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SEPTEMBER 1994 Vol.12 No.7 £2.95 Hfl 14.50

Risc PC • Archimedes • A300 series • A400 series • A3000 series • A4000 • A5000

ICS

051-625 1006

SOFTWARE

Price list prepared 19th July 1994

10 out of 10	*10 out of 10*	
– Dinosaurs, Driving Test, Early Essentials (-6), English (6-16), French (6-16), Junior Essentials (5-11), Maths Algebra (6-16), Maths Number (6-16), Maths Statistics (6-16), Spelling each		£18
– German, Italian, Science, Spanish each		£POA
Access for A3000	*Acorn*	£138
Access for A3020/A4000	*Acorn*	£138
Access for A5000	*Acorn*	£143
Access for Risc PC 600	*Acorn*	£118
Acorn Advance	*Acorn*	£88
– Primary Licence		£183
– Secondary Licence		£442
Advantage, KS2,3	*Longman*	£46
Almanac 3	*Stallion*	£64
Amazing Maths, KS1-4	*Cambridgeshire*	£19
Animated Numbers, age 3-6	*Sherston*	£19
Apollonius PDT	*Oak*	£140
ArcFax	*David Pilling*	£28
ArcFS 2	*Vertical Twist*	£20
Archimedes Assembly Language	*Dabs* vo	£15
– with disc		£22
Archimedes Game Maker's Manual	*Sigma* vo	£15
Archivist Pro	*Oregan*	£36
Arcterm 7	*Serial Port*	£58
Arcventure – I ... The Romans, age 10-12; II ... The Egyptians, age 8-9; III ... The Vikings, age 7-11 – each	*Sherston*	£25
Aries (Zodiac)	*GamesWare*	£24
Armlock	*Digital Services*	£33
Around the World in 80 Days, age 9-12	*Sherston*	£37
ArtWorks	*CC*	£112
– network licence		£650
– site licence		£545
ArtWorks CD	*CC*	£153
ArtWorks Made Easy	*Dabs* vo	£15
AudioWorks	*CC*	£45
	Acorn	£366
Aztecs, age 7-11	*Sherston*	£37
Badger Trails, age 9-11	*Sherston*	£35
BBC Basic Reference Manual	*Acorn* vo	£22
Beginner's Guide to Wimp Programming on the Archimedes	*Sigma* vo	£13
Betsi	*4mation*	£29
Birds of War	*Fourth Dim*	£24
Bitfolio Cartoon Graphics	*Look*	£17
Black Angel	*Fourth Dim*	£24
Bodywise, age 9-14	*Sherston*	£37
Bookstore	*ESM*	
– Primary, KS1,2	*ESM*	£35
– Secondary, KS3,4	*ESM*	£53
Break 147 & Superpool	*Fourth Dim*	£24
Cinemaster (new edition)	*Dabs* vo	£16
– with disc		£24
Cambridge Pascal	*Oak*	£63
CardShop	*Clares*	£19
Carnage Inc.	*Fourth Dim*	£18
Castle of Dreams, age 7-11	*Storm*	£20
Cataclysm	*Fourth Dim*	£14
Chameleon	*4mation*	£33
Chaos Engine	*Renegade*	£19
Chocks Away Compendium	*Fourth Dim*	£25
Chuck Rock	*Krisalis*	£17
Clip Art CD	*CC*	£18
Conjuguez	*Creative*	£25
Crystal Maze, age 7-70	*Sherston*	£28
Crystal Rain Forest, age 8-11	*Sherston*	£33
Cyber Chess	*Fourth Dim*	£24
Cycloids	*GamesWare*	£16
Darryl the Dragon, KS1,2	*4mation*	£18
– site licence		£36
Darryl the Dragon Activity Sheets	*4mation*	£10
DataPower	*Iota*	£123
DeskEdit2	*RISC*	£25
Desktop Assembler	*Acorn*	£118
Desktop C	*Acorn*	£178
Desktop Thesaurus	*RISC*	£17
Desktop Tracker	*Vertical Twist*	£39
Diggers	*Millennium*	£22
Digital Symphony	*Oregan*	£41
Dinosaur Discovery, KS2	*4mation*	£25
– site licence		£54
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Disc Rescue	*Look*	£28
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– site licence		£30
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Eureka 2	*Longman*	£92
Fervour	*Clares*	£16
Find It!	*Appian*	£34
Fireworkz	*Colton*	£89
First Logo, KS1,2	*Longman*	£21
First Page, KS2-4	*Longman*	£42
First Steps in Programming Acorn RISC OS Computers	*Sigma* vo	£15
Flashback	*US Gold*	£21
Flossy the Frog, KS1	*4mation*	£23
– site licence		£48
Flossy the Frog Art Disc	*4mation*	£10
Fontasy	*ICS*	£15
– site licence		£45
Fontasy / DrawBender / Placard	*ICS*	£30
– site licence		£80
Font Directory	*Look*	£28
FontFX	*Data Store*	£9
– site licence		£70
Fonts Pack 1	*Fabis*	£15
Fonts Pack 2	*Fabis*	£15
Food for Thought, age 7-16	*Sherston*	£15
F.R.E.D.	*GamesWare*	£15
Freddy Teddy	*Topologika*	£14
– Balloons & The Zoo	*Topologika*	£20
– The Playground	*Topologika*	£23
– The Puddle & The Wardrobe	*Topologika*	£18
Freddy Teddy's Adventure	*Topologika*	£14
Fun School 4	*Europress*	
– age -5, age 5-7, age 7-11 each		£18
Galactic Dan	*Fourth Dim*	£15
Games Wizard - The Apprentice	*GamesWare*	£17
Genesis Professional	*Oak*	£112
Genesis Project	*Oak*	£47
Genesis SDK	*Oak*	£750
Gods	*Krisalis*	£17
Granny's Garden	*4mation*	£23
– site licence		£48
Granny's Garden CD	*4mation*	£28
Granny's Garden Resource Pack	*4mation*	£15
Graphics on the ARM Machines	*Dabs* vo	£15
Graph_IT	*Sherston*	£19
GridPro	*4mation*	£35
– site licence		£70
Grievous Bodily 'ARM	*Fourth Dim*	£15
Hard Disc Companion II	*RISC*	£38
Haunted House	*Fourth Dim*	£18
Hearsay II	*RISC*	£59
Heimdall, limited offer	*Krisalis*	£13
Home Accounts	*Minerva*	£27
Illusionist	*Clares*	£40
ImageFS	*Alternative*	£34
ImageMaster	*David Pilling*	£24
Impression	*Dabs* vo	£14
– with disc		£17
Impression Borders Pack 1	*Fabis*	£10
Impression Borders Pack 2	*Fabis*	£10
Impression Publisher	*CC*	£135
– OPI Supplement		£225
Impression Style	*CC*	£76
– site licence		£435
Interdictor 2	*Clares*	£25
Investigator III	*Vertical Twist*	£42
Ixion	*GamesWare*	£16
Jahangir Khan Squash	*Krisalis*	£9
James Pond	*Krisalis*	£18
James Pond 2 +	*GamesWare*	£19
Junior PinPoint, KS1,2	*Longman*	£25
– primary site licence		£83
Junior PinPoint Datafile, KS2,3 – Animal Kingdom, Dinosaurs, Festivals, Food Glorious Food, Junior Olympics, The Victorians each	*Longman*	£13
Keylink Prolog	*Keylink*	£69
Keystroke	*Quantum*	£24
Kid Pix, KS1,2	*ESM*	£34
Knowledge Organiser 2	*Clares*	£63
Krisalis Collection	*Krisalis*	£20
Landmarks. KS2,3 – Aztecs, Civil War, Columbus, Egypt, Elizabeth I, Rain Forest, Second World War, Victorians each	*Longman*	£21
Landmarks Microworlds – Invasion	*Longman*	£22
Landscapes	*Longman*	£46
Lemmings	*Krisalis*	£17
Lemmings II (Tribes)	*Krisalis*	£20
Little Red Riding Hood, age 5-8	*Selective*	£13
Logo, KS1-4	*Longman*	£55
Lotus Turbo Challenge 2	*Krisalis*	£18
MacFS	*CC*	£76
Magic Pockets	*Renegade*	£18
Magnetoids	*Oregan*	£22
Magpie	*Longman*	£50
Manchester United	*Krisalis*	£9
Masterfile III	*RISC*	£43
Maths Circus	*4mation*	£25
– site licence		£53
Micro Music	*Fisher-Marriott*	£19
Monotype Fonts (Pack 1), offer	*Look*	£50
Morpheus	*Oregan*	£29
MultiFS	*Arxe*	£29
Music Box	*Topologika*	£32
Naughty Stories (5-7) (set of 6)	*Sherston*	
– Volume 1		£39
– Volume 1 primary site licence		£99
– Volume 2		£39
– Volume 2 primary site licence		£99
Nebulus	*Krisalis*	£17
NightSky	*Clares*	£63
Noddy's Big Adventure	*Jumping Bean*	£18
Noddy's Playtime	*Jumping Bean*	£18
Noot	*4mation*	£41
– site licence		£88
Noot Art Disc	*4mation*	£10
Notate, KS2-4+	*Longman*	£49
Oh No! More Lemmings (requires Lemmings)	*Krisalis*	£15
Omar Sharif's Bridge	*Krisalis*	£19
Orrery	*Spacetech*	£93
Ovation	*RISC*	£68
Oxford Reading Tree Stage 2 Story Books, age 5-7	*Sherston* vo	£9
Oxford Reading Tree Stage 2 Talking Stories, age 5-7	*Sherston*	£37
Padlock	*ICS*	£10
– site licence		£30
PenDown, KS1-3	*Longman*	£45
PenDown Etoiles, KS3,4	*Longman*	£49
PenDown Outline Fonts	*Longman*	£17
PenDown Plus, KS2-4	*Longman*	£67
Personal Accounts V3	*Apricote*	£38
Perspectives	*TechSoft*	£54
Photobase – Landscapes	*Longman*	£47
Photodesk	*Spacetech*	£157
PhotoTouch	*Oregan*	£64
PIMS	*Longman*	£339
PinPoint 2, KS3,4	*Longman*	£79
– site licence		£340
PinPoint 2 Datafile, KS3,4 – 1851 Census, Ancient Civilizations, Britain since the 1930s, British Monarchs, Diet and Nutrition, Far Away Places, Kartei - The German Questionnaire, Second World War, Solar System, Weather and Climate – each	*Longman*	£13
Placard	*ICS*	£10
– site licence		£30
Play It Again Sam 1	*Superior*	£19
Play It Again Sam 2	*Superior*	£19
Play It Again Sam 3	*Superior*	£19
Plot	*Clares*	£63
Powermonger	*Krisalis*	£POA
Premier Manager	*Gremlin*	£20
PrimeArt, KS1-4	*Minerva*	£54
PrimeMover, KS2-4	*Minerva*	£69
PrimeSolver, KS1-4	*Minerva*	£74
PrimeWord, KS2-4	*Minerva*	£51
Printer Drivers, RISC OS: Canon BubbleJet, Canon LBP, Canon PJ1080, ColourCel, Epson JX, Epson ESC-P2, HP, Integrex 132 – each	*Oak*	£15
Deskjet 500C, Epson / Star colour – each	*RISC*	£15
ProDrivers: Canon LBP8, Epson ESC-P2, HP Colourjet – each	*Oak*	£33
TurboDrivers: Canon, Epson Stylus 800, HP – each	*CC*	£39
ProArtisan 2	*Clares*	£102
ProArtisan 24	*Clares*	£125
ProArtisan 2CD	*Clares*	£129
ProCAD, KS4	*Minerva*	£450
Programming in ANSI Standard C on the Archimedes	*Sigma* vo	£15
Prophet (requires 2 Mb)	*Apricote*	£145
Prophet Entry Level	*Apricote*	£8
QuicKey	*ICS*	£10
– site licence		£30
Real McCoy 4	*Fourth Dim*	£22
Recall, age 8-13	*Sherston*	£37
Recordz	*Colton*	£97
RemoteFS Parallel Port	*Atomwide*	£49
RemoteFS Serial Port	*Atomwide*	£49
Render Bender 2	*Clares*	£40
Rephorm	*Oak*	£45
Repro	*Oak*	£46
Repton 3	*Superior*	£19
Resultz	*Colton*	£75
– secondary site licence		£312
Revelation	*Krisalis*	£9
Revelation 2, KS2-4	*Longman*	£65
Revelation 2 CD Rom	*Longman*	£90
Revelation ImagePro	*Longman*	£125
Rhapsody 3	*Clares*	£74

NO CHARGE FOR CREDIT CARDS

We'll be changing the style of our ads over the next couple of months.

You'll notice that the length of this list has already been reduced. The number of Acorn products keeps growing, and until now we were listing a substantial proportion of them. It's become an impractical goal for a magazine advert. One problem is that we have to set prices a month before you see them, by which time quite a few will be out of date.

BUT ...

We can supply you with almost any Acorn product, whether it is listed here or not.

Just call 051-625 1006 for an immediate price on most items. (Our phone does tend to be busy, so sending an SAE for a full up-to-date price list may be a quicker option).

POSTAGE IS FREE

FOR PREPAID SALES IN THE UK

All ICS business is done on Acorn computers using RISC OS software

Rhythm-Bed	Clares	£38
RISC OS 3 Applications Upgrade	Acorn	£10
RISC OS 3 First Steps	Dabs	vo £15
RISC OS 3 Programmer's Reference Manual	Acorn	vo £99
RISC OS 3 User and Apps Guide	Acorn	vo £22
RISC OS 3 User Guide for Risc PC 600	Acorn	vo £22
RISC OS Style Guide	Acorn	vo £13
Risc PC 600 Technical Reference Manual	Acorn	vo £POA
Risc PC 600 Welcome Guide	Acorn	vo £8
S		
Saloon Cars Deluxe	Fourth Dim	£24
– Deluxe Extra Courses		£15
S-Base 2 Developer	Longman	£189
S-Base 2 Developer Plus	Longman	£345
S-Base 2 Personal	Longman	£105
Schedule	Acorn	£18
Schema 2	Clares	£95
Score Draw	Clares	£44
Sea Rescue, age 7-9	Sherston	£24
Sensible Soccer	Renegade	£19
Serenade	Clares	£75
Shylock Gnomes, age 10-15	Selective	£16
Sibelius 6	Sibelius	£149
Sibelius 7	Sibelius	£789
– education and amateur price		£464
Sim City	Krisalis	£22
Simon the Sorcerer	GamesWare	£31
Sleuth	RISC	£40
Small	Virgo	£19
smArt	4mation	£46
smArt Aliens, Animals, Dinosaurs, Egypt, Europe†, Faces*, Fantasy, Fashion, Fiddles & Drums, Heraldry, Homes*, Leisure*, Look Smart, Smartoons, Trees and Gardens *English/French/German/Spanish/Welsh; †English/French/German; please specify each	4mation	£15
smArtFiler	4mation	£32
smArt Modern Languages	4mation	£19
SolidCAD	Silicon	£77
Somerset Talking Computer Project Learning Materials	Longman	vo £29
SparkFS	David Pilling	£20
Sparkle	Morley	£59
Special	ICS	£10
– site licence		£30
Speedball II	Krisalis	£17
Splash, age 7-11	Sherston	£17
Split an Image, age 7-16	Sherston	£16
Spooler (Clares)	Clares	£12
Spooler (Comp Tut)	Computer Tutorial	£9
Squirrel 2	Digital Services	£127
– site licence		£545
Squirrel C Developer's Toolkit	Digital Services	£97
Starspell Plus	Fisher-Marriott	£19
StrongED 3	Stallion	£22
Stunt Racer 2000	Fourth	£24
Stunt Racer 2000 Extra Tracks	Fourth	£16
Swiv	Krisalis	£9
T		
Talking PenDown, KS1-3	Longman	£53
Talking Pictures	Wyddfa	£18
Talking Pictures Welsh (Lluniau Llafar)	Wyddfa	£18
Talking Stories – Gwen at the Fair, Gwen goes to School, Gwen's Nose, Gwen's Tummy each	Wyddfa	£17
Target Maths, age 6-13	Triple R	£16
Technodream (Nevryon 2)	Superior	£19
Time Detectives ... The Victorians, age 7-11	Sherston	£37
Time Traveller, KS2	ESM	£39
– Britain Since the 1930s, KS2		£28
– Create Your Own Timelines, KS2,3		£37
– Expansion, Trade and Industry, KS3		£37
– Making of the United Kingdom,KS3		£37
– Medieval Realms, KS3		£37
– Tudor and Stuart Times, KS2		£33
– The Victorians, KS2		£30
Titler	Clares	£79
Topographer	Clares	£59
Touch Type	Iota	£38
– site licence for 10		£137
Trace	David Pilling	£9
Twain Canon IX incl Scan-Light Professional	David Pilling	£16
Twain Epson GT8000, 6500	David Pilling	£16
Twain HP Scanjet II, IIc, IIcx	David Pilling	£16
TWO (Task and Window Organiser)	ICS	£10
– site licence		£30
TypeStudio	RISC	£38
V		
Vector	4mation	£75
Victorians, age 7-11	Sherston	£POA
Viewpoints, age 7-11	Sherston	£36
Virtual Golf	Fourth Dim	£23
Visual Backup	Dabhand	£39
Vox Box	Clares	£40
W		
Waiter	Digital Services	£35
WimpGEN	Silicon	£76
WordWorks	CC	£36
Wordz	Colton	£54
WorraCAD	Oak	£65
X		
Xenon 2	GamesWare	£19
Z		
Zelanites (not OS 3)	Micro Power	£15
Zool	Gremlin	£18

"I say Grayson, have you heard the latest from ICS?"
"What's that, Mr Cholmondley-Warner?"
"I understand they have installed some additional telephonic apparatus."
"Yes, I have been in communication with them just now."
"Well, Grayson, and were you connected speedily?"
"I was indeed, to a very charming young lady. She was able to promise me Resultz by Friday."
"So the new ICS telephones are a great improvement?"
"Quite so. Apparently they anticipate being able to handle twice as many calls."
"First class service, Grayson."
"And jolly good prices too, Mr Cholmondley-Warner."

HARDWARE

COMPUTERS . . .

Risc PC 600 with 1 year's on-site support		
– 2M HD210 14" Monitor	Acorn	£1245
– 2M HD210 17" Monitor	Acorn	£1645
– 5M HD210 14" Monitor	Acorn	£1395
– 5M HD210 17" Monitor	Acorn	£1795
– 9M HD420 14" Monitor	Acorn	£1695
– 9M HD420 17" Monitor	Acorn	£2095

CALL FOR LATEST RISC PC OFFERS

MEMORY . . .

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

A3000 1-2 Mb †	IFEL	£58
A3000 1-4 Mb †	IFEL	£105
A3010 1-2 Mb		£35
A3020 / A4000 2-4 Mb †	IFEL	£74
A305/310/440 1-2 Mb soldered ‡	IFEL	£83
A305/310/440 1-4 Mb soldered + MEMC1a‡	IFEL	£158
– as above + fitting		£188
A5000 2-4 Mb †	IFEL	£70
A5000 2-8 Mb including fitting	Atomwide	£500
A5000 4-8 Mb including fitting	Atomwide	£391
A540 4 Mb †	Acorn	£238
Risc PC 1 Mb VRAM	Acorn	£127
Risc PC 2 Mb VRAM	Acorn	£195
Risc PC 2 Mb VRAM	HCCS	£148
SIMM 2 Mb 32 bit		£POA
SIMM 4 Mb 32 bit		£POA
SIMM 8 Mb 32 bit		£POA
SIMM 16 Mb 32 bit		£POA

SCANNERS, DIGITISERS . . .

Eagle M2	Wild Vision	£310
GreyHawk	Wild Vision	£98
Hawk V9 MkII	Wild Vision	£195
– A3000 Series		£195
Scan-Light A4	CC	£277
Scan-Light 256	CC	£185
– A3000 External	CC	£190
– A3000 internal	CC	£190
Scan-Light Professional	CC	£549
– as above + SCSI interface	CC	£699
Scan-Light Video	CC	£199
Scan-Light A3000/A4000	CC	£199
Vision 24	HCCS	
– A3000/3010/3020/4000 internal		£96
– A3000 external		£109
– A5000/400/300/RPC600		£96
Vision 24 508 line	HCCS	
– A3000/3010/3020/4000 internal		£134
– A3000 External		£109
– A5000/400300/RPC600		£134

PRINTERS . . .

A4-1200/1 Direct Drive Laser Printer	Calligraph	£989
Bubble Jet BJ-10sx	Canon	£175
Bubble Jet BJ-10sx + TurboDriver	Canon/CC	£219
Bubble Jet BJ-230	Canon	£315
Bubble Jet BJ-300	Canon	£325
Bubble Jet BJ-330	Canon	£380
Bubble Jet BJC-600	Canon	£425
Bubble Jet BJC-600 + TurboDriver	Canon/CC	£465
Bubble Jet BJC-800 + TurboDriver	Canon/CC	£1219
DeskJet 500C	Hewlett-Packard	£279
DeskJet 510	Hewlett-Packard	£225
DeskJet 550C	Hewlett-Packard	£445
DeskJet 560	Hewlett-Packard	£415
Laser Direct HiRes4	CC	£748
– 250-sheet Paper Cassette		£99
Laser Direct HiRes8	CC	£1049
Laser Direct HiRes Board	CC	£325

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SUNDRY . . .

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486 PC Card 25 MHz Bare	Aleph One	£357
486 PC Card 50 MHz 4 Mb	Aleph One	£591
486 PC Card 50 MHz Bare	Aleph One	£434
A300/400 Fan kit	ICS	£15
A305/310/440 RISC OS 3 Carrier Board ‡	IFEL	£19
A5000 Fitting Kit for second hard disc	ICS	£15
Backplane, 4-slot 4-layer with fan	IFEL	£55
Case Upgrade only for Risc PC 600 2M and 5M	Acorn	£98
ColourBurst	State	£374
ColourCard Gold	Wild Vision	£225
– A3000 External	Wild Vision	£225
Dongle Dangle with screw fittings	ICS	£6
EPL Toner Cartridge for LBP-4		£59
EPS Toner Cartridge for LBP-8		£75
Ethernet Network Interface Card for Risc PC 600	Acorn	£98
Fan filters (pack of 10) (not A5000)	ICS	£6
Floating Point Accelerator (A5000 + A540)	Acorn	£93
ideA Removable Hard Disc Fitting Kit for A5000	ICS	£25
Lark A16	Wild Vision	£195
Micro Mouse	Clares	£24
Monitor Stand for A3000	ICS	£25
Mono/SCSI	Atomwide	£48
Pc Card (incl Novell DR DOS) for Risc PC, special offer	Acorn	£99
Power Pad (Dual)	GamesWare	£33
Power Pad (Single)	GamesWare	£25
Power Stick	GamesWare	£25
Power Switch	GamesWare	£17
Printer Paper A4 Colour, 500 sheets		£40
Printer Port Sampler	Vertical Twist	£39
Printer/SCSI	Atomwide	£74
Revolution CD-ROM	Morley	£295
Revolution Pro (for SCSI system)	Morley	£435
RISC OS 3 Software Upgrade Kit	Acorn	£77

ICS

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Seal 'n Type spill-proof Keyboard Covers		
– Archimedes / A5000	Kador	£14
– A3000	Kador	£14
SVGA Multiscan ES Monitor 14"	Acorn	£320
SVGA Multiscan PS Monitor 17"	Acorn	£990
SVGA Multiscan Monitor 14"	Acorn	£315
– bought with computer		£250
Ultimate CD ROM Dual Speed for Risc PC 600	HCCS	£198
Ultimate CD ROM Dual Speed, MultiPodule (needs PSU upgrade)	HCCS	£223
Whisper Fan Quietener (for A300/A400 series only)	ICS	£15
Wizzo IDE Filing System on rom	ICS	
– Wizzo4 for A4 – now available		£39
– Wizzo5 for A5000		£39
Wizzo SyQuest Complete Package		£295
– Extra 105 Mb Disc		£60

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Hostages • Last Ninja
Manchester United Europe
Master Break
Pandora's Box
Populous
Quest for Gold

For ordering details please turn to page 3

ICS

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SPECIALS

Unrepeatable prices for a few items because we want to reduce our stock levels

1st Paint	£25
Carnage Inc.	£15
ColourBurst	£335
ColourCard Gold	£210
HiVision colour A3000 Series internal	£125
Impression Business Supplement	£15
Monotype Fonts (Pack 1)	£50
Real McCoy 4	£18
RemoteFS Parallel	£43
Scan-Light Professional + SCSI Interface	£625
Schedule	£15
Whisper Fan Quietener (for A300/A400 Series only)	£10

Offer applies only while stocks last • VAT extra

HOW TO ORDER

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LICENSED CREDIT BROKER

October issue on sale 15th September

Power Graphics

HAS the Acorn finally made it into the world of professional quality graphics. We compare three image processors and two painting packages that give it the edge. Starting on Page 18.

THE MEGADISK

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

Full details about the packed Megadisk – see page 6.

- **Magnetoids**
  Try out this amazing version of 3D asteroids and try not to get blasted.
- **Draw_Changer**
  Experiment with this fully functioning version of the powerful graphics editor.
- **Flower Power**
  Take a peek into Mike Goldberg's windowbox and then grow your own.
- **TechForum**
  Find out how to perform *really* fast division in ARM code.
- **Graphic Illustrations**
  Sample the quality of graphical art provided by Lynsoft.

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

Mad Hatter 66
Our adventure games wizard continues his guidance through the realms of space and adventure.

Body Building 76
Mike Cook explores the realms of servo motors, for the first time in many years.

Letters 80
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Can Acorn machines now hold their own in the world of the professional graphics artist?

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

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BBC Disk 57
Full details on what's on the subscription disk for the 8-bit BBC Micro this month, and how to use it.

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

Subscribe now! – See page 40

SUBSCRIBE to *Acorn Computing* and you'll get an amazing value-for-money deal that beats all our rivals: Not only do you get a whole years-worth of issues for LESS than any other Acorn magazine, 32-bit owners get TWO disks every month. See Page 40 for details of this unbelievable offer.

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Do you want more information about available products? Check out our special reader reply service on Page 82 so you can find out more about the software and hardware being advertised in *Acorn Computing*.

The MegaDisk

What's on this month's disk?

- Magnetoids
- DRAW_ Changer
- Programs from the magazine

Magnetoids: Seek and destroy

THIS IS a special version of Magnetoids from Oregan Software (021-353 6044) with a Risc PC mode giving more meanies than before and, to compensate, extra power-ups and even smoother gameplay. Once the demo has loaded press the mouse buttons to start the action, or Space to access the Options Menu.

