taking back moves or even reversing sides with the computer. A part game can be set up to aid analysis of particular problems.



The program is fully integrated with RISC-OS multi-tasking and windowing system. For instance, you can close down the main window after moving, work on some other application, and then return to find your chess game has been progressed.



As you would expect all moves are validated and the program accommodates Castling, 'En Passant' and all-piece promotion. Full advantage has been taken of the speed of the Archimedes.

Cheques/P.O's payable to **MICROPOWER**



Micro Power Ltd. Northwood House, North Street, Leeds LS7 2AA Tel. 0532 458800

TRIAL OFFER

Cut-down version of program (player v player only) available at £2.95 to enable you to experience the graphics. This is completely refundable against purchase of the full game.

AUTHORS

If you have written or are writing Archimedes software of commercial standard and are seeking a Publisher please write to Bob Simpson at the address given, preferably with a working sample of your program.

Price £19.95

Please add 0.95p for
postage & packing.



	BASIC	COLOUR
A3000...see below...see below...see below		
A410/1	£989.10	£1187.10
A420/1	£1169.10	£1367.10
A440/1	£1529.10	£1727.10
A540	£2695.50	£2893.50

SUMMER SUPER SPECIALS
A3000 Basic Model
SUPER Price £499.99#
OR !
A3000 Stereo Colour Model
SUPER Price £695.00#

WE ARE OPEN ALL DAY SATURDAY
WHY NOT VISIT OUR SHOWROOM !
TEST FLY INTERDICTOR 2 OR
TEST DRIVE THE NEW A540 ARM3

WE WILL TRY TO BETTER ANY OTHER
DEALER PRICE ... PLEASE TELEPHONE

The Learning Curve
A3000 Model
Basic £629.10 Colour £853.20
A420/1 Model
Basic £1169.10 Colour £1367.10

OUR PRICES
DO NOT
INCLUDE V.A.T.

Master 128	£
Cambridge Z88 Lap Top	£359.10
Panasonic KX P1081	£146.95
Citizen Swift 9	£157.00
Citizen Swift 24	£260.83
Citizen Swift colour upgrade	£34.20
Star LC10	£155.40
Star LC10 Colour	£294.35
Philips 8833 Colour	£195.00#
Philips 7522 Amber Screen	£69.52
Philips 8832 Colour	£199.67
Ahktek 40/80 400K Sgle no PSU	£99.00
Ahktek 40/80 800K Dual no PSU	£199.00
Ahktek 40/80 400K Sgle & PSU	£114.53
Ahktek 40/80 800K Dual & PSU	£221.70

OAK COMPUTERS	
20 Mb Ext HDisc (B & Master)	£517.75
SCSI 20Mb Add HDisc A3/410	£413.25
SCSI 20Mb Ext HDisc A3000	£508.25
SCSI 45Mb Add HDisc A3/410	£527.25
SCSI 45Mb Ext HDisc A3000	£622.25
SCSI Card for A3000	£189.05
SCSI Card for A3/410	£189.05

WE ARE LICENSED CREDIT BROKERS AND CAN OFFER
FINANCE ON COMPUTERS AND SOFTWARE. WE OPERATE
THE ACORN TEACHER AND ACADEMIC SCHEMES FOR
TRAINING AND FINANCE. PLEASE TELEPHONE !



0457 865953

0457 869917

COMPUTECK Ltd.

Dinting Lane Industrial Estate
Glossop
Derbyshire SK13 9NU
Visa-Master-Lombard Cards

ACORN SOFTWARE	
Desk Top Publisher (A)	£119.20
Lisp (BMC)	£16.10
Logistix (A)	£89.10
Micros In Business (BMC)	£34.75
Twin (A)	£26.10
View 3.0 (B)	£41.60
View Index (BMC)	£10.40
View Plot (BMC)	£20.83
View Professional (BMC)	£55.51
View Sheet (BMC)	£41.60

COMPUTER CONCEPTS	
Inter-Base (BMC)	£48.00
Inter-Chart (BMC)	£25.60
Inter-Sheet (BMC)	£39.20
Inter-Word (BMC)	£39.20
Inter-Sheet (A)	£23.20
Inter-Word (A)	£23.20
Laser Direct Laser Printer	£949.05
Spell Master (BMC)	£41.03
Impression II (A)	£152.09
Impression Junior (A)	£80.95

CLARES MICRO SUPPLIES	
Alpha Base (A)	£39.09
Artisan 2 (A)	£46.91
Toolkit (A)	£39.09
Interdictor 2 (A)	£27.35
Knowledge Organiser (A)	£46.91
Fontwise package (BMC)	£23.47

IMPACT SOFTWARE	
The Real McCoy (A) Discs	£23.44
Man of Arms (A)	£15.62
Holed Out (A)	£15.62
Apocalypse (A)	£23.44
Nevylon (A)	£15.62
The Olympics (A)	£15.62

PRES	
Adv. Control Panel (BMC)	£27.90
Adv. Disc Investigator (BMC)	£23.52
Adv. Disc Toolkit (BMC)	£27.90
Adv. File Manager (BMC)	£22.51

MINERVA SYSTEMS	
System Delta+Card Index (BM)	£50.83
System Delta Plus (A)	£62.56
Ateller (A)	£78.22

DABS PRESS	
Master Guide Book	£11.66
Viewstore/Sheet Book	£11.66
Archimedes DFS Disc	£23.44
"C" A Dabhand Guide	£13.45
Z88 A Dabhand Guide	£13.45
Archimedes Beginners Guide	£8.95

Summer Clearance

Goupil Golf Laptop/Desktop PC 1meg 286
 40meg H/disc VGA Retail £3500.00
SAVE £2000.00..... SALE Price £1500.00

Amstrad PC2086HD 12" VGA colour
 30meg H/disc Retail £899.00
SAVE £100.00 SALE Price £799.00

Amstrad PC2086SD Mono monitor
 3.5" Floppy Drive Retail £499.00
SAVE £50.00 SALE Price £449.00

Western Digital 30meg H/Card £249.00
SAVE £50.00 SALE Price £199.00

This advert contains just
a few of the items we have
Please telephone or send a
SAE for our FULL price lists

PRICES MARKED # ARE CHEQUE
or CASH ONLY NO CREDIT CARDS

We specialise in "Trading in" and
buying Used Hardware & Software

Post and Packing Charges
£1.00 for small, £2.45 for medium items.
Expensive products £10.00 for courier

USED STOCK SELECTION from COMPUTECK Ltd.

COMPUTERS & HARDWARE

Acorn	A420/1 40meg H/Disc	895.00
Acorn	BBC B 1770 DFS Series 3	170.00
Acorn	BBC B 1770 DFS Series 4	170.00
Acorn	BBC B 1770 DFS Series 7	200.00
Acorn	BBC B 8271 DFS Series 3	170.00
Acorn	BBC B 8271 DFS Series 4	170.00
Acorn	BBC B 8271 DFS Series 7	200.00
Acorn	BBC B+128 Computer	255.52
Acorn	Master 128	282.61
Acorn	Master 512 Board	152.17
Acorn	Master Turbo Board	70.00
Misc.	Z80 Second Processor	90.00
Philips	Colour Mod Res 8833 Mk I	150.00
Misc.	Brother HR10 Daisy Wheel	80.00
Misc.	Brother HR40 Daisy Wide Carr.	346.96
Panasonic	KX-P1124 80col 160cps	160.00
Misc.	Dual Drive 80T no PSU	120.87
Watford	Dual Drive 80T no PSU	120.87
A M S	AMX Mouse	20.00
Acorn	ADFS ROM and Disc	15.00
Acorn	Data Recorder ALF03	15.00
Acorn	Master Ecanet Module	30.00
Acorn	Prestel Adaptor (BM)	40.00
Misc.	8K SRAM Module	12.00
Misc.	Gratpad	60.00
Misc.	Ground Control Eptom Eraser	17.00
Misc.	Printer Sharer & Comps to 1 Pr	160.00
Misc.	Prim Modem 2000 In Software	60.00
Misc.	RAM/ROM Ext Box GGC Camb	30.00
Misc.	Terrel printer Sharer Box	23.00
Misc.	Timer Kit	8.00
Misc.	Timewarp RTC Technomatic (B)	13.87
Misc.	UV Stat Epromer	17.00
Nidd Vail	Anamouse (BM)	20.00
Misc.	Cartridge System for BBC B	13.00
Viglen	Dual Drive 40/80T No PSU	130.00
Viglen	PC Kit for BBC B	30.00
Watford	16K Disc RAM Board (B)	20.00
Watford	Aries 820 RAM Board (B)	30.00
Watford	Power Duck	6.00

BOOKS

Acorn	Advanced User Guide BBC	10.00
Dabs Pres	Master OS Dabhand Guide	8.00
Misc.	30 Basic Spectrum	3.00
Misc.	Adv'd Sideways RAM/ B Smith	7.00
Misc.	Assembly Long Prog I Blinbaum	4.00
Misc.	Century Programming Course	4.00
Misc.	Data Processing/Hardwr & Prog	0.00
Misc.	Expert Guide to BBC M James	3.00
Misc.	Graphics & Sound by S Money	3.00
Misc.	Inside Information/J Megarry	4.00
Misc.	Inside Your Computer/ Sinclair	3.00
Misc.	Intro The BBC Micro/I Sinclair	3.00
Misc.	Little Book of Basic Style	3.00
Misc.	Science On-line	3.00
Misc.	Structured Basic /R Freeman	4.00
Misc.	The Book of Listings/BBC Publ	2.00
Misc.	The Computer Book/BBC Publics	3.00

SERIOUS SOFTWARE

A M S	AMX Super Art ROM (B)	25.00
A M S	Extral Extral (BM) Disc	12.00
A M S	Max (B) ROM	10.00
A M S	Stop Press (B) ROM	25.00
A M S	Stop Press Discs (M)	25.00
Acorn	PC Emulator (A) Discs	60.00
Acorn User	Gallery Disc (B) 2xDisc	6.00
Acorn User	User Rom	12.00
Acornsoft	1st Word Plus Rel 1 (A) Disc	30.00
Acornsoft	BCPL ROM (B)	31.31
Acornsoft	Fortran 77 (A) Disc	60.00
Acornsoft	GXR Rom (B) ROM/Tape	16.00
Acornsoft	Hi - View (B) Disc	22.00
Acornsoft	Linkword French (BM) Tape	10.00
Acornsoft	View Spell (BM) ROM & Disc	21.74
Acornsoft	View Store (BMC) ROM	30.00
Acornsoft	Viewsheet (BMC) ROM	30.00
Acornsoft	Workshop (B) Disc	6.00
BBC Pubs	Drawing (B) Tape	3.39
BBC Pubs	Early Learning (B) Tape	4.00
BBC Pubs	VU-Type (B) Tape	6.00
Beebug	Design (B) Disc	10.00
Beebug	Exmon II (B) ROM	15.00
Beebug	Masterfile II (B) Disc	12.00
Beebug	Masterfile II (C) Disc	12.00
Beebug	Paintbox (B) Disc	8.00
Beebug	Sleuth (B) ROM	18.00
Beebug	Spillies Utile (B) Disc	6.00
Beebug	Teletext (B) Tape	3.50
Beebug	Teletext Pack (B) Disc	7.00
Beebug	Toolkit (B) ROM	12.00
Beebug	Vocab Teeler (B) Tape	8.00
Beebug	Wordcase (B) ROMs	12.00
Clares	Airroom (C) Disc	15.00
Clares	Airroom (M) Disc	15.00
Clares	Airroom (M) Disc	12.00
Clares	Airroom Pack (C) Discs	20.00
Clares	Beta Base Utile (B) Disc	6.00
Clares	Fontwise + (C) Disc	8.70
Comp Con	Coreldaker (B) ROM	12.00
Comp Con	Communicator (B) ROM	30.00
Comp Con	Disc Doctor (B) ROM	15.00
Comp Con	Graphics (BM) ROM	15.00
Comp Con	Gremilin (B) ROM	15.00
Comp Con	Impression (A) Disc	80.00
Comp Con	Inter-Word (BMC) ROM	30.00
Micro Pow	Basic Extension (B) ROM	15.00
Minerva	Gamma Plot (A) Disc	40.00
Minerva	Inter/View Link (C) Disc	10.00
Minerva	Mail Shot Application (C) Disc	10.00
Minerva	Sales Ledger (BM) Disc	26.04
Minerva	Stock Management (C) Disc	26.04
Misc.	3D Logo (C) Disc	12.00
Misc.	AIDS II by Soft Smith	8.65
Misc.	BBC Assembly Long Course	15.00
Misc.	Busicalc (BM) Disc/Supersoft	8.65
Misc.	Control Logo (C) Disc	12.00
Misc.	Creation Discs (A) EMR 6xDiscs	26.04
Misc.	Deebug and Disk Copy (B) Disc	8.26
Misc.	Diagram (B) Disc Pineapple	21.70

Misc.	Fontaid (B) ROM & Disc CJE	15.00
Misc.	Gemini Combo Pack (B) Disc	12.00
Misc.	Graphics Pack (B) Tape Salaman	3.00
Misc.	Icon Art Master (BM) Disc	12.00
Misc.	Instant Recall D/base (B) Tape	6.00
Misc.	Invoicing (B) Disc	10.00
Misc.	Logo Extension (C) Disc	7.78
Misc.	Merlin Database/Scribe (B) ROM	17.34
Misc.	Morse Tutor (B) Disc	8.65
Misc.	Music Logo (C) Disc	12.00
Misc.	Pixel Perfect DTP (BM) Discs	26.04
Misc.	Pixel Perfect Maths Pack (B)	10.00
Misc.	Printed Circuit Designer (B)	26.04
Misc.	Pro Punter (BM) Discs	30.00
Misc.	Record Keeper (B) Tape	4.00
Misc.	Science & Technology (B) Disc	12.00
Misc.	Share Anal - Synergy (B) Disc	26.04
Misc.	Slave + ROM (B)	20.00
Misc.	Spanish level A (BM) Disc	10.00
Misc.	Spanish level B (BM) Disc	10.00
Misc.	Spy (B) ROM	12.00
Misc.	Star Stick (B) ROM	10.00
Misc.	Super Graph (B) Disc Glentop	10.00
Misc.	Superboot (BM) Disc	6.00
Misc.	Ulliam (B) Disc by Tubelink	10.00
Misc.	Visual-Viewdata (B) ROM	20.00
Misc.	Vu-Calc (Pison) (B) Tape	8.00
Misc.	VU-File (B) Tape	10.00
Misc.	Xmas Carols (A) EMR Disc	4.30
Misc.	ZOOM Mach. Code Monitor (B)	10.00
Oak	Parametric Design Tool (A)	169.57
Pace	Microtel Terminal (B) ROM	8.00
PRES	Adv'd Disc Toolkit (BM) Rom	20.00
PRES	Advnc'd 1770 DFS (B) ROM	20.00
Superior	Speechi (BM) Disc	6.00
Watford	Beebman (B) ROM	20.00
Watford	Colour Art (B) Disc	6.00
Watford	NLQ Designer (BM) ROM	12.00
Watford	Office Mate (B) Disc	6.00
Watford	View Printer Driver ROM	25.00

GAMES

Acornsoft	Me & My Micro (E) Tape & Games	1.50
Acornsoft	Revs (C) Disc	6.00
Acornsoft	Rocket Raid (B) Tape	2.00
CDS	Colossus Chess (BM) Disc	6.00
CDS	Steve Davies Snooker (B) Disc	6.00
CDS & BR	Birdie Barrage Golf (C) Disc	6.00
CDS & BR	Blue Ribbon Games 2 (C) Disc	6.00
Domark	Empire Strikes Back (B) Disc	4.00
Domark	Not a Penny More (B) Disc/Book	6.00
Impact	Holed Out Designer (A) Disc	8.65
Impact	U.I.M. (A) Disc	13.00
Melborne	Way of the Expl Flat (B) Disc	6.00
Micro Pow	Dr Who & Mines (M8+) Disc	6.00
Minerva	Minotaur (A) Disc	7.83
Minerva	Missile Control (A) Disc	7.83
Misc.	Avon & Murdac (A) Disc	8.26
Misc.	Computer Crosswords (M) Disc	6.00
Misc.	Daley Thompson S/Test (B) Disc	6.00
Misc.	Fish (A) Disc	15.00
Misc.	Fortress (B) Disc	6.00
Misc.	Question of Sport (BM) Disc	6.00
Misc.	Yes Prime Minister (B) Disc	6.00
Superior	Barbarian II (BM) Disc	6.00
Superior	Life of Repton (C) Disc	4.00
Superior	Repton 3 (C) Disc	4.00
Superior	Sam (BM) Disc	6.00
Superior	Strikers Run (C) Disc	4.00
Superior	Zarch (A) Disc	8.00
Tynesoft	Spy vs Spy (C) Disc	6.00

USED
BBC B, B+, MASTER
& ARCHIMEDES
HARDWARE
PLUS SOFTWARE
IS NOW REQUIRED
PLEASE WRITE IN
FOR A QUOTE TO
TURN YOUR OLD
OR UNWANTED
GOODS INTO CASH
ONCE AGAIN

(B) BBC B (M) Master 128 (C) Compact (A) Archimedes

Acorn Computers

Master 128k	£355
Cumana 400k Disc Drive	£97
A3000	£525
A3000-2mb	£600
A3000 Learning Curve	£620
A3000 Learning Curve (2mb)	£695

A3000 Jet Set Pack

A3000 plus TV modulator plus:-
INTERDICTION - TRIVIAL PURSUIT
SUPERIOR GOLF & EUCLID
Only.....£625

A420 Archimedes Learning Curve	£1155
Archimedes A410/1 base	£920
Archimedes A420/1 base	£1125
Archimedes A440/1 base	£1475
Archimedes A540/1 base	£2550
Archimedes Colour Monitor	£195

Special Offer for May & June 1991
FREE - 10 discs with A3000 or A400

Games Computers

Amiga 500 Screen Gems Pack	£360
Amiga 500 First Steps Pack	£540
Amiga 500 Class of the 90's Pack	£540
Commodore A1084 Colour Monitor	£260
Amstrad 464plus + Mono Monitor	£215
Amstrad 464plus + Colour Monitor	£305
Amstrad 6128plus + Mono Monitor	£305
Amstrad 6128plus + Colour Monitor	£395

PLEASE NOTE

Games Machines above are quoted inclusive of VAT

**Phone for Concept Keyboards,
PRES Units, TV Modulators, etc.**

Phone for prices on:
Amstrad, Canon, Commodore, HP,
Olivetti, Opus, Philips, Schneider,
Tandon, Toshiba, Zenith
AMSTRAD FACSIMILE MACHINES.
Or any other product not listed

CITIZEN Printers

120D+ [With parallel interface]	£135
Swift9	£190
Prod9	£300
Prod9X	£400
124D	£200
Swift24	£270
Auto. Sheet Feeder [Swift]	£84
Colour Kit [Swift]	£38
Printer Stand [Swift]	£23

QUME Printers

Crystalprint WPplus	£900
Crystalprint Super Series II	£1250
(HP Laserjet II, IBM Proprinter & HPGL)	
Crystalprint Publisher II	£2400
(HP Laserjet II & POSTSCRIPT)	

Crystalprint Express

EPSON Printers

LX400	£140
LX550	£210
FX850	£355
FX1050	£440
LQ400	£215
LQ550	£299
LQ850	£495
LQ1050	£655
LQ2550	£800
SQ2550	£750
EPL7100 LASER	£850

Willow Software

Mail Order Office - Callers by appointment

Tel: (0934) 863087

The Willows, Wrington Lane, Congresbury, BRISTOL BS19 5BQ

All prices exclude VAT and are available for a limited period and are subject to availability.
Government and Educational Orders Welcome.

THE MICRO USER

NEWSAGENTS ORDER

Please reserve a copy of The Micro User magazine every month until further notice

- ☐ I will collect
☐ I would like it delivered to my home

Name

Address

Postcode

Note to Newsagent: Micro User should be available from your local wholesaler. If not contact the Circulation Manager, David Wren on 0625 878888.

SENLAC Computing Ltd. (Est. 1988)

£ (ex vat)	£ (ex vat)
Impression 2	150.00 (127.66)
Impression Junior	81.00 (68.93)
FontFX	9.50 (8.08)
Scan-Light Plus Junior	192.00 (163.40)
Scan-Light Plus A4	407.00 (346.38)
with Sheet Feeder	506.00 (430.64)
Laser-Direct	1050.00 (893.62)
Laser-Direct Hi-Res	1575.00 (1340.43)
ShowPage	138.00 (117.45)
Equasor	48.00 (40.85)
Tracer	57.00 (48.51)
Midnight Graphics Clip Art	34.00 (28.94)
Cash On Delivery	
available on single orders up to £350.00 value.	
Only £2.00 extra!	
Micro Studio Graphics from	17.50 (14.89)
Poster	87.00 (74.04)
Pipedream 3	138.00 (117.45)
Schema	113.00 (96.17)
Rhapsody	45.00 (38.30)
Genesis 2	138.00 (117.45)
Magpie	56.00 (47.66)
Revelation	81.00 (68.94)
Squirrel	123.00 (104.68)
Multistore	255.50 (217.02)
Flexifile	133.00 (113.19)
MultiFS	34.00 (28.94)

*** REMEMBER! Prices include VAT at 17½%, postage and packing ***

Please make cheques/postal orders payable to SENLAC Computing Ltd.

P.O. Box 304, BRIGHTON, BN2 2TT

We offer similar discounts across our whole range. Please send S.A.E. for current price list.

VAT Reg. No. 508 7594 16

Company Registration No. 2277309



**Educational
Software from
STORM is FUN!**

storm
Software

Write for an
illustrated brochure
STORM SOFTWARE
FREEPOST, Poyntington,
Sherborne, Dorset DT9 4BR.

0963 22469

NEW HUGE RANGE OF COLOURED INK PRINTER RIBBONS NEW

RED BLUE GREEN
BROWN PURPLE
YELLOW ORANGE
MAGENTA SILVER
GOLD

Prices from as low
as £3.00

Phone our order line
on 0923 672102

T-SHIRT PRINTING RIBBONS

Print on normal paper iron on T-Shirt

4 Colour Star LC10 £12.22c
Star LC10 Black £6.58c
4 Colour Star LC200 9 Pin £29.61c
4 Colour Star LC200 24 Pin £33.84c
Citizen 120D Black £7.99c
4 Colour Citizen Swift £29.61c
Epson FX80 Black £6.58
LX 80 £5.64c, FX100 £12.22c

T-Shirt ribbons now available in Red, Blue, Green, Yellow and Black and for a wide range of printers phone our order line 0923 672102

ALL ABOVE PRICES INCLUDE VAT & CARRIAGE

CARE ELECTRONICS

800 St. Albans Road, Garston, Watford, Herts. WD2 6NL.

Tel: 0923 672102 Fax: 0923 662304

CARE MASTER ROM CARTRIDGES

For interface and Spellmaster etc.

1. Dual cartridge takes 2 Rom	£10.40	£12.22c
2. Single Zif takes 2 Rom	£14.00	£16.45c
3. Dual Zif takes 2 Rom	£18.00	£21.15c
4. Quad Cartridge takes 4 Roms Including double height type	£14.00	£16.45c
Morley AA (Internal) Rom Board	£40.00	£47.00d

CARE MASTER SMART CARTRIDGE

At the press of a button halt any program running and execute any one of a host of useful built in, or user defined functions and once completed will return to the program and continue. Built in functions include:- Tape to Disc, Screen Dump to Disc or Printer, Sound On/Off, Auto save and much more.....

£30.00 £35.25c

BBC B ROM CARTRIDGE SYSTEM

BBC B Low Profile Rom System	£12.80	£15.04d
BBC B Spare Cartridges	£3.20	£3.76c

EPROM PROGRAMMER V2

Programs 8K, 16K, 32K CMOS or NMOS devices voltage selectable 21V or 12.5V. Complete with comprehensive software which includes Rom management system, plugs into the user port.....

.....	£30.00	£35.25d
Eprom Utilities Disc	£6.00	£7.05c
Eprom eraser with timer	£25.20	£29.61d

WORDALL (Archimedes)

Wordplay software package, ideal for crosswords, English students, education. Wordall includes: Crossword compiler, Anagram Generator/Solver, Sentence Anagrams, Spelling Checker, Wordsquare Generator/Solver, Word in Word, Word Search with wild card facilities. Add to or build your own Dictionaries, Print out Crosswords, wordsquares, etc. Two dictionaries supplied, one a massive 110,000 words. The other has 50,000 and is aimed at crosswords. Please note Wordall requires a min. of 1Meg Ram

£25.20 £29.61c

Government & Educational orders welcome. **HOW TO ORDER:** Enclose your cheque or P/Order made payable to CARE ELECTRONICS. Access or Visa cards welcome. Please allow 7 days for delivery.

Twenty four hour Credit Card Order Line 0923 672102

CARRIAGE RATES

b=£3.29, d=£1.88, C= Includes Carriage

LABELMASTER

For BBC Model B	£15.20	£17.86c
-----------------------	--------	---------

LABELMASTER PLUS

For Master Series, Archimedes and A3000. Very powerful yet extremely easy to use. Includes user definable label sizes and mailing list facilities.....

£17.20 £20.21c

PRINTER SWITCHERS

Two computers to one printer or vice versa	£20.00	£23.50b
Three computers to one printer or vice versa	£30.00	£35.25b
Four computers to one printer or vice versa	£36.00	£42.30b

Please note that the above units switch all lines, are suitable for all types of printers and computers using Centronics Parallel and INCLUDE LEAD.

For advice or a quote on your installation please phone.

User port switcher 2 to 1 & off	£24.80	£29.14d
---------------------------------------	--------	---------

CARE READY MADE LEADS RANGE

BBC/Master RGB-Euro (Scart)	£8.80	£10.34c
BBC/Master RGB-7 Pin Hitachi	£7.20	£8.46c
BBC/Master RGB-7 Pin Ferguson	£7.20	£8.46c
Centronics to Centronics Printer	£10.00	£11.75c
User Port Extension lead 0.5M	£8.80	£10.34c
1MHz Bus Extension lead 0.3M	£10.00	£11.75c

Wide range of leads in stock - please phone.

42M Archimedes Removable Drives – £499+VAT

If you are looking for a hard drive for your Archimedes or A3000, why not consider using a MicroNet MR45 removable SCSI hard drive?...

- **Fast** – The average access time is 20 milliseconds, so these are FAST devices. When used with an Oak SCSI card, the file transfer rate is the same as a conventional fixed hard disc.
- **Reliable** – The technology of these drives has been proven by use in huge quantities with Apple Macintosh computers.
- **Robust** – The discs, when not in the drive, are extremely robust. We (deliberately!) threw one half-way across the office, it hit a desk and knocked a phone on the floor! We then verified the disc and found that it did not have a single error on it!
- **Flexible** – The medium is removable, so you can use different discs for different uses.
- **Secure** – The medium is removable, so you can take out the disc and lock it up in a safe place.
- **Cheap** – The price of the drive including a single 42M disc, is just £499 (£590 including VAT and carriage). Extra 42M discs are £75 each. SCSI podules are available from £170.

*N.B. These are special prices for **Archive Magazine subscribers only** (ring for details) but it's worth paying £17 to join Archive just to buy one of these drives!*

Norwich Computer Services

96a Vauxhall Street, Norwich NR2 2SD. (0603-766592/Fax 764011)

LaserDirect HiRes complete package - only £999.00 !

C.C. / Canon LBP4 600 x 600 d.p.i. HiRes LaserDirect - £999.00
+ VAT £174.83 + p&p £9.00 = Total £1182.83

C.C. / Canon LBP8 600 x 600 d.p.i. HiRes LaserDirect - £1275.00
+ VAT £223.13 + p&p £9.00 = Total £1507.13

C.C. / Qume 300 x 300 d.p.i. LaserDirect - £849.00
+ VAT £148.58 + p&p £9.00 = Total £1006.58

Scan-light A4 - £349.00 + VAT £61.08 + p&p £7.00 = Total £417.08
with sheetfeeder £449.00 + VAT £78.58 + p&p £7.00 = £534.58

Scanlight Junior - £175.00 + VAT £30.63 + p&p £7.00 = Total £212.63

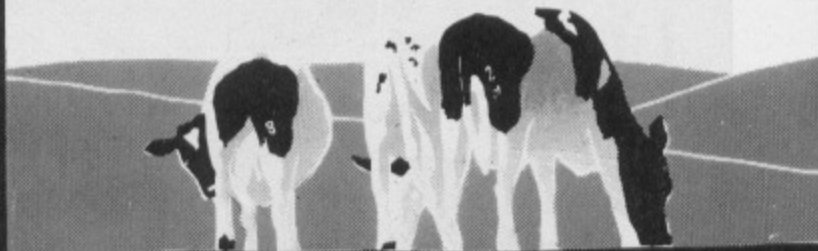
Impression II - £129.95 + VAT £22.74 + p&p £2.00 = Total £154.69

Impression Junior - £72.00 + VAT £12.60 + p&p £2.00 = Total £86.60

Poster - £75.00 + VAT £13.13 + p&p £2.00 = Total £90.13

WorraCAD - £79.00 + VAT £13.83 + p&p £2.00 = Total £94.83

To order, or for more information, phone 0689 872127
or send cheque payable to "Chelsfield Publications",
To: Chelsfield Publications, 2 Bucks Cross Cottages,
Chelsfield Village, Orpington, Kent. BR6 7RN



Chelsfield
Publications

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 adaptor, 9v battery, leads and driver software:

Only £169.00

* ArcTerm 7 is a fully multitasking coms package.
Available from: The Serial Port, Tel: (0243) 531194

The RTFM Joystick Interface

The interface allows up to two 9 pin Commodore® or Atari® style joysticks to be connected to your Archimedes/A3000. The interface fits inside your machine, though it does not require a module 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

Archimedes/A3000 Games

Pon! (£17.95, seriously cute, and 9/10 from Micro User)

Brixx! (£17.95, the most irritating tune in history, and Micro User gave it 9/10)

Slappit (£17.95, ever tried playing football, snooker and pinball at the same time?)

The Arc/A3000 Winter Box (£19.95, pack includes: Pon in Winterland, Brixx and Zap the Red Wierdos from Mars)

Dominate (£19.95, can you find the solution?)

Rekall (£14.95, test your powers of memory and deduction)

Bouncer (£19.95, fast action arcade game, out soon)



RTFM, 43 Hill Street, St Helier, Jersey

© (0534) 67870, Fax (0534) 68996.



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 £70

Mogul £20

Splice £30

Tween £30

(inc.VAT)

Ace Computing
27 Victoria Road,
Cambridge,
CB4 3BW.

Tel: (0223) 322559

Fax: (0223) 69180



PINEAPPLE SOFTWARE

The Pineapple Software Real Time Colour Video Digitiser

The Pineapple Software Real Time Colour Video Digitiser is now supplied with not just one, but two fully multitasking application programs! In fact the software supplied with each Digitiser comprises at least four different programs, (the number is increasing all the time). Included in these is the IMICCI application which is probably the most user friendly of all video processing programs. (See photo).

HARDWARE

The Digitiser hardware consists of a double width podule which plugs straight into the back of a 300 or 400 series Archimedes. (Note that a podule backplane is required in 300 series computers).

For A3000 owners we supply a special inexpensive adapter box which contains the digitiser card and plugs into the back of the A3000 using a ribbon cable.

Inputs are provided for PAL composite video and also R,G,B. Manual adjustment of Contrast, Saturation and Brightness provide for ease of initial setting up.

SOFTWARE

The Heart of the Digitiser software is a relocatable module which contains all the video processing routines. All of the previously mentioned software applications access these routines in various ways. For the user who can write simple BASIC programs this module provides easy access to all of the Digitiser routines via '*' commands and SWI's

The new multitasking software makes life very easy for those who wish to incorporate images into Wordprocessing, Desktop publishing, or Art packages. The ease with which grabbed images can be 'zoomed in' and 'cropped' to the required size has to be seen to be believed, and when the required part of the image is selected, it is then a simple matter to 'drag' the image directly into another application.

As well as providing it's own powerful processing routines the Pineapple Digitiser can just as easily use software such as ChangeFSI or AIM to process it's images giving unrivalled versatility.

Also now available in the Multitasking software is a routine to allow capture of a sequence of frames. The number which can be stored depends on the amount of memory you have available (and the size of image chosen), and when grabbed the images can be stored to disc or transferred to PAINT for analysis.

EXCLUSIVE FEATURES

The Pineapple Software Real Time Colour Digitiser is the only one currently liable with the following exclusive features:-

1. 16 bit operation (extended version) for smoother colour graduations.
2. Two independent multitasking applications plus other powerful software.
3. Digitising of the full video area normally displayed on a TV screen.
4. R,G,B inputs providing higher quality pictures from professional video equipment.

SPECIFICATION

Video Inputs	PAL coded video. 75 volts - 2.5 volts pk to pk. R,G,B, & sync input All inputs may be terminated by internal DIP switches.
Resolution	512 x 256 pixels
Storage system	Standard version 4 bits Red, 4 bits Green, 4 bits Blue - 192k Ram Extended version 5 bits Red, 6 bits Green, 5 bits Blue - 256k Ram
Picture Area	The Digitiser hardware allows the full screen area normally viewed to be stored in the podule ram. Horizontal shift, Vertical shift and width can be adjusted internally if required.
PAL Decoder	The PAL decoder provides manual control of Brightness, Contrast and Saturation, combined with full auto saturation control.

PAL COLOUR CODER

A new hardware product now available from Pineapple is a high quality colour coder video unit. This unit produces a full colour coded video signal from the Archimedes computer which enables you to feed the output of the computer into a video recorder or second colour TV monitor.

FEATURES:-

1. External to computer - no podule slots required.
2. Complete sync pulse regeneration to provide the best possible signal for recording onto VHS recorders or displaying on TV monitors.
3. Switch selectable to 624 or 625 line operation - for interlaced or non-interlaced screen modes.
4. Plugs into R,G,B, computer socket and provides buffered output to feed Archimedes monitor, + coded signal output.
5. Adaptable for use with other computers or R,G,B, and Sync signal sources.

S'VHS Version £79.00

Price £69.00 + VAT p&p free

NEW LOW PRICES!!!
NEW LOW PRICES!!!

BBC PCB Designer

NEW LOW PRICES!!!
NEW LOW PRICES!!!

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 interconnection.

The full auto-route facilities are available even on a standard unexpanded model 'B'.

'PCB Autoroute is remarkable. No similar software comes near the price. Acorn User - Aug 88

PRICE	EManual track routing	£55.00
	Auto track routing	£85.00
	Plotter Driver	£35.00
		P&P free

Still available at new
discounted price!
DIAGRAM II £25.00 !!!



Please add 15% VAT to all prices

39 Brownlea Gardens, Seven Kings, Ilford, Essex IG3 9NL
Tel: 081-599 1476. Fax: 081-598 2343



IMICCI Multitasking Application



IMICCI Application



Butterfly collection

- 'Pineapple has produced one of the 'ultimate' Computer Video Digitisers' -
- 'The Pineapple Colour Digitiser looks to be one of the most professional products yet to be seen on the Archimedes' -

Acorn User - April 90

Digitiser Prices

Standard	£285.00
Extended	£315.00
A3000 Adaptor Box	£65.00
POSTAGE AND PACKING FREE	

Marconi Tracker Balls

RB2/101	BBC 'B' & 'B+' ...£45.00	Replacement lead to convert 101 series to Archimedes.	£12.50
	inc software		
RB2/101M	Master£45.00		
	inc Pointer Rom		
RB2/115	Archimedes£45.00	Postage & Packing on Tracker Balls	
RB2/110	Nimbus.....£45.00		£ 1.75



Far from

Discover how to make your data really secure with Carl Dunkley

prying eyes

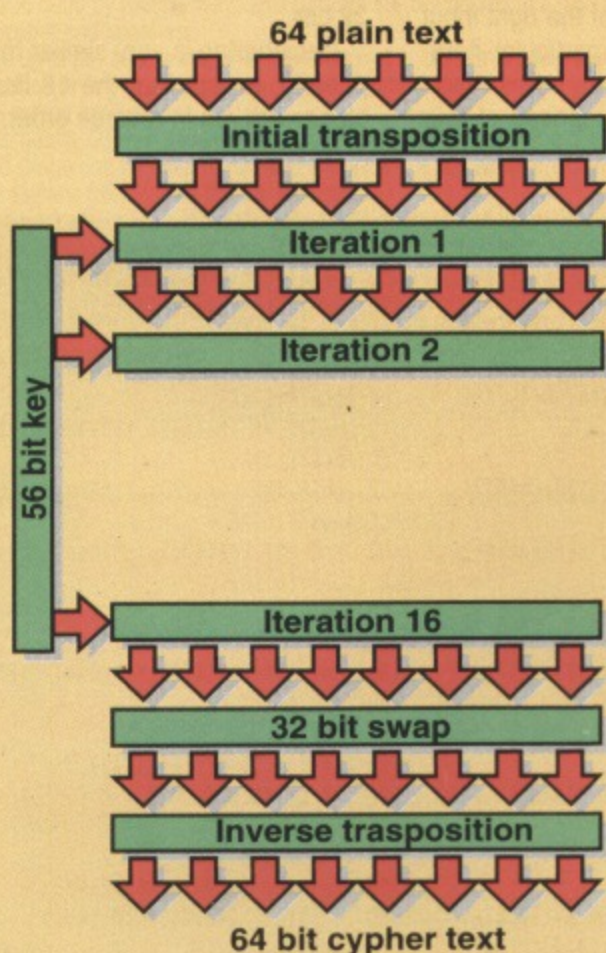


Figure I:
The
stages
of the
algorithm

A PART from the practical value of making vital information secure, there's a certain fascination in taking legible information, converting it to gobbledegook, then restoring it to its former state.

The United States Government has published an official standard for storing what they refer to as unclassified information: The Data Encryption Standard. The techniques used are fairly complex, but the resulting encrypted codes are virtual uncrackable. Except, presumably, by government cryptographers.

Listing I - InitDES - is used to compile the encryption routine and writes it to a file on disc as DES_mc).

This machine code file is loaded in at &1900 and PAGE should therefore be adjusted to at least &2300 before any programs are run.

Listing II - DES - is the file encryption program proper. Upon execution it resets PAGE to &2300 and loads DES_mc at &1900. It then asks for a filename, key and whether encryption or decryption is required. After this information has been entered the program processes the specified file.

So if you're happy not to know how it does what it does, just type in each listing in turn, using the checksums to ensure you've made no typing errors, and be careful to save them before running.