In the year 2156 the Terran empire has extended to the edges of the galaxy. Many outposts have been built at the frontiers of the known universe, manned by a few scientists, in order to make contact peacefully with the alien lifeforms known to exist beyond.

One of these bases is 61 Cygni, 11.1 light years from Earth. Not long ago, there was an encounter of a special kind. Communication was found to be surprisingly difficult, as no-one was able to make sense of the data received in any way.

A few days later extra-terrestrial spacecraft approached 61 Cygni. They had an incredibly weird object in tow. In a hurry, the only research vessel ready for launch was sent to welcome the convoy. But the craft lost its course and crashed into the convoy. Unsure on what had happened, the Terrans decided that attack was the best means of defence.

A small manoeuvrable shuttle was hastily equipped with laser guns, missiles and a deflector shield. The problem, however, is energy. The base is powered by the energy of a distant star, so the shuttle's positroneum batteries have not been fully charged, and can only power some of the shuttle's systems. The rest is up to you...

● *Don't hang around, it's dangerous out there*

● *Is this what the future holds – your atoms spread over the cosmos?*

Firing missiles

When the corresponding power-up is collected, one of the craft's missile racks is activated. You get four

● *One blinding flash and they got me*

Action	*Keyboard* Set A	*Keyboard* Set B	*Mouse*	*Joystick*
Bank Left	Z	<		
Bank Right	X	>		
Turn Up	X			
Turn Down	;	S		
Thrust	Space	Space	Select	Space
Lasers	Return	A	Adjust	Fire Button
Missile	Shift	/	Menu	Shift

Getting started with the MegaDisk

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

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

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

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

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

Mouse controls

Select	Accelerate
Adjust	Fire
Menu	Smart bombs

missiles each time.

A missile sight will appear ahead of your craft allowing you to target a missile. To do so, hold down the fire missile key. The colour of the sight will change to yellow.

When a target comes into the crosshairs, the missile will lock on to the target and fire immediately and the sight colour will change to red. The sight remains fixed on to the target, until the missile is destroyed. You cannot fire again during this time, as the target computer cannot track multiple targets.

The missiles are designed for use against enemy spacecraft but may be used against any flying target – be careful, as using missiles against asteroids will result in uncontrolled explosions.

The top panel

The scanner shows all objects in the local vicinity. The centre represents the position of your craft. Objects are represented by markers: Red markers are enemy spacecraft, violet markers are magnetoids, and blue markers are power-ups. The length of the vertical bars joined to the markers indicate the objects' vertical position above or below you.

This version of Magnetoids has four levels but beware – you have two minutes of gameplay before armageddon ...

The full game costs £24.95 and contains more levels – some easier, some harder – as well as in-game stereo music tracks, loads of enemy fighters, and hi-score animations.

● *Easy does it and this time we'll succeed*

General controls

F1	Pause (Space or Select to resume)
Cursor Up	Slide camera forward
Cursor Down	Slide camera backward
Esc	End game (when playing)
Esc	Exit program (at the title screen)
Fire	Start game (at the title screen)

During gameplay, you can adjust the position of your viewpoint using the up and down cursor keys. This will not effect the gameplay at all. Greater distance from the craft gives you a better view of the action but may reduce your shooting accuracy.

Options Menu

Ship Type	Choose from the two ships. Each has different flight characteristics
Controls	Choose either keyboard set A, keyboard set B, mouse, Acorn joystick, or RTFM joystick control
Sensitivity	Determines the speed at which the craft reacts to the controls. Adjust this in the range 1 to 8
Auto-Centering	Determines how fast the craft stabilizes itself when rotating. Recommended when not using mouse.
Control	Move horizontally to roll, move vertically to pitch the nose up or down

Programs from the magazine

- **Body Building** – Mike Cook takes at look at servo motors and what you can do with them in your own programs.
- **Graphics** – Do you want to be a computer artist, or just an artistic programmer? Mike Goldberg has some programs to help.
- **TechForum** – Michael Rozdoba takes you to the world of multiplication and division by constants in Assembly language.

DRAW_Changer: DTP aid

THIS draw file effects processor comes from DEC_Data (0392 221702) with a full on-line interactive help system using the hypertext program ClearView. However, it does require RISC OS 3.

DRAW_Changer is a useful application letting you change the line and fill settings of a draw file to achieve effects which, on large or complicated files, could take hours in Draw. The display gives you two windows – a source and a target image which allows you to visually compare the effects before deciding on the changes permanently.

DEC_Data have designed the program to be used by both the novice and experienced desktop publisher. For the novice there is a set of preset filters that allow basic changes to be made with a few clicks of the mouse. For the more advanced you can modify these filters, create new ones and save the filter settings to create colour and line effects.

● *You can set your own filters...*

You can batch process files to save time and output high quality anti-aliased sprites from thumbnails to sprites larger than the memory of the machines – if there is sufficient hard disk space. A directory of draw files can also be multi-file processed to create thumbnail sprites.

This special version of DRAW_Changer allows you to explore the full program but does not let you save. The full version is available directly from DEC_Data for £34.

To get started run DRAW_Changer and drag one of the draw files into the *owner* box or on to the iconbar. The file HelpNotes is a quick tutorial on how to use ClearView.

● *...or use preset ones and other useful facilities*

Clicking on the help icon will show help on a dialogue box or you can access Help from the menu over the DRAW_Changer icon on the iconbar. You can also drag a filter icon on to the ClearView icon or Help window.

FAULTY DISK?

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

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

The 32-Bit Subscription Disk

What's on this month?

- Accounts
- MEMCPatch
- Panda
- Public Domain
- 8-bit programs

Account: Watching the pennies

This is an update of an application we distributed a few months ago and it's intended to act as an electronic statement. When you receive a statement, type the details in, using the Add transaction feature. In future every time you pay money in or write a cheque, enter the details, using the date on which you made the transaction.

When your next statement arrives from the bank, you can amend the date to that on which the transaction finally filtered through the banking system. The advantage of this is that you always know what your current balance is, without having to dash off to the cash machine, or enquire at your branch.

The program is fairly logical to use, with notes on usage given in the text file and it also uses the Interactive Help facility. You can define what bank codes will be displayed by changing the Messages file. Codes should be a maximum of three characters long, and be separated by full-stops.

Alisdair Millard

MEMCPatch: Every last byte

Many programs running under RISC OS 2 tried to squeeze every ounce of speed out of the machine. One common trick to achieve this was to speed up the roms from 4MHz to 8MHz, thus doing away with the need for a *RMFaster command which is the legal way to speed up the roms but takes up additional memory.

Some programs performed a check to see whether the roms could be speeded up, while others – mainly games and PD programs – didn't bother and just performed a SYS "OS_UpdateMEMC",64,64.

This was fine under RISC OS 2 as most roms could be speeded up. However, when RISC OS 3 arrived, the roms acted differently and when this call is issued the computer crashes and needs to be reset.

Some of these calls were in easily alterable Basic code but others were embedded deeply in machine code files, virtually inaccessible, except to those with a disassembler and a lot of time. This is where MEMCPatch comes in.

Instead of hacking into the code to try and remove the offending call, load the MEMCPatch module before running the program. This module intercepts any call to OS_UpdateMEMC and makes sure that bit 6 of the MEMC control register is never set.

If a call with bit 6 set is detected, bit 6 is cleared and the call is carried out as normal to ensure that any parameters requested are returned intact.

If OS_UpdateMEMC was any normal, everyday SWI it would be software vectored, so that it could be modified easily. As it is associated with the hardware, and there are very few reasons why you would want to alter it, it is not software vectored, and therefore is more difficult to alter.

MEMCPatch redirects the hardware vector at &08 to its own routine, and then stores the old instruction within itself. Whenever a SWI is called, part of MEMCPatch is run, which checks to see if the SWI being called is OS_UpdateMEMC and if it is, clears bit 6 of both the new value to be set and the mask and then continues with the call.

If the SWI is not OS_UpdateMEMC then the original instruction is run which calls the RISC OS SWI handler. This is the method outlined in the December Techforum, and MEMCPatch also serves as a more useful example. Indeed, parts of the code are taken from the Zippy demo.

Theo Markettos

Panda: ChiChi's revenge

Panda is an amusing adventure game which, while you find your way to the Chair Bear of Panda Disks, pokes gentle fun at *Conker Computers* and one or two other familiar names.

The game is easier than most, because I can't stand getting no further than the first room. Exploring your way to Micro World, you'll find a few familiar computing names from the Acorn world, as well as discover the new PC clone operating system US-DROS. Type HELP if you're stuck.

Have fun and hopefully a laugh or two.

Panda Disks

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8-bit programs

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SEP 94

The story so far...

Steve Turnbull assesses the current scene with personal computers and consoles

IN the magazine world you can get a good guide to the interest in a particular subject. And as Europress Publications has magazines for most computer types, excluding the Apple Mac, we are in a pretty good position to view overall market trends.

The fall of the games consoles probably hasn't been perceived by the majority of the rest of the world yet – but they are on the way out. The reasons are many, not least of which is the continuing financial difficulties of the man in the street coupled with the extortionate prices of console games.

There is, in fact, a pattern if anyone would care to look. In the early 1980's there was a boom in home computers which were bought by the far-sighted and fairly well-off who believed they could handle the complexities of the machine or at least wanted to try.

Shortly afterwards came the 8-bit games consoles, which were sold through the High Street to people who wanted pub games (or chess, remember all the chess playing games?) in their living rooms. But it was a short-lived fad – playing computer games is essentially a solitary activity and being a human being isn't.

Then came the computer-sale doldrums, when Acorn nearly collapsed. Then, between 1985 and 1987, came the birth of the 16-bit machines – and, in Acorn's case, the 32-bit one.

With the ability to run more powerful applications, in particular the newly invented concept of Desktop Publishing, these machines took off in a new wave of spending.

Unfortunately it was timed very badly and ran headlong into the worldwide recession which stunted its growth considerably.

Shortly after this what happened? Yes, you guessed it, the *16*-bit games consoles. And here we go again with another round of the far-sighted and concerned buying *real* computers and those who just wanted to play games buying the consoles.

But now there's more of each type of buyer because of the growth of confidence in technology, so the console manufacturers make the machine as cheap as is (economically) possible and make the games as expensive as the market can bear.

The fact is that there's almost nothing a games console can do that the *real* computer can't, it's just that your average person doesn't want to be told: *Oh, it can do anything*. They want to be told: *Buy this machine and you can beat up the baddies*.

It's a problem of marketing. A person is only able to judge when he has all the facts. When you're trying to sell to someone who doesn't understand the potentials of a computer, he's in no position to decide whether he wants one or not, let alone which one to buy.

So now we move up to the present. Commodore and Atari incorrectly evaluated the way the market was going and are passing away just as the consoles are, which leaves just the PC manufacturers, Apple and Acorn in the personal computer market.

Just as a passing thought, Phillips with their CD-*i* nearly broke the trend. Unfortunately they were probably too early and failed to break into the personal computer/console market in a big enough way to make a difference.

But now the rules are changing, the advent of Interactive Multimedia (IMM), two-way TV or whatever you want to call it, is going to make a fundamental difference to the way things are done – but an IMM set-top box *is* a computer, so who's going to make it?

The PC hierarchy – manufacturers, IBM, Microsoft and Intel – can't because their machines can't match the required spec at a low enough price. Apple can, and they are trialling at the moment. And Acorn can, and are. At the moment Acorn is in a position that's only happened once before in their history.

In 1981 Acorn had the right hardware and software working (just), and they had the right partners (the BBC). But they blew it with lousy pricing and marketing.

This time they have the right hardware and software working and they have all the right partners. The machine is the right price – and, to tell the truth, Acorn really only have to sell to the corporates who provide the IMM services, because if Acorn is adopted as the standard the public will follow.

This time they'll have to try *really hard* to blow it. Let's hope they fail to snatch defeat from the jaws of victory.

Steve Turnbull – Editor

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Shoot to kill

POWERSLAVE is a new games software house which is about to bring the *official* Acorn version of the PC-blockbuster *Wolfenstein 3D* to your screens this autumn.

This will be faithful to the original *escape from the Nazis and save the world challenge* which won several major software awards on the PC scene.

Powerslave's Eddie Edwards commented, "We completely rewrote the entire graphics engine specifically for the ARM processor. Our version runs faster, more smoothly and at a higher resolution than the PC version – with ARM 3, it's even more playable than the original running on a top-end PC. But we haven't forgotten people with 1Mb ARM2 machines. The game is great on these too."

The game covers 60 different levels and has four skill settings, and will be launched at Acorn World in October.

Faster networking

DATATHORN Systems Ltd (081-502 4221) are trialling a new network file *Super server*. Based around a Motorola Systems Series 900 computer running UNIX , the new network system provides file access faster than the built-in IDE drive in a Risc PC.

The system is extremely reliable and the file server can be left running permanently, but there's a five year warranty on all parts with *no quibble* replacement if something does go wrong.

Datathorn provide on-line technical help as well as basic training for two staff, which covers everything you need to know to run the system on a day-to-day basis. There are advanced courses at extra cost for anyone wanting to exploit the system to the full.

This new system will fit into most existing systems at low cost and Datathorn will provide consultation services for integration where needed.

8-bit labeller

INTERFACE Consultation and Production (0726 882429) have written a new disk-labelling utility for the BBC B and Master called Disk Labeller Version 2. The program costs £12.50 and comes with 56 tractor fed labels.

Pocket picker

FOR fans of palmtop technology look out for a new version of the Pocket Book from Acorn. This rebadged Psion Series 3a computer will be called the Pocket Book II and will be available in September.

The Pocket Book has proved very popular in schools, on field trips and as a link with home and is to be seen more and more in business and administrative settings too. Version II looks very similar and linking leads will allow you to download information to desktop Acorn, Apple Mac and IBM PC clones.

However, there is more memory and software at your disposal and Version 2 is being marketed through education dealers, direct mail and – in a new venture with UCCA – marketing directly at sixth formers applying for university places.

The 256k version will be £229, the 512k version £280 while the original Pocket Book will be available until the end of the year for £169. The serial links for Mac, PC and Acorn machines cost £68, £60 and £42 respectively.

Rosie and Jim – plus John and the Duck

PRE-SCHOOL television is again making its mark on Acorn screens. This time the rag-doll duo of Rosie and Jim are leaping off the TV screen thanks to Sherston Software (0666 840433).

September will see the launch of the first two in a series of talking activity programs for four and five-year olds: *Duck loses his quack* and *Jim gets the sneezes*.

The stories will use the talking book technology used by Naughty Stories and the Oxford Reading Tree software. The program will feature animations and sound effects as well as the voices of the actors from the TV series.

● *The dynamic duo*

Pub software

FOLLOWING the success of Sherston Software, they are expanding their operation in the picturesque Cotswold village of Sherston. They have been operating in two sites in the village but are now moving to a sixteenth century pub in the village High Street – the Angel Inn which will be renamed Angel House.

Commenting on the move, Bill Bonham remarked, "Buying a pub and then stripping out the beer pumps to replace them with disk duplicators goes against the grain somewhat.

"Despite that, we are trying to maintain as much of the character of the original building as possible and are looking forward to getting all the staff under one roof."

Christmas is coming

Are you up to designing a Christmas Card? If so Acorn want to hear from you before 10th October 1994. If your design makes the grade it will be professionally printed and used worldwide by member companies of the Acorn Computer Group and you'll win your very own Risc PC.

Your theme is *A World of Opportunities* and all entries must be your original work and produced on an Acorn computer. Designs should be submitted in Draw format only and as an A4 hard copy.

There is no age limit and designs can be from individuals or groups. The prize will be presented at the Acorn World '94 show.

Entries should be sent to: Acorn Christmas Card Competition, Corporate Affairs Department, Acorn House, Vision Park, Histon, Cambridge CB4 4AE.

Better mousetraps

DESIGN Concept (031-668 2000) have new versions of two of their products: Kerner and MouseTrap. The latter is aimed at primary education and effectively restricts the mouse buttons so you can disable the Menu button for instance. The cost is £10 for up to five users.

Kerner upgrades outline fonts to RISC OS 3 standard allowing you to create, edit and delete kerning pairs. Kerning data can also be created using an auto-kerning system which finds, calculates and double checks possible kerning pairs.

This latest version now loads and saves indirected fonts such as Homerton Medium Oblique. You can also copy kerning and other width information between fonts, allowing faster upgrading of a whole font family and fonts can be loaded via a menu of available fonts.

There is also a new file format of pair files for easier customisation of auto-kerning. In addition, there is a new utility included called FindPairs which scans a text file, finding all the character combinations.

Text files can be processed to create pair files allowing fonts in any language to be kerned. The full product costs £15 but free upgrades are available to existing customers if they return their original disk.

Master CDs

IF YOU are creating a CD-Rom take a look at the special offer being made by Eesox (0223 264242). They are offering a complete CD-Rom master for £60 and a backup for £30 and this offer is open to your first order if made before 31 October 1994.

This service could apply to developers producing their own CD-Rom applications or to someone backing up their data from hard disk so freeing storage space whether you have a PC, Acorn, Apple Mac, CDTS or Sun machine. The service can turn round most jobs in 24 hours and gives you an ISO 9660 disk pre-mastered, mastered and produced.

● *Increased CD access*

Also in Eesox's repertoire is NetCDFast, the network complement to the successful CDFast application which gives an optimised cacheing program for use on any CD-Rom system accessed over a network.

As some operations' speed can be increased by four times, CD-Roms over a network become more usable giving similar performance to a hard disk. It can even help when different users are accessing the same CD-Rom application. It is completely transparent in operation. The cost is £130.

Top of the tree

ACORN computers led the educational multimedia market when the National Council for Educational Technology (NCET) announced the winning schools and colleges in the National Educational Multimedia Awards (NEMA) Competition. The challenge was to design the most imaginative multimedia presentation and was open to children under 19 as well as student teachers.

Six of the 18 finalists created their presentation on Acorn systems including the winner of the Initial Teacher Education Award, D. Kent from the University of Leeds, with *Waterworks* and Bishops Foxes School in Taunton with the Under 17s winner *Synagogues*.

A total of 82 high-quality computer presentations using text, video, photography, artwork, music, voices and sounds were received and of the 18 winners, six were on the Acorn machines, five on PC, five on Apple and two on the Amiga.

This year's awards were presented by Dominik Diamond at the National Museum of Photography, Film and Television in Bradford.

Preparations are already underway for the 1995 NEMA awards so make sure your school or college gets information on how you can enter. Details can be obtained from: NCET, Milburn Hill Road, Science Park, Coventry CV4 7JJ. Tel: 0203 416994.

What's on

Virtual Reality User Show 1994
13-15 September, London Novotel
Contact: VR Centre (081-995 3632)

Big Ben Open Day
1 October, Pieter Groen College, Helmbergweg, Holland
Contact: Big Ben Club (010 31 20 6631849)

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

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

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

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

Calculated light

ANGLIA Television (0603 615151) have added a new title to their datafiles for Key Plus. This latest addition is called Lenses and Light and includes a series of spreadsheets in Key Calc format.

Lenses and Light uses the ability to store and feature graphics in association with spreadsheets, as in the relationship between the aperture setting on a camera and the finished photograph. As well as numbers there are pictures showing the results of the different settings used.

Table dressing

IF YOU have been using Impression Style or Publisher you may have used TableMate. This table-making application comes from Dalriada Data Technology (0926 53901) and is now available on its own in version 2.

The new features of TableMate2 include word wrapping, draw file importing, colour handling, variable line thickness, multiple row and column insertion/deletion, exporting as a draw file as well as extended control of row height and text positioning. You can edit up to 16 tables at once and the cut and paste follows the Impression-style.

A full copy of TableMate 2 costs £32.50 but Impression Style and Publishers users can buy a copy for just £17.50.

Whoops

Last month we said that Eureka doesn't have dynamic graphs. It does and here's how: Create a set of required data, highlight the area and create a graph. Any data within that highlighted area that is modified will be reflected in a dynamic change to the graph.

Creative Curriculum Software (0422 340524) have updated the protection systems on all their products. For instance, Mathscard – costing £49 + VAT – now needs no key disk due to an innovative new protection system designed by CCS and likely to be licenced by other software houses in the near future.

The program can be run from floppy or transferred onto a hard disk. Then, if necessary, de-installed back on to the original floppy for transfer to another machine. The process is the same for ten user copies.

Finally, Eagles have landed courtesy of Computer Concepts – but at £386.57 inc VAT not £290, as reported in our August issue.

A new identity

ONE of the most exciting aspects to the Risc PC is that it can be anything you want it to be. If you install one of Cumana's (0483 503121) new 300iA CD-Rom drives with audio-mixing feature you'll have a fully functional multimedia machine.

The cost of the drive is £249 and gives clear, high quality sound via external speakers or headphones. Coming with the drive is Clares' ProArtisan 2 CD as well as Acorn's PhotoView and CDPlayer applications and £130 of software vouchers.

This joins one of a range of new CD-Rom drives from Cumana named Oscar, Bravo, Victor and Indigo. Oscar is aimed at the home user who wants an inexpensive but good quality drive and starts at £229.

It needs no cards as it just plugs into the printer port and is a double-speed Photo CD compatible drive. You will need a bi-directional printer port so will only work on the A5000, A3010/20, A4000 and Risc PC – for Impression Publisher and Artworks owners Oscar has a connector to plug in the dongles.

Bravo is similar to Oscar but is designed for classroom use and costs £299 for bi-directional parallel port connection, but for £299 you can choose connection via SLCD or EMU SLCD interfaces.

The Victor professional range starts at £299 and goes up to £1999 for those with higher-than-average technical requirements, while Indigo costs just £199 and fits internally to the Risc PC.

Medieval topic

LONGMAN Logotron and BBC TV are releasing a new series of titles for History Key Stage 2 – Zig and Zag. The first out this autumn will be Anglo Saxons which will complement the TV series, with project and topic work for 8-10 year olds and colourful interactive simulations. The cost is £29 with *Zig Zag The Romans* following in early 1995.

Keeping in touch

A NEW concept keyboard package has been announced by the Hampshire Microtechnology Centre (0705 378266) aimed at the early stages of a child's cognitive development and designed for children with severe learning difficulties and pre-school aged children.

InTouch covers recognition as well as matching and sequencing skills and has the facility to use the computer as a scanning communication aid using one or two switches.

There are five modes of operation: Touch and See, Touch and Match, Touch and Built, Touch and Return and Touch and Scan.

InTouch is only available for Acorn computers with RISC OS 3.1 and 2Mb of ram.

Passing the test

A NEW style of educational program is about to be released by 10/10 Software (0742 780370) called Driving Test. This comprises six games plus a unique test letting you have fun as you learn, revise or test your knowledge on facts of driving and the Highway Code.

You can choose from a variety of areas and can work at your own speed, with progress being automatically recorded as you play the games. There are also six categories of trivia questions or skill tests on the continental levels.

The games are Word Park, Clunk Click, Patience, Rear Mirror, Signpost and Speed Trap and are aimed at anyone who plans to take their driving test or wants to see how their current driving skills score.

● *Clunk click, every trip*

Cyber-drive

TECHNODREAM-author Graeme Richardson has joined forces with Mike Carter to create a new games house called Cybernation (091-230 0000). There first release is Spobbleoid, an arcade/puzzle game with 36 levels of collecting items, crushing monsters and running against the clock.

Of course there are hidden extras, but only practice and perseverance will reveal them. The cost is £24.95. Watch this space.

World at your fingertips

The Centre for World Development Education (071-831 3844) is releasing its award-winning World Development Database as CSV and text format datafiles which can be imported in databases and spreadsheets on RISC OS, Dos and Apple platforms.

The database is available for £35 including manual, the World Bank's Development Data Book and data disk. The latter contains information from 129 countries with a population of more than one million.

There are also specific files dealing with Energy, Health and Population. Social and economic indicators are covered: Life expectancy, infant mortality, population growth rate and school enrolment.

DA'S PICTURE

DA's Picture is a 24-bit art/image processing package, compatible not only with the new RiscPC, but also the older range of machines and most graphic cards. All the tools, modules and palettes can be moved to where they suit you, and are not fixed.

- **Virtual Memory Management** enables large pictures to be edited without massive quantities of RAM.

- **Dual Mouse Control.** Each mouse button can be assigned a different and independent tool or colour.

- **Tools.** Pencil, Marker, Airbrush, Watercolour, Smear, Dither and our unique Stamp tools allows an infinite number of brushes, such as Fractal, Grass, Ball and many more.

- **Filters.** Erode, Blur, Sharpen, Invert, Contour, to name but a few.

- **Masks.** Both 1-bit and 8-bit masks can be used. It is also possible to import greyscale pictures as masks, and even make a stencil from a mask.

- **Palette.** User palettes may be defined and saved. The "Colour Pick" tool makes grabbing colours from pictures child's play.

- **Block Clipboard.** Cut up your images and paste them in numerous ways. The clipboard menu allows you to define many parameters before pasting an image, e.g. any degree of transparency, colour saturation, negative, tinted, scaled.

- **Zoom.** The magnify tool allows super fast zooming in and out. Simply aim the mouse and click until you reach the required zoom level (13 levels). Zoom out to one 17th of original size.

- **Gradient Creator.** Design Linear or Radial gradient fills for use as backgrounds, masks etc. Gradients can be dithered to obtain many different effects.

- **Colour Gradation.** This module allows images to be re-coloured by adjusting the amount of each colour present in an image. For instance change greys to sepia, or correct the colours in a scanned or digitised picture. These settings can be saved for further use.

- **Import/Export.** TIFF, as well as Sprite, JPEG, TGA, GIF and PhotoCD.

- **Options.** DA's Picture is a modular program, this means peripherals such as Scanners and Digitisers can be used within the program. The first module (available soon) is for the Epson 24 bit colour scanner, next will be the Vector Module. This module is used to import or draw vector graphics. You can use various tools on vector paths, for example airbrush, marker, stamps.

Illustrations created completely in DA's. Picture by Mark Bloomfield.

Pencil/Crayon

Air Brush/Cloning Pen

Smudge/Sharpener

Water/Fader

Fill/Magic Wand

Restorer/Stamp

Block/Measuring Tape

Densitometer/Colour Picker

Move Tool/Magnifier

The tools used to create the illustrations.
All Trademarks Acknowledged.