Apart from the standard checksum

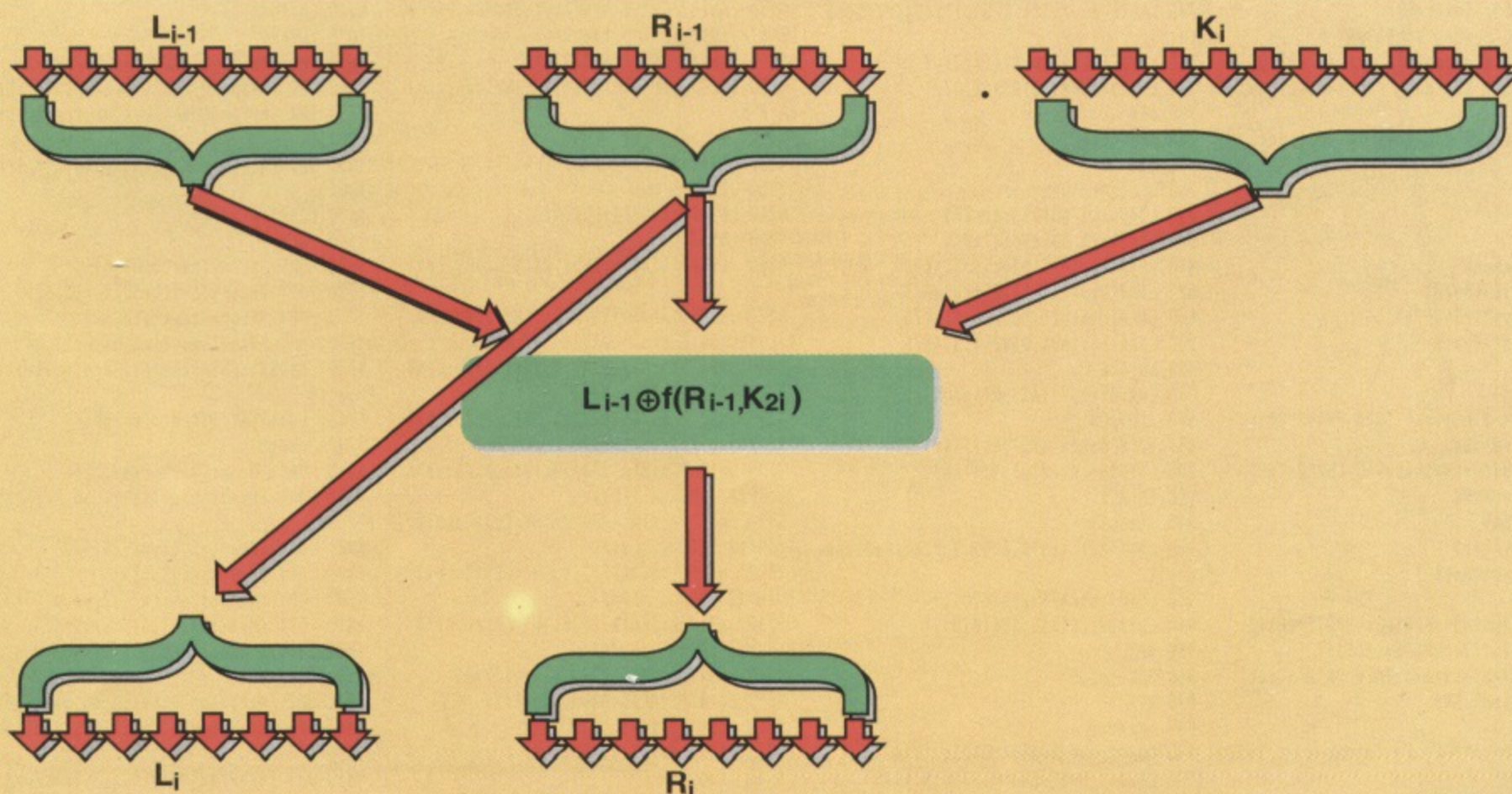


Figure II: Each iteration stage



we use for all programs there is also a certain amount of built-in checking to ensure the programs work correctly. But before you start encrypting all your favourite files make backups and ensure you can decode them too.

How it works

The algorithm uses a 64 bit plain text message and a 64 bit key although

this is assumed to contain parity bits and so is reduced to 56 bits.

Figure 1 is an outline of the DES algorithm and it can be broken down into 19 distinct stages:

Stage 1 A 64 bit transposition is made on the text.

Stages 2 to 17 These 16 iterations are parameterised by the 56 bit key.

Stage 18 The left and right 32 bits of the text are swapped.

Stage 19 A final transposition – the bits are swapped around – is done

on the text, yielding the cipher text.

Figure 11 shows what happens in the 16 stages that involve the key: Each stage takes two 32 bit inputs and produces two corresponding 32 bit outputs.

The left output is simply a copy of the right input while the right output is the bitwise Exclusive Or of the left input and a function of the right input and the key for that particular iteration.

● The function is composed of four

steps:

● The 32 bit right hand number is expanded to 48 bits.

● This is Exclusive Ored with the key currently in use.

● The result is split up into eight 6 bit groups.

These are then reduced to eight 4 bit groups, generating the required 32 bits.

Deciphering is very similar to enciphering, except that the 16 iteration stages are run in reverse order.

```
10 REM Data Encryption Standard
20 REM by Carl Dunkley
30 REM (c) The Micro User
40 :
50 MODE7
60 IFPAGE<>82300 THENPAGE=82300:CHAIN
"INITDES"
70 PX=&1900
80 :
90 PRINTSPC(8)"DATA ENCRYPTION STAND
RD"
100 PRINT'SPC(8)"By C.Dunkley (Dec 199
0)"
110 PRINT'STRINGS(40,"-");
120 PRINT'"Initialising look-up tables
"
130 PROCsetup_lookup_tables
140 PRINT'"Assembling"
150 PROCassemble
160 PRINT'"Checking algorithm"
170 PROCcheck
180 PRINT'"Saving machine code"
190 *SAVE DES_MC 1900+900
200 PRINT'STRINGS(40,"-");
210 PRINT'"Successfully, assembled DES
_MC program."
220 PRINT'"Key = &";"initkey;" Plain/c
ipher text = &";"inittext
230 PRINT"MC Loaded at &1900"
240 PRINT"Ensure page is set to &2300"
250 PRINT"Call &";"des;" to encrypt te
xt"
260 PRINT"Call &";"ddes;" to decipher
text"
270 END
280 REM *****
290 :
300 DEFPROCcheck
310 text$="12345678"
320 $initkey="12345678"
330 $inittext=text$
340 CALLdes
350 CALLddes
360 IFtext$<>$inittext THEN PRINT'"Fir
st check failed":END
370 text$=CHR$0+CHR$0+CHR$0+CHR$0+CHR$
0+CHR$0+CHR$0+CHR$0
380 key$=text$
390 $initkey=key$
400 $inittext=text$
410 CALLdes
420 text$=CHR$140+CHR$166+CHR$77+CHR$2
33+CHR$193+CHR$177+CHR$35+CHR$167
430 IFtext$<>$inittext THEN PRINT'"Sec
ond check failed":END
440 ENDPROC
450 REM *****
460 :
470 DEFPROCassemble
```

```
480 RX=PX
490 FORNX=0TO2STEP2
500 PX=RX
510 COPTNX
520 .copy
530 LDA(&70),Y:STA(&72),Y:DEY:BNEcopy:
RTS
540 .transpose
550 LDA(&74),Y:STY&7F:TAY:LDA(&72),Y:L
DY&7F:STA(&70),Y:DEY:BNEtranspose:RTS
560 .eor
570 LDA(&76),Y:EOR(&78),Y:STA(&7A),Y:D
EY:BNEeor:RTS
580 .rotateleft
590 LDA#key% MOD256:STA&70
600 LDA#key% DIV256:STA&71
610 LDA#(key%+1) MOD256:STA&72
620 LDA#(key%+1) DIV256:STA&73
630 LDA#rotate1% MOD256:STA&74
640 LDA#rotate1% DIV256:STA&75
650 LDY&7E
660 LDA(&74),Y:TAX
670 .loop0
680 LDY#1:LDA(&70),Y:STA&7F
690 LDY#29:LDA(&70),Y:STA&80
700 LDY#1
710 .loop1
720 LDA(&72),Y:STA(&70),Y:INY:CPY#56:B
NEloop1
730 LDY#28:LDA&7F:STA(&70),Y
740 LDY#56:LDA&80:STA(&70),Y
750 DEX
760 BNEloop0
770 RTS
780 .rotateright
790 LDA#key% MOD256:STA&70
800 LDA#key% DIV256:STA&71
810 LDA#(key%-1) MOD256:STA&72
820 LDA#(key%-1) DIV256:STA&73
830 LDA#rotate2% MOD256:STA&74
840 LDA#rotate2% DIV256:STA&75
850 LDY&7E
860 LDA(&74),Y:TAX:BNEloop00:RTS
870 .loop00
880 LDY#28:LDA(&70),Y:STA&7F
890 LDY#56:LDA(&70),Y:STA&80
900 LDY#56
910 .loop11
920 LDA(&72),Y:STA(&70),Y:DEY:CPY#1:BN
Eloop11
930 LDY#1:LDA&7F:STA(&70),Y
940 LDY#29:LDA&80:STA(&70),Y
950 DEX
960 BNEloop00
970 RTS
980 .reduce
990 LDA#(s_box%-64) MOD256:STA&74
1000 LDA#(s_box%-64) DIV256:STA&75
1010 LDX#8:STA&80
```

```
1020 .loop2
1030 LDA#6:CLC:ADC&70:STA&70:LDA#0:ADC&
71:STA&71
1040 LDA#4:CLC:ADC&72:STA&72:LDA#0:ADC&
73:STA&73
1050 LDA#64:CLC:ADC&74:STA&74:LDA#0:ADC
&75:STA&75
1060 LDA#0:STA&7F
1070 LDY#1:LDA(&70),Y:BEQnot32:LDA#32:
STA&7F
1080 .not32 LDY#6:LDA(&70),Y:BEQnot16:L
DA#16:CLC:ADC&7F:STA&7F
1090 .not16 LDY#2:LDA(&70),Y:BEQnot8:L
DA#8:CLC:ADC&7F:STA&7F
1100 .not8 LDY#3:LDA(&70),Y:BEQnot4:LDA
#4:CLC:ADC&7F:STA&7F
1110 .not4 LDY#4:LDA(&70),Y:BEQnot2:IN
C&7F:INC&7F
1120 .not2 LDY#5:LDA(&70),Y:BEQnot1:IN
C&7F
1130 .not1 LDY&7F:INY
1140 LDA(&74),Y:STA&7F
1150 LDY#1:LDX#0:AND#8:BEQnbit8:LDX#1
1160 .nbit8 TXA:STA(&72),Y:LDX#0:LDY#2:
LDA&7F:AND#4:BEQnbit4:LDX#1
1170 .nbit4 TXA:STA(&72),Y:LDX#0:LDY#3:
LDA&7F:AND#2:BEQnbit2:LDX#1
1180 .nbit2 TXA:STA(&72),Y:LDX#0:LDY#4:
LDA&7F:AND#1:BEQnbit1:LDX#1
1190 .nbit1 TXA:STA(&72),Y
1200 DEC&80:LDA&80:BEQfini:JMPloop2:.fi
ni RTS
1210 .expand_text
1220 LDA#1:STA&80:LDA#0:STA&7F
1230 .loop6
1240 LDY&7F:INC&7F:LDA(&70),Y
1250 LDY&80
1260 LDX#0:STA&7E:AND#128:BEQn128:LDX#
1
1270 .n128 TXA:STA(&72),Y:INY:LDX#0:LDA
&7E:AND#64:BEQn64:LDX#1
1280 .n64 TXA:STA(&72),Y:INY:LDX#0:LDA&
7E:AND#32:BEQn32:LDX#1
1290 .n32 TXA:STA(&72),Y:INY:LDX#0:LDA&
7E:AND#16:BEQn16:LDX#1
1300 .n16 TXA:STA(&72),Y:INY:LDX#0:LDA&
7E:AND#8:BEQn8:LDX#1
1310 .n8 TXA:STA(&72),Y:INY:LDX#0:LDA&7
E:AND#4:BEQn4:LDX#1
1320 .n4 TXA:STA(&72),Y:INY:LDX#0:LDA&7
E:AND#2:BEQn2:LDX#1
1330 .n2 TXA:STA(&72),Y:INY:LDX#0:LDA&7
E:AND#1:BEQn1:LDX#1
1340 .n1 TXA:STA(&72),Y:INY:STY&80
1350 LDA&7F:CMPI#8:BNEloop6:RTS
1360 .shrink_text
1370 LDX#0:LDY#1:STY&80
1380 .loop7
1390 LDA#0:STA&7F
```

```
1400 LDY&80
1410 LDA(&70),Y:BEQn128:LDA#128:STA&7F
1420 .nn128 INY:LDA(&70),Y:BEQn64:LDA#
64:CLC:ADC&7F:STA&7F
1430 .nn64 INY:LDA(&70),Y:BEQn32:LDA#3
2:CLC:ADC&7F:STA&7F
1440 .nn32 INY:LDA(&70),Y:BEQn16:LDA#1
6:CLC:ADC&7F:STA&7F
1450 .nn16 INY:LDA(&70),Y:BEQn8:LDA#8
:CLC:ADC&7F:STA&7F
1460 .nn8 INY:LDA(&70),Y:BEQn4:LDA#4
:CLC:ADC&7F:STA&7F
1470 .nn4 INY:LDA(&70),Y:BEQn2:INC&7F
:INC&7F
1480 .nn2 INY:LDA(&70),Y:BEQn1:INC&7F
1490 .nn1 INY
1500 STY&80
1510 TXA:TAY:LDA&7F:STA(&72),Y
1520 INX:CPX#8:BNEloop7
1530 RTS
1540 \**** main loop
1550 .initkey EQU0:EQU0:EQU0
1560 .inittext EQU0:EQU0:EQU0
1570 .ddes
1580 LDA#1:STA&81
1590 JMPstart
1600 .des
1610 LDA#0:STA&81
1620 .start
1630 OPT FNexpand_text(initkey,key%)
1640 OPT FNexpand_text(inittext,text%)
1650 OPT FNtranspose(key%,64,key_trans1
%,56)
1660 OPT FNtranspose(text%,64,init_tran
s%,64)
1670 LDA#1:STA&7E
1680 .main
1690 OPT FNCopy(text%,b%,64)
1700 OPT FNCopy(text%+32,text%,32)
1710 OPT FNCopy(text%,e%,64)
1720 OPT FNtranspose(e%,64,bst%,48)
1730 LDA&81:BNEnotleft:JSRrotateleft:J
MPcont1
1740 .notleft JSRrotateright
1750 .cont1
1760 OPT FNCopy(key%,ikey%,56)
1770 OPT FNtranspose(ikey%,56,key_tran
s2%,48)
1780 OPT FNeor(e%,ikey%,48,y%)
1790 OPT FNreduce(y%,x%)
1800 OPT FNtranspose(x%,32,perm%,32)
1810 OPT FNeor(b%,x%,32,text%+32)
1820 INC&7E:LDA&7E:CMPI#17:BEQend_des:JM
Pmain:.end_des
1830 OPT FNtranspose(text%,64,swap%,64)
1840 OPT FNtranspose(text%,64,final_tra
ns%,64)
1850 OPT FNshrink_text(text%,inittext)
```




```
1860 RTS
1870 JNEXT
1880 ENDPROC
1890 REM *****
1900 :
1910 DEFFNreduce(source%,destination%)
1920 COPTN%
1930 LDA#(source%-6) MOD256:STA&70
1940 LDA#(source%-6) DIV256:STA&71
1950 LDA#(destination%-4) MOD256:STA&72
1960 LDA#(destination%-4) DIV256:STA&73
1970 JSRreduce
1980 J:=N%
1990 ENDPROC
2000 REM *****
2010 :
2020 DEFFNreor(source1%,source2%,size%,d
estination%)
2030 COPTN%
2040 LDA#source1% MOD256:STA&76
2050 LDA#source1% DIV256:STA&77
2060 LDA#source2% MOD256:STA&78
2070 LDA#source2% DIV256:STA&79
2080 LDA#destination% MOD256:STA&7A
2090 LDA#destination% DIV256:STA&7B
2100 LDY#size%
2110 JSReor
2120 J:=N%
2130 ENDPROC
2140 REM *****
2150 :
2160 DEFFNcopy(source%,destination%,siz
e%)
2170 COPTN%
2180 LDA#source% MOD256:STA&70
2190 LDA#source% DIV256:STA&71
2200 LDA#destination% MOD256:STA&72
2210 LDA#destination% DIV256:STA&73
2220 LDY#size%
2230 JSRcopy
2240 J:=N%
2250 ENDPROC
2260 REM *****
2270 :
2280 DEFFNtranspose(source%,old_length%
,table%,new_length%)
2290 COPTN%
2300 OPT FNcopy(source%,data%,old_lengt
h%)
2310 LDA#table% MOD256:STA&74
2320 LDA#table% DIV256:STA&75
2330 LDY#new_length%
2340 JSRtranspose
2350 J:=N%
2360 ENDPROC
2370 REM *****
2380 :
2390 DEFPROCsetup_lookup_tables
2400 RESTORE
2410 init_trans%=FNload-1
2420 final_trans%=FNload-1
2430 swap%=FNload-1
2440 key_trans1%=FNload-1
2450 key_trans2%=FNload-1
2460 bst%=FNload-1
2470 perm%=FNload-1
2480 s_box%=FNload-1
2490 FOR loop0%=1 TO 7
2500 dummy%=FNload-1
2510 NEXT
2520 rotate1%=FNload-1
2530 rotate2%=FNload-1
2540 data%=P%-1
2550 P%=P%+64
2560 key%=P%-1
2570 P%=P%+64
```

```
2580 text%=P%-1
2590 P%=P%+64
2600 e%=P%-1
2610 P%=P%+64
2620 b%=P%-1
2630 P%=P%+64
2640 x%=P%-1
2650 P%=P%+32
2660 ikey%=P%-1
2670 P%=P%+56
2680 y%=P%-1
2690 P%=P%+48
2700 ENDPROC
2710 REM *****
2720 :
2730 DEFFNload
2740 Q%=P%
2750 FOR loop1%=1 TO 2
2760 V%=0
2770 READ string$
2780 FOR loop2%=1 TO LEN(string$) STEP
2
2790 ?P%=VAL(MID$(string$,loop2%,2))
2800 V%=V%+?P%
2810 P%=P%+1
2820 NEXT
2830 READC%
2840 IFC%<V% THEN PRINT"Check sum err
or,""in ":";string$;END
2850 NEXT
2860 =Q%
2870 REM *****
2880 :
2890 DEFFNexpand_text(source%,destinati
on%)
2900 COPTN%
2910 LDA#source% MOD256:STA&70
2920 LDA#source% DIV256:STA&71
2930 LDA#destination% MOD256:STA&72
```

```
2940 LDA#destination% DIV256:STA&73
2950 JSRexpand_text
2960 J:=N%
2970 ENDPROC
2980 REM *****
2990 :
3000 DEFFNshrink_text(source%,destinati
on%)
3010 COPTN%
3020 LDA#source% MOD256:STA&70
3030 LDA#source% DIV256:STA&71
3040 LDA#destination% MOD256:STA&72
3050 LDA#destination% DIV256:STA&73
3060 JSRshrink_text
3070 J:=N%
3080 REM *****
3090 :
```

SUBSCRIBE NOW!