Please send me a copy of DA's Picture for the Acorn @ **£120.00** inc VAT and p&p (Single User Version)

NAME:

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A world of opportunities

RETURNING to the Wembley venue of previous shows, Acorn World promises a world of opportunities for all the family over Friday, Saturday and Sunday, the 28th to 30th October 1994. This year's show is sponsored by *Acorn Computing* and our sister magazine *Acorn User* and you can experience the educational use of Acorn computers, from giving your child a *headstart* to developing your own IT skills for business, education and entertainment.

As well as seeing the latest in hardware and software – which we'll be describing in the coming months – you'll be able to view the STBs (Set Top Boxes) from Online Media, Acorn's fledging company at the forefront of a new era in communication, plus you can try out the new Pocket Book II.

In particular, this year's show will contain a variety of FREE training sessions. Run by Acorn, these will be an hour long and limited to small groups with everyone provided with a Risc PC. Each session will be a complete mini-training course, as well as giving an idea of what Acorn's regular one and two-day courses offer.

What can you do? Well there are five courses to choose from:

- Introducing RISC OS
- Make the most of Draw and Paint
- Effective DTP
- Creative Multimedia
- Behind the Desktop

All the courses assume you have a working knowledge of Acorn systems except for *Introducing RISC OS*.

Also in the pipeline is a *Laser Labyrinth*. Children can enter and fight as a warrior to find out just what armed combat does to your heartbeat as monitored on a computer. This is a collaboration between the IT/activity holiday company Superchoice and Acorn, and follows on from last year's popular abseiling tower.

Next month we'll have more details on what you can see and do at Acorn World – as well as information on a special A3020 offer – and news on what exciting competitions and displays you can see and take part in at the *Acorn Computing* stand.

The Acorn World 1994 Show

Wembley Exhibition Centre
28-30 October 1994
Advance Tickets: Adults £5, Children £4 and Family £16
Ticket Hotline: 0933 441448

Acorn World '94 – Theatre Timetable

Times	Friday	Saturday	Sunday
11.00 – 11.25	Introducing the Risc PC	Introducing the Risc PC	Introducing the Risc PC
11.35 – 12.00	Set Top Boxes and the Information Highway	The Best of Both Worlds	Photo-retouching in the hands of a Graphic Artist
12.10 – 12.35	Digital Video Editing	Technology on the Move – Pocket Book in Education	Home and School – providing the missing link
12.45 – 1.10	Talk to us – we talk to everyone	Photo-retouching in the hands of a Graphic Artist	ARM'd for the Future
1.20 – 1.45	Risc PC – the perfect sound	New Literacy – taking IT into the 21st century	What's New in Multimedia
1.55 – 2.20	ARM'd for the future	Set Top Boxes and the Information Highway	The Best of Both Worlds
2.30 – 2.55	Technology on the Move – Pocket Book in Education	What's New in Multimedia	Set Top Boxes and the Information Highway
3.05 – 3.30	Photo-retouching in the hands of a Graphic Artist	Talk to us – we talk to everyone	Meet the Editors – Acorn User
3.40 – 4.05	The Best of Both Worlds	Risc PC – the perfect sound	Technical Question Time
4.15 – 5.00	Technical Question Time	Meet the Editor – Acorn Computing	CLOSED

A whiter shade

THE development of the Risc PC has had a considerable effect on the type of product being produced for the Acorn RISC OS machines – namely there's been a flood of graphics packages utilising the 24-bit colour capability.

There have always been an inordinately large number of painting packages for Acorn machines – mainly because a lot of the necessary code is built into the operating system – but now we have a veritable flood of "professional quality" image processors and painting packages which operate in 24-bit colour.

So what is *image processing* and how does it differ from *painting*?

Image processing assumes that you start with a finished picture, which might be digitised from a video source, scanned from a physical picture in mono or colour or perhaps a picture from a PhotoCD, and from there you *process* it to alter its qualities.

What you alter depends on the effect you're trying to produce. For example, you may have a picture which is a bit dark. With an image processor you can lighten it so that more of the detail is visible, or it might be over-exposed so you darken it.

Alternatively you may have a rather murky image where all the colours look the same. You can increase the contrast or perhaps alter the colours to make the greens greener, the blues bluer or the reds redder.

There are serious applications for these kinds of effect in professional publishing to make usable images out of bad ones and to adjust the false colour pictures that you can get from satellites.

In addition there's the problem that printing on to paper plays havoc with colour, so you often need to adjust colour to improve the final look of a picture. However, these are just the simpler things you can do from a strict image processing viewpoint – but there's more.

● *Changing the form of an image*

You can then begin to add special effects like modifying the image to make it look as if it's on to textured surface – the choice of texture is yours. Then again you could turn a colour photograph into a monochrome print.

This type of change is fairly innocent and can be used to enhance the original picture, but it's debatable where *enhancement* ends and *creativity* – and, in some cases, *abuse* – takes over.

The cover picture for this magazine was put together using PhotoDesk, although in their finished forms any of the three packages here could have achieved the same (or at least a very similar) result. Compo, reviewed separately, could also have managed certain

● *Processing an image to make it clearer*

# of pale

Steve Turnbull examines the new wave of picture processing packages

● *Creating a monochrome picture*

sections of it.

While some people might argue that it's abuse, it's an example of the creativity that an image processing package can achieve. An example of abuse, which was mentioned in an editorial a while back, was the Sun and Daily Mirror changing the same picture by each pasting their own magazine name on to the T-shirt of the subject (well, one of them was faking it).

This might be considered harmless abuse but it becomes less harmless when you realise that you can take a completely innocent picture, such as children playing, and turn it into a riot with slogans painted on the walls – as the electronic publishing magazine XYZ demonstrated in one of their early issues.

Since the development of image processing, it may still be true that the camera itself cannot lie – but it can be made into an extremely convincing liar with a few clicks of the mouse.

Using image processors for creative work falls into two categories.

There are the commercial artists who combine and modify images for specific effects whether it be designing posters, creating logos or even magazine covers.

On the other hand there's the creative artist who samples all sorts of images and combines them in a collage for purely aesthetic purposes – although the medium of computer art is a strange one since an image can be reproduced infinitely once finished, the original is just an arrangement of atomic particles, which is difficult to put a signature on.

This comparative review is based around three packages, all of which are claimants to the Acorn throne of professional graphics package:

The first is PhotoDesk from SpaceTech, a company which is not usually associated with this type of package except when you remember that SpaceTech have an image processing package designed for their astronomical picture CDs.

Next up is DA's Picture. This one's heritage stems from the Atari ST where Digital Arts produced its predecessor.

Finally there's Photo-Touch from Oregan. Perhaps an unexpected company again, but Oregan did produce a graphics morphing package so it's not a complete surprise – and elements of that package exist in Photo-Touch.

The main difficulty with including Photo-Touch in this review is that it's not finished and has many elements ➤

which are to be added. These will be mentioned as we go through.

Import, export and memory

All the packages are capable of importing and saving a wide variety of picture formats whether Acorn-specific, particular to other machines or generic. On the one hand this is essential, otherwise the packages become isolated and lose effectiveness, but on the other, none of them use the generic import/export conversion system developed by Computer Concepts which allows infinite extension without having to get new versions of the main program, or alternatively use a system like ImageFS.

When files are imported, each program converts it to its own internal format which is stored in virtual memory – as much as possible of the file is held in memory while the rest is stored on hard disk and brought in when needed. Currently, Photo-Touch does not have virtual memory which limits the file size to memory but it is planned.

Virtual memory slows down the operation of these applications a lot, but when you consider that an A4-sized 24-bit sprite occupies 20Mb or more, you can see how necessary it is. The more ram you have the better.

PhotoDesk is able to import draw files and creates a bitmapped version of it which you can edit or use as a mask that can be used to modify other work.

Photo-Touch imports one type of file which is a total surprise: Replay movies. When you drag one on to the iconbar icon it gets disassembled into its component frames which you can load in and edit. Why you might want to do this and how it can be practical is covered under Photo-Touch's special features.

PRODUCT SPOTLIGHT

Product: DA's Picture
Price: £99 (£120.95 inc VAT & postage)
Supplier: DA, 231 Northborough Rd, Norbury, London SW16 4TU
Tel: 081-679 7307

The user interface

When using a product like this the user interface and overall ease-of-use is crucial. All of them have a toolbox and use menus to some extent and both PhotoDesk and DA's Picture use dialogue boxes in association with the main tools as well, while Photo-Touch doesn't.

● *Creative montaging of images*

PhotoDesk's toolbar runs along the bottom of the active window which contains the image and a border area. The toolbar moves between windows as you change the one you're working on.

This can result in a slow-down if you're working on a small machine as sections need to be paged in from virtual memory to redraw any newly-revealed part of a picture.

The toolbar, from left to right, has the effect gradient icon, effect icons (colour, tint, colour filter, masking, image processing and special effects), the effect style icon, the application tools (airbrush, paint brush, magic wand and drawing tools), plus an application tool switch (between painting and cutting/pasting tools), the colour sampler and magnifier.

All the tools can be used with *most* of the effects which can be changed by both the gradient and style modifiers. Where appropriate, clicking on an icon pops up a dialogue box to allow you to adjust the settings – however clicking on an icon has another effect which you have to bear in mind.

PhotoDesk redefines the Select and Adjust mouse buttons as Do and Undo, so you can paint a colour on to a picture with Select held down and take it off with Adjust.

If you change tool with Select the current image is saved – any alterations are fixed – but if you change tool with Adjust you can undo with the new tool, so you can apply an effect with a filled rectangle tool then take off bits of it with the airbrush. This is a bit fiddly at first but okay once you get the hang of it.

There's a clipboard which shows a thumbnail image of all the pictures currently loaded and one neat trick is that by using the magnifier tool you can select the area to be displayed by dragging on the thumbnail – it's quicker than scrolling, especially if you're using virtual memory.

The Undo feature is simple. There is the last stored version which you can restore to on pressing F8, but if you change tools with Select the displayed version becomes stored.

As you'd expect, the pointer changes shape depending on the tool you're using. It might seem unnecessary to say this but DA's Picture doesn't (although it is planned) and, surprisingly, neither does Photo-Touch, although it does change the pointer under other circumstances.

The three painting effects (colour, tint and filter) bring up a dialogue box that allows you to select either from a user-definable palette of colours – you can also save the colours separately and load them in again – from quick RGB drag bars or from the full RGB-CMYK-HSV

● *The PhotoDesk toolbar*

Colour picker.

Switching from image to image requires that you make the image active – the window is highlighted. This is achieved by clicking Menu over the window or by clicking on the border area.

DA's Picture uses a vertical toolbar with all the drawing tools on show. The tool bar is independent of any image window you're using. You can have any or none of the dialogue boxes appearing when the program is run and by default the toolbar is displayed.

With the version I was using, there were a number of stylistic discrepancies with RISC OS that I understand are to be fixed. The previously mentioned unchanging pointer is one; another was that clicking on the iconbar icon doesn't bring up the new image dialogue box, you have to go into the menu for it.

The image menu looks very strange and the items on it seem inexplicable – you *have* to use the manual, although I only had a provisional one to work from.

The dialogue boxes themselves don't work according to style – Tab doesn't take you to the next entry field, for example – and the Colour picker isn't the standard RISC OS one.

These may not seem very important, but for someone who has used RISC OS daily for years it becomes a barrier to using the program quickly and easily.

In use it is similar to PhotoDesk, although it has more options on the actual drawing tools. For example, you can set the spray can to fade in to a specific intensity then fade out again over a given period. Likewise you can force a change of colour as this happens.

The use of the mouse buttons is interesting. Both Select and Adjust are for *doing* but they can have different tools attached to each, so you could clone with the Select and sharpen the image with Adjust. Some tools require both buttons, in which case both current tools are overwritten.

The blend and gradation dialogues worked very well, giving a preview of the effect that you were about to get on the main image before you applied it.

Filter, in the case of DA's Picture, is the actual image processing effects, whereas it means something different on PhotoDesk, and has two meanings in Photo-Touch.

DA's Picture has an image list which is similar to PhotoDesk's clipboard. In this case the images are listed by name at the top and then there are pictures below.

One thing that DA's Picture has is the concept of a block, which is a defined area of an image that can have effects applied to it. It's also used for cutting and pasting.

Unfortunately I was unable to fully use the blocks as the preliminary reference manual was not clear. Photo-Touch has a selected area option which is similar and PhotoDesk just uses masks rather than having a separate type of area selection.

The Undo function on DA's Picture is a little more complex than PhotoDesk. You have the current image which you're editing and the last stored version which you can restore to, but there's also the option to swap them over which means you can compare a modified image with its predecessor by flipping between them.

The main problem I had ➤

● *DA's Picture toolbar*

● *Using masks to combine images*

● *The Photo-Touch toolbar*

➤

was with the DA's Picture user interface because the dialogue boxes had to be explicitly displayed from the iconbar icon so, given that a new user will click what he sees on screen, it takes a while to find the more powerful, but important, facilities.

Photo-Touch conforms to RISC OS style as you would expect, but relies much less on dialogue boxes than the other two and uses big menus instead.

This could become a considerable disadvantage when virtual memory has been implemented, as menus will cover large sections of the image which will then need to be redrawn when the menu disappears.

This applies not only to the main image menu – which has some massive sub-menus – but also to the vertical toolbar which, on some of the icons, pops up graphical menus which extend across the image.

When you apply an effect to an image it produces a new window containing the altered picture. This is because Photo-Touch can hold up to nine copies of the current image, so you can play around with different effects and compare them to see exactly what you want.

The Undo option on Photo-Touch is completely different to the others. You must specifically save the image but you can save multiple positions and restore any of them.

Three of the toolbar icons are dedicated to moving the images around. There's swap source and destination, copy source to destination and copy destination to source. This system has benefits over the others but you can end up with lots of windows on screen.

Unlike the other packages, Photo-Touch doesn't allow you to *paint* effects like image sharpening. Instead you have to sharpen the entire image, the result is put in the destination image, then paint from the destination back to the original.

On the whole Photo-Touch operates as you'd expect, with items appearing and disappearing in conformance with RISC OS style guidelines.

It has some unusual features but nothing strange as far as the user-interface goes.

Masking

In image processing, one of the most important features is the mask. This can be applied to various parts of the image and prevents any changes being made to the area it's covering. It's like putting masking tape over the chrome of a car to stop paint going on to that part.

PhotoDesk and DA's Picture have 8-bit masks, meaning you can have 256-level masking. The effect of this is that rather than just having a mask that's on or off, you can blend from one operation into the next. At present, Photo-Touch only has a 1-bit (on or off) mask but this will be changed – you can assume that it will probably be similar to PhotoDesk's.

Due to DA's Picture's heritage, it is only capable of using its limited range of drawing tools to create a mask. PhotoDesk has a much more extensive range of tools and can use them all, including the fancy undo facilities. In addition, PhotoDesk can import 256-colour sprites or even draw files and apply those as a mask as well.

PhotoDesk has mask inversion – a mask level of 0 becomes 255, vice versa and all the values in between. You can also hide the mask or *smooth* it – this increases the fade area between no mask

PRODUCT SPOTLIGHT

Product: PhotoDesk
Price: £169.95 + VAT
Supplier: Spacetech, 21 West Wools, Portland, Dorset DT5 2EA
Tel: 0305 822753

Creating a cover

● *The original pictures*

● *The Tutankhamun picture was flipped and the face was cloned using the cloning tool with a mask*

● *The womans eye was cut and rotated then recloned into the correct position*

and full mask. The mask is displayed in one of the CMYK colours and looks like a transparent filter through which you can see the image – this is very useful.

DA's Picture can't invert masks but it does allow you to have eight 1-bit masks, instead of one 8-bit, which can be displayed in different colours. The masks are not see-through and completely hide the image behind, if switched on.

DA's Picture will load 256-colour grey scales and use them as masks, or it will take 4-colour images and use the contrast percentage of the image as a mask.

Both DA's Picture and PhotoDesk allow you to save and reload masks, though only PhotoDesk will let you shift a mask around in relation to its picture.

Image processing

Of the three packages, there is no question that Photo-Touch has the largest number of image processing options but uses numeric rather than graphical means to adjust them – PhotoDesk goes for the graphical approach where appropriate. DA's Picture has less facilities than either but still allows a certain amount of customisation.

Both PhotoDesk and Photo-Touch allow you to specify whether the image enhancement will affect the red, green or blue colours or any combination of them – Photo-Touch extends this to any operation so you could, for example, just draw on the red part of the image.

Photo-Touch separates image processing into three areas:

- *Contrast/Colour* gives you colour contrast control and allows you to perform colour correction on different parts of the image.
- *Process* gives you image inversion, quantisation, brightening, darkening, conversion to monochrome or greys, crude colour adjustments, colour filtering, colour translation, shading, RGB, CMYK and HSV colour separations (puts separate colours into different image slots).
- *Filtering* adds noise at two different levels, smoothes the image in various ways, sharpens it, enhances edges in different ways, provides a custom filter and embossing.

Photo-Touch and DA's Picture have two area selection mechanisms, the selected area (*block* in DA's Picture) and the mask, while PhotoDesk only has the mask.

When you use an image processing effect the packages only apply it where appropriate. With PhotoDesk and DA's Picture a graduated level of effect is applied ➤

PRODUCT SPOTLIGHT

Product: Photo-Touch
Price: £79.95 (inc VAT and postage)
Supplier: Oregan, 36 Grosvenor Avenue, Streetly, Sutton Coldfield B74 3PE
Tel: 021-353 6044

● *The final picture (above) was colour enhanced using the contrast tool and the woman's eye was repositioned*

● *The chin was then merged in and the side of the face blacked out*

● *The face was then masked and the original Tutankhamun picture was recloned on the left*

● *The right hand side of the picture was blurred with the motion blur effect and a mask, and the forehead blurred in*

➤

where 8-bit masking is in use.

PhotoDesk allows every image process to have a *strength* value between 0 and 100 – the exact meaning of the value depends on the process. The processes are divided into five areas:

- *Enhance*, which modifies a pixel relative to its neighbours and can perform sharpening, smoothing, edge detection, bas relief effects and so on.
- *Gamma* which affects contrast, brightening and darkening.
- *Emboss* applies a texture to an image (you can also have a tool style which includes a texture).
- *Math* performs functions like adding noise, quantisation, solarisation and crude pixel value change.
- *Equalise* which can modify the balance of colour in the image.

DA's Picture's image processing facilities are located on its Filter dialogue box. There is a strength setting and, unlike the others, DA's Picture allows you to specify the size of the surrounding area that's taken into account when altering a pixel and it has an independent *use mask* setting. It's functions are: Invert image, add noise, add grey noise, blur, sharpen and contour (edge detect).

In this area, Photo-Touch and PhotoDesk are roughly on a par in terms of facilities, but PhotoDesk provides adjustments on things that Photo-Touch doesn't. DA's Picture just can't compete.

Next up are the special effects. In PhotoDesk all operations are unified except for some of the special effects. Here you find cloning (copying from one part of an image to another, which may be a different image completely) which does use the standard tools; ripple, where you draw a line on screen and the whole thing is distorted to match the line; motion blur; smudge and smear, which uses a special finger tool (smudge merges colours in an area, while smear will drag colour around) and finally camera lens, which allows you to de-focus an image. All of these obey the mask if it's in use.

If it weren't for the fact that these things are *sometimes* necessary it could be arguable that Oregan went a bit over the top with Photo-Touch's facilities: Scratch, ripple, trace edges, mosaic/pixellate, pointillise, transform, extend area, add noise, cycle pixels, mask (uses black pixels of destination image as a mask), kaleidoscope, squash (fills a shape), whirl, morph (limited with only one intermediary image), distort (to fixed shapes), fuzzy.

Many of Photo-Touch's special effects can be found in PhotoDesk's image processing dialogue box, but it certainly has some interesting ones. However, many of them seem uncontrollable.

For example you cannot adjust the degree of brightening or darkening in this section – although by using other parts of the package you can achieve the same effect in a fully controlled way. The Photo-Touch options tend to sprawl as opposed to PhotoDesk's clean and unified interface.

Photo-Touch also has 16 other mathematical operations for combining the source image with the destination. DA's Picture doesn't have any special effects of this type at all.

One of the drawing facilities not covered so far is the rubber stamp. This is where one type of image is stamped on to another. Photo-Touch doesn't have a stamp facility, DA's Picture does but it requires a special file format which is a 64x64

Elegant compositions

Steve Turnbull gets some help in putting it all together

ALTHOUGH I'm including Compo in this article, it's considerably different to the other packages we've looked at so far and certainly isn't in competition with any of them. It's a complementary application and as such you'd buy it in addition to the other described here – or in addition to Pro-Art 24 or Studio 24.

What Compo (short for *Composition*) does is allow you to take various bitmap images and combine them in a variety of ways. For example you can take two pictures and blend one into the other using masks that you can create yourself – anything from simple fades to a mask based on another picture.

In itself this is no different to what any of the other packages can achieve but with one crucial difference: The images are treated as completely separate objects at all times and can be moved around and individually altered until you achieve the desired effect and *then* you can save your final image. It's best to imagine the Compo user-interface as being like Draw – you drop in pictures and move them around.

You can make the images opaque or transparent – or any of the 256 shades in between – you can tint them, create shadows and so on, and you can continue to move each around until you're satisfied with the final result.

Most of Compo's operations are reversible, although scaling isn't. Rather than build all the image processing capabilities into Compo itself, Clares have opted to interface with ChangeFSI which performs all the complex graphic operations while the main program concentrates on

pixel image with a mask, and PhotoDesk will use any draw file as a stamp applying any effect.

Text handling on PhotoDesk allows you to enter some text in any font, apply rotation and skew to it, then place it using any effect. DA's Picture doesn't seem to have a text tool though its not clear, while Photo-Touch has the ability to plot text in any font rotated.

Special facilities

PhotoDesk and DA's Picture are both plain and simple image processing packages and don't perform any functions beyond the needs of their purpose. Photo-Touch is different.

As mentioned, Photo-Touch will load a Replay movie – also VIA files – and then it allows you to load in frames and process them. Supposing you load a 25 frame per second movie that lasts 30 seconds, you now have 750 sprites to process.

Photo-Touch provides, on its toolbar, the ability to record and play back most of its image processing actions. So you can perform the operations on one image, record it, then repeat it with one mouse click on the next image, or on a different selected part of the same image.

Summing up

It's a little difficult passing judgement on Photo-Touch as it isn't finished. Assuming all the improvements are carried out I would say it will be a good product at a much lower price. And there are benefits to its way of handling images although it doesn't fit my way of working.

I feel it could do with a reworking of the user interface. The morphing doesn't seem useful but the movie processing is an area that could be worked on as it distinguishes it more.

DA's Picture doesn't make the grade, although there's more control over the individual tools available. Its image processing facilities and drawing tools are too limited in number and the user interface just isn't RISC OS enough.

PhotoDesk has a well-designed user interface that's clearly been thought through thoroughly – it's logical, intuitive and easy to use. It's not perfect and there are various features currently being added that will enhance it further and which are not available on the other packages either.

PRODUCT SPOTLIGHT

Product: Compo
Price: £169 + VAT
Supplier: Clares, 98 Middlewich Rd, Rudheath, Northwich CW9 7DA
Tel: 0606 48511
Requirements: Risc PC only

● *Using Compo with a blend mask*

other areas.

Each of Compo's objects can have separate blend and tint masks and these can be individually edited with a set of drawing tools – these are not as extensive as the drawing tools on something like PhotoDesk but this was only the alpha-release version and enhancements are promised.

You can add text in Compo which is converted into a bitmap image which can then be manipulated just like anything else.

Summing up

Even in its current very unfinished state Compo is an impressive product – and, as far as we know, there's no product like it on any other computer platform. Superb.

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Picture Perfect

Rob Miller accesses 24-bit graphic creation

ONE of the main improvements over older technology is the Risc PC's ability to display full, 24-bit colour images. To the untrained eye this may not sound – or more correctly, *look* – like a particularly important step, but the benefits it brings are extremely important and far-reaching.

Many of the established Acorn software houses were quick to announce new or improved versions of existing programs that will take advantage of the extended colour facilities of the new machine and Clares have been one of the first with their new ProArtisan 24.

ProArtisan 24 is the latest incarnation of Clares' popular art program which started life as Artisan on the original Archimedes. By today's standards this was a simple 16 colour screen editor but has now been transformed into an extremely powerful art and picture processing package, capable of producing *real* pictures.

If you are unfamiliar with ProArtisan it is basically a painting program that allows you to draw pictures using dots (or pixels), lines and shapes.

Editing tools allow pictures to be changed in a number of ways and a selection of processing tools allow effects such as blurring, sharpening and contrasting. ProArtisan 24 is mainly based around this earlier program and the majority of its features are the same.

What's new?

As you've probably guessed from the name, ProArtisan 24 allows pictures to be created and edited in full 24-bit colour and you will need a Risc PC. For older machines there is ProArtisan 2.

Unlike vector-based programs such as Computer Concepts' ArtWorks, bit-map programs really need to run on machines with full 24-bit display capabilities to get the most out of them. Dithering 24-bit images in 256 colour modes is possible but is not really practical when you wish to edit the pictures as well.

Having access to a full palette of 16 million colours transforms ProArtisan so that anything you could do with both non-computer and computer materials should be possible.

Mixing colours together, for example, really does mean that. The computer no longer needs to approximate anything and ProArtisan 24 can now be described as a true WYSIWYG (What You See Is What You Get) program.

● *Selecting colours in ProArtisan 24*

A coat of many colours

With a possible maximum of 16,777,216 colours, it doesn't take much to realise that selecting the exact shade you want is not going to be easy and Clares have done an extremely competent job with their colour picker.

As well as choosing colours using Acorn's new 24-bit colour-picker – also included in ProArtisan 24 – you can select shades from any of 32 *sub-palettes*. These can be used to store your own selections of colours and can be saved for loading in and using at a later date.

With now over 16 million colours, graded fills are always smooth and selecting different colour schemes is simplicity itself. Fills are made up of 256 shades and are created simply by choosing the start and end colour and dragging the pointer from one to the other. Extra colours can be inserted by dropping them on to the palette and dragging the pointer from this point to the extremes.

Brushing up on things

The concept of a brush has now been greatly extended allowing you to customise the size and opacity of a brush precisely to achieve all ➤

● *The rather effective Airbrush tool*

● *The appropriately named Warp tool*

● *Blending from one picture to another is easy*

manner of effects.

The airbrush tool now works exactly as you would expect a real airbrush to react. Other brushes let you mimic the effects of watercolours, charcoal, chalk and oils and all give equally stunning results.

Textures were first introduced in ProArtisan 2 but now work far more effectively. Again the computer no longer has to compromise by choosing the nearest colour and the 24-bit palette allows realistic effects such as marbling and ragging to be achieved.

Textures of brush types can be customised by altering the brush style and this fact alone greatly enhances the power of ProArtisan 24, with the number of different combinations of brush style and type virtually limitless.

Paths are similar to those in Draw and can be seen in ProArtisan2. Now they have been extended to link in with the system of brush styles and types. A rectangle, for example, can be positioned on the canvas or drawing area and any brush style or type can be selected to render/paint/draw.

Paths can be as simple as straight lines or as complex as a piece of text. They can also be imported directly from Draw so it is perfectly possible to have Draw running alongside ProArtisan 24 and use it as an *additional* drawing tool for complex curves.

PRODUCT SPOTLIGHT

Product: ProArtisan 24
Price: £169.95
Supplier: Clares Micro Supplies, 98 Middlewich Road, Northwich, Cheshire CW9 7DA.
Tel: 0606 48511
Requirements: Risc PC

● *Loading a picture from a PhotoCD*

PhotoCD

Just before the launch of the Risc PC, Clares released a special version of ProArtisan 2 that incorporated features to allow the direct import of Kodak PhotoCD images. ProArtisan 24 includes the same PhotoCD support, giving you potential access to a wide range of high quality 24-bit pictures.

For PhotoCD you'll need a CD-Rom drive but loading PhotoCD images is simple. An item on the main ProArtisan 24 menu allows you to catalogue any Kodak-format PhotoCD and import the pictures directly without the need for an intermediate program.

Cataloguing a PhotoCD produces a window containing a contact sheet of the available pictures much in the same way as Acorn's PhotoView application. Pictures are displayed ten at a time to cut down on the amount of time (and memory) required to cache each thumbnail image.

Clicking menu over any of the pictures brings up a small sub-menu allowing you to select the size of the imported image from 384 x 256 to 3072 x 2048. Bearing in mind that the images are 24-bit, you'll need quite a lot of memory for the bigger images – 20Mb plus for the 3072 x 2048 ones.

Images can be grey-scaled before loading and a special clipping window allows you to select an area of picture for loading. This is very useful if you have limited memory but still want to import part of a picture at one of the higher resolutions.

Loading a picture is then just a case of double-clicking on the required image. Smaller pictures load quite quickly but the bigger ones can take some time.

A typical image at 3072 x 2048 can take well over 15 minutes to load which may seem a long time, but is actually quite quick when compared to similar software on PC and Apple Mac systems.

● *Perfect graded fills in ProArtisan 24*

● *Textures work perfectly with 24-bit colour*

Summing up

I was very impressed with ProArtisan 24. The Risc PC is an ideal machine for real computer artists and ProArtisan 24 looks like it could well be the art package to judge all others by. There are, of course, one or two features that could be improved upon but nothing (thank goodness) is perfect.

£170 might seem a lot to pay for a piece of software but when you've already forked out over £1,000 for your machine plus the extra memory and nice monitor, it's a small amount in comparison.

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A program

Rob Miller takes you on a tour of the latest in painting from Pineapple Software

LIKE the Archimedes before it, the Risc PC has inspired a wealth of art packages designed to make use of the graphics capabilities of the machine in question. Pineapple Software – perhaps most well known for their VProtect anti-virus software – are the latest in a long line of companies to join the throng with Studio 24.

Like the other recently-released paint packages, Studio 24's main feature is its ability to handle 24-bit graphics – the true-photographic palette of 16 million colours. What would effectively be just another paint package is transformed into a tool with virtually limitless possibilities.

Unlike Clares' ProArtisan 24, Studio 24 will run on any Acorn RISC computer, although it's obviously better suited to the new Risc PC or machines fitted with graphic accelerators such as Computer Concepts' Colour Card or State Machine's Colour Burst.

24-bit pictures also take up a lot of space so a computer fitted with extra memory – preferably 4Mb or more – is ideal.

PRODUCT SPOTLIGHT

Product: Studio 24
Price: £125
Supplier: Pineapple Software, 39 Brownley Gardens, Seven Kings, Ilford, Essex IG3 9NL.
Tel: 081-599 1476
Requirements: 2Mb ram

Starting up

Studio24 comes on three 800k disks, one of which contains the program while the other two contain examples and extra resources. There is no software protection as such, but a registration system exists whereby you phone up Pineapple and they give you an *access code* for your software.

Your name is embedded into the code and you are free to copy it across to your hard disk. This system allows Pineapple to get an instant record of who owns Studio 24 and enables them to send future upgrades automatically whenever there is a new release. This is an excellent idea and perhaps one that other software companies should take note of.

● *The colour window in Studio24*

Once the software is installed, it can be run in the usual way, after which it loads itself on the iconbar. From here, there is a small menu allowing you to either create a new picture – referred to as a *canvas* – or set overall program preferences. A *Minimise Memory* option acts much in the same way as that in Impression and frees up any spare memory left hiding in your computer.

Creating a new canvas is simply a case of providing the width and height of your picture in pixel units. There is no option to choose a particular number of colours – 8-bit, 16-bit and so on – as all pictures are created and stored as 24-bit images.

You can, however, export your picture in a number of different formats. You can select a different pixel ratio such as 1:1 (like Mode 21), 1:2 (like Mode 15) or 2:2 (like Mode 13).

Once the picture size has been chosen, the canvas is displayed in a window. Like most art programs, there is a separate toolbox containing the most common tools – paint, draw, cut and paste – with access to the stencil, plus the paint styles and opacity level.

The paint style is something that affects every action where colour is applied to the canvas, such as spray-

● *Creating your own filters is also easy*

● *Some of the possible effects using the brush FX tool*

● *Filters let you transform pictures in a number of ways*

painting or flood filling and can be changed by selecting a pattern from one of six predefined ones. Paint styles range from *Canvas* to *Ripples* and with them, you can achieve some quite superb results. Further paint styles can be loaded in or you can even design your own.

Like the paint styles, the opacity level effects all operations where colour is applied to the canvas. Altering the opacity level allows you to determine how much paint is applied – with a low setting you'll get a kind of coloured wash effect and a full setting produces solid colour.

A second toolbox provides sub-menu to the currently selected main tool. If you have chosen the paint option, for example, the sub-menu displays a selection of different painting options. The contents change depending on the tool and in some cases – as with the magnifying glass – disappears entirely.

The third main window is the colour selection menu which follows very closely the approach of Acorn's new colour picker in RISC OS 3.5. A *colour cube* is used to select a new colour, giving quick and easy access to the 16 million possible hues.

Colours can also be selected by typing in the exact amount of red, green and blue that you require. HSV – Hue, Saturation and Value – the selection is also included on the colour dialogue box.

The main menu

First up on the main tool box is the magnifying glass. This is used to zoom in (and out) of a picture to make fine detail work easier. Unlike some other art packages, there is no way of having more than one view of a canvas.

This can make fine editing quite time-consuming as you tend to find yourself having to constantly zoom in and out of the picture to check your work at magnified then 1:1 ratios.

The second main tool is the paintbrush. From here, you can paint on to the canvas with either a spray-can or solid brush. Any changes you have made to the opacity or paint style are reflected in the type of stroke you achieve. Choosing a low opacity setting means that the current colour is thinly applied to the canvas, with subsequent strokes making the colour *thicker*.

The brush size can be changed from a single pixel up to a circle approximately 30 pixels across, while other brush shapes are possible by loading in separate brush files supplied on the resources disk.

The current brush shape is shown *actual size* on the sub-menu and the brush shapes are simple sprites which means that you can use something such as Paint to create your own custom shapes or modify those supplied with Studio 24.

The custom brush method is a simple solution to providing unlimited brush shapes, although anything bigger than 30 pixels square or so is impossible to show on the sub-menu. This doesn't affect the way the brush works but makes it difficult to tell which brush you have selected.

As well as the main FX tool, the paint tool has its own sub-menu which allows you to apply a number of effects as if they were ordinary colours.

There are seven *processes* to choose from, ranging from *Invert* which overturns whatever is underneath the brush, to *RGB noise* which sprays the brush area with random coloured pixels. Other choices include *Contrast* and *Saturation* and all processes except Invert can be set at varying levels.

Next up on the paint sub-menu is the blur tool. Although, at first, this seems to have little practical use, with ➤

Stencilling

The stencil is a single feature which can be used with other tools to achieve some very clever effects. It effectively allows you to create a mask on your canvas to ensure that marked areas are left untouched by subsequent painting actions.

Any of Studio 24's painting and drawing tools can be used to create a stencil and they can be saved out separately to any pictures and loaded in at a later date.

For example, you could create a stencil in the shape of some text, import a picture as your paste brush and then *fill* the text with the picture.

mable canvas

● *Merging colours is easy with the blur tool*

● *The Paint tool with different levels of opacity*

● *Cutting and pasting from one canvas to another*

a little practise and experimentation some excellent effects can be achieved and it's ideal for *smudging* colours to get a water colour effect.

A few of the accompanying pictures were produced mainly using the blur tool and I've yet to see a similar tool in other art packages that can achieve the same results.

A *Clone* tool allows you to copy areas of the canvas from one place to another. A small rectangular cursor determines the size (and position) of the area to be copied and changes depending on the current brush size.

Like all painting actions the opacity level regulates the amount of *paint* produced when cloning an area. The final option is *Stencilling* which is described later.

● *The warp tool in full swing*

Pen to paper, brush to canvas

Drawing is quite simple and just contains the basic straight line, curved (or freehand) line, rectangle, and ellipse. Rectangles and ellipses can be either unfilled – just outlines – or filled with the current colour. A final option allows you to draw curved lines and to join the start and end to form a solid shape. The thickness of lines can be altered from a single pixel up to about 30 pixels wide.

Both the opacity level and the paint style options affect the way in which lines and shapes are drawn. By using a low opacity setting and a paper paint style, it's possible to draw a filled rectangle over a picture to simulate bumpy paper.

A virtually unlimited number of effects can be achieved by using different combinations, making this feature particularly impressive.

Cut 'n' paste

No art program would be complete without a cut and paste option and Studio24 includes a simple interface for this purpose. It does exactly what it's meant to, but the cut and paste tool is somewhat lacking when compared to those found in other art packages.

The rubber-band tool does allow irregular shapes to be selected, although something along the lines of ProArtisan 24's Magic Wand would have been useful.

Once a shape has been selected, the blend options only allow you to paste the whole cut out back into the picture. There are none of the fades found in some of the other 24-bit art packages which is a shame really, as it would have made a useful tool even better.

You can, however, use the opacity level to achieve semi-transparent pasting and there are

● *Clever effects are possible with only a few strokes*

● *The stencil makes effects like this easy*

no less than six different ways of pasting objects back on to the canvas.

Write on down

Text manipulation in Studio24 is simple – just type in your text, choose your outline font and size, and hey presto, your words appear. Text can be any colour and can be anti-aliased against any background, no matter how colourful. It can also be set to any angle. Like the paint and draw tools, the text tool uses the opacity level and paint styles if selected.

Once you've put your text on the page, that's it. You can't edit it on the page as you would in, say ArtWorks, but that's to be expected. You can, however, use the Undo tool to remove, edit and replot it. This is a good example of how the Undo tool can be used in conjunction with other tools to make life just that little bit easier.

Special fx

Those of you with some knowledge of image-manipulation will probably be familiar with the concept of *filters*. In technical terms, these are special matrices that can be applied to individual pixels to alter them and their surrounding partners in some way. All sorts of effects are possible and Studio24 has a list of well over a dozen to choose from.

With filters, you can do things such as blur images, sharpen edges or emboss all or part of an image. The FX sub-menu provides four different methods of selecting the area to be processed.

The first three are similar to the cut options – rectangle, ellipse or rubber banding – but the fourth method allows you to *flood fill* an area and this area is acted on by the filter.

It's difficult to cite an exact use for a particular filter but even if you can't find a use for any of those supplied, there is always the option of creating your own. The special custom filter window allows you to alter those already present or add your own and save them for future use.

Full up

Flood filling in Studio 24 is quite simple. You can either fill an area with solid colour – or a pattern if the paint style is in use – or with either a linear or circular graded fill.

Graded fills are defined separately in the colour picker window and are just a case of choosing a start and end shade. Studio24 automatically selects the colours in between to provide a smooth transition.

All fills can be either Local – affecting only the area in which you click – or Global and affect any instance of the colour on which you click. The fill tolerance can be altered between 0 and 100 per cent so that fills can be made to fill areas of similar shade rather than solid colour.

This can be quite useful when you are trying to change an area of what looks like one colour but is in fact made up of several similar shades.

Summing up

Studio24 provides some excellent tools and features – especially the stencil – but it is let down somewhat by what it doesn't have. It's certainly not just another art package but I am sure the power of the Archimedes – and in particular the Risc PC – could be stretched much, much further.

I was also a little surprised by the speed of operation, especially as I was doing this review on a Risc PC 600. The brush tools do not feel as smooth as they could and I quite often got annoying gaps when moving the mouse too quickly. There's a lot more information to deal with when working with 24-bit colour but I am sure this could be better.

The overall appearance of Studio 24 is excellent and Pineapple have taken a lot of care to make sure that the front-end fits Acorn's guidelines.

Anybody familiar with RISC OS should therefore be able to start using Studio24 straight away – more than can be said for similar programs on other less-able platforms.

At £125 it stands up well against the immediate competition and with a bit of added speed and a few of the new tools it could be one of the best art packages ever to grace the Acorn market.

Warp and weft

The warp tool is rather peculiar and lives alongside the transform tools such as Flip, Rotate and Scale. Warping requires two pictures – the first being the current canvas and the second one being used to define the warp.

Without seeing it in action, it's quite difficult to explain but here goes. When a picture is warped with another, the pixels in the second image are scanned and the colour intensity of each pixel determines how much a pixel in the first picture should be shifted.

The pictures needn't be the same size, as the warp is automatically repeated across the image if required. Some example warps are provided with Studio 24 to help you get started.

● *Here's one someone else did before the program...*

● *...and here's another*

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ADA 2080	250Mb	13mS	£279
ADA 2170	340Mb	16mS	£339
ADA 2180	420Mb	13mS	£439

A3000 Internal IDE Drives

Part No.	Capacity	Access Time	Price
ADA 0720	80Mb	19mS	£169
ADA 0730	120Mb	16mS	£189
ADA 1070	200Mb	13mS	£329
ADA 2080	340Mb	13mS	£439

A300/400 IDE Hard Cards

Part No.	Capacity	Access Time	Price
ADA 0670	80Mb	19mS	£169
ADA 0680	120Mb	16mS	£199
ADA 1070	200Mb	13mS	£319
ADA 2090	340Mb	13mS	£429

A3020 Internal IDE Drives

Part No.	Capacity	Access Time	Price
ADA 2120	60Mb	19mS	£139
ADA 2130	80Mb	19mS	£169
ADA 2140	120Mb	16mS	£209
ADA 2150	200Mb	13mS	£339
ADA 2160	340Mb	13mS	£449

Accessories

• A5000 2nd drive accessory kit	£10	• IDE ROM Upgrade to v2.10	£16
• External Case & PSU for HDD	£49	• A300 Podule case	£10
• 16-bit IDE Interface - A300/A400	£39	• 8-bit IDE Interface - A3000 internal	£49

ARM3 Turbo Card

Using the latest surface mount technology on a high quality 4 layer PCB, the ARM3 Turbo Card will increase the speed of your A300, A400 or A3000 computer by up to 6 times.
The upgrade can be fitted by the user in A300 and A400 machines, but for owners of the A3000 we can collect, fit and deliver your computer back for an additional £24.
Owners of A300 and old A440 models will need a MEMC1A upgrade to use the ARM3.

Offer Price
£89

BUY ARM3 & RISC OS 3 TOGETHER FOR ONLY £155

RISC OS 3.1 Upgrades

• RISC OS 3.1 Single User upgrade	£69
• RISC OS 3.1 Bulk Software upgrade	£319
• RISC OS 3.1 Hardware upgrade	£24

Scan256 Handscanner

If you need a 256 greyscale handscanner for your Archimedes or A3000 (external), then look no further.
Scan256 gives you up to 256 grey levels at a maximum resolution of 400dpi and is supplied with state-of-the-art software. This makes it the only sensible scanning and image processing solution for the Acorn 32-bit machines.
The highly advanced software supplied with the scanner offers you many different image processing options, such as dithering, image enhancement, edge detection, brightness and contrast controls, plus many more.

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

• **Scan256 for A300/A400/A5000**	**£149**
• **Scan256 for A3000 external**	**£169**

TO ORDER CALL OUR SALES HOTLINE or FAX YOUR ORDER on 0582 488588 **0582 745555**

Aries Monitors

For the ultimate in high definition, flicker-free monitors displaying the sharpest text and graphics look no further than the new Aries Monitor range.
They're easy on the eye, safe and offer superb value for money – as you'd expect from Watford.
All monitors require SVGA VIDC Enhancer and 9pin to 15pin VGA adaptor.

Aries 14" SVGA Monitor
- 14" high res 0.28mm dot pitch tube
- 800 x 600 NI (1024 x 768 max resolution)
- Horizontal frequency: 29KHz to 38KHz
- Adjustable horizontal & vertical controls
- Tilt & swivel base
- Complete with connecting lead (15pin)

£165

Aries A-Scan Pro Monitor
- 14" high res 0.28mm dot pitch tube
- 1024 x 788 NI @ 72Hz
- Horizontal frequency: 29KHz to 70KHz
- Front mounted user controls
- Auto pincushion/trapezoid control
- Complete with connecting lead (15pin)

£199

Aries 6000 LR Monitor
- 15" high res 0.28mm dot pitch tube
- 1280 x 1024 NI @ 60Hz
- Horizontal frequency: 30KHz to 65KHz
- Microprocessor controls & LCD display
- Tilt & swivel base
- Complete with connecting lead (15pin)

£279

Aries 6500I Monitor
- 15" flat screen 0.28mm dot pitch tube
- 1280 x 1024 NI @ 60Hz
- Horizontal frequency: 30KHz to 65KHz
- Microprocessor controls & LCD display
- Precise colour controls
- Complete with connecting lead (15pin)

£299

Aries 7500 Monitor
- 17" flat screen 0.28mm dot pitch tube
- 1280 x 1024 NI @ 60Hz
- Horizontal frequency: 30KHz to 65KHz
- On-screen display of user settings
- Tilt & swivel base
- Complete with connecting lead (15pin)

£525

Aries 7560I Monitor
- 17" flat screen 0.26mm dot pitch tube
- 1280 x 1024 NI @ 60Hz
- Horizontal frequency: 30KHz to 65KHz
- Microprocessor controls & LCD display
- Precise colour adjustment
- Complete with connecting lead (15pin)

£499

Memory Upgrades

A310 to 2Mb RAM	£89
A310 to 4Mb RAM	£149
A3000 to 2Mb RAM	£49
A3000 to 4Mb RAM	£119
A3000 to 8Mb RAM	£259
A3010 to 2Mb RAM	£49
A3010 to 4 Mb RAM	£139
A3020/A4000 to 4Mb RAM	£79
A410/1 to 2Mb RAM	£35
A410/1 to 4Mb RAM	£70
A420/1 to 4Mb RAM	£105
A540 additional 4Mb RAM	£249
A5000 to 4Mb RAM	£79
A5000 4Mb to 8Mb RAM	£259
RiscPC additional 2Mb RAM	£85
RiscPC additional 4Mb RAM	£139
RiscPC additional 8Mb RAM	£279
RiscPC additional 16Mb RAM	£499

PC Cards

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

386 1Mb RAM - A3020/A4000	£225
486 4Mb RAM - A3020/A4000	£420
486 25MHz 0Mb RAM - A5000	£369
486 25MHz 4Mb RAM - A5000	£529
486 50MHz 0Mb RAM - A5000	£449
486 50MHz 4Mb RAM - A5000	£609
MS-DOS 6.2/Windows 3.1 Bundle	£99
4Mb SIMM RAM for 0Mb cards	£149

Ultimate Expansion

Ultimate Expansion – A5000	£39
Ultimate Expansion – A3000	£39
Ultimate Expansion – A3010	£41
Ultimate Expansion – A3020	£38
SCSI uPodule	£69
Vision Digitiser uPodule	£99
Analogue uPodule	£29
Serial Port uPodule	£49
MIDI uPodule	£49
Scanlight 256 uPodule	£229
PSU Kit for Ultimate Exp.	£30

(please call for pricing of above cards with IDE hard drives fitted)

I/O Cards

A3000 User Port/MIDI card	£44
A3000 Analogue/User card	£35
I/O Podule - User/Ana/1MHz	£79
Archi Analogue/User card	£49

Miscellaneous

Floating Point Accelerator – A5000	£99
MIDI Expansion card	£85
MEMC1A Upgrade	£25
4 Podule Backplane	£22
Fan for Backplane	£7
Arc to BBC Serial Link	£16
A3000 Serial Upgrade	£19
Laser Direct Hi-Res 4ppm	£799
Laser Direct Hi-Res 8ppm	£1099
ArcLaser A4-1200 Printer	£985
Scanlight 256 – A3000 internal	£195

Archi Hand Scanner

Watford's MKII Hand Scanner for the Archimedes and A3000 has a maximum resolution of 400dpi, and a scan width of 4". Features include: cropping and scaling images, X flip and Y flip, and edge detection.

A300/A400/A5000 version	£89
A3000 external version	£109
v1.10 ROM Upgrade	£20

Upgrade to A4 Scanner
For existing users of the Watford MK2 Hand Scanner we can offer you an upgrade to the A4 Scanner for only £129

Archi A4 Scanner

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

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

Disc Controllers

External Floppy Disc Interface	£10
Backplate/Lead for above	£9
8-bit SCSI card	£129
16-bit SCSI card	£149
16-bit SCSI card - 16Kb cache	£169
16-bit SCSI card – Acorn	£249
ST506 Hard Disc podule	£49
16-bit IDE interface - A300/A400	£39
8-bit IDE interface - A3000 internal	£49

Graphics Cards

Colour Card Gold	£239
Chroma 500 Genlock card	£419
Chroma 150 PAL Encoder	£169
Chroma Genlock card	£209
Hawk V9 MKII Digitiser	£189
Eagle M2 Multimedia card	£319
Vision Colour Digitiser	£99
HiVision Colour Digitiser	£149
Scanlight Video 256	£199

Archi Mk4 Mouse

The new Mk4 mouse for your Archimedes is the ideal replacement for your old worn out Acorn mouse. The sleek design makes the mouse a pleasure to handle, and it also looks nice on your desktop.

only £24

Archi Accessories

A3000/A3010 Keyboard Dustcover	£5
A3000 Combined Dustcover	£9
A300/400 Dustcover	£9
Archi Keyboard only Dustcover	£5
A5000 Dustcover	£9
14" Monitor Dustcover	£6
Perspex Keyboard Cover	£8
A3000 Monitor Stand (WE)	£15
A3000 Podule Case	£15
A3000 Carry Case	£10
A4 Notebook Carry Case	£35
A4 Notebook Battery Pack	£49
Archi Keyboard Extension Lead	£8
Quest Trackerball	£25
Voltmace Delta Cat Joystick	£25

Networking

Econet Interface – all models	£49
Ethernet Interface III – A5000	£149
Ethernet interface – RiscPC	£99
Acorn Access – A3000	£145
Acorn Access – A3020	£145
Acorn Access – A5000	£145
Acorn Access – RiscPC	£119
Accord P/P Networking – A3000	£145
Accord P/P Networking – A3020	£149
Accord P/P Networking – A5000	£145
EtherLAN Card – A3000 (BNC)	£131
EtherLAN Card – A3020 (BNC)	£143
EtherLAN Card – A5000 (BNC)	£131
EtherLAN Card – A3000 (BNC/TP)	£131
EtherLAN Card – A3020 (BNC/TP)	£148
EtherLAN Card – A5000 (BNC/TP)	£131
EtherLAN Card – RiscPC (BNC/TP)	£113
12 port UTP Ethernet Hub	£299

Ethernet Cabling

Length	Thinnet	Twisted Pair
1m	£2.50	£2.00
3m	£4.50	£2.75
5m	£6.50	£3.25
10m	£9.50	£5.25

Fax/Modem Bundle

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

- Fax/Modem with ArcFax software £149

VIDC Enhancer

The Watford VIDC Enhancer for the Archimedes 300/400 and A3000 computers, caters for all types of Multiscan and VGA monitors.

Multiscan VIDC Enhancer	£15
SuperVGA VIDC Enhancer	£29

CD-ROM Drives

Cumana OSCAR CD-ROM Drive
Dual speed drive – connects to printer port on A3010, A3020, A4000, A5000 or RiscPC.
- OSCAR CD-ROM – parallel port £229

Cumana BRAVO CD-ROM Drives
Dual speed drive – available with printer port connection or supplied with SLCD interface.
- BRAVO CD-ROM – parallel port £299
- BRAVO CD-ROM – A3000 SLCD £299
- BRAVO CD-ROM – A5000 SLCD £299

Cumana VICTOR CD-ROM Drives
Dual speed SCSI drive – available as a single drive or dual & quad speed versions using a six disc CD autochanger. Interface not included.
- VICTOR 402A – single drive £299
- VICTOR 632A – single drive £399
- VICTOR 602-6CD A/C–Dual sp £499
- VICTOR 604-6CD A/C–Quad sp £969

Cumana INDIGO CD-ROM Drives
The ideal CD ROM drive for the RiscPC. Simply connects to IDE interface, so no need to use one of the expansion slots (300i only). The 300iA also includes an audio mixer & Pro Atrisan 2 CD.
- INDIGO 300i CD-ROM – IDE I/F £199
- INDIGO 300iA CD-ROM – IDE £249
- INDIGO 401 CD-ROM – SCSI £199
- INDIGO 631 CD-ROM – SCSI £299

Interfaces & Accessories
- SCSI Interface – A3000/A4000 £119
- SCSI Interface – A5000 £119
- SCSI-2 Interface – RiscPC £199
- SCSI Interface cable £15
- SCSI II Interface cable £20

CD-ROM Software

Artworks	£129
Artworks Clip Art	£18
British Birds	£150
Castles	£40
Countries of the World	£40
CD – 4 Disc Set	£149
CD Francais	£120
Creepy Crawlies	£90
Dictionary of Living World	£175
Dinosaurs	£124
Frontier 2000CD	£125
Grooves	£90
Hutchinson Encyclopaedia	£49
Illustrated Holy Bible	£23
Illustrated Shakespeare	£23
Image Warehouse	£53
Revelation II	£99
Sherlock Holmes	£23
Space Encyclopaedia	£57
Really Useful CD v1	£47
Really Useful CD v2	£47
Times & Sunday Times	£195
Tekkie CD	£99
Pro Artisan v2	£129
Times Newspaper Sampler	£40
Changing Times	£125
Daily Telegraph	£125
ITN European Atlas	£149
World War 2	£149
Intro to Classical Music	£49
Interactive French Tutor	£149
Interactive Periodic Table	£99
En Marcha – Spanish	£140
Directions 2000 – French	£140
Elements – Science Series	£130
Materials – Science Series	£130
Water – Environment Series	£130
Inventors & Inventions	£150
Land and Air – Environment	£130
Number Games	£79
Picture Gallery	£79
Cars – Maths in Motion	£49
Understanding the Body	£40
Sherston Naughty Stories	£79

TO ORDER CALL OUR SALES HOTLINE
or FAX YOUR ORDER on 0582 488588
0582 745555

Imagine.....