If you prefer to save the wear and tear on your fingers you'll find this listing - together with all the others from this issue - on this month's disc, sent free if you subscribe to *The Micro User*.

```
3100 REM initial transposition
3110 DATA 58504234261810026052443628201
20462544638302214066456484032241608,1056
3120 DATA 57494133251709015951433527191
10361534537292113056355473931231507,1024
3130 :
3140 REM final transposition
3150 DATA 40084816562464323907471555236
33138064614542262303705451353216129,1104
3160 DATA 36044412522060283503431151195
92734024210501858263301410949175725,976
3170 :
3180 REM swap
```

```
3190 DATA 33343536373839404142434445464
74849505152535455565758596061626364,1552
3200 DATA 01020304050607080910111213141
51617181920212223242526272829303132,528
3210 :
3220 REM key transposition 1
3230 DATA 57494133251709015850423426181
002595143352719110360524436,912
3240 DATA 63554739312315076254463830221
406615345372921130528201204,880
3250 :
3260 REM key transposition 2
3270 DATA 14171124010503281506211023191
2042608160727201302,332
3280 DATA 41523137475530405145334844493
9563453464250362932,1020
3290 :
3300 REM bit selection table
3310 DATA 32010203040504050607080908091
0111213121314151617,236
3320 DATA 16171819202120212223242524252
6272829282930313201,556
3330 :
3340 REM permutation table
3350 DATA 16072021291228170115232605183
110,279
3360 DATA 02082414322703091913300622110
425,249
3370 :
3380 REM S boxes, 1 to 8
3390 DATA 14041301021511080310061205090
00700150704140213011006121109050308,240
3400 DATA 04011408130602111512090703100
50015120802040901070511031410000613,240
3410 :
3420 DATA 15010814061103040907021312000
51003130407150208141200011006091105,240
3430 DATA 00140711100413010508120609030
21513081001031504021106071200051409,240
```

10 = 0 0	390 = 3731 D	770 = 9843 7	1150 = AEB1 3	1530 = 9843 D	1910 = D986 E	2290 = 6A96 F	2670 = F901 6
20 = 0 0	400 = 459B 3	780 = 8D9B C	1160 = 6D91 F	1540 = 0 D	1920 = 6A96 1	2300 = 4B5B C	2680 = BAF5 9
30 = 0 0	410 = 721A 8	790 = C2D1 6	1170 = EB0B 1	1550 = E842 C	1930 = B652 2	2310 = A960 D	2690 = 2BFE 9
40 = 9719 9	420 = 9A70 3	800 = 7243 B	1180 = C8C7 4	1560 = EC6D F	1940 = 6C0 8	2320 = 19F2 3	2700 = ED0F 8
50 = 8AFC 8	430 = 628D 8	810 = 3550 C	1190 = 4310 A	1570 = A9BF 2	1950 = C490 6	2330 = C48D B	2710 = 0 8
60 = DFB8 0	440 = ED0F 5	820 = 85C2 7	1200 = 41EA 6	1580 = 46C5 3	1960 = 7402 B	2340 = 2A3A E	2720 = 9719 4
70 = 4A64 6	450 = 0 5	830 = FA9 2	1210 = 2F1 2	1590 = A77D 8	1970 = FD2 2	2350 = ADFA 3	2730 = FC16 B
80 = 9719 6	460 = 9719 F	840 = BF3B 8	1220 = 7282 1	1600 = 6894 8	1980 = ADFA C	2360 = ED0F 8	2740 = C9E4 1
90 = 649C 6	470 = 98E9 E	850 = CF04 9	1230 = 43F6 5	1610 = 116 D	1990 = ED0F A	2370 = 0 8	2750 = 9671 A
100 = AD06 5	480 = 2736 9	860 = 48CA 0	1240 = FE37 5	1620 = 3208 A	2000 = 0 A	2380 = 9719 F	2760 = 7A0E 2
110 = CCA 0	490 = 2395 A	870 = 1252 6	1250 = F1D8 2	1630 = 4CD A 1	2010 = 9719 5	2390 = 75DC 4	2770 = D80A 1
120 = 146E 1	500 = 5D7 B	880 = CAAB A	1260 = 999C F	1640 = CA82 B	2020 = B908 B	2400 = 9FF8 D	2780 = E055 B
130 = AB80 9	510 = 6A96 4	890 = 38E3 0	1270 = 99F 1	1650 = B55E A	2030 = 6A96 1	2410 = 1E16 4	2790 = 62FE 9
140 = C114 8	520 = 55AF D	900 = CB2 4	1280 = 5857 A	1660 = C089 C	2040 = 378 A	2420 = 25E7 1	2800 = BAD5 A
150 = 126A 7	530 = 9B9F A	910 = 3142 F	1290 = A921 6	1670 = 68E8 4	2050 = B3EA A	2430 = 30C 4	2810 = 5569 B
160 = 44E 0	540 = BB05 5	920 = 44A7 B	1300 = D532 6	1680 = 37C9 A	2060 = 6F15 3	2440 = CA0B 9	2820 = 2C83 1
170 = C2CC 1	550 = 2066 F	930 = 3C4B 3	1310 = 1007 F	1690 = BBC2 9	2070 = DF87 6	2450 = B2F1 3	2830 = 965A 8
180 = 3BCB 8	560 = AD4E A	940 = 4ED F	1320 = 4490 C	1700 = DCC 5	2080 = 68FB 4	2460 = C8AF C	2840 = 987C 8
190 = 32E2 6	570 = A6A7 3	950 = E8A9 D	1330 = E6CB 6	1710 = 7383 A	2090 = F82B F	2470 = 5EAF 9	2850 = 2C83 7
200 = CCA 5	580 = AC32 7	960 = 1B18 6	1340 = 9AEF A	1720 = 88C 5	2100 = EFE7 A	2480 = 76DD 4	2860 = CEBD 9
210 = 7ECC A	590 = C2D1 8	970 = 9843 6	1350 = 75AC B	1730 = 9A95 9	2110 = BAFB C	2490 = 8107 2	2870 = 0 9
220 = A47A E	600 = 7243 F	980 = 6A88 8	1360 = 2F10 A	1740 = A205 1	2120 = ADFA F	2500 = 21C4 0	2880 = 9719 5
230 = 7026 9	610 = E33B 0	990 = B6C2 D	1370 = F668 D	1750 = AD1C F	2130 = ED0F C	2510 = 2C83 A	2890 = 7D22 7
240 = CEDD 8	620 = 53A9 7	1000 = 650 C	1380 = 53D7 1	1760 = 4E4A 5	2140 = 0 C	2520 = C714 7	2900 = 6A96 C
250 = 8C2E 9	630 = 820A 2	1010 = BE75 D	1390 = 1F58 D	1770 = D00A 0	2150 = 9719 6	2530 = BFEE F	2910 = 8BD3 4
260 = 83C2 F	640 = 3298 E	1020 = 372 C	1400 = F1D8 F	1780 = EEBB E	2160 = C138 4	2540 = 5466 8	2920 = 3B41 E
270 = FD2E 2	650 = CF04 6	1030 = 4D83 0	1410 = 6929 4	1790 = 636E B	2170 = 6A96 7	2550 = 8C10 D	2930 = 260F 6
280 = 0 2	660 = 17B4 D	1040 = 5D06 8	1420 = 7B4A B	1800 = EC66 C	2180 = 8BD3 5	2560 = 836D 5	2940 = 969D 0
290 = 9719 3	670 = 2330 A	1050 = 57FB 2	1430 = 8A99 1	1810 = A56 9	2190 = 3B41 A	2570 = 8C10 5	2950 = 25EA D
300 = 69A8 1	680 = 62CE 8	1060 = 1F58 9	1440 = F67F 2	1820 = 8F72 8	2200 = 260F F	2580 = 374 3	2960 = ADFA 2
310 = D657 3	690 = 1ADB 1	1070 = 8A8D A	1450 = 5B3F 7	1830 = 25A1 9	2210 = 969D 5	2590 = 8C10 D	2970 = ED0F C
320 = 4D23 8	700 = 8BB6 9	1080 = D277 0	1460 = 3D8B 4	1840 = DA6B B	2220 = EFE7 7	2600 = DF5 8	2980 = 0 C
330 = 459B E	710 = 3311 F	1090 = 7B9 E	1470 = FF99 D	1850 = 7BA6 F	2230 = 53D4 3	2610 = 8C10 0	2990 = 9719 4
340 = 721A 6	720 = 1F96 0	1100 = 439 3	1480 = A2DD 7	1860 = 9843 1	2240 = ADFA 2	2620 = C6A1 A	3000 = 7662 8
350 = 94C4 5	730 = 942E C	1110 = E8F6 3	1490 = 4C82 1	1870 = 5460 4	2250 = ED0F E	2630 = 8C10 1	3010 = 6A96 0
360 = 768B E	740 = 26D5 D	1120 = 871D 1	1500 = 2A05 1	1880 = ED0F 0	2260 = 0 E	2640 = 294 1	3020 = 8BD3 2
370 = 4B8 6	750 = E8A9 8	1130 = 7AF7 1	1510 = CF09 E	1890 = 0 0	2270 = 9719 9	2650 = 1323 B	3030 = 3B41 4
380 = B845 C	760 = 2998 6	1140 = 93C0 B	1520 = C49 C	1900 = 9719 4	2280 = A6A9 6	2660 = ED74 9	3040 = 260F 4



```

3440 :
3450 DATA 10000914060315050113120711040
20813070009030406100208051412111501,240
3460 DATA 13060409081503001101021205101
40701101300060908070415140311050212,240
3470 :
3480 DATA 07131403000609100102080511120
41513081105061500030407021201101409,240
3490 DATA 10060900121107131501031405020
80403150006100113080904051112070214,240
3500 :
3510 DATA 02120401071011060805031513001
40914110212040713010500151003090806,240
3520 DATA 04020111101307081509120506030
01411081207011402130615000910040503,240
3530 :
3540 DATA 12011015090206080013030414070
51110150402071209050601131400110308,240
3550 DATA 09141505020812030700041001131
10604030212090515101114010706000813,240
3560 :
3570 DATA 04110214150008130312090705100
60113001107040901101403051202150806,240
3580 DATA 01041113120307141015060800050
90206111308010410070905001514020312,240
3590 :
3600 DATA 13020804061511011009031405001
20701151308100307041205061100140902,240
3610 DATA 07110401091214020006101315030
50802011407041008131512090003050611,240
3620 :
3630 REM rotate left
3640 DATA 0101020202020202,14
3650 DATA 0102020202020201,14
3660 :
3670 REM rotate right
3680 DATA 0001020202020202,13
3690 DATA 0102020202020201,14

```

```

10 REM Data Encryption Standard
20 REM by Carl Dunkley
30 REM (c) The Micro User
40 MODE7
50 *KEYO PAGE=&2300|M*LOAD DES_MC|MCH
."DES"|M
60 IFPAGE=&2300 THEN100
70 *FX138 0 128
80 STOP
90 :
100 des%=&20E2:key%=&20C9:text%=&20D2:
ddes%=&20DB
110 *FX200 1
120 :
130 REPEAT
140 CLS
150 PRINTSPC(8);"DATA ENCRYPTION STAND
ARD"
160 PRINT'SPC(8);"By C.Dunkley (Dec 1
990)"
170 PRINT'STRINGS(40,"-");
180 PRINT
190 key$=""
200 FORN%=1TO8
210 INPUT"File name : ",in$
220 INPUTTAB(0,7);"Key      : ",key$
230 PRINTTAB(0,7);SPC(40);
240 IFLENkey$>8 THEN220
250 PRINTTAB(0,7);"Cipher or Decipher
: ";
260 REPEAT
270 AS=CHRS(GET OR32)
280 UNTILAS="c"ORAS="d"
290 PRINT;AS;
300 PRINT'
310 IFLENkey$<8 FORloop%=LENkey$TO7:ke
y$=key$+CHRS0:NEXT
320 FX=OPENUP(in$)
330 SX=EXT#(FX)
340 NX=S%DIV8

```

```

350 IFN%<>S%/8 THEN PROCmessage
360 $key%=key$
370 0%=0
380 PRINTTAB(0,12);"Iterations left :
";
390 FORloop%=1 TO NX
400 PTR#FX=0%
410 text$=""
420 FORloop1%=0TO7
430 text$=text$+CHRS(BGET#(FX))
440 NEXT
450 $text%=text$
460 IFAS="c" CALLdes% ELSE CALLddes%
470 PTR#FX=0%
480 FORloop1%=0TO7
490 BPUT#FX,?(text%+loop1%)
500 NEXT
510 PRINTTAB(18,12);NX-loop%," ";
520 0%=0%+8
530 NEXT
540 CLOSE#FX
550 PRINT'"Finished"
560 PRINT'STRINGS(40,"-")
570 PRINT"Another file (Y/N)?";
580 REPEAT
590 AS=CHRS(GET OR32)
600 UNTILAS="y"ORAS="n"
610 UNTILAS="n"
620 CLS
630 END
640 REM *****
650 :
660 DEFPROCmessage
670 PRINT"The file size is not divisab
le by 8,"
680 AX=S%-8*(S%DIV8)
690 PRINT"the last ";A%," byte(s) will
not be altered."
700 ENDPROC
>*:1.XS

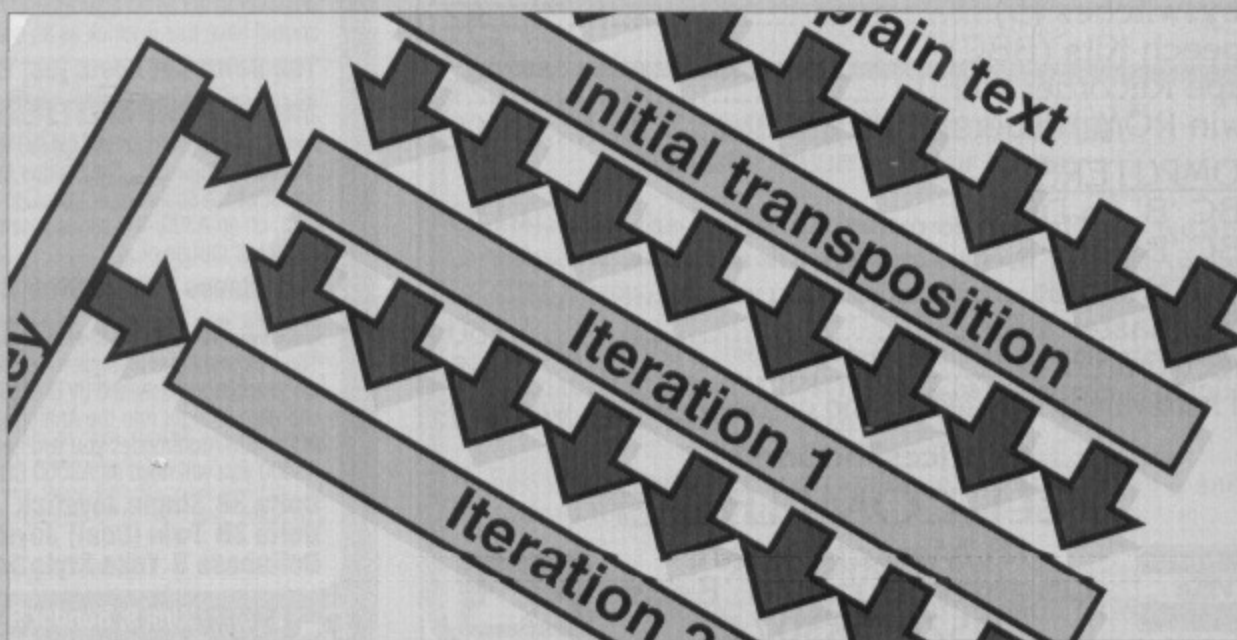
```

Get it
right ✓

3050 = 969D C	3380 = 0 5
3060 = 80B 0	3390 = 492D E
3070 = ADFA 2	3400 = 955E 4
3080 = 0 2	3410 = 9719 3
3090 = 9719 3	3420 = 2175 4
3100 = 0 3	3430 = D12F A
3110 = 57E2 3	3440 = 9719 4
3120 = 2D63 6	3450 = 288A 0
3130 = 9719 D	3460 = 1E45 3
3140 = 0 D	3470 = 9719 F
3150 = 646B F	3480 = 2C11 5
3160 = F9BC 0	3490 = E05 F
3170 = 9719 1	3500 = 9719 A
3180 = 0 1	3510 = 5F62 C
3190 = F9FE 9	3520 = C177 1
3200 = 44E2 7	3530 = 9719 E
3210 = 9719 9	3540 = 68CA 6
3220 = 0 9	3550 = BC00 5
3230 = 6FAA 7	3560 = 9719 C
3240 = D0E 9	3570 = B68B 1
3250 = 9719 B	3580 = 8A0F 9
3260 = 0 B	3590 = 9719 0
3270 = C332 9	3600 = 9D55 B
3280 = E8CC 4	3610 = BBB 5
3290 = 9719 A	3620 = 9719 1
3300 = 0 A	3630 = 0 1
3310 = C3F7 7	3640 = BD85 C
3320 = 71A5 A	3650 = CE14 7
3330 = 9719 E	3660 = 9719 9
3340 = 0 E	3670 = 0 9
3350 = 2595 7	3680 = 3D53 0
3360 = 1166 6	3690 = CE14 5
3370 = 9719 5	

Get it
right ✓

10 = 0 0	140 = 7A16 B	270 = 45EA B	400 = BE33 F	530 = 2C83 5	630 = FD2E E
20 = 0 0	150 = 2546 3	280 = DE44 4	410 = B76D D	540 = 574F A	640 = 0 E
30 = 0 0	160 = 6C01 A	290 = C076 E	420 = 43E9 9	550 = 48FC 3	650 = 9719 9
40 = 8AFC C	170 = CCA B	300 = 7475 7	430 = 12C0 A	560 = B9BD 5	660 = 429C E
50 = 6CA5 6	180 = FF3E 2	310 = FABB 6	440 = 2C83 F	570 = 5C17 5	670 = 74A7 C
60 = A667 8	190 = 4F39 8	320 = 7554 8	450 = EBD8 2	580 = BFBA 6	680 = A223 5
70 = 193D 0	200 = C634 9	330 = 7CE4 7	460 = B063 1	590 = 45EA 3	690 = E259 A
80 = 4E55 3	210 = 99C2 8	340 = A8DA A	470 = BE33 0	600 = 8DE9 2	700 = EDOF C
90 = 9719 2	220 = 2B2 8	350 = 8A8 4	480 = 43E9 B	610 = BASC 1	>*SP.
100 = 4D52 9	230 = FCD2 D	360 = B8E1 B	490 = C0F0 0	620 = 7A16 5	
110 = 6ABE 3	240 = 620E 5*	370 = 92DE 7	500 = 2C83 A		
120 = 9719 8	250 = A317 A	380 = F62C F	510 = 1BB5 2		
130 = BFBA 1	260 = BFBA 9	390 = 31D9 E	520 = B69B 9		



Accounts Manager

The Professional Solution

FEATURES

- ✓ Sales, Purchase, Nominal Ledgers
- ✓ Budget Reports
- ✓ Sales/Purchase Analysis
- ✓ Debt Chasing and other letters
- ✓ Aged Debt Analysis
- ✓ 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
- ✓ Now includes Freeform Invoicing

KENDAL COMPUTER CENTRE

68 Stramongate, Kendal, CUMBRIA LA9 4BD
Tel: 0539 722559

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 and 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.