Aries

A 2400dpi* colour flatbed scanner for the Archimedes or RiscPC for under £800. With true colour capabilities (16.7 million), we are sure you'll agree that it's an offer you can't afford to ignore.

Having brought you the most innovative handscanner back in 1992, we thought it was time to do it again. Following their success in the PC field, we introduce the award winning Aries Relisys flatbed scanners for the Acorn Archimedes and RiscPC. When you see the remarkably affordable price, you'll be sure to want one.

ISO-9001 Manufactured to BSI Quality Standard Certificate

With the Aries Relisys scanner you'll open up a whole new world of possibilities. Imagine being able to scan a whole A4 size picture and in true colour. If you don't want the whole image, simply select the required area and scan again - the software will capture only what you want to see.

The Aries Relisys scanner is the perfect answer for anyone involved in desktop publishing (DTP) work that requires the ability to import graphic images easily, or import text via Optical Character Recognition (OCR) software.

With the firmware interpolation they produce outstanding quality scans (up to 2400dpi*) and either 256 greyscales or 16.7 million colours.

The scanners are amazingly fast too. With a standrad SCSI II interface, they can scan a whole A4 page in 15 seconds (mono) and in minutes (24-bit colour).

An optional 50 page document feeder is available for scanning long documents, and an adaptor to get the best results when scanning transparencies.

* Resolution quoted is the maximum achievable using interpolation.

FREE Software

All Aries Relisys scanners come supplied with connecting cable, TWAIN driver and a copy of ImageMaster scanning software.

Software Features:

- Scan size not limited to RAM – images are saved directly to hard disc.
- Industry standard files supported – TIFF, JPEG, PCX, PBM, BMP, GIF and Sprite.
- TWAIN compliant.
- Scan type selectable from monochrome up to 16.7 million colours (24bpp).
- Advanced image processing tools/filters.
- Edit, rotate, shear, crop & flip images.
- Alter colour resolution of scanned image.

Scan256 Pro – 256 Greyscale A4 Scanner

- Single pass 256 greyscale scanner
- 8.5" x 14" scanning area
- 2400dpi x 2400dpi maximum scan resolution*
- 256 brightness/contrast settings
- SCSI II interface

Introductory Offer Price **£599**

ScanColour Pro – Colour A4 Scanner

- Single pass 16.7 million colour scanner
- 8.5" x 14" scanning area
- 2400dpi x 2400dpi maximum scan resolution*
- 256 brightness/contrast settings
- SCSI II interface

Introductory Offer Price **£799**

Optional Accessories:

Document Feeder	£259
Transparency Adaptor	£295
Sleuth OCR software	£43

Educational Discounts
Please call 0582 745555 for details

TO ORDER CALL OUR SALES HOTLINE 0582 745555
or FAX YOUR ORDER on 0582 488588

Access VISA AMERICAN EXPRESS

Archimedes Software

Desktop Publishing

- Impression Publisher £109

Impression Publisher

Impression Publisher is the latest version of the highly acclaimed document processing software for the Archimedes and RiscPC. Publisher can be your work processor. It is also excellent at handling large documents, even books. It's ideal for producing adverts, brochures and the most complex page layout tasks, and at a remarkable price.

Special Offer Price £109

- Impression Publisher OPI £159
- Impression Style £69
- Impression II Business Supplement £29
- Impression II Borders Disc £10
- Ovation £79

DTP Utilities

- CC Graphics Loaders £35
- Desktop Thesaurus £15
- Equasor £32
- Spellmaster £25
- Sleuth OCR £43
- Type Studio £35
- Optical OCR £POA

Word Processors

- DeskEdit 3 £21
- Data Word £14
- Easiwriter 3 £115
- Easiword Plus £38
- Pendown £45
- Pendown Plus £65
- Pendown Etolles £45
- Primeword £42
- Wordz £75

Spreadsheets

- Advantage £39
- Eureka £92
- ProSheet £28
- Resultz £87
- Schema 2 £95

Databases

- Flexifile £18
- Genesis Project £49
- Genesis Professional £119
- Insight £57
- Knowledge Organiser 2 £70
- Masterfile 3 £39
- Multistore v2 £78
- Pinpoint 2 £82
- Junior Pinpoint £24
- Pinpoint Datafiles £
- Recordz TBA
- S-Base Personal v2 £99
- S-Base Developer v2 £189

Integrated Packages

- Advance £79
- Desktop Office £48
- Pipedream 3 £69
- Pipedream 4 £90
- Fireworks £124

Languages

- Desktop Assembler £99
- Desktop C £151
- PC Bolt £89
- Control Logo £21
- Easy C £43
- Logotron Logo £57
- Risc BASIC Compiler v9.0 £59
- Risc FORTH Compiler £59
- Robo Logo v1.1 £29

Site Licences

- Advance Primary Licence £181
- Advance Secondary Licence £440
- Artworks £540
- Impression Style £495
- Impression Publisher £540
- Pinpoint 2 879
- Pipedream 4 £695

Communications

- ArcTerm 7 £58
- Hearsay 2 £59
- Arc Fax £34

Graphics

- Artisan 2 £43
- Autosketch II £89
- ArcTist £15
- Atelier £23
- Artworks £99
- Chartwell £22
- Craftshop 1 £18
- Craftshop 2 £18
- Euclid 2 £58
- Film Maker v5.1 £47
- GraphBox £36
- GraphBox Professional £65
- Illusionist £37
- Image Animator £58
- Kid Pix £32
- Plot £59
- Poster £63
- Presenter GTI £55
- PrimeArt £42
- Pro Artisan 2 £95
- ProArt 24 £125

ProArt 24

ProArt is the latest addition to Clares' range of graphics packages. Written for the RiscPC, this powerful software takes advantage of the machines 24-bit colour capabilities and more.

Special Offer Price £125

- Render Bender 2 £37
- Rephorm £42
- Revelation 2 £69
- Revelation Image Pro £99
- Solids Render v5.1 £59
- Titler £105

CAD

- Arc PCB v1.8 £72
- Arc PCB Schematics v3.2 £151
- Arc PCB Professional v5.1 £203
- CADet £95
- SolidCAD v5.1 £62
- SolidTools v5.1 £154
- PowerRouter £43
- Excellon Drill £43
- Oak Parametric Design Tool £149
- WordCAD £59

Business

- Business Accounts System £259
- Business Account Modules £79
- Payroll Manager v2.0 £59
- Prophet Accounts £129
- Personal Accounts £
- Home Accounts £24
- Financial Accountant £175
- Shareholder Professional £115
- Micro Trader System £275
- Micro Trader Modules £75
- PlanING £95
- ProjectING £289

Music & Speech

- Rhapsody 2 £45
- Rhapsody 3 £72
- Notate £59
- ArcTIculate £17
- Armadeus £59
- Vox Box £45
- Score Draw £45
- AudioWorks £30
- Speech! £18

Printer Drivers

- Expression PS £18
- Star/Citizen Colour Driver - OS 2 £10
- DeskJet Colour Driver £10
- Epson JX Colour Driver - OS 2 £10
- !Pronters v1.22 Upgrade - OS 3 only £5
- Canon BJ/BJC600 TurboDriver £39
- HP DeskJet/Laser Jet Turbo Driver £39
- Epson Stylue TurboDriver £39
- Show Page £139
- Repro £42
- SuperPlot £10
- SuperDump £10

Networking

- AUN/Level 4 Fileserver Rel. 8 £859
- TCP/IP Protocol Suite - Single User £99
- TCP/IP Protocol Suite - Site Licence £399

Games

- Adventures of Sylvia Lane £18
- Air Supremacy £13
- Black Angel £22
- Break 147 & Superproof £22
- Birds of War £22
- Battle Chess £17
- Cyber Chess £18
- Carnage inc. £15
- Crystal Maze £24
- Chess 3D £18
- Chocks Away Compendium £18
- Chuck Rock £14
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- Diggers £18
- Dungeon £16
- E-Type Compendium £15
- Elite £29
- Ego: Repton 4 £13
- F.R.E.D. £14
- Fervour £18
- Grievous Bodily Arm £15
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- Games Wizard £17
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- Haunted House £18
- Hero Quest £18
- Heimdall £18
- Ixion £14
- James Pond £15
- James Pond 2 - Robocod £16
- Lemmings £14
- Lemmings 2 - Tribes £18
- Lotus Turbo Challenge II £16
- Magic Pockets £17
- Manchester United £8
- Manchester United Europe £18
- Mah Jong Patience £15
- Nebulus £14
- Oh No! More Lemmings £12
- Omar Sharife Bridge £15
- Premier Manager £17
- Play It Again Sam 1 £18
- Play It Again Sam 2 £18
- Play It Again Sam 3 £18
- Populous £18
- Real McCoy 2 £20
- Real McCoy 3 £20
- Real McCoy 4 £20
- Repton 3 £13
- Striker £17
- Superior Golf £18
- Saloon Cars Deluxe £20
- Sensible Soccer £13
- Sim City £15
- Stunt Racer 2000 £18
- SWIV £8
- Technodream £18
- Virtual Golf £18
- Warlocks £22
- Xenon 2 £17
- Zool £15

Miscellaneous

- Investigator 3 £43
- DFS Reader £5
- Compression £32
- Gerber Plot £43
- Touchtype £39
- Hard Disc Companion 2 £39
- Oak Logic £69
- Ancestry £42
- Time Tabler £469
- RISC OS 2 SID Utilities Discs £10
- Concept Keyboard Designer £20
- File Handling for All Disc £4
- WIMP Programming for All Disc £4
- ImageMaster Scanner software £30
- Time Tabler £469

CLEARANCE OFFERS

We have a number of software titles on offer, at **£15.00** each, while stocks last. Please call for availability.

- **Acorn Desktop Publisher**
- **First Word Plus Rel. 2**
- **Clares Graphic Writer**
- **Desktop Folio DTP**
- **Investogator II**
- **PC Emulator v1.7**
- **Genesis Plus**

Educational

- 10 out of 10 English £15
- 10 out of 10 French £15
- 10 out of 10 Dinosaurs £15
- 10 out of 10 Driving Test £15
- 10 out of 10 Number £15
- 10 out of 10 Statistics £15
- 10 out of 10 Algebra £15
- 10 out of 10 Early Essentials £15
- 10 out of 10 Junior Essentials £15
- 10 out of 10 Structured Spelling £15
- Arcventure I – Romans £24
- Arcventure II – Egyptians £24
- Arcventure III – Vikings £24
- Arcventure I, II & III Bundle £68
- Around the World in 80 Days £29
- An Eye for Spelling £31
- Animated Alphabet £16
- Animated Numbers £16
- Aztecs £32
- Badger Trails £32
- Best Four Adventure £31
- Best Four Language £31
- Best Four Maths £31
- Bookstore – Primary £33
- Bookstore –Secondary £52
- Britain since 1930 £29
- Bumper Disc 1 £16
- Bumper Disc 2 £16
- Crystal Rain Forest £31
- Dream Time £16
- Export, Trade and Industry £34
- Farm £15
- Fun School 3 RED - Under 5s £15
- Fun School 3 GREEN - 5 to 7s £15
- Fun School 3 BLUE - Over 7s £15
- Fun School 4 RED - Under 5s £15
- Fun School 4 BIUE - Over 7s £15
- Fleet Street Phantom £22
- Geordie Racer - Look & Read £21
- House of Numbers £20
- Investigating Maths £32
- Landmarks – World War II £21
- Landmarks – Egypt £21
- Landmarks – Rainforest £21
- Landmarks – Victorians £21
- Landmarks – Columbus £21
- Landmarks – Aztecs £21
- Landmarks – Civil War £21
- Landmarks – Elizabeth I £21
- Landmarks Microworld – Invasion £22
- Linkword – French £32
- Linkword – German £32
- Linkword – Spanish £32
- Magpie 2 £49
- Mapventure £22
- Nature Park Adventure £22
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- Naughty Stories Vol.2 £37
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- Numerator £32
- Numerator Chaos Pack £18
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- Sky Hunter - Look & Read £21
- Stig of the Dump £18
- Space City £22
- Space Mission Mada £22
- Through Dragon's Eye - Look & Read £21
- Topographer £59
- Viewpoints £29
- Wizards Revenge £15
- Worst Witch £18
- Zig Zag – Anglo Saxons £24

Books

- Archimedes Assembly Language £12
- Acorn to PC £5
- Archi Game Makers Manual £14
- Artworks Made Easy £12
- ARM Technical Data Manual £10
- Ansi C Rel 4 User Guide £25
- BBC BASIC Reference Guide £15
- C: A Dabhand Guide 3rd Edition £15
- Control on the Archimedes £10
- First Impressions £20
- File Handling for All £10
- Good Impressions £12
- Impression II - A Dabhand Guide £12
- Mastering First Word Plus £12
- RISC OS 3 Programmer's Ref. Man. £95
- RISC OS 3 First Steps £12
- WIMP Programming for All £10
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- A3010/A4000 Technical Manual £29
- RiscPC 600 Technical Manual £POA
- RiscPC OS Style Guide £10

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or FAX YOUR ORDER on 0582 488588

Access VISA AMERICAN EXPRESS

Laser Printers

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

• Brother HL-6	6ppm	£422
• Brother HL-6V	6ppm	£463
• Canon LBP-4U	4ppm	£478
• Canon LBP 4i	4ppm	£480
• Canon LBP-8 IV	8ppm	£920
• Canon LBP-8 IIIR	8ppm	£1559
• Epson EPL-5200	6ppm	£480
• Epson EPL-5600	6ppm	£660
• Epson EPL-7500 PS	6ppm	£1135
• Fujitsu VM600	6ppm	£529
• Fujitsu VM4	4ppm	£499
• HP Laserjet 4L	4ppm	£462
• HP Laserjet 4 ML	4ppm	£745
• HP Laserjet 4P	4ppm	£716
• HP Laserjet 4MP	4ppm	£975
• HP Laserjet 4+	12ppm	£947
• HP Laserjet 4M+	12ppm	£1270
• HP Laserjet 4Si	16ppm	£2175
• HP Laserjet 4Si MX	16ppm	£3259
• NEC SuperScript 610	6ppm	£422
• NEC S 102P	6ppm	£992
• OKI OL-400ex	4ppm	£379
• OKI OL-410ex	4ppm	£515
• OKI OL- 850 PS	8ppm	£770
• Panasonic KX-P4400	4ppm	£360
• Panasonic KX-P4410*	5ppm	£360
• Panasonic KX-P4430*	5ppm	£496
• Panasonic KX-P4440	10ppm	£775
• Panasonic KX-P5400	4ppm	£599
• Star LS-5	5ppm	£365
• Star LS-5 EX	5ppm	£499
• Star LS-5 TT	5ppm	£530

*2 years on-site warranty

Laser RAM Upgrades

Type	1M	2M	4M	8M
• Canon LBP-4+	£139	–	–	–
• Canon LBP-4i	£109	–	£279	–
• Canon LBP-8 IV	£119	–	£299	–
• EPL-4100/4300	£70	£110	£205	–
• EPL-5200/5800	£58	£115	£215	–
• Fujitsu VM600/VM4	£57	£85	£149	£299
• Fujitsu VM800	£115	–	–	–
• HP III/IIIP/IIID	£75	£115	£135	–
• HP II/IID	£75	£115	£135	–
• HP IIISI	£57	£85	£158	£299
• HP 4/4M/4P/4MP	£85	£85	£149	£299
• HP 4L/4ML	£75	–	–	–
• KX-P4410/4430	£129	£199	–	–
• KX-P4420/4450i	£75	£115	£135	–
• KX-P4400/5400	£89	£139	£229	–
• OKI OL400c	£89	£118	–	–
• Star LP-8	£138	£225	–	–
• Star LS-5	£75	–	–	–

Laser Consumables

Type	Toner	Drum	Dev
• Canon/Star 4s	£48	–	–
• Canon LBP-8 IV	£70	–	–
• Canon LBP-8 III	£52	–	–
• Canon LBP-4U	£52	–	–
• EPL-4100/4300	£83	£89	–
• EPL-5200	£85	–	–
• EPL-7500	£177	–	–
• Fujitsu VM600	£85	–	–
• Fujitsu VM800	£115	–	–
• Fujitsu VM4	£29	£149	£89
• HP III/IIID	£52	–	–
• HP IIIP/IIP	£48	–	–
• HP IIISi/4Si	£95	–	–
• HP 4/4M/4P/4MP	£70	–	–
• HP 4L/4ML	£45	–	–
• NEC 610	£85	–	–
• NEC S60/S62P	£89	–	–
• OKI OL-400/800	£19	£189	–
• OKI OL-400s	£17	£129	–
• KX-P4410/30	£27	£109	£109
• KX-P4420	£22	£80	£59
• KX-P4450/51/55	£19	£99	£79
• KX-P4400/5400	£32	£69	–
• Qume Crystalprint	£99	£189	–
• Star LS-5	£83	–	–

Laser Accessories

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

9pin Matrix Printers

• Citizen Swift 90	80col	£115
• Citizen Swift 90C	80col	£122
• Citizen 1200+ Parallel	80col	£90
• Citizen 120D+ Serial	80col	£109
• Epson LX100	80col	£109
• Epson LX300	80col	£??
• Epson LX400	80col	£91
• Epson LX1050	132col	£174
• Epson FX870	80col	£226
• Epson FX1170	132col	£284
• Epson DFX5000C	132col	£1095
• Pansonic KX-P1150	80col	£89
• Panasonic KX-P1695	132col	£287
• Star LC15	132col	£178
• Star LC100C	80col	£89
• Star ZA200	80col	£255
• Star ZA250	132col	£315

24pin Matrix Printers

• Citizen ABC Mono	80col	£115
• Citizen ABC Colour	80col	£135
• Citizen Notebook Printer	80col	£???
• Citizen Swift 200 Mono	80col	£138
• Citizen Swift 200 Colour	80col	£146
• Citizen Swift 240 Mono	80col	£185
• Citizen Swift 240 Colour	80col	£165
• Citizen Swift 24X	132col	£235
• Epson LQ100	80col	£118
• Epson LQ150 Colour	80col	£159
• Epson LQ570+	80col	£188
• Epson LQ870	80col	£353
• Epson LQ1070	132col	£283
• Epson LQ1170+	132col	£407
• Epson LQ2550	132col	£879
• NEC P2Q	80col	£134
• NEC P3Q	132col	£236
• NEC P32Q	132col	£245
• NEC P62Q	80col	£337
• NEC P72	132col	£386
• NEC P90	132col	£582
• Panasonic KX-P2023	80col	£109
• Panasonic KX-P2123	80col	£126
• Panasonic KX-P2124	80col	£208
• Panasonic KX-P1624	132col	£210
• Panasonic KX-P2624	132col	£255
• Star LC24-20 II	80col	£113
• Star LC24-15 II	132col	£235
• Star LC24-30C	80col	£148
• Star LC24-100	80col	£95
• Star LC24-300C	80col	£178
• Star XB24-200C	80col	£315
• Star XB24-250C	132col	£385

Ribbons/Ink Cartridges

Type	Black	Colour
• Canon BJ10ex/BJ10sx	£15	–
• Canon BJ200/BJ230	£16	–
• Canon BJ300/BJ330	£11	–
• Canon BJC600	£6	£8
• Canon BJC800	£16	£22
• Citizen 120D+	£4	–
• Citizen Swift 200/240	£4	£13
• Citizen Swift 24X	£8	£18
• Epson LX400/LX850/FX870	£4	–
• Epson LX100	£4	–
• Epson LX1050/FX1170	£5	–
• Epson LQ100	£4	–
• Epson LQ150	£4	£12
• Epson LQ570/870	£5	–
• Epson LQ1070/1170	£8	–
• Epson LQ2550	£8	£16
• Epson SQ870/SQ1170	£23	–
• Epson Stylus 300	£10	–
• Epson Stylus 800/1000	£10	–
• Epson Stylus Colour	£14	£29
• Fujitsu DL1150/DL1250	£5	£7
• Fujitsu DL3600	£6	£12
• Fujitsu B100/B200	£14	–
• HP DeskJet High Capacity	£20	£21
• HP DeskJet 310	£13	£21
• HP DeskJet 1200	£22	£26
• HP PaintJet	£17	£27
• HP PaintJet XL300	£17	£19
• Kaga/Taxan KP810/815	£5	–
• NEC P22Q/P32Q	£8	–
• NEC P60/72/P90	£8	£14
• Panasonic 1150/1170/1180	£8	–
• Panasonic 2180/2123/2124	£7	£15
• Panasonic 1624/2624	£8	–
• Star LC10/LC100	£5	£9
• Star LC200	£5	£12
• Star LC24-20/24-100/24-200	£5	£12
• Star LC24-30	£8	£12
• Star XB24/ZA200/ZA250	£5	£12
• Star SJ48	£15	–
• Star SJ144 – 3 pack	£18	£18

Roland Plotters

• DXY1150	£575	• DXY1250	£725
• DXY1350	£939	• DPX2800	£POA
• Sketchmate A4	£335	• S/Mate A3	£499

Inkjet Printers

• Canon BJ10sx	80col	£141
• Canon BJ200	80col	£180
• Canon BJ230	132col	£241
• Canon BJ300	80col	£322
• Canon BJ330	132col	£372
• Canon BJC600	80col	£410
• Canon BJC800	132col	£1070
• Canon BJC820 (Mac)	132col	£1228
• Citizen ProJet II	80col	£299
• Epson Stylus 800	80col	£177
• Epson Stylus 1000	132col	£340
• Epson SQ870	80col	£415
• Epson SQ1170	132col	£580
• Epson Stylus Colour	80col	£399
• Fujitsu B100	80col	£145
• HP DeskJet 520	80col	£186
• HP DeskJet 500C	80col	£247
• HP DeskJet 560C	80col	£373
• HP DeskJet 310	80col	£166
• HP DeskJet 310 & CSF	80col	£205
• HP DeskJet 1200C	80col	£1080
• HP DeskJet 1200C PS	80col	£1608
• HP PaintJet XL300+	132col	£1616
• HP PaintJet XL300 PS	132col	£2575
• HP DeskWriter 520 (Mac)	80col	£189
• HP DeskWriter 560C (Mac)	80col	£375
• Star SJ48	80col	£182
• Star SJ144	80col	£286

Sheet Feeders

• Canon BJ10ex/BJ10sx	£43
• Canon BJ300	£88
• Canon BJ330	£92
• Citizen Swift 24/200/240	£75
• Epson LX400	£69
• Epson LQ570/LQ870	£47
• Epson LQ1070/LQ1170	£89
• Fujitsu B100	£59
• HP DeskJet 310	£48
• NEC P2Q/P3Q	£59
• NEC P3Q/P32Q	£85
• Panasonic 1170/1180/1123	£59
• Panasonic 1124/1124i/2124	£79
• Panasonic 1624/2624	£128
• Star LC100	£69
• Star LC24-20	£69
• Star LC200/LC24-200	£69
• Star XB24-200	£79

INKJET REFILL PACKS

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

Accessories

• Citizen Swift 200/240/ABC Colour Kit	£34
• Canon BJ10sx Battery Pack	£33
• Epson 0K Serial Interface	£29
• Epson 8K Serial Interface	£75
• Epson 32K Serial Interface	£95
• Epson LQ100 Tractor Unit	£29
• HP DeskJet FX Emulation Cartridge	£49
• HP DeskJet IBM Emulation Cartridge	£57
• HP DeskJet 256K RAM Cartridge	£45
• HP DeskJet 310 Battery Pack	£33
• HP DeskJet Carry Case	£49
• HP DeskJet 310 Colour Kit	£28
• HP DeskJet 1200 Postscript Upgrade	£499
• HP DeskJet Prestige Elite Fonts	£55
• HP DeskJet Letter Gothic Fonts	£56
• HP DeskJet 310 Parallel Cable	£12
• Panasonic Serial Interface	£49
• Panasonic 32K Buffer	£16
• Panasonic 2180/2123 Colour Kit	£30
• Star 8K Serial Interface - LC range	£52
• Star 8K Serial Interface - XB range	£39
• Star 32K Buffer - LC24/XB24	£52
• Dustcovers for 80col printers	£6
• Dustcovers for 132col printers	£9
• 51636G - 50 x DJ500 Transparencies	£35
• 51838J - 50 x DJ500 Glossy A4 Paper	£35
• 51630Z - 50 x DJ500 A4 Paper	£15
• Appletalk Printer Cable - 2m	£12
• 51636G - 50 x DJ500 Transparencies	£35
• Appletalk Interface for DeskJet 1200	£129
• Appletalk Interface for LaserJet III	£189

HP On-site Warranty

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

Manual Printer Sharers

Standard Low Cost Sharers

Connects	Serial	Parallel
• 2 to 1	£8	£9
• 3 to 1	£11	£12
• 4 to 1	£15	£16
• 5 to 1	£POA	£POA

Professional Sharers

Connects	Serial	Parallel
• 2 to 1	£12	£13
• 3 to 1	£15	£17
• 4 to 1	£24	£26
• 5 to 1	£38	£38

Crossover Sharers

Connects	Serial	Parallel
• 2 in/2 out	£28	£29
• 4 in/2 out	–	£49

Auto Printer Sharers

Uni-Directional

Connects	Serial	Parallel
• 2 to 1	£27	£29
• 4 to 1	£44	£45
• 8 to 1	£75	£75

Bi-Directional

Connects	Serial	Parallel
• 2 to 1	£POA	£POA
• 4 to 1	£POA	£POA

256K Multi Spooler

These parallel Auto sharers have built-in 256K buffers.

• 2 in/2 out	£99	• 4 in/2 out	£115
• 8 in/1 out	£149		

Compact Converter

• Serial/Parallel Converter	£32
• Serial/Parallel Converter & Buffer	£POA

Printer Leads

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

Other standard cables available on request

Paper

• 500sht A4 80g Laser/Copier paper	£2.50
• 500sht A4 90g Laser/Inkjet paper	£5.50
• 500sht A4 80g Coloured paper	£3.99
Pink, Green, Gold, Daffodil, Blue, Vellum	
• 1000sht 9.5" x 11" Fanfold paper	£5.50
• 2000sht 9.5" x 11" Fanfold paper	£8
• 1000sht 15" x 11" Fanfold paper	£7.50
• 2000sht 15" x 11" Fanfold paper	£11
• 1000sht A4 70g Fanfold paper	£9
• 2000sht A4 70g Fanfold paper	£15

High Quality Paper
500 sheets A4 80gm pure white
ideal for laser & inkjet printers
£5.50

Labels

On continuous fanfold sheets

• 1000 90mm x 38mm Single Row	£4.50
• 1000 90mm x 36mm Twin Row	£4.80
• 1000 90mm x 49mm Twin Row	£4.95
• 1000 102mm x 36mm Twin Row	£4.70
• 2400 70mm x 37mm Laser Labels	£15.25

Miscellaneous

• 80 column Perspex printer stand	£12
• 132 column Perspex printer stand	£18
• 80 column Professional printer stand	£15
• 132 column Professional printer stand	£27
• Printer trolley	£39
• Economy Computer Workstation	£79
• Multiform Paper Feeder	£12
• Professional Printer Trolley	£79
• Ergo Chair	£29

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Microvitec Monitors

- Cub 3000 - 14" Medium Res for Arc £195
- Cub 1440 - 14" Multiscan for Arc £389
- Cub 1450 - 14" Multiscan for Arc £689
- Touchtec 501 for BBC £239
- Touchtec 3000 for Arc £239

Acorn Monitors

- AKF30 14" Med Res RGB £179
- AKF40 14" Med Res RGB £179
- AKF52 14" Multiscan £249
- AKF50 14" Hi Res Multiscan £299
- AKF60 14" SVGA Multiscan £319
- AKF85 17" SVGA Multiscan £989

Multiscan Monitors

- NEC 3FGe £459
- NEC 4FGe £499
- NEC 5FGe £773
- Taxan 787LR £219
- Taxan 789LR £289
- Taxan 795 Trinitron £489
- Taxan Ergovision 580LR £349
- Taxan Ergovision 685+ £619
- Taxan 875+ £729

Cables

Monitor Cables

- BBC to Philips 8833 £3.50
- BBC to Microvitec Cub £3.50
- BBC to SCART lead £7.50
- BBC to Phono lead £2.50
- BBC to UHF TV lead £2.50
- Arc to Philips 8833 Mk2 £7.50
- Arc to SCART Stereo lead £9.50
- A3010 to Philips Mk2 £7.50
- A3010 to SCART Stereo lead £9.50
- Arc to VGA Monitor adaptor £9.00
- 15pin to 15pin VGA lead £12.00
- 15pin VGA Extension lead £12.00

Disc Drive Cables

- Single Disc Drive Data lead £4
- Dual Disc Drive Data lead £6
- Single Disc Drive PSU lead £3
- Dual Disc Drive PSU lead £4
- Data Duck - connect 2 drives £14
- Power Duck - connect 2 drives £8

Disc Storage Units

- M35 - Holds 50 5.25" discs £4.95
- M85 - Holds 100 5.25" discs £6.95
- M25 - Holds 25 3.5" discs £4.95
- M40 - Holds 40 3.5" discs £6.50
- M80 - Holds 80 3.5" discs £6.99
- DLC2 - Holds 10 x 3.5" discs £1.90
- DLC3 - Holds 5 x 5.25" discs £1.60
- DLC4 - Holds 10 x 5.25" discs £2.00

3M Diskettes

- 10 x 5.25" D/S D/D 80T (747) £6
- 10 x 5.25" D/S H/D 1.6Mb £8
- 10 x 3.5" D/S D/D £6
- 10 x 3.5" D/S H/D £10

Disc Albums

- DW1 - Holds 6 x 3.5" discs £2.50
- DW2 - Holds 6 x 5.25" discs £3.00
- DW3 - Holds 20 x 5.25" discs £3.50
- DW4 - Holds 40 discs £4.50

Bargain Corner

We have a limited number of new and refurbished items for sale at bargain prices. As this is a special offer the items have a 30 day warranty only.

- 12" Monochrome Monitors £49
- 14" RGB Colour Monitors £109
- Dot-matrix Printers from £69
- Master 512 co-processor £49
- Master 65C102 co-processor £39

Please ring or call in for availability of items.

BBC Books

- Advanced BBC User Guide £5
- Master Reference Manual Part 1 £14
- Master Reference Manual Part 2 £14
- Master Advanced Reference Manual £5
- Complete BBC User Handbook £10

Concept Keyboards

- 2010 Universal Concept Keyboard £107
- BBC User Port Cable £12
- Arc Serial Port Cable £12
- PC Serial Port Cable £12
- CK Designer software for Archi £20

BBC Master 128

We have a limited number of the original BBC Master 128 computers available at a special price.

£309

30Mb Winchester

We have a limited number of brand new 30Mb hard drives suitable for the BBC Master or BBC B/B+ with ADFS fitted.

£159

Aries IEEE Interface

An IEEE 488 parallel interface for the BBC Micro. Complete with cables and software.

£99

BBC Software

- Logotron Logo (ROM) £43
- Numerator (ROM) £39
- Pendown (ROM) £32
- View 3.0 (ROM) £45
- ViewSheet (ROM) £36
- ViewStore (ROM) £36
- ViewSpell (ROM/80T Disc) £28
- InterWord (ROM) £29
- InterSheet (ROM) £37
- InterChart (ROM) £25
- InterBase (ROM) £45
- Mega3 - Word/Chart/Sheet £69
- SpellMaster (ROM) £39
- WordAid (ROM) £20
- View Printer Driver Generator £12
- View Printer Driver (ROM) £29
- Fun School 3 Under 5s (Disc) £17
- Fun School 3 5-7yrs (Disc) £17
- Fun School 3 Over 7s (Disc) £17
- Quest Paint (ROM/Disc) £15
- ConQuest (ROM) £10
- Quest Fonts (Disc) £5
- Quest integrex 132 Driver £5
- Wapping Editor (ROM/Disc) £29
- Wapping Art (Disc) £5
- Wapping Fonts #1 (40T Disc) £7
- Wapping Fonts #2 (80T Disc) £7
- AMX Super Art (ROM/Disc) £10
- AMX Stop Press (ROM/Disc) £10
- Page Fonts for Stop Press £5
- BASIC 2 (ROM) £15

BBC Add-Ons

- 32K Shadow RAM Card £29
- 32K ROM/RAM Card £29
- 64K ROM/RAM Card £39
- 128K ROM/RAM Card £59
- Sideways ZIF Socket System £15
- 16K Static RAM for ROM/RAM £8
- 16K DRAM for ROM/RAM £10
- Battery Backup for ROM/RAM £3
- Sideways RAM Utilities Disc £5
- AMX Mouse only £15
- Quest Mouse III £15
- Quest Tracerball £20
- Mouse Mat (Red, Green or Blue) £3
- Master Twin ROM Cartridge £8
- Master Quad ROM Cartridge £12
- Data Duck £10
- Power Duck £8

Disc Filing Systems

- Watford 1772 DDFS Kit £29
- Acorn 1772 Single Density DFS £49
- Watford DFS ROM £16
- Acorn ADFS ROM Upgrade £25
- Disc Filing System Manual £5

Archi Spare Parts

- Cased Archimedes keyboard £99
- Replacement Archimedes keyboard £75
- Replacement A3000/A3010 keyboard £29
- A300/A400 Power Supply £55
- A5000 Power Supply £69
- A4000 Power Supply £59
- A3000 Power Supply £49
- 3.5" FDD for A3000/A400 £49
- 3.5" FDD for A3010/A4000/A5000 £59
- VIDC Video Controller £39
- ARM2 CPU £29
- MEMC 1A Memory Controller £25
- IOC I/O Controller £39
- 256K x 4 ZIP DRAM £6
- Fan Filter £2
- Replacement Keyboard Cable £17
- Replacement Mouse Cable £12
- Replacement Logitech Mouse Ball £7
- 1.2v NiCad Battery for A3000/A5000 £4
- AA Batteries for A300/A400 – pair £2
- Function Keystrip Holder £2
- Eject Button for A3000/A3010 FDD £3
- Loudspeaker £2

BBC Spare Parts

- BBC B Power Supply £49
- BBC B Casing £10
- BBC B Keyboard £39
- Master 128 Casing £15
- 4816 200ns DRAM £2
- OS 1.2 ROM £15
- Master 128 Keyboard £62
- Master 128 Power Supply £69
- Keyswitches £1.50
- Keytops £1
- UHF Modulator £4
- Master 128 Battery Pack £4
- Video ULA £14
- Serial ULA £14
- 6502 CPU £5
- 6522 VIA £5
- Master ULAs £15

Psion Computers

- Series 3 128K Computer £108
- Series 3 256K Computer £159
- Series 3A – 256K Computer £229
- Series 3A – 512K Computer £269

Accessories

- 128K Solid State RAM Disc £48
- 512K Solid State RAM Disc £97
- 1Mb Solid State RAM Disc £199
- 128Mb Solid State Flash Disc £30
- 258K Solid State Flash Disc £48
- 512K Solid State Flash Disc £79
- 1Mb Solid State Flash Disc £139
- 2Mb Solid State Flash Disc £199
- Parallel Interface Link £24
- Serial Interface Link – PC £58
- Mains Adaptor £12
- Professional Finance £47
- Spelling Checker/Thesaurus £39
- Spreadsheet £50

Fax Machines

- HP Fax 900 £729
- HP Fax 950 £885
- Canon 9200 £675
- Oki Fax 450 £279
- Oki Fax 1000 £910
- KX-F2300E £345
- KX-F2400E £390
- Pan UF123 £299
- Pan UF128M £385
- Pan UF312 £896

Staff Vacancies

Due to our latest expansion, we require staff to man our technical support lines for both Acorn and PC products. Applicants should be familiar with Acorn hardware and software. Also experience in repairing and maintaining computer hardware/peripherals would be an advantage as the work may be of this nature sometimes. Good rates of pay and excellent prospects.
Please write for the attention of Adrian Godfrey, enclosing your CV, to the Luton address below.

Modems

All modems are BABT approved and come with BT lead

PACE MODEMS

- Pace Microlin FX £112
- Pace Microlin FX32+ £172
- Pace Linnet Quad FX £117
- Pace Linnet 2400 £107
- Pace Linnet 32+ FX £197
- Pace Ultralink 32+ £349

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Personal Accounts V3

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Computerised accounts

Clem Vogler and Mike Williams look at two very different accounting packages aimed at the home and the office

ONCE you have your account records on a computer you'll wonder how you ever managed before. This can be done on a variety of levels from reconciling your bank accounts in Almanac to a full-blown stock control system, not to mention bar code reading and payrolls.

The main reason why people fight shy of having anything to do with computerised accounts are the needless complexities and totally inappropriate packages which are sold to companies and individuals for the so-called *industry standard* machines. As with anything, you need to find the right package for your needs with the correct learning curve for your level of computer knowledge.

Enterprise Professional

THIS RISC OS-compatible modular package for book-keeping and accounting has its source code written in C so there is no time lost interpreting a Basic program at run time.

It comes in single user and network versions and an earlier one was marketed as Micro Trader, developed from a BBC Micro program of the same name written when RISC OS was just a twinkle in Acorn's eye. There are thus a good many years' experience behind Enterprise Professional and it shows in the refined user interface and bomb-proof code.

The system requirements are modest: You can operate 700 accounts from a single floppy with no disk swapping required. 1Mb of memory is sufficient as data is filed to disk during use and not all held in memory. If you use a hard disk you can have 100,000 stock lines and almost unlimited numbers of accounts with more rapid data access.

The modules are a Sales Ledger, a Purchase Ledger, a Nominal Ledger, a Stock Control module, a Mailer database and a Payroll module. The payroll module was not implemented at the time of writing this review, but should be available by the time you read this. I hope to report on it shortly.

You can confine yourself to entering income and expenditure or you can record assets and liabilities as well. There are period-end procedures and year-end procedures to generate a balance sheet and profit-and-loss account.

You can analyse account information by departments and it produces a clever VAT return which is a facsimile of the sheet used by Customs and Excise – so you can just sign the printout and send it to them.

Banking reconciliation has to be done by comparing bank statements with the bank nominal code audit trail – there is no purpose-built reconciliation routine with tick boxes for checking off items against the statement. You can make adjustments or journal entries in each ledger.

● *Setting up standing orders*

Events and procedures

Enterprise Professional is *event driven* which means you can call up windows and enter data in the order you like. This makes it easier to use than *procedural* software.

Despite this flexibility, the system prevents you – with one exception – from entering inconsistent data. With non-procedural software this is a considerable achievement. The caveat is that there are default accounts which overwrite a previous selection when the cash/bank button is clicked.

You avoid overwriting your selection by using the radio button first. I'm told that production versions of the software – available by the time you read this – will have had this weakness fixed.

The software overcomes a potential danger arising from the ➤

Account No.	Period	Statement Date	Statement No.
S1001	01.03.94 - 31.03.94	21.04.94	03/94

Date	T/x	Reference	Goods amount	VAT amount	Total
		Total brought forward -			0.00
21.04.94	Csh		-587.50	0.00	-587.50
21.01.94	Inv	4	100.00	17.50	117.50
21.02.94	Crd	6	-54.00	-9.44	-63.44
		Statement Total			-533.44

● *...and printing*

● *Setting up a sales statement...*

RISC OS three button mouse that if you click an OK box with Adjust rather than Select, the dialogue box remains on screen tempting you to click it again and post the transaction twice. If you do this the second posting will default to a zero amount, maintaining data integrity.

The user interface is superb. The data entry screens could not be bettered for clarity and logical arrangement. Almost all the choices are an ideal compromise between providing necessary features and keeping complexity to a minimum.

Menus are logical and Find options are optimally implemented. For example, if you enter *N C* it will find Acorn Computing and all other strings containing *n c* and offer you the choice.

Keystrokes are minimised, with writable fields filled in for you by the system whenever the data to do this is present and identifiable. Naturally, VAT is calculated for you and multiple VAT rates can be entered so the new 8 per cent rate on domestic fuel can be handled.

Those who are not concerned with VAT just press Return when the cursor is in the VAT column – acceptable, though not quite as good as having a setup option to ignore VAT.

Printing options

Reports and transaction advices, are well set out, with the same good choice of essential information and avoidance of excess detail. They are printed in system font by default, so output from your printer is immediate. There's no time to mess about with outline fonts when customers are waiting for invoices.

You can print more elegantly via Impression if you want. You can also customise the invoices and other documents, though the default documents will suit most needs.

If you do want to design your own be prepared for a bit of programming, there is no wimp screen painter to do it for you as with some database managers, nor would it be fair to expect one for the limited use it would receive.

All documents and reports can be sent to the printer or displayed on screen and transaction documents can be printed in multiple copies or printed to a file if a hardcopy is not needed.

The reports options are well chosen. For each ledger there is an accounts listing and an audit trail – either in full or by batch. There is also a statement for individual accounts.

Additionally, the sales module produces an aged debtors report and the purchase module reports on aged creditors. The nominal module provides a trial balance. The stock control module's reports cover stock, reorder, turnover and price lists.

The vexed problem of how to set startup balances has been addressed with an option to edit opening balances with the balancing entry posted to a temporary creation accruals account – an *accrual* is something owed but not yet paid.

When the opening balances are correctly set up the creation accruals account is removed, the remaining ledger balances and the edit option is disabled – an intelligent solution in my opinion.

Store control

The stock control module is nicely integrated with the invoicing modules so you can invoice for a stock item by stock number and the description, price and VAT rate are entered.

The modules are not hot-linked in the sense that altering an item in

PRODUCT SPOTLIGHT

Product: Enterprise Professional
Price: £279 for all modules except Payroll. Modules can be bought individually at £79.95, Mailer £49.95 and Nominal, Sales and Purchase Modules available as a package at £199
Supplier: ACP, PO Box 319, Lightwater, Surrey GU18 5PW.
Tel: 0276 472046

● *Another month has passed*

● *Recording the banking*

● *Lightning quick VAT returns*

● *Invoice details are imported from stock control*

one window updates related fields in other windows. The active module is, however, linked to the current state of other modules, so if you try to invoice for more items than are in stock you get a warning.

If you make a change in a window which results in another open window displaying inconsistent data, you are prevented from posting the transaction in this window until you have legitimatised it.

This safeguard works in practice, though there are one or two maverick ways to beat it, like changing a service item to a stock item in the middle of preparing its invoice.

Stock prices can only be specified to the nearest penny, so you can't resell a unit of electricity at 4.8 pence. This affects invoicing, even if you aren't using the stock control module. You can get round it by selling fractions of a hundred units at £4.80 per hundred.

There is also a limitation in the way stock quantity is specified as you can have only two decimal places and only four digits in all, including any decimal point.

Enter 273.5 items and it rounds down to 273 but the rounding down error is flagged by a warning bleep at entry time.

My criticism is reserved for the bank transaction handling. You pay a remittance by cheque to an account supplier. The payment is recorded as coming from the default bank account, even though you may in fact be using another bank account. This restraint does not apply in the nominal ledger but it does apply in the purchase ledger.

Accordingly, if you want to bank an invoice associated transaction you have the choice of sticking to a single bank account or entering an untidy journal adjustment whenever the account chosen is not the default account.

You can, of course, perform all banking in the nominal ledger but then the transaction cannot be linked to a supplier account and the purchase ledger will not balance.

There is a fix. Define the default bank code (301) as a notional bank account. Your real bank accounts are 302, 303 and so on. After posting the invoice payment in the purchase ledger the audit trail will show 301 as the source of the payment, rather than 302.

Now do a nominal ledger cash withdrawal from 302 but edit the cash in hand (300) code to 301. You must blank the box and type it in as it is not a legal cash account. It's effectively an adjustment, but won't show up in the Journal entries – where the auditors look.

There is a similar problem in the sales ledger with returned cheques. ACP feel this shouldn't present problems, as most businesses use a single current account, but they have agreed to extend the software soon to accommodate multi-account users.

The nominal module has a standing order facility for crediting or debiting accounts on a periodic basis. It also handles regular account transfers. You set up the source and target accounts, the amount, period and number of payments.

Whenever the system clock at run time shows that a payment has passed the software asks for permission to post it. Very neat. Unfortunately, there are no links back to the sales and purchase ledgers, so it can't be used for account clients held on these ledgers.

Summing up

Although I managed to find one or two faults with Enterprise Professional, I was able to adapt my working style to overcome them. I thought Enterprise Professional was the best accounts package I have come across and it's better than any of the Dos or RISC OS alternatives I've used.

It has a smooth installation routine, an automated backup procedure and password protection for year-end accounts. It comes with an adequate handbook and good telephone support. Designed by a business user with programming skills, rather than the reverse, it addresses the real needs of small businesses. Most importantly, for financial software, it is reliable. It doesn't crash and doesn't go wrong. Nor will you if you buy it.

Clem Vogler

Personal Accounts

IF, like me, your arithmetic is somewhat approximate and your memory of standing orders and direct debits on the hazy side, a computer package which copes quickly and easily with keeping track of your bank account is a boon. I've been using my computer for this task for perhaps eight years now using homegrown software, which has done what I required.

I looked at Apricote's Personal Accounts when it first emerged, but wasn't entirely convinced with what I saw. Quentin Pain, of Apricote, assures me that he listened to my comments (and those of others), so I was delighted to have the opportunity to assess version 3 of this software.

Personal Accounts does much more than allow you to enter the transactions relating to your bank account (or accounts) and automatically looks after those standing orders and direct debits. It also allows you to categorise every transaction, so you can keep a check on just how much you spend on food, petrol, holidays and so on.

In addition it will also keep track of where you spend your money. For example, if you buy your food from three or four different shops you can also check how much you spend with each.

Primed with all this kind of information, Personal Accounts can also be used to predict the state of your finances in the future and to assist with budgeting.

● *Personal Accounts' main menu*

In use

Once installed on the iconbar, Personal Accounts is controlled from its main window display, which is effectively a menu in window format. Selecting any option opens the corresponding window.

Setting up your own Personal Accounts system involves using three of the main windows, dealing with accounts, income ➤

headings and payment headings. You probably have a current account, but credit cards like Access or Visa are also treated as accounts.

You enter all relevant details including starting balance and any agreed overdraft. Income and payment headings allow you to categorise income and expenditure. Most people have few income sources, but a multitude of payment types. It's up to you just how many you create and how specific or how general the categories are.

Broadly, all transactions involve money being moved from an account or income heading to another account or payment heading. Most of the cheques written will be from your current account to a payment heading – food, petrol, clothes and so on – but a cheque to pay off part of a Visa account will be a movement from one account to another.

All transactions are made in the Entries window, where abbreviations and the use of menus makes life simple and easy. This window also provides a number of related functions, particularly the facility to re-order or to search through the entries.

PRODUCT SPOTLIGHT

Product: Personal Accounts
Price: £49.95 inc VAT and p&p
Supplier: Apricote Studios, 2 Purls Bridge Farm, Manea, Cambs PE15 0ND.
Tel: 0354 680432

Orders and reports

Standing orders and direct debits are two of my bugbears, but are handled well by Personal Accounts. Simply enter the relevant details in the Standing Orders window, and payments will appear automatically in the Entries window in correct date position.

Personal Accounts allows you to set up two types of report for printing, detailed transaction reports and summary reports. You can define and save five different types of transaction report like a bank or credit card statement, and there are four types of summary report covering accounts, income, payments and standing orders.

Transaction reports are very customisable, allowing choice over the information to be printed and the transaction records to be selected.

● *The Transaction window with standing orders and direct debits automatically inserted*

Personal Accounts : Entry 10

Date	From		To		Ref	Total	Desc
01.04.94	1	Lloyds (Joint)	4	Beneficial Bank	000099	0.51	
01.04.94	1	Lloyds (Joint)	A1#	*Miscellaneous		24.70	
01.04.94	1	Lloyds (Joint)	C1#	*Pension		100.00	
01.04.94	1	Lloyds (Joint)	2	Lloyds (Self)		50.00	
01.04.94	1	Lloyds (Joint)	3	Lloyds (Partner)		50.00	
04.04.94	1	Lloyds (Joint)	B1#	*Savings (1)		26.50	
06.04.94	1	Lloyds (Joint)	J1#	*Cash		60.00	Cash
07.04.94	1	Lloyds (Joint)	D1#	*Foreign & Col.		110.00	
09.04.94	1	Lloyds (Joint)	J1#	*Cash		60.00	Cash
09.04.94	1	Lloyds (Joint)	A1#	*Miscellaneous	000060	50.50	Paper
10.04.94	1	Lloyds (Joint)	F1#	*Insurance		5.56	
10.04.94	1	Lloyds (Joint)	G1#	*Oil		30.00	
10.04.94	1	Lloyds (Joint)	E1#	*Henderson		100.00	
11.04.94	A1#	*Interest	1	Lloyds (Joint)		0.19	

SORT | Auto CLEAR | Find First | Previous | Next | Show Cursor

Other features

Personal Accounts assists in reconciling your own records with the statements you receive from your bank. Entries which have been reconciled are marked off in the Entries file, and whether an entry has been reconciled or not can be used in selective reporting.

Other features to make life easier include the use of Return to repeat the date of the previous entry, auto-incrementing of cheque numbers on entry, and the use of drag and drop to copy information not only between fields within Personal Accounts but also from Personal Accounts to any suitable destination such as a word processor or DTP document.

There is also an extensive Options window which adds considerably to the flexibility and degree to which you can customise Personal Accounts for your needs. Indeed, for a package of this size I think it has more user selectable options than any other I have seen.

Drawbacks?

With such a wealth of features and facilities, Personal Accounts can seem confusing, particularly if you just want to maintain a straightforward bank account including standard orders and direct debits.

You can do this but I would be very much surprised if anyone buying Personal Accounts with this simple approach in mind wouldn't be strongly tempted to use the package more fully.

To help, the manual is adequate, largely tutorial in style, but uninspiring in layout, and without sufficient reference for users beyond the early stages.

Also, despite its flexibility, there are a number of limitations which I would like to see removed. If you have one datafile loaded which has been altered, there is no way of loading a different file without saving the first or quitting the application.

Also the Entries file does not provide a running balance, bank statement style, and this can only be achieved with the report option. You can export the report as a text file but a preview option would been better.

Personal Accounts does not always adhere strictly to RISC OS guidelines but unless you are somewhat of a pedant in such matters, the deviations are usually sensible alternatives.

Summing up

By and large, Personal Accounts does most things that most people would ask of it. No doubt there are other features which some readers might wish to see included. I would like to see some simplification of the user interface, but without removing any of the existing functions. A more comprehensive and better illustrated manual would also improve matters.

However, Personal Accounts does all that you would expect, is moderately priced, and if your own manual efforts at keeping track of your bank account have led to unexpected bank charges, or worse, then the cost will soon be repaid, with interest.