DataKing - "...the database package that schools - and most people - actually want" - Micro User

Available now: DataKing Plus

- * Fully RISC-compliant
- * Wide range of graphs and charts
- * All charts export to !Draw
- * Designed (by teachers) to meet National Curriculum data handling requirements
- * Simple to operate - learn and use in one lesson
- * Rapid file creation and data entry
- * Comprehensive search and sort; define fields as function of other fields, "fast data" (tokenised fields), label printing, statistics etc
- * Perfect for non-IT specialists
- * Ideal for classroom and home use
- * £59 inc. - inclusive of site licence
- * LEA licences - £10 per school

Shenley Software, 5 Coombefield Close, New Malden, Surrey KT3 5QF 081-949-3235

THE BEST VALUE AT 90 PENCE A DISC

Telstar PDSL can now offer discs at only 90 pence a disc. Nearly 300 discs and expanding all for only 90 pence a disc. See the vast range now and get our Demo disc for £1 now. Cheques to Telstar PD.

FREE COMPETITION

By ordering our demo disc you will automatically be entered into our free draw to win 20 PD discs.

ALPS AND CREATOR GAMES

We are looking for games created with these two brilliant programmes from Alpine. If you have made any games with these why not send them in and let other people enjoy them.

TELSTAR PDSL 48 Alderbrook Close, Rolleston Staffs DE13 9AH

ELECTRON SPARES

Main Computer Board	£49
Internal Powerboard	£9
Keyboard Assembly	£15
Casings (top & bottom)	£5
Mains Power Unit	£15
Keyswitches (5)	£2
Keytops (Set)	£5
Loudspeaker	£2
Modulator (UHF)	£4
Twin ROM Holder	£9
Cassette Leads 7D/3J	£4
T.V. Lead	£4

ADD-ONS (BBC/MASTER)

Econet Module (Master)	£30
Keyswitches (5)	£2
Speech Kits (BBC)	£10
Tape Recorder ALF03	£27
Twin ROM Holders (Mast)	£9

COMPUTERS

BBC 'B' no DFS	£155
BBC 'B' + DFS	£190
BBC 'B+' 64k	£225
BBC Master 128	£260
Electron 32k	£65

All hardware is fully tested and carries a 90 day warranty

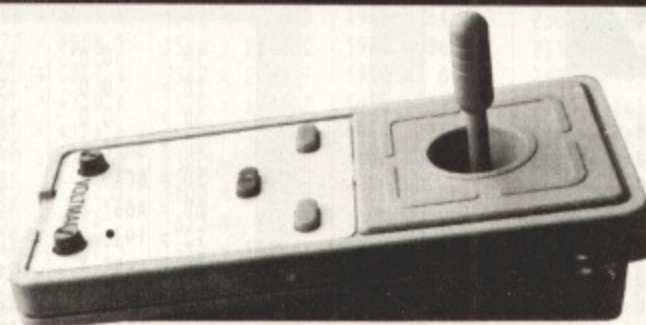
All prices include VAT

BELL COMPUTERS

18 Market Square
Leighton Buzzard, Beds
0525-383074



VOLTMACE



DELTA-CAT ARCHIMEDES JOYSTICK

The lowest cost and most versatile of the joysticks for the Archimedes. Needs no interface - just plugs into the mouse port. With no software changes it will immediately run any mouse driven software. With specially written software it can be made to act as an analogue joystick or a digital joystick. All good software should have this joystick as an option where relevant.

The Delta Cat costs just £34.95 inclusive.

MOUSE PORT SPLITTER BOX

Almost a necessity on an A3000 to save keep lifting the computer up to change from mouse to Delta-Cat. The Splitter Box has two mouse sockets on it and a switch to select which socket is in use. Can also be used for other items such as trackballs. Even on an A300/400 series it can pay for itself by saving damage to your keyboard socket or mouse plug.

The Mouse Port Splitter Box retails for £19.95 inclusive.

DELTA 3B SINGLE AND DELTA 3B TWIN

The true analogue joystick for either the BBC B, BBC Master, or Archimedes range of computers. Accessed by Basic Advail commands. The Delta 3B series joysticks will plug straight into the Analogue Port of a BBC B or Master. To work on an A300/400 Archimedes you will need a backplane and I/O module. To work on an A3000 you will need an A3000 BBC Analogue + User Port Module.

Delta 3B Single Joystick	£16.95
Delta 3B Twin (Dual) Joystick	£24.95
Deltabase B Yoke Style Joystick	£34.95



Unit 9, Bondor Business Centre, London Road,
Baldock, Herts, SG7 6NG. Telephone (0462) 894410



UNIVERSAL TELETEXT ADAPTOR

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



Reviewed in Acorn User, June 1991

The ARC/A3000 version contains many powerful features making it very easy to use, i.e. point and click at page numbers. SAE for details.

Prices include:-

User port lead
TTX V1.08 S/ware
User notes
BBC B
£62.00

Parallel port lead
TTX V1.08 S/ware
User notes
A3000/ARC
£62.00

Podule socket lead
TTX V2.00 S/ware
User notes
A3000/ARC
£77.00

A3000 MEMORY UPGRADES

- * Low power design, only 8 chips.
- * 1 Meg upgradeable to 4 Meg.
- * Easy to fit, just plugs in.
- * Screw fixed for reliability.
- * PCB size only 175 x 50mm.

1 MEG £70.00 inc VAT & P+P

(Gives 2 Meg total memory)

4 MEG £170.00 inc VAT & P+P

(Gives 4 Meg total memory)

NOTE: Memory prices fluctuate,
please phone for our best quote.

SAE for full details

ARM 3 PROCESSOR

- * Cache operation at 24 MHz.
- * RISCOS IArmspeed software.
- * 3 + times speed increase.
- * DIY plug in design.
- * Fits A300/400 series.

Introductory price**£299.00**

A305/310 4 MEG MEMORY UPGRADE

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

Introductory price**£260.00**

SAE for details of above products

Ground Control

DEPT MU7.
GROUND CONTROL
ALFREDA AVENUE
HULLBRIDGE
ESSEX SS5 6LT

ALL PRICES INCLUDE
VAT AND P&P
MAIL/TELEPHONE ORDERS
ONLY PLEASE
EDUCATIONAL AND
GOVERNMENT ORDERS
WELCOME

TEL: 0702 230324

4Mb RAM for the A310

Now only £298

- ✓ Expands the A305 and A310 to 4Mb.
- ✓ Plug-in construction - no soldering required
- ✓ Accepts larger OS ROMs when released
- ✓ Low power consumption
- ✓ Includes MEMC1a upgrade worth nearly £80
- ✓ ARM3 compatible
- ✓ A no-quibble money-back guarantee

All for only **£298**
plus VAT £350.15



Further information from:



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

InData

Tel: (0752) 781286

InData

Why not publish your Database or Multi-media files.

26, Luxmore Close, Leigham, Plymouth, Devon, PL6 8NX.



**THE ARCHIMEDES
PUBLIC DOMAIN**

The Arcaynia Demo 5 Disc & May 91 Catalogue Booklet

The disc contains some of the latest PD software available for the Archimedes from each section of the PD range, and is absolutely 100% full. Our extensive catalogue, features over 280 discs of high quality software for all users. Send a £1 coin now to receive our PD catalogue booklet and accompanying disc. All orders are normally processed the same day. Try us for service, where quality counts.

Arcaynia : PO Box 1927 : Sutton Coldfield : B74 3QZ

CORPLAN - The Letter Writer's Friend!

FOR SERIOUS WORK WITH WORDWISE PLUS

Using CORPLAN with Wordwise Plus (or Plus 2), your disc-equipped Model B, B+ or Master could probably handle your personal word-processing better than some expensive machines we could mention!

CORPLAN helps with the problems of 40 column editing, while exploiting the unrivalled capabilities of WW+ for programmed text processing. It also provides supplementary support for Inter-Word, when available.

CORPLAN gives you descriptive document indexing, a rapid-search address database, a library for your own special forms and layouts and a set of resident utilities for mailmerge, label generation, form design etc. There are many configuration options and "hooks" for your own modifications and extensions.

An unexpanded Model B with DFS and twin drives will do, but CORPLAN takes full advantage of features such as ADFS and real-time clock when available.

Pack contains disc, comprehensive manual, keystrip etc. Price £19.50, post free UK. 14 day unconditional refund. Free information sheet. Reviewed in Micro User, February 1991.

CORPLAN Computer Systems

Three Gables, 7A Talbotts Drive,
Maidenhead, Berks. SL6 4LZ
Phone or Fax: (0628) 24591



ARCHIMEDES PUBLIC DOMAIN

Greater value for your money

Following the successful launch of Acme PDSL, we are pleased to announce that we have lowered the price of our disks to you. The new price is only 99p (inc P&P).

Edition 2 of the Acme PDSL newsletter and catalogue is now available. It contains descriptions of hundreds of Public Domain and Shareware disks.

For your newsletter and catalogue, send your name and address (enclosing £1.00) to:

ACME PDSL (MU7)
17 May Avenue, Wollaton, Nottingham NG8 2NE

ALTERNATIVE ONE

Instead of three free issues you can choose this special money-saving offer:



... it's the **ULTIMATE** experience!

The Soviet Union has produced the finest fighter in the world. Now Domark give you the thrill of flying the formidable MiG-29 Fulcrum on your Archimedes. Prove your skills in a series of gruelling missions based on real life scenarios!

It offers:

- ★ Ergonomically optimised controls
- ★ Actual instruments and avionics
- ★ Accurate modelling of high g-effects on pilot, including simulated blackouts
- ★ "Expert-driven" combat systems
- ★ Unique missions featuring real world scenarios

Included in each pack is a superb 128 page full colour manual, full instructions, and a giant poster.



Archimedes/A3000 only

RRP £39.99

But take out a subscription and get it for...

£19.99

Three months' **FREE** reading...

(PLUS 15 FREE DISCS OR TAPES)

...when you take out an annual subscription

ALTERNATIVE TWO

Instead of three free issues you can choose this special money-saving offer:

PERSONAL SOUND SYSTEM

Now you can lose yourself in a new dimension. Experience all the fun and excitement of your favourite games, music packages, etc. without disturbing the rest of the household.



SYSTEM COMPRISES:

- ★ A cleverly designed interface and the latest high-velocity lightweight headphones
- ★ Crystal clear sound reproduction
- ★ Can be used in three different ways: headphones sound only, monitor sound only, sound on both headphones and monitor
- ★ Interface features a tough plastic case with volume control
- ★ You can also use the headphones with your personal stereo
- ★ Full instructions supplied to help you get the most out of this superb accessory

Exclusive to The Micro User and available **ONLY** to subscribers for

£5

FREE!



Don't miss this great offer!

The number of subscribers to *The Micro User* has reached an all-time record – and is still growing, month after month.

The reason is not hard to find. Readers of what is now the leading magazine for BBC/Acorn machines don't want to miss their monthly fix of how-to-do-it programming articles, hard-hitting reviews, ready-to-run utilities and exclusive games. As a subscriber they no longer need worry that their newsagent has run out of copies.

As a subscriber, too, you will receive each month a disc or tape containing ALL the programs listed in the magazine – plus occasional extras. These are ONLY available to subscribers. This means that if you opt for the 15-for-12 offer you'll receive 15 free discs or tapes during the period of your subscription!

THE MICRO USER

12-MONTH SUBSCRIPTION ORDER FORM

					
	Tape	5.25 40T	5.25 80T	*ADFS	3.5" Arch/A3000
New subscription – UK	<input type="checkbox"/> 2401 £24	<input type="checkbox"/> 2403 £27	<input type="checkbox"/> 2405 £27	<input type="checkbox"/> 2407 £30	<input type="checkbox"/> 2409 £30
Renewal subscription – UK	<input type="checkbox"/> 2402 £24	<input type="checkbox"/> 2404 £27	<input type="checkbox"/> 2406 £27	<input type="checkbox"/> 2408 £30	<input type="checkbox"/> 2410 £30
New subscription – Europe/Eire	N/A	<input type="checkbox"/> 2488 £39	<input type="checkbox"/> 2489 £39	<input type="checkbox"/> 2490 £43	<input type="checkbox"/> 2491 £43
Renewal subscription – Europe/Eire	N/A	<input type="checkbox"/> 2472 £39	<input type="checkbox"/> 2473 £39	<input type="checkbox"/> 2474 £43	<input type="checkbox"/> 2475 £43
New subscription – Overseas	N/A	<input type="checkbox"/> 2480 £59	<input type="checkbox"/> 2481 £59	<input type="checkbox"/> 2482 £64	<input type="checkbox"/> 2483 £64
Renewal Subscription – Overseas	N/A	<input type="checkbox"/> 2464 £59	<input type="checkbox"/> 2465 £59	<input type="checkbox"/> 2466 £64	<input type="checkbox"/> 2467 £64

*Suitable for Master Compact and Electrons with E00 ADFS

I wish to take out or renew my subscription to *The Micro User*, and have ticked the disc/tape format box on the left. I would also like to receive ((tick ONE box only):

☐ 2573 Three extra issues free of charge (15 instead of 12)

☐ 2574 MiG-29 (Archimedes/A3000) – extra £19.99 enclosed

☐ Personal Sound System – extra £5 enclosed

My machine is: ☐ Electron ☐ BBC B ☐ Master ☐ Master Compact ☐ Archimedes/A3000
2578 2572 2575 2577 2576

I wish to pay by:

☐ Cheque/Eurocheque made payable to Europress Publications Ltd

☐ Access/Mastercard/Eurocard/Barclaycard/Visa/Connect

Expiry Date

All cheques to be in UK Sterling and drawn on a UK bank

Name _____ Signed _____

Address _____

Post Code _____

Daytime phone number in case of queries _____

Send to: Europress Direct, FREEPOST, Ellesmere Port, South Wirral L65 3EB (No stamp needed if posted in UK)

Order at ANY time of the day or night

By phone: 051-357 1275

By fax: 051-357 2813

General Enquiries: 051-357 2961

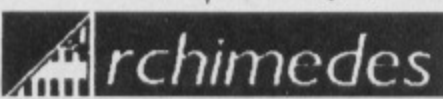
Don't forget to give your name, address and credit card number



SOFTWARE
Bargains

AND

Mercury Games



Software Checklist



TITLE	SRP	SALE
Alien Invasion	14.95	11.95
All in Boxing	14.95	11.95
Amazing Ollie (Educ)	16.39	14.95
Ancestry	81.69	69.95
Archi C (Release 3)	175.08	149.95
Arc Sign	94.00	79.95
Arcade 3 Compilation	15.50	12.20
Arcade Soccer	19.95	19.95
ArcDFS	29.95	26.95
Arch Operating System	21.95	-
Arch Assembly Lang	21.95	18.95
Arch Basic Compiler	99.95	89.95
Arch. First Steps	9.95	7.95
Arch Joystick Interface	28.14	25.95
ArcLight	50.00	39.95
ArcPinball	25.50	20.50
Arcterm 7	79.95	69.95
Armadeus	82.00	71.00
Armadeus Sound Samp. Board	154.95	141.95
Artisan 2	61.95	49.95
Astro	23.44	20.50
Autosketch V2	92.82	79.95
Ballarena	20.39	16.35
Bert Boat	7.95	6.95
Blowpipe	19.95	16.35
Bug Hunter	18.34	16.35
Bug Hunter in Space	18.34	16.35
Bumper Disc 1 (Educ)	23.95	19.95
Bumper Disc 2 (Educ)	23.95	19.95
Charts & Graphs	20.39	17.35
Chocks Away	24.95	24.95
CIS Utilities 2 (2 Discs)	17.32	14.95
Coffee (Educ)	32.84	29.95
Conqueror	24.95	19.95
Corruption	29.95	14.95
Crisis	18.34	16.35
Delta Cat (Joystick)	34.95	31.95
Desktop Folio	105.75	99.95
Desktop Office	132.78	112.95
Desktop Publisher	175.08	139.95
Dominate	20.39	16.35
Drop Ship	19.95	19.95
Dust Cover Archimedes	14.95	9.95
Dust Cover A.3000 K'bd	5.95	3.95
E-Type	19.95	19.95
E-Type Extra 100 Miles	16.95	16.95
E-Type Designer	16.95	16.95
Easword	40.82	34.95
Equator	57.57	49.95
Euclid (RISC-OS)	70.00	59.95
Farmer Giles	20.39	20.39
Film Maker	99.95	84.95
Fish	29.95	14.95
Flexifile	153.21	129.95
Flight Path (Educ)	32.84	29.95
Fortran 77 (Release 2)	116.33	97.95
Font FX	11.75	11.75
Freddy's Folly	15.28	11.95
Freddy Teddy	23.44	20.50
Fun School 2 (0-8yrs)	20.99	16.95

TITLE	SRP	SALE
Fun School 2 (6-8yrs)	20.99	16.95
Fun School 2 (8+ yrs)	20.99	16.95
Fun School 3 for Arch postponed; please call for further details		
Genesis 2	152.75	134.95
Giant Killer	20.39	18.35
Graph Box V2	81.69	69.95
H.P. Paint Jet Driver	14.99	11.95
Hearsay	70.50	59.95
Herewith The Clues	25.50	20.50
Holed Out	19.95	19.95
Holed Out Designer	19.95	19.95
Holed Out Extra Courses 1 & 2 (each)	16.95	16.95
Home Accounts	51.03	41.95
Hostages	19.95	15.95
Hotlink Presenter	58.74	49.95
Hoverbot	15.28	12.35
Ibix The Viking	20.39	16.35
Impression 2	198.57	163.47
Impression Junior	105.69	91.95
Investigator Ref 2	27.95	24.95
Inertia	19.95	15.95
Instigator	49.95	41.95
Inter-chart (Disc)	22.32	18.95
Inter-sheet II (Disc)	34.07	29.95
Inter-word (Disc)	34.07	29.95
Interdictor 2	36.00	30.50
Iron Lord	19.95	15.95
Jet Fighter	15.28	12.25
Kapitan Konflikt	19.95	15.95
Kiddicad	116.33	99.95
Knowledge Organiser	65.00	54.95
Last Days of Doom/Hezarin	20.39	16.35
Let's Spell At Home	25.50	20.50
Let's Spell At the Shops	25.50	20.50
Let's Spell Out & About	25.50	20.50
Mad Professor Mariart	20.39	16.35
Maddingly Hall	15.28	12.25
Mah Jong Patience	20.39	16.35
Man at Arms	19.95	19.95
Manchester Utd.	25.53	20.50
Master Break	19.95	15.95
Maths Pack 1 (5-7yrs)	12.95	10.95
Mental Maths	20.39	16.35
MicroDrive	20.39	16.35
MicroDrive Extra Courses USA	15.27	13.25
Mogul	20.00	16.95
Mouse/Joystick Splitter	19.95	17.95
Multistore V2	306.48	254.95
Nevryon	19.95	19.95
Office Tools	375.00	339.95
Ollie Octopus Sketchpad	16.39	14.95
Ovation	116.33	99.95
Overload	16.00	12.95
PC Access	40.82	34.95
PC Emulator	116.33	116.33
Pendown V2	63.45	63.45
Pipedream 3	172.72	146.95
Pipemania	25.53	20.50
PON	18.34	15.95

TITLE	SRP	SALE
Powerband	24.95	24.95
Presenter 2 (RISC-OS)	46.94	39.95
Pro Artisan	105.00	89.25
Protext v5	152.75	134.95
Realtime Solids Modler	195.00	164.95
Rekall	15.27	12.95
Render Bender	85.00	69.95
Animated Discs	14.95	11.95
Repton 3	19.95	15.95
Return to Doom Trilogy	20.39	16.35
Revelation	63.45	63.45
Rhapsody in Blue	49.95	39.95
Risc Basic Compiler	149.95	129.95
RISC-OS Prog Ref Manual	79.00	79.00
RiscType	20.39	16.95
RoboLOGO	99.95	84.95
Scan-Light Jnr A3000	233.83	216.95
Scan-Light Senior	468.83	439.95
Schema	135.00	114.95
Search & Rescue (Educ)	32.84	29.95
Shareholder	195.00	184.95
Showpage	175.07	154.95
Slapit	20.39	16.35
Solid CAD	149.95	129.95
SolidTOOLS	375.00	319.95
Spellbook (4-9yrs)	25.50	20.50
Spellmaster (Disc)	34.07	29.95
Splice	30.00	24.95
Star LC10 Printer Driver	14.95	11.95
Super - Dump	29.95	26.95
Superior Golf	19.95	15.95
Supersound Creations 1 & 2	18.34	16.35
System Delta Plus	81.69	69.95
Tactic	20.39	16.35
Tempest	135.00	114.95
The Art Machine PK 1 or 2 (each)	35.19	31.95
The Olympics	19.95	19.95
The Pawn	29.95	14.95
The Real McCoy	29.95	29.95
The Wimp Game	19.95	19.95
Things to do with Words	25.50	20.50
Things...with Numbers	25.50	20.50
Thundermonk	15.28	12.25
Tiny Logo/Tiny Draw	35.19	31.95
Tracker	49.95	44.95
Trivial Pursuit	30.64	24.95
Turtles 'World Tour'	20.42	16.25
Tween	30.00	24.95
Twin World	19.95	15.95
U.I.M.	29.95	29.95
White Magic Vol 1 & 2 (each)	19.95	19.95
Winter Box	20.39	16.25
Wordwise A-Plus	34.07	29.95
World Champ. Boxing Manager	25.53	20.50
Worldscape	19.95	15.95
Worra Battle	17.57	14.95
Worra Cad	116.33	99.95
Worra Plotter	35.19	29.95
Zarch	19.95	15.95

Phone or write for our
Archimedes catalogue - it's FREE!