Mike Williams

● *Miscellaneous transactions*

Personal Accounts : Entry 11

Date	From		To		Ref	Total	Desc
01.04.94	1	Lloyds (Joint)	4	Beneficial Bank	000099	0.51	
06.04.94	1	Lloyds (Joint)	J1#	*Cash		60.00	Cash
09.04.94	1	Lloyds (Joint)	J1#	*Cash		60.00	Cash
09.04.94	1	Lloyds (Joint)	A1#	*Miscellaneous	000060	50.50	Paper
11.04.94	A1#	*Interest	1	Lloyds (Joint)		0.19	
15.04.94	1	Lloyds (Joint)	J1#	*Cash		60.00	Cash
20.04.94	1	Lloyds (Joint)	A1#	*Miscellaneous	000061	21.00	Prese
21.04.94	1	Lloyds (Joint)	A1#	*Miscellaneous	000062	10.64	Milk
22.04.94	1	Lloyds (Joint)	J1#	*Cash		60.00	Cash
28.04.94	B1#	*Salary	1	Lloyds (Joint)		1222.80	

SORT | Auto CLEAR | Find First | Previous | Next | Show Cursor

● *A typical report for comparing with your bank statement*

David Shalgrave
Current Account April 1994 : Wed,01 Jun 1994 : 15:12:12

Date	To	Ref	Total	Balance	Description
01.04.94	Beneficial Bank	000099	0.51	1488.04	
01.04.94	*Miscellaneous		24.70	1463.34	
01.04.94	*Pension		150.00	1313.34	
01.04.94	Lloyds (Self)		50.00	1263.34	
01.04.94	Lloyds (Partner)		50.00	1213.34	
02.04.94	*Cash		60.00	1153.34	Cash
04.04.94	*Savings (1)		26.50	1126.84	
06.04.94	*Cash		20.00	1106.84	Cash
07.04.94	*Foreign & Col.		110.00	996.84	
09.04.94	*Cash		60.00	936.84	Cash
09.04.94	*Miscellaneous	000060	50.50	886.34	Papers
10.04.94	*Insurance		5.56	880.78	
10.04.94	*Oil		30.00	850.78	
10.04.94	*Henderson		100.00	750.78	
11.04.94	Lloyds (Joint)		0.19	750.97	Interest
15.04.94	*Cash		60.00	690.97	Cash
20.04.94	*Miscellaneous	000061	21.00	669.97	Present
21.04.94	*Miscellaneous	000062	10.64	659.33	Milk
22.04.94	*Cash		60.00	599.33	Cash
24.04.94	*Bank Loan		195.09	404.24	
25.04.94	*Council Tax		80.75	323.49	
28.04.94	Lloyds (Joint)		1222.80	1546.29	
28.04.94	*Holiday	464354	29.85	1516.44	Eurocheque
30.04.94	*Cash		60.00	1456.44	Cash

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● A310, twin floppies, 4Mb, ARM3, 45Mb SCSI HD, Qume LaserDirect, monitor, PC Emulator, £900. 081 715 5523, eves.

● Archimedes 420/1 4Mb RAM 40 Mb Hard Disc Risc OS/3.1 ARM 3 G16 Graphics accelerator Multisync monitor DTP learning curve software games plus utilities £850. Deskjet 500 printer £150. Tel: 0227 830695.

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Impre

IMPRESSION – and in particular, Impression Publisher – is undisputedly the best document processor produced for Acorn computers, and Squirrel is one of the best databases available.

Impression excels in every aspect of document layout, and in the versatility of its printing routines. Using Impression, it is so simple to produce multiple columns, text wrapped round graphics, and so on, and the ability to print out multi-page documents as pamphlets so that all the pages are printed on the right piece of paper, is a godsend to anyone who uses the program to produce catalogues.

Squirrel excels as a database in its extraordinary flexibility in designing reports, which allows the user to specify precisely how the output of a query is to be printed, from basic formatting to the type-face and font size.

As a book dealer and an established user of Impression, I bought Squirrel specifically to create a database of books, with the intention of using it to produce a multi-page catalogue in A5 pamphlet form.

I was therefore surprised to find that such a versatile package seemed to have no easy way of exporting the report file into an Impression document, which would then have enabled me to use Impression's superior printing routines to print it in pamphlet form, and to include graphics embedded in the text.

Furthermore, there was no way of controlling the printing directly from Squirrel – it was A4 pages or nothing and certainly no chance of pamphlet printing.

Squirrel already includes a facility for merging a database with Impression using Impression's mailmerge facility, but this of course is quite different from being able to export an entire Squirrel report into an Impression document.

However, there is a way of doing it, thanks to something called DDF (Document Description Format) which enables any text from whatever source to be exported into Impression, together with instructions about formatting, effects and styles. Here's how!

As an example, I have taken my own database of books, created in Squirrel:

The fields involved are:

Reference	a number
Author	which includes the title
Condition	
Description	
Price	

In addition, each book is put into a *Category* (Crafts, Biography, Literature, etc). The *Description* field is a text field, *Reference* is a numeric and the others are strings.

I wanted to list the books in categories, laid out as follows:

CRAFTS

592 Albers, A. ON WEAVING (Studio Vista 1974 UK rep)
Fine
4to pbk. 206pp.
Numerous b&w diagrams.
£7.50

589 Anderson, E. THE SPINNER'S ENCYCLOPAEDIA (D&C 1987)
M in Mdw
Large 8vo 288pp.
Numerous b&w photos and ills.
£10.00

It is, of course, quite easy to set up the Report document to achieve this output, but I wanted it to appear in double columns, flowing round graphics and, possibly, with extra pieces of text inserted in various places.

To achieve the required effect we have to get the report information into Impression, but we certainly don't want to have to apply the required styles to every entry – repetitive operations are what computers are good at, and humans aren't.

So these are the steps that have to be gone through to get Squirrel to export data *and* styles into Impression:

- From the Squirrel main menu, select *Define query*.
- Select *Sort order* and drag in *Category*, *Author* and *Price* in that order. The reason for including *Price* will become clear later.
- Now select *Reporting* in the usual way. It is, however, important to choose *Draft* before going to *Edit* and opening the window which shows the Report Layout.
- Delete all fields in the report layout window and then drag the *Category* field into the Header for Category space, the *Price* field into the Footer for Price space, and the other fields into the main report space.
- At this point, open an Impression window and define new styles to correspond with the way in which the various fields are to be displayed. In the example above, I have defined the following styles:

Category as Trinity Bold 20pt, with a left margin and return margin at 0mm

Reference as Trinity Bold 12pt with a left margin and return margin at 0mm

Author as Trinity Bold with a left margin and return margin at 20mm and a Tab at 20mm

Description as Trinity Medium Italic with a left margin and a return margin at 20mm

This last style will be applied, not only to the *Description* field,

● *Figure II*

● *Figure I*

ssionable Squirrel

David Siddons shows how Impression and Squirrel can be made to work equitably

but also to the *Condition* and *Price* fields.

● Now we are ready to apply the styles we want to the fields. This is done using !Edit to produce the following text:

```
{"CATEGORY" ON} {"CATEGORY" OFF}
{"REFERENCE" ON} {"REFERENCE" OFF}
{"AUTHOR" ON} {"AUTHOR" OFF}
{"DESCRIPTION" ON} {"DESCRIPTION" OFF}
{TAB}
```

These are all DDF commands which will tell Impression to set and unset the various styles. Notice that each command is contained within curly brackets. The words in inverted commas correspond to the names of the styles set in Impression.

Each of these commands is then dragged separately into the report layout, to produce the effect shown in figure I.

All that is required now is to export the report to Impression. This is done using the *Save => Data* option and the text file is simply dragged across into an Impression frame. The Squirrel Report is now in Impression, styles and all.

Graphics can be embedded and text can be added before, after or within the report at will, and the whole thing can be printed out in any way you want. Figure II is an example.

It is possible to use DDF commands which directly act as an Effect in the text, rather than by setting up styles. So, for example, instead of inserting {"CATEGORY" ON} before the *Category* field, you could insert:

```
{Font Trinity.Bold}{Fontsize 20pt}
{Leftmargin 0pt}{Returnmargin 0pt}
```

The commands are documented in Impression's manual (page 254 onwards), although the description there does little to explain to the novice how to use them, and the manual for the new Impression Publisher omits the section altogether.

The easiest way to find out what commands you can use in this way seems to be to open an Impression window, type in some text, then save the text, using *Save text story* (with Styles) into an !Edit window.

Having said that, it's much better to use styles because then you can make global changes to your new document if you don't happen to like the look of some part of it, or if you want to squeeze it up a bit.

There you will see all the effects and styles set up by the default document, and it is a fairly easy job to work out what each command means – see figure III. Some of the DDF commands used by Publisher are slightly different from those used by Impression.

Commands have to be entered accurately, and must start and end with a curly bracket {}. These brackets, together with what they contain, will not be printed but merely tell Impression what to do with the subsequent text.

There is one other trick used in this example which the keen-eyed reader may have spotted. One of the drawbacks of Squirrel is that when a text field is printed – as opposed to a string field – it automatically creates enough lines to accommodate all the text, but unfortunately it doesn't take account of any other field that may be below it.

It would be sensible if the field below it were just pushed down but that's not how it works. In the example above, it would be no use just positioning the *Price* field immediately below the *Description* field because it's a text field and may take up several lines. These would simply overwrite the *Price* field.

The trick to overcome this problem is to set the sort order as *Category, Title, Price*. The *Price* Field can then be inserted as a *Footer for Price* and it automatically appears at the end of each record, so will not be overwritten.

```
{
define style "BaseStyle";
font Trinity.Medium;
fontsize 18pt;
spaceabove 0pt;
spacebelow 0pt;
leftmargin 1.8pt;
rightmargin 0pt;
returnmargin 1.8pt;
condframethrow 0pt;
rulewidth 0pt;
ruleoffset 0pt;
fontaspect 100%;
fontcolour rgb=(0,0,0);
linecolour rgb=(0,0,0);
rulecolour rgb=(0,0,0);
justify left;
underline 0;
strikeout off;
script off;
hyphenate off;
leader "";
locktolinespace off;
ruleaboveoffset 0pt;
rulecontrol 0;
vertrulewidth 1pt;
ruleleftmargin 0pt;
rulerightmargin 0pt;
tabs 72pt,144pt,216pt,288pt,
360pt,432pt,504pt,576pt,648pt}
This is just a test
```

● *Figure III*

IMPRESSION Style

Impression Style is the newest word processor member of the Impression family, and the most comprehensive and powerful version so far released. Over the last few years Impression has become the most successful 32-bit Acorn software application and while Impression's DTP capabilities have been renowned, the fact is that most users use it as their day to day word processor. Impression Style is a major update, with special attention paid towards improving the word processing abilities still further, and making it even easier to use than before. So, for example, it now includes automatic paragraph numbering and

two sorts of on-line help amongst dozens of other improvements.

For those with technical writing needs it includes a mathematical equation editing utility and table building utility. For writers it includes what Archimedes World called "the superb WordWorks dictionary and thesaurus package." Other features that help make Impression Style a better text processor include automatic abbreviation expansion - one of the greatest time saving features available, drag and drop editing, an optional, configurable tool bar, along with firm favourites such as spell check as you type.

In a *modern* world of computer software we have *created* a package to leave you with a lasting *impression*

Archimedes World summed it up by calling it "a document processor of immeasurable power and sophistication."

And for those who need complete control over the page layout and appearance, Archimedes World and Acorn User magazines both had exactly the same conclusions - "Style itself is currently the best DTP package available."

"Importing foreign formats is one thing Style handles better than any other package I have encountered."

"The manuals are brilliant and offer full details on the use of the software. In fact, these manuals are so good, it seems unlikely that there will be much need for supplemental books from third party publishers."

"At the end of the day, Impression Style is a superb product for the relatively small asking price."

***Archimedes World*, Feb 1994**

"Impression Style represents ridiculous value for money."

***Acorn User*, Jan 1994**

"There is no other product on the Acorn platform to touch this, whether at the £100 asking price point or at £500. Every writer should own a copy."

***Archimedes World*, Feb 1994**

If you use your computer for word processing, then shouldn't you make sure that you use the best tools available?

Impression Style upgrade options

Upgrade from	Cost (ex VAT)	Total cost inc p&p and VAT
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Pam Turnbull looks at a selection of products to inform, educate and help

The short file

JETWear: T-shirt crazy

ONE of the problems about being a parent is that offspring expect you to be able to knock up all sorts of concoctions *Blue Peter-style*. I have had both successes and failures printing on to T-shirts with my BBC B and dot matrix printers, but the JETWear textile transfer papers promised to be easier.

All you need – in addition to computer and printer – is an iron. The instructions said all I had to do was design, print, iron and wear. The design was not a problem thanks to clip-art, but plain text works well and if you are nifty with a camcorder, scanner, Photo CD or graphics tablets, possible designs are infinite.

Different papers are available for different printers and I opted for the ink jet. The secret, you see, is not in the ink, it's in the paper. So you don't have to mess around with special ribbons or inks, you just put the paper in, print, iron and wear – makes me sound like an advert, but it's really that easy.

The final effect looks best on a white garment, though you can print on to pastel shades if your design is bold enough. Something to look out for when printing numbers or letters is that you must reverse them to produce a mirror image ready to be printed out and ironed on – Impression, Draw and Artworks, among others, allow you to do this.

If you don't have a colour printer you can add colour with water-based and permanent markers and interesting effects can be created if you add some hand designs directly on to the transfer paper.

This is a good way to make friends and influence people but be warned, you'll soon be asked to produce T-shirts for friends, friends of friends and teddy bears. Perhaps I should have opted for the Classroom Pack with 30 sheets?

PRODUCT SPOTLIGHT

Price: £6.95 (Home Pack 4 sheets) £37.95 (30 sheets) £99.95 (100 sheets) inc VAT plus £2.95 postage and packing
Supplier: Quill Marketing, 11 Hemmings Close, Norwich NR5 9EH.
Tel: 0603 748002

Desktop Utilities 2: A helping ARM

ADDING to the library of available programming aids comes the ARM Club with a selection of utilities: FreeMap, GraphTask, PrintCtrl and a Window Open Module.

FreeMap is designed to replace the standard display generated by the *Free* option on from the drive icons. This is a multitasking RISC OS application providing a textual and graphical display of the free space on the disk as well as the disk map. It also provides a facility which compacts all the free space on the disk.

GraphTask, on the other hand, provides an extension to the RISC OS task window by allowing the full use of graphics even while running true RISC OS tasks.

Task windows are usually managed by a text editor program such as Edit, which doesn't know how to handle graphics or text positioning codes. GraphTask does, so can handle all graphics, screen modes and palettes and display them all in a window on the desktop – wow.

When a new window is opened it behaves as a Mode 12 screen regardless of the current wimp mode. ColourTrans is used to approximate the correct mode requested by the program running in the window. This program runs on the Risc PC but you are warned not to use the OS_ScreenMode call from within a task window.

Next up for the enthusiastic dabbler comes **PrintCtrl**, a colour printer controller for the Star LC10 printer – though this will work with other printers in the Star range and is compatible with colour printers providing Epson JX/EX emulation and with most Epson monochrome printers.

PrintCtrl provides printer configuration and background text file printing with filters. Furthermore, all printer command codes are contained in a resource file which can be altered to suit non-standard printers.

You can use PrintCtrl with applications which don't use the RISC OS printer drivers, and you can set up the printer before any printing is done, selecting various printing styles not normally available.

PrintCtrl can be used to print text files from the desktop with the printing done in the background. A filter enables unwanted codes such as extra line feeds and top-bit-set characters to be removed.

Window Open Module gives you access to commands to control the operation of tasks and their windows. The module enables standard working environments to be set up and recreated via an Obey file.

All in all these are useful programs of the sort you could find by hunting through the better PD libraries. However, at this price these could well save you time without hurting your pocket too much.

● *Useful enhancements for the enthusiast or dabbler*

PRODUCT SPOTLIGHT

Price: £5
Supplier: The ARM Club, FREEPOST ND6573, London N12 0BR.
Tel: 071-624 9918
Requirements: RISC OS 3.1

Graphics Utilities: A sprite in time...

OF A similar ilk to their Desktop Utilities comes The ARM Club's graphical offerings: Broadcast, CTenhance, Esprit, Mirror and two modules. All work with the Risc PC apart from Broadcast and the DEEJmodes module.

If you need a PAL quality display then **Broadcast** is aimed at you, as it is designed to display standard RISC OS draw and sprite files at the PAL broadcast display quality of 625 lines at 50Hz frame rate with 2:1 interlace.

You can use this program to transfer images from the Archimedes range to video tape or other video sources via a monochrome composite video output or colour PAL encoder card.

Alternatively, you can display sprites from multiscan monitor modes on a standard resolution monitor or TV and obtain the highest quality display of draw files possible on a normal monitor.

ColourTrans enhancement comes with **CTenhance**. Where ColourTrans module is used to represent 24-bit RGB colour values on the limited palette, CTenhance aims to increase the number of colours which can be represented.

CTenhance vastly increases the number of colours in all modes by using *error diffused dithering* which builds a pattern of colours selected to diffuse the difference/or error between the closest colour that could be found and the desired 24-bit colour.

The program works with *correctly written* applications using the ColourTrans module, including programs handling draw files. However, programs do have to be specially written to take advantage of the dithering techniques.

If you are using modes providing more than 256 colours, CTenhance is automatically disabled – if you are in a 32 thousand colour mode standard ColourTrans dithering should be enough. When you switch down to a 256 colour mode, CTenhance will re-enable itself.

Esprit is an example of a RISC OS application written in a combination of ANSI C and ARM assembler. You are presented with a 3D Lotus Esprit Turbo sports car which can be rotated and scaled using a toolbox. Interesting but is it a utility?

Mirror, however, is. This program is designed for use alongside desktop drawing programs when you are using vertical or horizontal symmetry to create an object. The usual technique with vector graphics packages is to draw half an object and then reflect it to produce the complete picture.

Mirror provides a window which shows a reflection of anything to its left, right or above and below. You can then decide if this is what you had in mind before you reflect the image in the drawing package.

Two modules come with this collection of utilities **DEEJmodes** and **ScreenKey**. DEEJmodes provides a range of new modes for use with MultiSync monitors, while the ScreenKey module is a useful utility for saving the current screen display as a sprite which can then be incorporated into DTP documents and the like.

PRODUCT SPOTLIGHT

Price: £5
Supplier: The ARM Club, FREEPOST ND6573, London N12 0BR.
Tel: 071-624 9918
Requirements: RISC OS 3.1

● *Some of the graphics tools available*

Photobase: Keeping track

ONE of the best things about the growing prevalence of CD-Rom drives and consequentially CD software in the Acorn market, is the sheet size of resources now at our fingertips. As CD-Roms are such a huge and cost-effective way of saving large amounts of high quality images and data, libraries such as the Photobase series from Longman are very welcome indeed.

The first release in this series is *Landscapes* and is a visual resource library of over 2,000 VGA colour photographs of natural and man-made environments.

The sheet size of the data could make such a library unwieldy but here the management part of the database comes into its own – as one would expect from the publishers of S-Base.

The material can be used at any level in geography, science, technology, environment, education and art. All aspects of life on the planet are dealt with and illustrations taken from every continent.

Photobase gives fast access by creating a miniature image – or thumbnail – and an index so that images are accessible at all times from the desktop.

Photobase can also recognise different directories of sprites and link them together as if they were one integrated resource – useful if you have access to more than one CD-Rom or perhaps Computer Concepts' six high Pioneer drive – including your own drawn or scanned images.

A database is only as good as its searches and Photobase's images has its own *card* which contains a miniature representation of a sprite, a text containing details and keywords both of which can be searched on for the images you want.

Buttons at your fingertips allow you to view, search, index, resource and display. The manual is straightforward but I found the software very intuitive to use. If you have RISC OS 3 double-click on any thumbnail and it will immediately load into Paint – RISC OS 2 users will have to have some relevant software loaded first.

If you want to load an image into a DTP package, hold down Shift and double-click Select on thumbnail. The location of the directory display and the sprite you want will be revealed. Then just drag the sprite file across as you would normally.

This is a very nicely put together package as it is deceptively simple to use but hides a very powerful database. Proof of the power and flexibility of Photobase is the ability to sequence and display pictures to produce professional and elaborate presentations simply.

PRODUCT SPOTLIGHT

Price: Landscapes £49
Supplier: Longman Logotron, 124 Cambridge Science Park, Milton Road, Cambridge CB4 1BR.
Tel: 0223 425558
Requirements: CD-Rom drive

● *Using Photobase to pick a picture*

Me and my

Mike Cook looks at another selection of your problems and questions

AGENDA

- Sideways ram
- SCSI choices
- 32-bit IR
- Print issues
- Monitor sound
- ARM code
- AD converters

Q I HAVE been thinking about buying a shadow ram card. But my computer has a Watford 32k rom/ram card fitted. Do you know of any software which I could load into a couple of sideways ram *slots* to make 32k sideways ram act as 20k shadow ram – leaving 12k for the program? I noticed an old Solidisk advert mentioning utility disks.

On the software side, I have an AMX mouse and SuperArt. I cannot get the colour print dump (4 colour ribbon) to work with my Star LC-10. It seems to issue a linefeed after each pass of the print head before any colour mixing.

I have tried *FX6,10 but there was only a slight difference. Do you know of a colour dump that will work with SuperArt?

Richard Walker, Hartburn, Cleveland

A *Shadow ram is mapped over the video section of the memory map whereas sideways rom is mapped much lower. As these two occupy different addresses there is no way of converting one to the other.*

Virtual memory involves shipping program storage out to disk and while this will work it is extremely slow, especially where data is being swapped a lot between disk and ram.

In your printer there is a link which gives an automatic LF with CR. It sounds like this is set – removing it might cure your problem.

SCSI access

Q AT THE moment I am thinking of purchasing a SCSI card so that I can connect devices such as a CD-Rom, flat-bed scanner and so on.

Please could you advise me on the different sorts available such as 16-bit and cached version. Who makes them and how much are they? I read that some cards come with CDFS software as well.

Would it be possible to buy a card from a PC accessories manufacturer and if I could obtain CDFS software could I buy a CD-Rom drive from the same sources?

T. G. Riches, Worcester

A *You can't use a PC SCSI card in an Acorn machine. The cheapest SCSI card at present comes from Atomwide and plugs into your printer port, but this will only work on models with a bidirectional printer port like an A5000, A4000, Risc PC and the A30x0 machines.*

Acorn make one but it is rather expensive, and HCCS do a micro-podule version for the A3000 and A3010. Cumana and Morley are the only other two manufacturers I know of.

The cached version of the interfaces has a memory so that when you request some data it brings that data and also some that follows it on the media. If you ask for some more with luck it already has it, so your programs respond much faster.

This can make things like Replay movies play more smoothly. In theory, 16-bit cards can transfer data even faster into your computer – often this is not twice as fast due to limitations at the computer end.

Some cards have the CDFS software on eprom and others rely on loading it from disk. One thing you must remember, however, is that any SCSI device you attach will need software to drive it.

Therefore, if you are getting a CD-Rom drive your SCSI card software must support that sort of drive. You can't just get any SCSI drive and expect it to work.

The same applies to other devices such as scanners. Fortunately, when it comes to hard disks they are so similar that any SCSI hard drive will run from your Acorn's SCSI card.

DEFINITION: Psychoceramics – the study of cracked pots

Lighting the way

Q HAVING decided to build the Body Building pack 79 infra-red handset emulator for my Master Compact, I thought it would be useful if I could attach it to my A4000 from time to time as well.

Is there an Archimedes version of the BBC program to control the infra-red transmitter?

Iain Coulter, Sutton, Dublin

A *Sorry, I haven't written a 32-bit driver for that system. The problem is that you would need a User Port or a bidirectional printer port. It should be perfectly possible to do however, has any reader done one?*

Printing problems

Q AT THE beginning of last year my husband and I bought an A3010 Family Solution. This included EasiWord as the word processor and we recently added a Canon Bubble Jet BJ10sx printer with which I am experiencing a few problems.

When printing a multi-page document, I find that the first page prints okay but when I feed in the next sheet a number *1* is printed at the top of the sheet. I then tried to feed in another sheet and this will be printed as normal. The same thing happens in between each sheet feed which is infuriating.

I have tried messing around with the headers and footers and page layout but don't really know what I'm doing and have got absolutely nowhere. The printer manager is set up for A4 Generic DP.

Is it possible to print only one page from a file rather than the whole file which may not be needed? Finally can I type and print in 1.5 or double line spacing?

Mrs K Barker, Cheadle Hulme, Cheshire

A *What's happening here is that the computer thinks the page is longer than the printer thinks it is. You can do one of two things: First of all alter the page size in the printer manager and not rely on the Generic A4 size.*

Alternatively you could alter the paper size setting in the printer. I think this is possible by setting some slider switches inside the printer. Your printer manuals will tell you if this is possible.

EasiWord has been updated since the version which came with the Family Solution Pack. You can upgrade directly

shadow

from Minerva Software for £10 (plus VAT) for the new disk or £15 for the new disk and new manual. This latest version will let you print one page from a file, mail-merge and double line space, among other enhancements.

Superior sound bytes

Q I SHOULD like to be able to connect my Acorn A3000 with my Philips AKF17 monitor so that the sound comes through the monitor speakers instead of through the computer. Is this possible? And if so how?

Peter Stevens, West Malling, Kent

A *At the back of the monitor there is a phono socket that will take an audio signal. Therefore, all you have to do is make up a lead from the headphone jack socket to the monitor.*

There is one snag, however, and that is that the monitor only has one speaker inside so you will loose any stereo effect. A much better option would be to buy a pair of miniature speakers with amplifiers and connect them to the headphone sockets. This increases the separation and can sound a lot better.

Graphically lacking

Q I HAVE owned an Electron since the year they were released and have been programming for almost as long, so I started programming the A3010 from the day I bought it.

Last year I started to teach myself ARM code and wrote a short routine to poke random numbers into a Mode 0 screen creating a TV *snow* effect. I then saved out the assembled code as an absolute file which works by double-clicking it from the desktop.

I have now advanced and am currently writing an ARM code Repton-style game, but when the code and data is saved out as an absolute file it won't run by double clicking and I get an internal error at address &8008.

I got round this by using a Basic program to dimension some memory, load the file into it and execute the code from the start of this memory block.

I assumed the problem was that I was not using a memory management module that many other applications seem to use.

However, a friend recently got some graphics demos from SkyFall with which four of them won't load on my computer and give the same error, even when I take out the 4Mb memory board and my hard disk and perform an R-power on.

Is there something wrong with my A3010 – they work fine on my friend's A3010?

Michael Jagger, Denholme, West Yorkshire

A *Whenever an absolute code file (file type &FF8) is double-clicked the operating system loads it into address &8000 and starts the program off from there.*

Therefore, any machine code you write must be positioned independently or be compiled to run from this address. Therefore, your executable code must start at the beginning of your block, you can't put labelled storage space here and you can't assume anything that Basic might have set up.

From the error message you are getting it looks like it is the third line of code that is tripping up the computer.

It is unlikely that there is anything wrong with your computer and graphics demos are notorious for being, should we say, a little flaky. What is more likely is that there is some configuration difference between your friend's computer and your own.

The extra memory won't give you any problem but the hard disk might as the default drive is then four rather than zero, and many demos assume they are being run from a single floppy machine.

Portable conversions

Q HAVE you ever managed to get one of the proprietary AD/parallel converters designed for the IBM to work on an Archimedes? We have just ordered such a device from Pico Technology to use primarily on an IBM compatible portable. However, we are very interested to see if we can get it to work on an A4.

I have asked the company to give us as much data as they can to enable us to interface the converter. By the way, the reason we are looking at this one is that for £75 you can get an 11 channel 10-bit 15kHz sampler plus the associated IBM software.

Robert Richards, Penarth, South Glamorgan

A *I am not sure how this device is attached to the computer. If it is plugged in the backplane of the PC – that is it has edge connectors on the PCB – there is no way it can be connected up at present.*

An expansion board for the Risc PC is planned that should be able to take that sort of board. However, some data converters plug into the printer port – or parallel port as it is sometimes called.