Great discount structure for Educational Establishments - ask for our info sheet

Impression 2

SRP £198.57

Our Sale price

£163.47 (Inc)

NEW RELEASES

TITLE	SRP	SALE
Blaston	19.95	15.95
Boogie Buggy	24.95	21.95
Bouncer	20.39	17.35
Chess 3D	19.95	19.95
Chocks Away Compendium	39.95	36.95
Chocks Away Extra Missions	19.95	19.95
Clip Art Collection Vol 1	23.44	19.95
Clip Art Set 1	35.19	29.95
Concept Designer Pack	28.20	28.20
Creator	45.77	41.95
Fine Racer	19.95	15.95
Freddy Teddy's Adventure	19.95	18.95
Giant Killer Support Disc	17.88	16.95
Gumshoes	24.95	24.95
Level 4 Filesaver	233.83	215.95
Logotron Logo	77.55	77.55
Maggie	63.45	63.45
MIG-29 Fulcrum	40.85	34.95
No Excuses	25.53	21.95
Numerator	77.55	77.55
Pendown Ext. Outline Fonts	21.15	21.15
Speech	19.95	15.95
Tracer	61.25	54.95
Wonderland	34.99	29.95

AND MUCH MORE! - ASK FOR OUR CATALOGUE!!

fun school 3

UNDER 5's Includes:-

- COUNTING - Help teddy reach the jar of honey by counting up to nine
- LETTERS - Join in all the fun at the alphabet fair by pairing large letters
- MATCHING - Pair up the shapes to fill teddy's piggy bank with money
- ACTIONS - Make teddy jump, hop, sleep, juggle, skip, eat & more
- PAINTING - Colouring fun down on the farm with all the pigs & cows
- GALLERY - Learning to read is really easy in the Fun School Gallery.

5-7 YRS Includes:-

- TOYSHOP - Spend your pocket money wisely in the shop
- TIME - Tell the time & watch the cuckoo clock come alive
- FUNTEXT - Explore the Ceefax-style database & take the challenge
- COLLECT - Guide the frog from log to log to create & solve the sums
- ELECTRICITY - Fix the incorrect circuits to set the bell ringing
- JOURNEY - Travel round the village & learn about directions.

OVER 7 YRS Includes:-

- TREASURE SEARCH - Follow compass directions to find the jewels
- WORD SEARCH - Pick out the words cleverly hidden in the large grid
- ROBOT DRAW - Create beautiful patterns & learn how to program
- PLANETARY MATHS - Solve the sums before they hit the forcefield
- SENTENCES - Correct spelling, punctuation & grammar mistakes
- DATABASE - Store information, sort it, search it, then test yourself.

All age ranges for the BBC - OUT NOW!
(Prices per age-range)

SRP BBC Cass £12.99 **Sale £9.95**
SRP BBC 5.25" Disc £16.99 **Sale £13.95**

Fun School 3 for the Archimedes/A3000
- release delayed - please call for details.

fun school 2

BBC/ELE CASSETTE SRP £10.99 **Offer Price £8.95**
BBC 5.25" DISC SRP £13.99 **Offer Price £11.25**
(All prices per age-range - 0-6 yrs, 6-8 yrs or 8+ years)

RECENT RELEASES

TITLE	BBC or Electron Cass	BBC disc	CPCT disc
A Question of Sport	8.95	10.50	14.95
Arcade Soccer	6.50	8.50	9.95
Arc Pinball	-	9.95	10.95
E-Type	6.50	9.75	11.25
Elite	9.95	11.95	15.95
Exile	9.95	11.95	15.95
Hostages	7.95	9.95	11.95
Holed Out	8.50	9.75	9.75
Klax (BBC only)	8.25	-	-
Last Ninja 2	7.95	9.95	11.95
Master Break	7.95	9.95	11.95
Perplexity	7.95	9.95	11.95
Pipemania	8.25	12.25	12.25
Repton Infinity	9.95	11.95	15.95
Sim City	9.95	11.95	15.95
Sporting Triangles	8.25	10.25	-
Tank Attack	10.25	12.25	-
Play It Again Sam Compilations 1 to 10 (each):	6.95	8.95	10.50
Play It Again Sam Compilations 11 to 14 (each):	7.95	9.95	11.95
Superior Col 1 (BBC only)	6.95	8.95	10.50
Superior Col 2 (BBC only)	6.95	8.95	10.50
Superior Col 3 (Ele only)	6.95	-	-
Turtles 'World Tour'	-	7.95	-

Amazing summer offers! - ask for our catalogue.

Play It Again Sam 15

Includes

Last Ninja 2 Ricochet
Cyborg Warriors Network

SRP BBC/Ele Cass £12.95, Offer Price £9.95
SRP BBC 5.25" Disc £14.95, Offer Price £11.95
SRP Cpct Disc £19.95, Offer Price £15.95

JOYSTICKS

Joysticks for BBC, B+/Master 128
& Electron Plus 1

Delta 3B

Twins

£21.95

2 analogue, light
spring action,
joysticks wired to
one plug

Delta 3B

Single

£14.95

Analogue, light
spring action joystick.
Can be used as either
left or right-handed.

Printers ... Printers ... Printers ... Printers

KX-P1081	Panasonic 9 pin 80 col dot matrix	£159.95	SP-200	Seikosha 9 pin dot matrix	£179.95
KX-P1180	Panasonic 9 pin 80 col dot matrix	£169.95	SL-92	Seikosha 24 pin dot matrix	£269.95
KX-P1124i	NEW! Panasonic 24 pin 80 col dot matrix	£299.95	MP-1350	Seikosha 9 pin dot matrix	£314.95

(Prices include VAT, printer cable & courier despatch - (UK mainland only). Please state for which computer you require the printer)

- Please add 95p P&P (Europe £2.50, Outside Europe £4.50)
- All prices include VAT (except books which are zero rated)
- Goods despatched within 48hrs (subject to availability)
- Out of hours answerphone . . . 0532 436300
- Educational discount of 30% off SRP available on most Archimedes software, Official Order No. required - minimum order value £30.00
- Prices correct at time of going to press, E & OE

SOFTWARE
Bargains

Dept. MU71, C/o Northwood House,
North Street, Leeds LS7 2AA
Telephone **0532 436300**
Please make cheques payable to SOFTWARE BARGAINS

I AM 11 years old and have an Electron. Nearly all my friends have Amigas and Atari STs and they say that I should buy a new computer.

The problem with those machines is that software for them is very expensive whereas on the Electron and BBC Micro you can buy excellent software for just £2.

Electrons and BBC Micros – not forgetting Amigas and the others – are much better than games consoles.

Name me a games console with a keyboard, cheap games and the ability to save things on to discs and tapes.

They do have good graphics, but so does the Electron, just take Barbarian, Code-name:Droid, Stryker's Run and Hostages.

Even then graphics aren't everything. I think playability is the main thing: Chukie Egg is one of the best games I've ever played and yet there are hardly any graphics.

My only problem is having a 3.5in drive, there's only a limited number of games for me. – **Graham Lally, Kingston upon Thames, Surrey.**

Running school networks

WE have recently bought 10 A3000s and linked them with the existing 20 BBC Micros on our school network.

Unfortunately the Australian software market doesn't support Acorn machines as well as it should and many old BBC Micro retailers have fallen by the wayside.

Consequently I am searching for assistance from high school teachers and enthusiasts who could help with some inexpensive software.

Having just spent a vast

The Electron has its advantages

amount of money on the hardware we're left with very little for software.

Are there any schools in the UK who would be interested in being linked with ours either by disc/post or modem, for a sort of student liaison scheme?

On a different subject, I once saw a Star Trek game, based on the original TV series, for the Atari ST. Is it available for the BBC Micro or Archimedes? – **Patrick Carswell, Chanel College, 11 Patterson Street, Gladstone QLD 4680, Australia.**

● Low priced software is most easily available from the public domain libraries, though there's no guarantee of quality.

The Star Trek game you mention suffered very badly from piracy.

An early version was stolen and copies quickly spread throughout the world.

Although it was released eventually – considerably different to the pirated version – its sales were not encouraging.

There is no Archimedes version and it's unlikely there will be one in the near future.

Infinite bombs on Bombed

I REALLY enjoyed playing Bombed from the February issue, but it can be very annoying to run out of dynamite.

So here's a cheat that goes

in Listing II to give you an extra bomb every time you use one:

```
510 DEFPROCbombdrop:$(X%,Y%)
=2:B%=1:BOMB%=BOMB%+2:BX%=X%:
BY%=Y%:PROC:ENDPROC
```

And if you want infinite lives change line 470:

```
470 UNTIL LX=15
```

–**Michael Ballinger, Cirencester.**

Way to run !DangerDog

I HAVE just upgraded my subscription to receive the Archimedes disc. On receiving my first one I followed the instructions and managed to extract both !DangerDog and !King from the archive and put them in the ram disc and then on to a floppy.

But when attempting to remove the ram disc I found it impossible to delete !King, so in the end I was forced to switch the machine off. I was able to delete !DangerDog, so what went wrong?

Also when attempting to load either of these into Basic so I could run them I just got the ... is a directory error message.

It must be possible to load and run these programs because they were Basic listings printed in the magazine. I don't particularly want to type them in from the magazine again, so what's wrong here?

Another peculiarity emer-



ged with the ShopList program. I transferred it to floppy and ran it, saving the file I created to the floppy, as expected.

But when I came back later I double-clicked ShopList from the DeskTop but it just wouldn't load the file that was on the disc – it kept looking on the hard disc, so couldn't find it.

But when I loaded the program into Basic it loaded the shop file from the floppy disc without difficulty! What is going on? Surely this defeats the whole object of the DeskTop?

Incidentally only !King has any sound. I hope you can help – **W. Cummins, Chingford, London.**

● Well that's quite a list of problems, but they're all fairly simple to solve.

The first step is to understand that !DangerDog and !King are not Basic programs – at least not entirely.

Technically they are called applications, which is to say directories that have a name beginning with !.

If you double-click them they will run, you don't need to

WANT to write to The Micro User? The address is:

Letters, The Micro User, Europa House, Adlington Park, Macclesfield SK10 4NP.

Writers of the most interesting letters receive a £10 prize.

load them into Basic – in fact you can't, as you discovered.

Inside these application directories are other files which include the Basic programs that were in the magazine, but heavily modified to run on the Archimedes.

The problem with deleting !King is that the both the main directory – and the files it holds – are locked.

To unlock them you must first Shift+double-click with Select (left hand button) on the application icon, which opens up the inside of the application directory without running it.

Now click Menu (middle button) over the Filer window that has just appeared and click on the Select all option using Adjust (right hand but-

Another Basic variant

I WAS interested to see a version of BBC Basic for the PC – BBasic 3 – being mentioned in the May Micro User News.

I use a different one, BBC Basic 86+ from M-Tec or Grey Matters.

Although it's a bit buggy and the editor is ghastly, it does provide a familiar environment for BBC Micro users. Most standard BBC Basic programs run correctly with little

or no modification – apart from the inevitable problems with different screen modes.

In addition, it seems to offer some real advantages over QuickBasic – one of the most popular PC Basics – such as SPOOL and EXEC files, user-defined function keys, the integral 8088 assembler and the ability to print text at the graphics cursor. – **Sebastian Lazareno, Ware, Herts.**



ton). Now move up to *Selection* and slide across to the arrow, then on to the sub-menu and go down to *Access* and again slide across to the arrow to bring up the access dialogue box.

Make sure the first item does not have a star in it – click on it if it does – then click on the *Update* button to alter the files on disc.

Now do the same thing to the !King directory itself then use the Filer Menu to delete !King – all the sub-files will go as well. If they are locked !King cannot be deleted.

The problem with ShopList is more subtle: The Filer – which controls accesses to all file storage whatever media is used – maintains a default directory.

If a request is made to load or save a file and it isn't explicitly stated where the file should go, the default directory is used.

For example, the default directory might be *adfs::fred.\$* which is the root directory of an *adfs* disc called *fred*. So a command like:

```
SAVE"myProg"
```

will save it to the default directory and if disc *fred* isn't in a disc drive you will be asked to insert it. On the other hand, the instruction:

```
SAVE"ram:$Temp.myProg"
```

will save the file in sub-directory *Temp* in the *ram* disc.

Your machine clearly has the hard drive set up as the

default directory, but why did it save to floppy sometimes?

Although you haven't said in your letter, we would guess that you get into Basic using a utility that sits on the icon bar.

And when you load a file into Basic using it, the utility sets the default directory to be the place that the Basic program has just come from. That's why it works from Basic but not from the DeskTop.

Although changing the default directory is bad programming practice on the Archimedes, you could add a line to the start of the ShopList program:

```
0 *DIR adfs::0.$
```

which will set the default directory to drive zero.

Due to the differences in sound between the 8 bit and 32 bit machines, conversion is not simple.

Viewstore for the Electron

DOES Viewstore exist for the Electron – version E1.00 perhaps? If it does where can I get a copy, either new or secondhand?

Also are there any public domain libraries for the Electron? I'd be interested in hearing from any. – A. B. Richardson, P.O. Box 5471, Wellesley Street, Auckland, New Zealand 1036.

● We spoke to Pres about this and they told us there's no special Viewstore for the Electron because the stan-

More winning ways

I READ with interest the Micro User article, Bucking the odds, written by Graham Kendall. About 10 years ago I used an Acom Atom to investigate three even-money gambling systems.

Although it's interesting to see the variation in fortunes, the punter always loses. Here's a rundown on the three systems:

Martingale: *This is a simple stake doubling system. Every time you lose double the stake for the next bet:*

```
1 2 4 8 16 ...
```

So after three consecutive losses you'll be betting eight units. When you eventually win the net profit is one unit. This is a classic example of chasing your losses.

Straight Metropolitan: *Make*

a list of several numbers, for example:

```
1 3 5 3 7 3
```

The stake you place on the bet is the sum of the two end numbers, in this case four. If you win delete the numbers, if you lose add the value of the stake to the end of the list and calculate the new stake.

When the list is cleared the net profit is the list total.

Reverse Metropolitan: *Make a list of several numbers, for example:*

```
1 3 5 2 4 6
```

The stake is always the sum of the end numbers, in this case it's seven. If you lose delete the end numbers, if you win add the stake to the list.

The apparent advantage of this system is that you know

dard rom is compatible.

However the disc supplied is 5.25in and it needs to be converted to 3.5in. Pres can also supply a set of notes for Electron users of Viewstore for £5.

As for getting hold of a copy, we're not so sure. Pres no longer have any, but you could try some other UK suppliers. As a final resort you could advertise for a copy in *The Micro User Classifieds*.

Nothing ventured...

I AM a regular reader of The Micro User and often type in

the listings. I had a go at the Quick Commands program from Routine Matters in the May issue – but line 90 is missing.

Could you print it please because I can't work out what it should be. – N. J. Langridge, Swavesy, Cambs.

● We had to go back to the original for this – there is no line 90, the program just doesn't have one. But you can put one in if you like:

```
90 \ Nothing
```

More accurate time lines

FOLLOWING the publication of my calendar programs for the 8 bit and 32 bit BBC Micros in the January 1991 issue of The Micro User you printed a letter by Michael Leete pointing out a couple of interesting historical features that I hadn't incorporated.

Since then I have been in contact with Mr Leete who kindly provided details of what needed changing.

As a result I have produced new versions of the programs both of which now run from 1AD to 9999AD. –

PRIZE letter

what your losses are going to be and higher value bets are made with units gained rather than chasing losses.

If the gaming system to be simulated is roulette the stake must be an even number of units. This is to allow for a zero result where half the stake is returned. Also gaming houses usually apply limits to the maximum and minimum stake values.

If anyone finds a winning system I'd be very interested to know about it – but it's probably an error in the program. – Mike Carr, Sheffield.

Martyn Fox, Windsor, Berks.

● The two amended programs can be found on this month's subscription discs and tapes.

There's more all round

I AM writing to complain about the way you've conned the readers. In the May issue you said that The Micro User was going to be wider but, looking at the June issue, all you've done is put a border on the edge. At least you didn't put the price up. – Peter Snow, Ilford, Essex.

● True, there is a border – but there was an even bigger one before we changed the page size.

There are now four columns per page instead of three, or five where we used to have four. Which means we can get up to a third more information per page.

We have the same number of editorial pages as before, so that means you get even more in every bumper issue!

And yes, we haven't changed the price which means *The Micro User* is even better value for money.

Oh rats!

When recently using my Arc
The mouse started having a lark
I had no luck
The pointer got stuck
And my optimism went dark

Oh what can the problem be
The buttons, well they work all three
It happened for days
In several ways
Oh what can this problem be

It's either the wire or ball
But it can't be the wire at all
'Cos I changed the mouse twice

(I had a plural of mice)
My temper was starting to fall

I decided to give it a wash
I gave it a soaping because
All of that muck
Was making it stuck
It saved me a whole load of dosh

After the mouse ball's first rinse
It's worked like a dream ever since
I hope that this message
Will make problems less(-age)
And that non-scanning rhyme made you
WINCE!
– Michael Youell, Sandy, Beds.

The Micro User gui

KENT

COMPUTEREYES

16 Starnes Court, Union Street, Maidstone, Kent

**Archimedes specialist for
the Kent area**



(0622) 751096



LONDON

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

HAMPSHIRE

HOME, BUSINESS
AND EDUCATIONAL COMPUTERS
FULL BBC A3000 & ARCHIMEDES RANGE
REPAIRS, ACCESSORIES, SOFTWARE
PRINTERS AND PC COMPATIBLES
ACORN AUTHORISED DEALER

FACT SYSTEMS (BARROW) LTD

UNIT 19, FOCUS 303 BUSINESS CENTRE,
SOUTH WAY, WALWORTH INDUSTRIAL ESTATE,
ANDOVER, HANTS, SP10 5NY

10AM-5PM MON-SAT

(0264) 334811

REAR OF LOCOMOTORS

SCOTLAND

THE COMPUTER DEPOT

205 BUCHANAN STREET
GLASGOW G1 2JZ
TEL: 041-332 3944

55 CLERK STREET
EDINBURGH EH8 9JQ
TEL: 031-668 4146

D U N D E E
TEL: 0382 29653

*Best display in Scotland
of BBC and Archimedes*

FREE installation of all upgrades

*Excellent prices on printers, monitors,
drives etc... Repairs to BBC machines*

*Scottish dealer for WATFORD
ELECTRONICS*

Service Dept. phone 041-332 0625

Licensed Credit Brokers

Mail Order Service

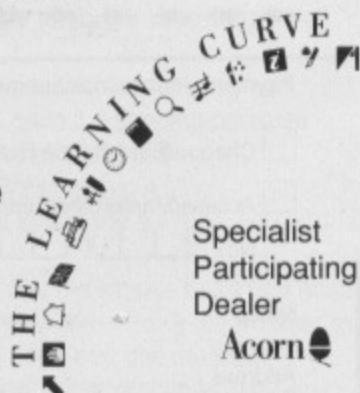
ESSEX

Le Computer

the Essex Acorn Specialists

- Home and School
- Special needs
- Specialist Software
- Teacher's Scheme

Tel: (0245) 362225



Specialist
Participating
Dealer
Acorn

DERBYSHIRE

Acorn Archimedes BBC A3000

Sound Advice

Sales

We offer

Home Tuition

Technical Support

Acorn Approved

**SELECTIVE
COMPUTER
SERVICES**

Telephone
Derby (0332) 690691

Contact Yvonne Benson on 0625 878888 now to

de to local dealers

BIRMINGHAM

DACO SYSTEMS

463 Warwick Road, Tyseley, Birmingham B11 2JP

**Your Birmingham
Acorn, Tulip &
Osicom PC Dealer**

- Special Needs • Business •
- Education • Home Use •

Tel: 021-706 8933



CLEVELAND

**NOW
AVAILABLE
THE A3000 JET
SET PACK**

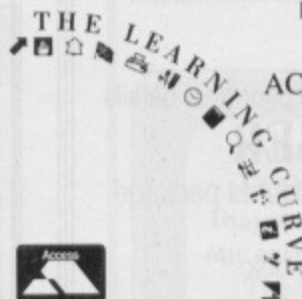
TEL: 0642 786922

FAX: 0642 783740



YARM COMPUTERS

HARDWARE - SOFTWARE - PERIPHERALS - SUPPLIES TO EDUCATION,
BUSINESS AND HOME



ACORN DEALERS

**FREE 1 MEG
UPGRADE
FITTED**

WINPENNY HOUSE, 137 HIGH STREET
YARM, CLEVELAND TS15 9AY



BEDFORDSHIRE

ADVANCED COMPUTER SERVICES

The area's only Acorn specialists

Hardware ★ Software ★ Consumables ★ Spares
Servicing ★ Repairs ★ Peripherals

FORTHCOMING PRODUCTS

1. !Label - Fully Multi-Tasking produces labels from any database
2. Business Accounting Program - details to be released
3. !Module 1 - Pupil Administration Package for GCSE Science
4. National Curriculum - Markstore Program

After sales service second to none

8 Frederick Street, Luton LU2 7QS

☎ (0582) 20604



ISLE OF WIGHT



COMPUTER TUTORIAL SERVICES

ACORN DEALERS

Archimedes &
A3000

All Hardware and
Software

Sales & Business Consultancy
Individual Tuition
Bespoke Software
Micro Computer Supplies

TEL: (0983) 294333 FAX: 298439

4 Mill Hill Road, Cowes, Isle of Wight PO31 7EA

MIDDLESEX

JR Letronics Co

- Archimedes/A3000/BBC
- Computer Peripherals
- Educational & Business
Software
- Documentation
- Discs & Paper

Proprietor:
J. H. JARLETT

Acorn

The choice of experience
Authorised Dealer

☎ 081-977 8053

and Fax

The Annexe, 2 Broad Street, Teddington, Middlesex TW11 8RF

After sales helpline - We try to help



DEVON



0822 853434

Acorn

AUTHORISED
ACORN DEALER

- Archimedes Computers
- Monitors Printers
- Education
- Teacher's Scheme
- Repairs to BBC, Master, Archimedes,
Printers, etc

**Ask for our
Finance and
Leasing Terms**



WEST DEVON ELECTRONICS

**Station Road, Horrabridge
Yelverton, Devon PL20 7ST**

to have YOUR company included in this section

YOUR local dealers

CUMBRIA

KENDAL COMPUTER CENTRE LTD.

68 Stramongate, Kendal, Cumbria

Authorised Acorn Dealer
and Service Centre

IBM Compatible Systems 286 processors from £499 phone for details

ARCOUNTS MANAGER

Now available, a full featured Professional Accounts package
for the Archimedes

Phone for details and demonstration disc

(0539) 722559



NOTTINGHAMSHIRE

G. A. COMPUTERS LTD

Acorn  AUTHORISED
ACORN DEALER

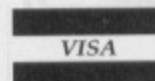
ACORN PRE VAT PRICES HELD UNTIL JUNE 31ST

0% FINANCE AVAILABLE, AVERAGE A.P.R. 0%

SUPPLIERS TO EDUCATION

STOCKISTS OF AMSTRAD, COMMODORE, ATARI

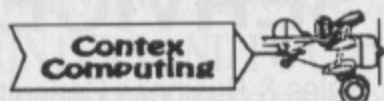
LARGE RANGE OF PERIPHERALS & MEDIA
AMSTRAD ADVANCED SYSTEMS CENTRE & CAM-
BRIDGE Z88 AUTHORISED DEALER
SAGE MAIN AGENT



1 WILFORD ROAD, RUDDINGTON,
NOTTINGHAM. PHONE (0602) 211225
FAX (0602) 456289



Contact Yvonne Benson on 0625 878888 now to have YOUR company included in this section



BANK MANAGER

Complete and versatile personal accounts program. Consistently acclaimed!

'data entry is a delight...professional...excellent product' Micro User April 86

Standard version: Enter cheques and receipts. Automatic date sequencing. Reconcile statements. Search, amend and delete. Analyze expenditure. Forward cash flow forecast. Budgets. Up to 36 bank accounts online, inter account transfers, 9999 standing orders, 99 analysis headings, over 4,000 postings on an 80k diskette. Reports to screen or printer. Mix foreign currencies, graphics, password, file recovery, field editing, programmable reports.

Master/Compact version adds ADFS/hard disk support, sideways RAM, 40/80 col screen reports, and other enhancements.

Archimedes /A3000 adds high speed native mode, RAM disks, wild card analysis enquiries, sort and more. 'Impressed...ideal...easy to use' Micro User March 88

Bank Manager (all versions; disk systems only) £25.00

BANK MANAGER BUSINESS UTILITY

For the club accounts or small business user. From the Bank Manager data files print "trial balance" or "P&L reports" via the programmable spreadsheet generator.

Business Utility Pack (needs the Bank Manager) £12.00

TYPING TUTOR

Quickly learn to touch type. Over 90 smoothly graded lessons graduate you from the basic home keys to complete keyboard mastery. Word scan or exact key checking. Targets may be revised, rhythm metronome, key click, free format options. Recommended for adult education.

Typing Tutor £15.00

SPREADSHEET MK V

Low cost versatile spreadsheet. 26 cols, 900 (Arch/A3000) or 99 (B/Master) rows, many functions and facilities including programmable report writer and input scripts.

Spreadsheet MK V disk £15.00

All programs available in B, Master/Compact and Archimedes/A3000 versions. Archimedes/A3000 versions are RISC OS compatible

State type of computer (eg A3000, B, Master) and disk type (eg 3 1/2" or 5 1/4" 40 track or 5 1/4" 80 track). Please add £1 P&P (Overseas £3.50)

CONTEX COMPUTING
(Ref MU), 15 Woodlands Close,
Cople, Bedford MK44 3UE



Tel: 0234 838347

FREE

with every computer
we sell...

...our expertise!

If you are buying a new Archimedes or Master Series computer, you don't expect to know all about it from day one. That's where we come in. We don't leave our customers high and dry with their problems - they know they can rely on us to get them out of trouble. Whether it's hardware or software, we're the people who know.



Acorn
R140
Unix
Work-
station

Cambridge
Z88
Portable

THE DATA STORE

6 Chatterton Road, Bromley, Kent
Tel: 081-460 8991. Fax: 081-313 0400
(closed Wednesday)

An old-fashioned specialist
computer shop

!!!! EVERYTHING'S A BARGAIN !!!!

NO VAT INCREASES!!!

T.M.J. Computer Software

39 Farmstead Road, Corby, Northants. NN18 0LE. Tel: 0536 69011
On Line BBS:DARKHAVEN 0604 413716 (Service Restored)

*** All prices are inclusive of VAT and POSTAGE ***

Product	Price	Product	Price
The Wimp Game	£16.99	Micro Drive Extra Courses	£12.95
Iron Lord	£16.99	Hostages	£16.95
Apocalypse	£25.99	Impression 2	£160.95
Nevron	£16.99	Arc Pinball	£21.99
The Olympics	£16.99	Trivial Pursuit	£23.75
Chocks Away Version 2	£19.99	Man. U. Football	£20.99
Chocks Away Extra Missions	£16.99	Master Break	£16.99
E-Type	£16.99	The Real McCoy	£25.99
Bug Hunter in Space	£15.99	The Real McCoy 2	£25.99
Ball Arena	£16.99	The Real McCoy 1&2	£49.00
Mig 29 Fulcrum	£34.99	Boogie Buggy	£19.99
White Magic 2	£16.99	Twin World	£16.99
Holed Out 1 & 2	£14.99	Tactic	£16.99
Interdicator 2	£29.95	World Championship Boxing Manager	£21.99
		PRES A3000 Monitor Stand	£31.99



Open Monday-Friday 9am-12noon & 1.30pm-6.30pm
Saturday - 9.30am-1.30pm



CUMBRIA

FREE support with all our system

- *Expert advice! on system purchase
- *Expert help! on using your system
- *Expert backup! software support and hardware servicing
- *Leasing facilities now available

Consult the experts!

CSS Computer Centre

Unit 3A Townfoot Ind. Est. BRAMPTON
CUMBRIA CA8 1SW

☎ 06977 3779

Acorn Qualified dealers and Unix centre

Authorised SJ Networks, installer * Education specialists

Government plc and education orders welcome



Acorn
The choice of experience



Alsystems
EDUCATION AND TRAINING MICROCOMPUTER SYSTEMS



Telephone ALTON (0420) 87213



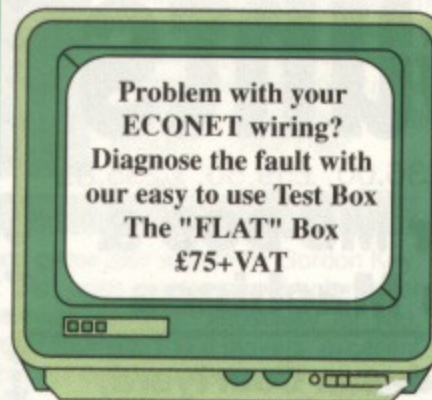
Acorn Level 4 File Server

available now!

Only £160 + VAT

FREE SOFTWARE FOR THE ARCHIMEDES!

Well, free if you buy any of the Archimedes range of ACORN computers from us. This offer only applies while stocks last, so call us now. Not only are our prices competitive but we also offer telephone/personal support for those who need it.



Problem with your
ECONET wiring?
Diagnose the fault with
our easy to use Test Box
The "FLAT" Box
£75+VAT

- ACORN REPAIR CENTRE
- UNIX & TCP/IP SOLUTIONS
- NETWORK INSTALLATIONS

Connect your Archimedes to a
'normal' Television for only
£20+VAT



We supply a wide
range of hardware
and software.

Watch out for our new address, soon...



Taipei2

for Archimedes/A3000

Play one of the most addictive games of patience ever

'A nice implementation, which I found very addictive' A&B March 1991

See review in the May 1991 issue of The Micro User

Send cheque for £9.95 to

Black Sheep Software, PO Box 1831, London N15 3NE



SIGNWRITER

for the BBC & Archimedes

Professional lettering that looks good at larger sizes.
Produce quality Banners, Posters, Letterheads, Adverts,
Signs, Tickets & Notices in minutes.

BBC Disk £29.95 - Archimedes £39.95

Extra Fonts at £5.75

Black & Coloured Ribbons - red, green, blue, purple, orange & brown for various
printers. Please ring for availability and prices.

5 1/4" Discs £0.40 each. 3 1/2" Discs £0.80 each.

(All prices include VAT and Delivery)

We take Access and Visa. Please make all cheques payable to WIGHT SCIENTIFIC

WIGHT SCIENTIFIC

44, ROAN STREET, GREENWICH, LONDON, SE10 9JT

Telephone 081 858 2699 Fax 081 853 4416

DIAMOND-PUBLIC-DOMAIN

For The Archimedes
Over 290 Discs Available

Graphics-Utilities-Draw-Files-Sprites-Applications-SoundTracker
Clip-Art-Sonix Super Sounds-Games & Demos

For First Class



Full Range of The Serial port
Software/Hardware Available

65watt Power Supplies
Cased: 12 volt at 1.5amp
Surge upto 2.5amps £29.50
5volts at 3.75amps +£3.00 Del.

And Same Day



Discs Are Priced AT £1.50 Each. This Includes Recorded Delivery & Package.
For Catalogue/Demo Disc With Over 1300k Of Useful 'GOODIES' Send £1.50 To-

Mike Witkiss, 86 Meadowbank, Moor Lane, Holway,
Holywell, CLWYD. CH8 7EF

EQUIPMENT
ALWAYS
IN
STOCK

MICROMANIA UK

SPECIALISTS IN QUALITY 2ND USER
EQUIPMENT (0332) 830140

SALES
HOTLINE:
(0332) 830140

MAIL
ORDERS:
MICROMANIA
9 GIAMIS
OAKWOOD
DERBY
DE2 2AJ

Archimedes A3000 Base	£495
Archimedes A310 Mono	£645
Archimedes A310 Colour	£695
BBC Master 128K/Drive/Monitor	£320
BBC B/Drive/Monitor	£245
Colour Monitors From	£130
Epson Printers From	£100
Monitor/Printer Leads From	£7

CARRIAGE
EXTRA

REPAIRS REPAIRS REPAIRS

ALL COMPUTERS REPAIRED
FREE ESTIMATES
PRICES FROM £15
3 DAY TURNAROUND

EDUCATIONAL AND
INSTITUTIONAL
ORDERS WELCOME



PART
EXCHANGE
WELCOME

ALL
EQUIPMENT
3 MONTHS
WARRANTY

MAKE YOUR MICRO EARN!

Yes making money with your micro becomes incidental when you know how. Your micro is, if only you knew it, a gold mine. The size and make is irrelevant. Make the initial effort. **NOW** by starting your own **HOME BASED BUSINESS.**

This may be the most important move you will ever make!

REMEMBER: You'll never get rich by digging someone else's "ditch". Anyone in the country, including **YOU**, can become very rich in a relatively short period of time just by doing a few basic things! It's more rewarding than playing games. The benefits are many and varied, Full or part time. For **FREE** details send S.A.E. to:



HOME BASED BUSINESS

31 PILTON PLACE (MU19)
KING AND QUEEN STREET
WALWORTH, LONDON SE17 1DR

Accounts

Prices: £14.85, £24.25, £36.00, £59.50, £235.81

Software for MS-DOS & BBC/Acorn Machines

**Micro-Aid Kildonan Courtyard,
Barrhill, GIRVAN, Ayrshire, KA26 OPS**

Tel: 0465-82288 FAX available VISA/ACCESS

LEARN BASIC ON DISK!

Announcing the most comprehensive, compact step-by-step course ever, now being sold worldwide! Each disk contains 16 full lessons packed with information covering all the major BASIC keywords. Topics include: Errors, Tables, Printer Control, Sorting, Functions, Filing, * Commands, Word Processing etc... The Library Disk supports Elementary Part 1 with 34 additional programs. Ideal for classroom or home use, with FULL back-up facility. See news columns in March and June 1990 issues. Buy in affordable units or economy kits. Lessons numbered as follows:

1. Elementary 1-16, 1a. Library, 2. Elementary II 17-32, 3. Intermediate 33-48, 4. Advanced 49-64.

Disks 1 or 2 £20.95. Disks 3 or 4 £22.95. Library £10.95. Trial 8 Lessons £10.95.

Starter Kit: Disks 1 and 1a £28.95. Elementary Kit: Disks 1, 1a and 2 £44.95

Inter Kit: Disks 1, 1a, 2 and 3 £64.95. Full Kit: All five £84.95, Disks 1 + 2 £36.95

For BBC B/Master/Compact/Electron and Archimedes with Emulator

Please state whether 40T/80T and DFS/ADFS. Payment by cheque please to:

UNIVERSAL COMPUTER SUPPORT

Dept. MU, 168 Hough Road, Walsall,

West Midlands WS2 9BQ. Tel: (0922) 30038

ADVERTISERS' INDEX

4Mation.....	46	Home Based Business.....	114
4th Dimension.....	49	Ian Copestake.....	25, 31
Ace.....	95	IFEL.....	103
Acme PDSL.....	103	Indata.....	103
Advanced Comp Systems.....	111	Integrex.....	39
Al Sytems.....	113	JR Electronics.....	111
Alpine.....	19	Kendal Comp Centre.....	102, 112
Arcania.....	103	Le Computer.....	110
Arxe Systems.....	58	Micro Aid.....	114
Atomwide.....	8	Micro Studio.....	66
Automatic Services.....	110	Microfix.....	66
Beebug.....	12, 34	Micromania.....	113
Bell.....	102	Micropower.....	91
Black Sheep.....	113	Minerva.....	87
Burton.....	102	Morley.....	2, 3
Calligraph.....	90	Norwich Comp Services.....	94
Care.....	94	Orion.....	26, 27, 67
Chelsfield.....	95	Pineapple.....	96
Clares.....	37	Pres.....	20
Computeck.....	92	Rickett.....	114
Computer Concepts.....	82	Selective.....	111
Computer Depot.....	110	Senlac.....	93
Computer Focus.....	62, 95	Serial Port.....	55, 65
Computer Tutorial.....	111	Shenley.....	102
Computereyes.....	110	Silicon Vision.....	10
Contex.....	112	Skyfall PD.....	114
Corplan.....	103	Soft Sector.....	114
CSS Computer Centre.....	113	Software Bargains.....	106
Dabhand.....	6, 7, 52	Storm.....	93
Daco.....	111	Superior.....	OBC
Dastore.....	112	TMJ Software.....	113
Diamond PD.....	113	Universal Comp Support.....	114
Electronic Font.....	38	Voltmace.....	102
ESM.....	22	Watford.....	68-81
Eterna.....	45	We Serve.....	66
Fact Systems.....	110	West Devon Electronics.....	110
GA Computers.....	112	Wight Scientific.....	113
Ground Control.....	103	Willow.....	93
Hi-Voltage.....	14, 15	Yarm.....	111

SOFT SECTOR

Tel: 0962
863225

UNBRANDED DISKS by SONY, VERBATIM, BASF
100% Certified and Guaranteed Error Free

	10	100
3.5" DSDD 135tpi.....	£4.90	£46.00
3.5" DSHD.....	£9.60	£86.00
5.25" DSDD 48tpi.....	£3.10	£28.00
5.25" DSDD 96tpi.....	£4.30	£40.00
5.25" DSHD.....	£5.20	£49.00

All disks come with labels

5.25" with envelopes/write protect tabs

BRANDED DISKS by VERBATIM DATALIFE, TDK

Price per pack of 10

3.5" DSDD 135tpi.....	£7.00
3.5" DSHD.....	£12.50
5.25" DSDD 48tpi.....	£5.50
5.25" DSDD 96tpi.....	£8.00
5.25" DSHD.....	£8.50
Amsoft CF2 Disks.....	£19.00

ACCESSORIES

Disk Boxes 40 Cap 3.5"/50 Cap 5.25" - £6.99 each 80 Cap 3.5"/100 Cap 5.25" - £7.99 each
(10% Discount when bought with 25 disks or more)

Library Cases 10 Cap 5.25"/3.5" - £1.05 each Mouse Mats - £2.69 each
Disk Labels 3.5" - £1.00 per 100 Disk Labels 5.25" - £1.25 per 100 Envelopes - £3.10 per 100
Printer Ribbons for most printers - Original and Compatible - Ring For Prices

ALL PRICES INCLUSIVE OF CARRIAGE FOR MAINLAND UK, ADD VAT AT 17.5%
SOFT SECTOR 58 Andover Road, Winchester, Hants SO22 6AG

**PUBLIC
DOMAIN**

Skyfall

Just £1 for the **DOUBLE** Skyfall demo disc

The New Skyfall Summer Catalogue is now out, it contains full details of our large 340 range of discs. New this season are Super Compiled Application Discs, which only have the best applications on them, plus some New Outline fonts. Also we still have the largest DTP resource and Sound 'n' Graphics collections

Regular customers can purchase our discs at £1.50 to £2 each, and members of our new 'PD Club' can enjoy a 50p discount off these prices, as well as unlimited user support, product discounts and free catalogue updates. So if you want the 'Summer '91 Double Demo Disc' and 12 page detailed catalogue just send £1 coin with your name and address to:

SKYFALL, PO Box 2220, Birmingham, B43 5RZ.

The convenient SINGLE SOURCE for EDUCATIONAL SOFTWARE

- * All popular educational programs at publishers prices or below including Mirrorsoft, 4Mation, Sherston, E.S.M., Bourne, Chalksoft, Kosmos, Database Fun School, etc.
- * Wide range of formats: Not only BBC/A3000/ Electron but also Spectrum +2/+3, Amstrad, Nimbus, Commodore 64/Amiga, Atari ST, IBM-PC and others!
- * Vast stocks: 30,000 programs available for immediate delivery.
- * Unconditional guarantee: problems rectified by expert staff - telephone helpline also available.

THE EDUCATIONAL SOFTWARE DIRECTORY
describes and prices hundreds of programs

Write or phone for a free copy

RICKITT EDUCATIONAL MEDIA

FREEPOST • Ilton • Ilminster • Somerset TA19 9HS •
Telephone 0460 57152 • Fax 0460 53176

Please state the age of your children and make of your computer



The Fourth Dimension

THE REAL MCCOY 2



The Fourth Dimension

4 Game Collection

The Real McCoy

A prestigious collection of 4 top games in their original format from The Fourth Dimension; U.I.M. (a massive 3D action adventure), Arcade Soccer (multi-player World Cup action), White Magic (a unique arcade role-playing adventure) & Quazer (a superfast arcade shoot'em up).
Bought individually they would cost £81.80



The Real McCoy 2

This 4 game collection really is The Real McCoy. These are genuine top games in their original format with full instructions. The games have been carefully selected and include a massive 3D mega game, an arcade isometric game and 2 quite different multi-player sports games. Bought individually they would cost £89.80p making this a very prestigious special edition collection.

APOCALYPSE (R.R.P. £29.95)



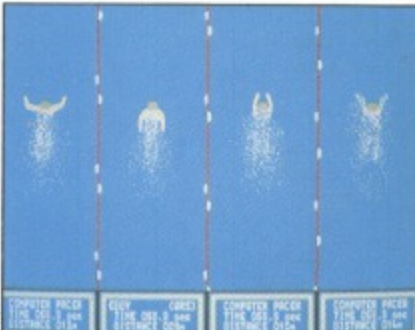
Apocalypse was written especially for the Archimedes by Gordon Key. It places you on the surfaces of varied futuristic hostile planets colonised by very varied but always ruthless enemies. In your highly advanced and extremely fast and manoeuvrable craft you must find your way around the increasingly massive planets and systematically annihilate the enemy.
"Simply, this is the best release yet for the Arc by absolutely miles. Stunning graphics, stunning sound and masses of action. Brilliant."....Risc User

HOLED OUT (R.R.P. £19.95)

Holed Out is a superb 3D golf game also written by Gordon Key. Whether you're young or old, male or female, beginner or professional Holed Out has been designed especially for you. Features include: 2 contrasting courses, 1 to 6 players, excellent 3D graphics and sound effects, full set of accurately defined clubs, slice/hook capabilities etc. etc..
"...it is quite a stunning piece of work.".... The Micro User
"...I play golf and this is the nearest thing I've seen to the real game on a computer. The graphics are very good with a large scale golfer complete with bag and trolley (and a good swing!) and the sounds are very realistic."....Archive



THE OLYMPICS (R.R.P. £19.95)



The Olympics can be played by 1 to 8 players and is comprised of 6 main events: Diving, Shooting, Javelin, Swimming, Canoeing and Pole Vault. It contains a superb piece of music, opening and closing ceremonies and 14 national anthems.
"Compilation packages of sporting events may have been round on other machines for ages but the first one for the Arc is every bit as good....VERDICT: A Gold Medallist."....A&B Computing (Now Archimedes World)
"Excellent graphics.... Classy presentation.... and plenty of variety.... Should find favour with all members of the family. Definitely recommended."....Risc User

INERTIA (R.R.P. £19.95)

Inertia is a totally original game with beautiful graphics and superb digitised sound effects and music. There are 2 massive and varied landscapes to be explored and many special tiles to be collected. Your craft floats freely around the landscapes and you must exert forces upon it to guide its speed and direction. Full colour 3 dimensional maps of the 2 landscapes can be viewed at any time and are a joy just to wander around.
"... the accompanying music is superb....Inertia is another reasonably priced game for all ages. Highly recommended.".... The Micro User



ARCHIMEDES & BBC 3000

All games are compatible with the BBC A3000 and 310 & 400 Series

The Real McCoy....£29.95 The Real McCoy 2....£29.95

SPECIAL MAIL ORDER OFFER
The Real McCoy 1 & 2 ONLY £49.95

DEALERS

Most of our games are available from most good dealers. If they don't stock them, then please give them a copy of this advert & tell them they can easily buy them direct from us.

SUPERFAST 1st Class FREE Delivery

LETTER



Simply send us a quick letter telling us the game(s) you require, your name and address, and payment via cheque, postal order or ACCESS or VISA card details.

All orders are despatched immediately by 1st Class post. Carriage is paid by us in the U.K.
(Overseas orders add £3 per product).
FULL DETAILS OF ALL OUR GAMES ARE AVAILABLE ON REQUEST & ARE SENT WITH ALL ORDERS



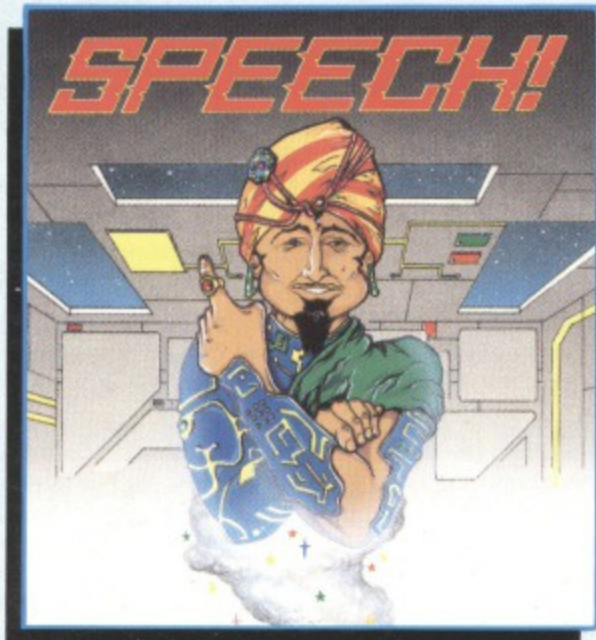
PHONE

TELEPHONE ORDERS WELCOME
(0742) 700661/769950
ACCESS & VISA Accepted
24 hour Service 7 Days a Week

The Fourth Dimension

1 Percy Street,
Sheffield,
S3 8AU, England
Tel: 0742 700661
or 769950

SUPERIOR SOFTWARE



A3000/Archimedes



A3000/Archimedes

SPEECH!

Give Your Computer a Voice

SPEECH! works entirely in software, no extra hardware whatsoever is required, and has an unlimited vocabulary. The program has a built-in parser which translates English words into phonemes, so it can directly speak words you input or text files. The phonemes can be used directly if you wish, so stress and intonation can be added as required and even foreign languages can be spoken. SPEECH! includes a user-friendly spelling program, which can be easily changed to include your own words.

The new A3000/Archimedes version of SPEECH! is fully RISC OS compatible and allows multitasking in Desktop. You can vary the pitch, speed, volume, and voice, both directly and in your own text files and programs, and can even 'sing' words over a four octave range! The A3000/Archimedes version also includes a program so you can alter the dictionary yourself.

BBC Micro/Master & 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.

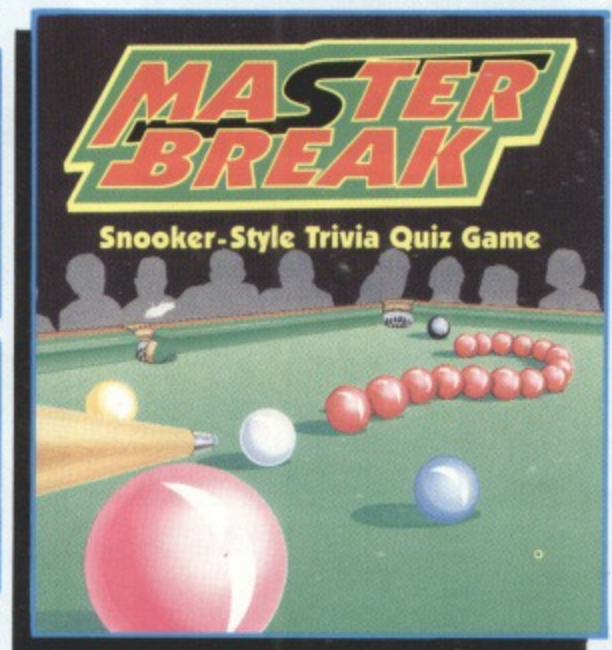
BBC Micro/Master, Electron & A3000/Archimedes



BBC Micro/Master



A3000/Archimedes



PLAY IT AGAIN SAM 15



Last Ninja 2



Cyborg Warriors

PLAY IT AGAIN SAM 15

A New Action-Packed Four-Game Compilation

LAST NINJA 2

The Last Ninja is back with a vengeance! Battling with fists, shuriken stars, swords and lots of other devious weapons, against the evil Shogun in downtown New York.

"Animation is excellent and there's lots of detailed scenery. The puzzles are quite fiendish"Micro User.

NETWORK

An action-packed 'Top Ten' game by Peter Scott, featuring teleport machines, lifts, springs, strange aliens and lots, lots more. Shoot your way through more than 100 different screens as you attempt to collect the twenty parts of the 'Flync' machine. Nerve-fingling excitement.

CYBORG WARRIORS

A brand-new release by Superior. A multi-level, sideways scrolling shoot-em-up, with lots of weird robots and monsters to shoot, and tokens to collect which can give more powerful weapon systems. The BBC Micro/Master version has a joystick option, which allows two players to battle together.

RICOCET

A massive arcade adventure with brilliant graphics, as you control SPRAT, the Small Partially Robotic Alien Time-traveller. Five different levels: FORTRESS, TECHLEV, DERELICT, THE UFO and ANCIENT.

"A superb problem-solving game. A must for your games collection"BBC Acorn User.

BBC Micro/Master & Electron

SPEECH!

BBC Micro Cassette\$9.95 BBC Micro 5 1/4" Disc.....\$11.95
Master Compact 3 1/2" Disc.....\$14.95 A3000/Archimedes 3 1/2" Disc.....\$19.95

MASTER BREAK

BBC Micro/Electron Cassette.....\$9.95 BBC Micro 5 1/4" Disc.....\$11.95
Master Compact 3 1/2" Disc.....\$14.95 A3000/Archimedes 3 1/2" Disc.....\$19.95

PLAY IT AGAIN SAM 15

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 Micro versions of the games, unless otherwise stated.

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, HOSTAGES, A QUESTION OF SPORT, REPTON INFINITY, PERPLEXITY and SIM CITY, and the compilation titles: ACORNSOFT HITS 1 & 2, SUPERIOR COLLECTIONS 1, 2 & 3 and PLAY IT AGAIN SAMS 1 to 14. All are available for immediate despatch

Our A3000/Archimedes titles include great classics such as ZARCH, CONQUEROR and REPTON 3 (now with enhanced graphics), and the new highly praised golf simulation/designer, SUPERIOR GOLF. Also the action-packed HOSTAGES game.

Please write to the address below or telephone for a full list of Superior Software games.



(Superior Software is a trading name of Superior Microcomputing Ltd.)
Dept. Q2, P.O. Box 6, Brigg, S. Humberside DN20 9NH. Tel: (0652) 58585

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)

R SOFTWARE

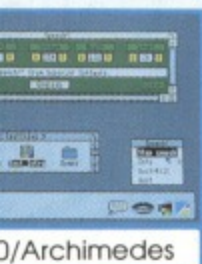
SPEECH!

Give Your Computer a Voice

SPEECH! works entirely in software, no extra hardware whatsoever is required, and has an unlimited vocabulary. The program has a built-in parser which translates English words into phonemes, so it can directly speak words you input or text files. The phonemes can be used directly if you wish, so stress and intonation can be added as required and even foreign languages can be spoken. SPEECH! includes a user-friendly spelling program, which can be easily changed to include your own words.

The new A3000/Archimedes version of SPEECH! is fully RISC OS compatible and allows multitasking in Desktop. You can vary the pitch, speed, volume, and voice, both directly and in your own text files and programs, and can even 'sing' words over a four octave range! The A3000/Archimedes version also includes a program so you can alter the dictionary yourself.

BBC Micro/Master & A3000/Archimedes



0/Archimedes



0/Archimedes

ers
GRAPHY,
e BBC
edes

en
complete
break.

our -
sed all
OUL SHOT!

ATCH

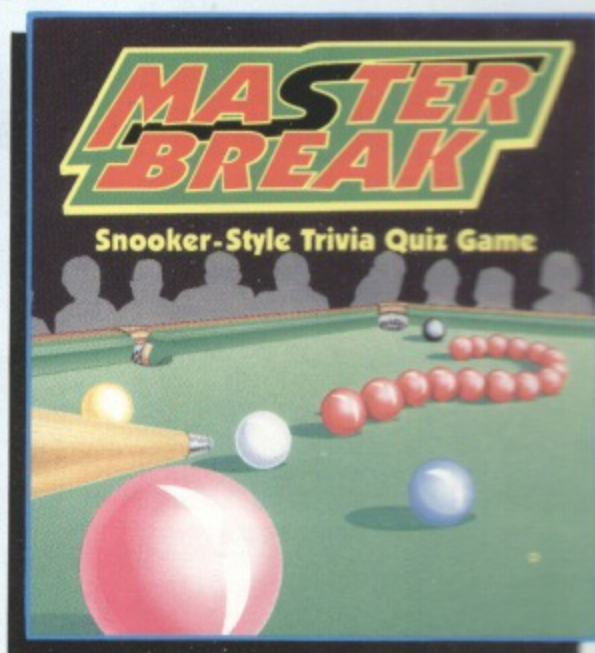
edes



BBC Micro/Master



A3000/Archimedes



Snooker-Style Trivia Quiz Game



ist Ninja 2



org Warriors

PLAY IT AGAIN SAM 15 A New Action-Packed Four-Game Compilation

LAST NINJA 2

The Last Ninja is back with a vengeance! Battling with fists, shuriken stars, swords and lots of other devious weapons, against the evil Shogun in downtown New York.

"Animation is excellent and there's lots of detailed scenery. The puzzles are quite fiendish"....Micro User.

NETWORK

An action-packed 'Top Ten' game by Peter Scott, featuring teleport machines, lifts, springs, strange aliens and lots, lots more. Shoot your way through more than 100 different screens as you attempt to collect the twenty parts of the 'Flynche' machine. Nerve-tingling excitement.

BBC Micro/Master & Electron

CYBORG WARRIORS

A brand-new release by Superior. A multi-level, sideways scrolling shoot-em-up, with lots of weird robots and monsters to shoot, and tokens to collect which can give more powerful weapon systems. The BBC Micro/Master version has a joystick option, which allows two players to battle together.

RICOCHET

A massive arcade adventure with brilliant graphics, as you control SPRAT, the Small Partially Robotic Alien Time-traveller. Five different levels: FORTRESS, TECHLEV, DERELICT, THE UFO and ANCIENT.

"A superb problem-solving game. A must for your games collection"....BBC Acorn User.

MASTER BREAK

Iron Cassette...\$9.95 BBC Micro 5 1/4" Disc...\$11.95 BBC Micro/Electron Cassette...\$12.95 BBC Micro 5 1/4" Disc...\$14.95
3 1/2" Disc...\$14.95 A3000/Archimedes 3 1/2" Disc...\$19.95 Master Compact 3 1/2" Disc...\$19.95

& Master 128 computers. Screen pictures show the BBC Micro versions of the games, unless otherwise stated.

PLAY IT AGAIN SAM 15

n Electron
FILE,
ITY,
1, 2 & 3

Our A3000/Archimedes titles include great classics such as ZARCH, CONQUEROR and REPTON 3 (now with enhanced graphics), and the new highly praised golf simulation/designer, SUPERIOR GOLF. Also the action-packed HOSTAGES game.

Please write to the address below or telephone for a full list of Superior Software games.

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)

THE MICRO USER

July

Vol. 9 No. 5

THE MICRO USER

Volume 9

Number 5

July 1991

£1.50



For ALL users of the BBC Micro, I