These could be used with any Acorn computer equipped with a bidirectional printer port – these tend to be the newer ones from the A5000 onwards. The snag is, of course, that the software will need rewriting for the ARM chip.

You can't use the PC emulator as no doubt the software to drive this will be as primitive as most PC software and rely on hard-wired *memory locations.*

The specification of the converter is nothing to get excited about. In the February 1987 issue of Body Building I designed an 8-channel, 8-bit converter that would run at 400Khz for only £38. This is plugged into the user port and is still available.

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

He will answer any questions about difficulties you may be having with your machines, mainly those to do with hardware. If you want a personal reply ensure that you enclose an SAE with your letter.

Plug in and go?

Q OUR family owned an A3000 for a few years and have recently purchased an A4000. I am very interested in games consoles, have a Sega Megadrive and found out that the plug on the end of the joypad fits perfectly but I can't get it to work with any of my games.

David Watson, Washington, Tyne and Wear

A *Sorry, just because a plug will fit is no guarantee that it will work. It's like saying you can pour wine into a car's petrol tank so why won't it run. The A4000 has no provisions to plug in a joystick – even if it did the Megadrive joypad is a totally different electronic beast to a joystick.*

I am afraid the only answer is to get a specific Acorn joystick and several Acorn companies spring to mind like Voltmace and Leading Edge. Also remember that when you have a compatible joystick not all games will respond to them.

As there is no single hardware standard – like on the old 8-bit machines – software patches have to be inserted to drive them. This will only work if the game has gone through the appropriate software vector and not made assumptions about the state of the machine.

NEXT MONTH

WHAT'S COMING IN THE NEXT ISSUE OF *ACORN COMPUTING*

HINTS AND TIPS SPECIAL ISSUE

- Getting connected to the Internet
- Choosing the right software
- DTP special projects #1
- File handling through RISC OS

Regulars

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Viewing in 3D

Joshua Westbury is guaranteed to send you dotty

THE latest in-thing in 3D graphics are the random dot stereograms, or stereogra*phs*, depending on who you're talking to. And this program will create one on your faithful BBC Micros.

In the past, viewing in 3D has either required red/green filters over the eyes or even glasses with polarising lenses. The advantage of stereograms is that you don't need special hardware to view them but the disadvantage is that you have to be able to de-focus your eyes – and it can take quite a bit of practice before you'll be able to do it.

There are actually two programs in the system provided on this month's disk. Firstly use the Stereo Engine Studio to create the pictures – although you can use any drawing program that works in Mode 1. Pre-drawn pictures might work but it's best if you create your own.

When drawing the picture image, you're working in three levels with black as the background – red is the first layer, yellow the second and white is the top. Keep your picture nice and simple – big bold lines and solid areas are best, definitely avoid thin vertical lines and don't use perspective.

Once you've used Studio to create your picture, save it and load up Stereo Engine itself, then load the picture into it. You can put a miniature of the picture into the corner and add a title and some text.

Depending on the type of screen dump routine you have, select either the Colour/Greyscale option or two-tone. The dump should take about 10 minutes for low resolution and 20 minutes for high.

How to see it

Once you've got your stereogram, how do you view it? Well it depends on how good, or bad, your control over your eyes is – this takes practice so be patient and don't spend too long getting frustrated, try it again after a break.

Take your printed stereogram, don't use the screen version – you can but it's not good for your eyes – and put it behind a sheet of glass. You could tape it behind a window, for example.

Look at the image and then relax your eyes. If you've never done this before it may take a while to get used to it. If you're using glass you can try focusing on a distant reflection in the glass itself.

If you can get the whole image blown up larger to A4 or even A3 that will help too, it increases the depth. Good luck.

Using the Stereo Engine Studio

The controls for this program are quite simple but provide sufficient control to produce usable pictures – both the example programs were created using this program.

Keys

Move	cursor keys
Brush size	1 and 2
Paint	space bar
Colour	3 and 4
Circle	C then enter size

To fill large areas use the triangle function:

M	Moves one of two arrows to cursor position
D	Draws a line from last arrow to current position
T	Draws a triangle between the two arrows and current position

To remove the arrows before loading or saving press M twice.

L Load S Save

Acorn COMPUTING

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FAULTY DISK?

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

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

Number crunching

In which Michael Rozboda misspells his name

WELL, why not? Everyone else does, and we do live in a free democratic society with equal rights for all. Ahh, the old ones are always the best, or so they say. It seems like only four weeks since the last TechForum. Doesn't time fly by when you're enjoying yourself? I wouldn't know – answers on the back of a fiver to the usual address.

You can let me know at the same time as sending in all your programming hints and tips.

Incidentally, this month's column is going to steer away from the usual Acorn C bashing and poke about in some ARM code scraps, so should be of interest even to uncultured C-phobists.

And if you are missing your monthly dose of C, don't worry – I'm sure all will be back to normal next month with yet more bug warnings.

Conditional assembly

Ever need to check if a character code lies in a given range and at the same time reduce it to a simple numeric? For example, check if it is between *a* and *f* then change it to a numeric between 0 and 5.

With the Acorn's assembler, you might use something like:

```
SUBS    r0, #'a'
BLT     out_of_range
CMP     r0, #5
BGT     out_of_range
```

This is fine, but isn't optimal – it doesn't make good use of the ARM's ability to conditionally execute any instruction. You can easily combine several comparisons of similar type to test *a>b and c>d* or *a>b or c>d* like this:

```
CMP     a, b
CMPGT   c, d
BGT     both_true
```

for *and*, and

```
CMP     a, b
CMPLE   c, d
BGT     either_or_both_true
```

for *or*. The trouble with using similar code for our initial problem is that the two comparisons used can't be combined in this way.

However, this method can still be utilised if the code is rewritten to contrive the comparisons to be of the same type. This is one way:

```
RSBS    r0, #'f'
RSBGES  r0, #5
BLT     out_of_range
```

You can figure out why that works as a simple exercise.

Assembler multiplication with constants

Multiplication by a constant can be done quickly using additions and subtractions making with the help of the barrel shifter. For instance, *Add a, a, a, ASL #2* to multiply by 5, or *RSB a, a, a, ASL #3* to multiply by 7. This is old hat.

However, you might be less familiar with the fact that the process of constructing such code can be automated. This comes in very useful if you are writing a compiler, or perhaps just some code involving an arbitrary constant in a multiplication.

Although occasionally sub-optimal, it will invariably be better than using the *MUL* instruction – as long as it *is* a constant multiplier. The following procedure is described in the manual accompanying Acorn's Assembler, appendix C:

```
General recursive method for Rb :=
Ra*C, C a constant

If C even, say C = 2^n*D, D odd:
D=1     :     MOV    Rb, Ra, LSL #n
D<>1    :     {Rb := Ra*D}
              MOV    Rb, Rb, LSL #n

If C MOD 4 = 1, say C = 2^n*D+1, D
odd, n>1:
D=1     :     ADD    Rb, Ra, Ra, LSL #n
D<>1    :     {Rb := Ra*D}
              ADD    Rb, Ra, Rb, LSL #n

If C MOD 4 = 3, say C = 2^n*D-1, D
odd, n>1:
D=1     :     RSB    Rb, Ra, Ra, LSL #n
D<>1    :     {Rb := Ra*D}
              RSB    Rb, Ra, Rb, LSL #n
```

Assembler division with constants

I was browsing through some old code fragments – as you do – when I came across a nifty little routine from A. F. Reysenbach to carry out integer division by 10. This used fewer than a dozen cycles, compared with several hundred for a conventional division routine and it resembled code to multiply by a constant.

Which set me thinking: Could this be generalised to allow equally fast division by other constants? A few minutes' thought revealed how the routine worked.

To understand this you need to consider the fractional binary expansion of 1/10. This is just like a decimal number with decimal points, except using base two – thus the first digit after the point is halves, the second quarters and so forth.

```
0.11000000 00000000 00000000 00000000
```

means decimal 0.75. Using this, 1/10 is approximately:

```
0.000 11001100 11001100 11001100 11001
```

In fact, the pattern 1100 repeats indefinitely, giving the precise recurring binary expansion. You can investigate fractional binary numbers using !SciCalc which comes on disk with RISC OS 3.

To calculate 1/10, enter: 10, π/x, *, 256, x≤, x≤, =, then round down to an integer and change base to binary. After notionally adding the leading zeros needed to give 32 digits, you'll have the first 32 binary digits of 1/10 following

the binary point.

Now to divide a number by n we need only to multiply by 1/n, and can do so in a sequence of integer multiplications and divisions by powers of two, using the binary expansion of 1/n to specify the steps needed, exploiting any patterns in the expansion, such as a repeat.

This is best explained by means of a few examples, and I'll start with A. F. Reysenbach's 1/10:

Compound multiplicand	Instruction
1.0	
0.0001	MOV a, a, LSR #4
0.00011	ADD a, a, a, LSR #1
0.000110011	ADD a, a, a, LSR #4
0.00011001100110011	ADD a, a, a, LSR #8
0.0001100110011001100110011001100110011	ADD a, a, a, LSR #16

As you can see, only five instructions are needed to calculate a/10.

Unfortunately, life isn't quite that simple. As long as we use enough steps to include at least 32-bits of the expansion, the resulting truncation error will be small. However, this ignores the rounding errors made at each step, since each calculation rounds its result down to an integer.

Luckily, a little analysis shows that by moving the first step – a simple division by a power of two – to the end, we can reduce errors. This will produce an approximate quotient *b* which is either (*a DIV 10*) or (*a DIV 10 – 1*).

To obtain the correct result, we need only to calculate the remainder (a – 10*b) – using a rapid multiplication by 10, of course. If this is greater than or equal to 10, we add one to b and subtract 10 from the remainder.

You'll find several examples for division by other numbers on the cover disk.

Here's another, this time for division by 13 and with the instructions in the correct order. 1/13 ≈

```
0.000100111011 000100111011 00010011
```

which has repeating pattern 100111011, that itself can be constructed from three copies of 1001.

Compound multiplicand	Instruction
1.0	
1.001	ADD b, a, a, LSR #3
1.0011001	ADD c, b, b, LSR #4
1.00111011	ADD b, c, b, LSR #5
1.00111011000100111011	ADD a, b, b, LSR #12
1.001110110001001110110001001110110001001110 11	ADD a, a, a, LSR #24
0.000100111011000100111011000100111011000100111011	MOV a, a, LSR #4

As before, the code must then calculate the remainder and if this is greater than or equal to 13, add one to the quotient and subtract 13 from the remainder.

When generalising this yourself to other divisors, there are a few points to bear in mind.

- Only positive numerators will be handled correctly. To use signed 32-bit values, you must first remove the sign and then reimpose it after the calculation. The examples on the cover disk do this.

  Indeed, even if you stick with positive numbers you must still restrict the range to leave their top bit clear, as this is needed during the intermediate calculations.
- You must remember to ensure that at least 32-bits of the divisor reciprocal's binary expansion are used.
- As with constant multiplication, you can also use SUB or RSB to perform intermediate calculations when constructing the multiplicand's bit pattern. The cover disk example for the divisor 23 does this.

However, in such cases you should, strictly speaking, also test for remainder less than zero, as well as greater than or equal to the divisor, after calculating the approximate quotient – I haven't bothered to do this with the 23 example.

In such cases, if you find that the remainder is less than zero, subtract one from the quotient and add the divisor to the remainder, to correct for the error.

- Suppose there are *j* steps involved in calculating the approximate quotient, excluding the final division and this last division is by, say, *k = 2^m*, some m. For example, in the division by 13, j=5 and k=16.

For the algorithm to work, a condition to keep the errors

sufficiently small is *j<=k*, I think. Generally, you shouldn't even need to consider this, as it is easily satisfied, however if anything goes wrong, keep it in mind.

A challenge

As it stands, writing code to carry out a division by a particular constant using this process is still a manual task.

Do you have a strong enough stomach to try and automate this process? Anyone who can supply TechForum with a macro, in either for the Acorn Desktop Assembler or in BBC Basic (or both), to generate such code will receive unbounded fame and considerable respect in a subsequent issue.

Stop me, buy one!

Don't forget, 42 may be the answer, but we have yet to discover the questions. If you have a question, it is your duty to society to write in, so do it NOW.

To: TechForum,
Acorn Computing,
Europa House, Adlington Park,
Macclesfield SK10 4NP.

Flower power

Mike Goldberg plants a few biannual ideas

AS I gaze indolently through my office window I cannot help but admire the profuse diversity of the cottage garden plants that have all but taken over my back garden. Sadly, it will not always be like this. My office has just moved from its idyllic location to the dark, dank cave-like conditions of our kitchen where once extinct creatures can be found.

So what about brightening the place up a bit with indoor plants – hardy enough to withstand my unfailing ability to kill them effortlessly? The only way around that one, I thought, was to create electronic flowers – a kind of digital windowbox. That way I could have whatever strange hybrid flower I wanted without all that tiresome watering and potting-on nonsense.

● *A full box*

The idea was to gradually fill a windowbox with quite a range of different-looking flowers from very little information or program lines. The results have astounded me to be honest.

That such diversity can be created from about 20 random variables is staggering. Imagine the data contained in the cells of real seeds and it really isn't surprising there's such variety. Just double-click Windowbox and grow a few of your own.

How it works

I have divided the growing process up into just four stages: Stalk, leaves, flowerhead and petals. The stalk is built up from steadily attenuating rectangles which were originally boring monotone.

By printing the same rectangle, but slightly to the right of the previous one in a lighter tint, I managed to come up with a more convincing curved appearance, which you can see in Figure I.

For a bit of fun look in the stalk-growing procedure (DEFPROCstalk), alter the RECTANGLE FILL to CIRCLE FILL and take out the last parameter, *sh%*. Now run the program for alien plants. The starting thickness of the stalk and the number of segments are random and you can alter the parameters in the program itself.

I could have made the program offer you these options but in my experience most people just want to get on with it, and if you want to alter something you will.

It's more fun butchering someone's program anyway as you can sit there, pull the coding to pieces and laugh at how bad it is and how you'd do it much better.

Now then, the leaves. I love computer generated leaves! Ever since I saw a whole background of them in that blue hedgehog game I've coveted them!

Actually, I think they were supposed to be palm tree leaves but the idea's the same. As each of the stalk's segments xy coordinates are stored in arrays, finding a start position for each leaf is easy. Drawing random leaves is simplicity itself – see Figure II.

With just one point to MOVE to, another to DRAW to followed by four PLOT85s (triangle plotting) a whole random batch of leaves can be created. The 3D effect is suggested again by altering the tint of each triangle just as in real life – the different facing planes of a leaf would reflect varying shades of reflected light.

For more foliage alter the RND(12) figure, the first line in DEFPROCleaves to something daft, like 64 or whatever. You could end up with a Russian vine – why on earth did I plant a real one? It's taken over half our fence.

Of course all leaves aren't green so alter the GCOL5 in there to RND(63). Another thing these leaves remind me of is the spaceship in !Lander, only more controllable.

Now the pretty bits, the petals. This is where the diversity comes in, and from so little alteration. Right. The top of the plant is ascertained from the coordinates of the last stalk

● *Figure I: The stalk*

● *Figure II: The leaves*

segment and this is where a circle of *n* number of petals is drawn at *r* radius – see Figure III.

The petals are just random-coloured circles of a fixed size, or a series of ever-dwindling circles placed on top of one another. By just altering the colour, amount and size of the circles the permutations would appear to be endless.

I couldn't believe what was being drawn. I thought I was going to be spending ages writing extra code to produce more variants, but there was no need. I'd already got half a garden centre-full of strange but somehow familiar looking plants.

Figure IV shows the flower middle which is simply plonked between the petals as a series of tinted circles – a bit poor really.

I really wanted hanging bits like fuschias and fancy orchid-type stuff, but this is beyond the wit of your horticultural programmer. Fancy a bit of green-fingered typing?

I'd like to see an enhanced petal drawing procedure and stamen procedure – I'm happy with the stalk and leaves – so send in your procedure and I'll send you a cartoon for your trouble. Programmers into recursion and fractals should have a field day, so to speak.

The only variable I have offered for twiddling when the program is running is the speed at which everything grows. The idea being that slowing everything down can sometimes be more interesting than the finished result. At full tilt the windowbox soon becomes crowded but ever changing.

Watch out for the mega plants that have petals the size of small planets. They can easily take over the box and intimidate the other occupants. Yes, there's definitely a hint of Triffid in there. I did think about lessening the parameters allowing this but you get enormous flowerheads on some things. Sunflowers for instance or cauliflowers – they're big.

Oh, I nearly forgot, for REAL speed of growth take out all the delay lines. Simply type in:

```
LISTIFdelay%
```

and this will give you the half dozen lines or so to remove. It goes like the clappers now! Geoff Hamilton eat your heart out.

Someone suggested to me that this program would make an ideal screensaver but then any animation is an ideal screensaver if you think about it. Why are screensavers often as not more interesting than the things you really use a computer for? Cos they're fun.

People have also said to me that they'd rather watch the grass grow than use a computer. Well now they can do both!

● *Figure IV: The middle bit!*

● *Figure III: The petals*

● *That's the Triffid I was telling you about...*

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Making the world in your own image

Teri Paul looks at the world of shareware and public domain software

FRACTAL pictures are a true invention of the computer age but the complexity of the mathematics can be a major turn off to many computer users. This is a truly fascinating aspect of computing at any level and if you are interested in a bit of trial and error fractal making, take a look at FracLand 2 **from Peter Millerchip.**

FracLand does not require a manual as it is so easy to use – just load it up and click Select on the icon. You'll then find yourself looking down on a single-tasking world which is a random and light-sourced landscape. A mouse icon in the bottom right corner of the screen tells you the current options.

Now it is time to explore. Click Select and you'll zoom in on that part of the landscape. Menu gives you an isometric 3D plot while. Adjust returns you to the desktop but the landscape is not lost.

On the 3D plot screen there are two little bars which demonstrate the height scaling factors. Select will increase the scaling factor for more mountainous landscapes and Menu will give you wide open plains.

As the landscape is generated by a fractor algorithm you can zoom in to your world an infinite number of times. As you zoom in the program generates the data, so you can zoom in indefinitely without hitting any limit, unlike traditional fractal programs which deal with Mandelbrots and the like.

However, in practical terms there is a limit – your computer's integer limit if you keep zooming on a sea or land – so if you want to do some close inspection keep to the coastline.

Iconbar follies

If you've ever got bogged down in some work and feel the need for some light relief without totally escaping, why not try playing with your iconbar. Colin McEwan has several fun – or irritating depending on your mood – programs just for you.

Sunny is an iconbar silly that turns your pointer into a nice little sunny face. Click Menu and Select Sunny or Select again to return your pointer to normal.

However your standard hourglass will in future be a sun. By the way if you copy something from ARCFS2 under RISC OS 2, you'll get the sun with sunglasses coming off from time to time.

You'll also find that as well as changing your pointer into an animated sunshine, if you click Select on the iconbar icon a window will appear in which you can select stylish sun fashion: Sun glasses, a smiley mouth, extra radiance, ears, a nose or a slightly rounder face.

If summertime for you is synonymous with rain then try out **Rain**. Freshen your stuffy computer room, not by opening the window – far too healthy – rather by adding a rainstorm to your iconbar.

This could leave you needful of venting some aggression. Turn to the iconbar again, this time with **GreyThunder**. Far into the 21st century, the world is in disrepair – polluted, barren and empty as the populous left for pastures new. All that is, but you.

Alone and stuck playing a computer game you cannot finish. All you have to do is guide your craft through some rather nasty bouncing balls, a couple that seem to be pursuing a sort of odd sine-wave pattern, some nasty cones that come at you from really inconvenient angles, and a few nasty green monsters, before you can bear to tear yourself away from your computer and phone for a rescue shuttle.

All this action takes place in a small window on the actual iconbar using the standard game keys. There are sound effects but I prefer to turn them off. This is not for those with bad eyesight, but different all the same. If this applies to you, load the BigMode module or why not take a look at **Magniscope** – now in version 2.04.

This utility lets you zoom in and out of your desktop altering the aspect ratio and so on and is very useful when it comes to template editing for instance. There is only one window in which you set the base mode and then you can alter the pixel size values – in OS units – or click on the arrow button.

Experiment to find the best display for different purposes. For instance, if you want a wide screen mode make the X pixel size ➤

● *Changing your outlook*

smaller than the Y.

You can save your altered display in the usual way, creating a mode module which can be used independently. I did experience some problems – especially with Mode 15 – as you can't scroll the options window and on some large screen modes you can't see all of the pane to change your settings.

DTP – desktop practices

I MUST admit that I only recently began to use Chars from the Apps folder – my Z ceased to work and this was the easiest option as I couldn't remember the Ascii code for it. I use Impression II and Style mostly so was intrigued when I noticed **ImpChars** in GemPD's catalogue.

This program displays the character set in a window and lets you enter characters by clicking on them – just like Chars – but it passes font information to Impression along with the character itself. This makes it very easy to enter a Dingbats or Symbol font character by clicking on a character, without taking into account styles or effects.

The four buttons labelled Dingbats, Symbol, System and Trinity give quick access and other fonts can be selected from the Fonts menu. When an outline font is used an Impression DDF string is used to define a font effect, so when you want ±, μ and Ω and so on use the system font to avoid using an effect unnecessarily.

ImpChars also lets you press the Alt key while the pointer is over a character, having the same effect as clicking Select on the character – but doesn't close any menus.

You can also resize the character display to make the characters bigger. Just resize the window in the normal way, bring up the menu and choose *Resize* which will scale the characters to fit.

In practice this worked well but I did run into some problems with the font cache. I just couldn't get this large enough on a 2Mb machine when Style was loaded to display resizes of some of my more elaborate fonts. Failure exited the program which I found irritating.

Until now JPEG is something ignored by the majority of Acorn users but the times are a-changing. JPEG is a compression method for pictures and takes you on from Creator and the like.

It is a *lossy* format which means that not all the information you put in gets stored and some image detail is lost. But what's remarkable about JPEG is the file sizes – they are very small for the data they contain.

Dave Thomas has written **MakeJPEG** which will take a Graphic Interchange Format (GIF), Portable Bitmap Toolkit (PBM) or Truevision Targa format file, convert it to a JPEG file and convert it back again. It will also make any JFIF standard JPEG file a GIF, PBM or Targa file. The more memory you have in your machine for this type of activity the better.

The *JPEG Quality factor* icon lets you set the percentage quality level which determines the level of detail that will be kept from the original file. By default this is at 75 per cent but you can change this and the eventual JPEG file size – the greater the detail the larger the file.

You can also convert the input file into grey scales and file optimisation will try to optimize the output file, making it smaller but keeping the quality. This option does take time and will need quite a lot of memory though.

Under your control is the insertion of extra bytes to help make sure the file, if corrupted, does not loose too much data – though this does make the file larger. You can also smooth over the input file to get rid of dithering and some unsightly patterns and help the file compress.

When it comes to decompression *reducing colours to* will let you reduce the amount of colours from its automatic setting of 24-bits-per-pixel. Floyd-Steinberg dithering is another option toggling dithering when reducing the number of colours in the image. The author, Dave Thomas, does warn that this can interfere with ChangeFSI or Translator

MakeJPEG supports one-pass quantisation, utilising one-pass instead of two-pass colour reduction which is faster and less demanding of memory. However, the resulting image is of a lower quality. If memory is no problem, cross-block image smoothing improves image at very low quality settings.

GIF outputs a Compuserve GIF file with up to 8bpp, PPM/PGM gives a Portable Bitmap Toolkit format image with up to 24bpp – or 8bpp when output in greys – and Targa produces a Truevision Targa file with up to 24bpp/8bpp grey.

Your chosen format determines the size. As a rule of thumb GIF format is only 8bpp and LZW compressed so they are fairly small, whereas PBM and Targa images are often 24 or 8bpp and uncompressed.

● *JPEG conversion at your fingertips*

Featured this month

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Pawns

LAST time, in The Pawn, I left you just outside the lift where you can now discard your hard hat. Even without it, we are going to do some pretty amazing things in the not too distant future. First there's a touch of speleology – nice big word, innit? Then we're going to enter politics – well, sort of.

We've got to return to the cave near where we found the snow for the Guru. To do that, the sequence of moves is as follows: Southeast, east, up twice, out (don't forget to open the door) down, north twice, northeast and then climb the rocks to the cave entrance.

Now we have our light source, (the White), there's nothing to stop us entering the cave system, so make three moves east and one down for a start.

Once in the small cave, move east again and read the REM statement for a bit of a thrill. Ignore it and drop everything instead: Yes, even the light source. It took me some while to figure out why it had to be done here.

Now move east again and you come to a large cavern with our old friend the stream of lava taking up its northern half: Something must be done. So, it's up twice to the river chamber. It says the wall is weak so, in spite of the fact that the lava was referred to as a *river*, and the room description uses the same word here, break that wall.

The resulting flow of water sweeps you back down the shaft – in fact it does more than that: If you type the command *Look*, you will find yourself back where you dumped everything. If you drop it anywhere else – you can't climb the shaft carrying things – you will be told *it's too dark to see*.

Now you can re-equip yourself and go east to the large cavern once more. The water has solidified and cooled the lava – ain't we wonderful? – so moving north is now possible.

You can see a blue pedestal, an exit to the northeast and a notice. Reading the notice tells you that it leads to a maze. The reference to Dante is his line *Abandon hope all ye who enter here*.

The notice said the maze was irrelevant to the adventure, so it's up to you, folks: If you find mazes irresistible, go ahead, but save first and don't blame me. What I think you should do is this: Examine the pedestal to get a clue as to what it contains, give it a hefty shove and then help yourself to what's inside.

Next thing is to find your way back to that tree again – and no, I'm not giving precise moves, just retrace your steps. Once you have gone down into the tree and east from the low ceilinged room into the white room, you should move north into the office which was used as the election headquarters of one Gringo Baconburger. If you lift up the rug you'll find a safe hidden there.

Use the blue key you got from the niche under the pedestal to unlock the safe and then open it. You've got to be quite precise now: The safe appeared to be empty, but I was sure it couldn't be. I tried *examine* then *look* in but it was only when I used the verb *search* that anything showed up.

There's a ballot paper there, designed by Fastfood Gringo, so grab it. Now return to the white room and go east to the Polling Station. Examination shows that one ballot box is small and used for anti-Gringo votes while the large one is for voting in Gringo's favour.

If you know what's good for you, a favourable vote is what you will cast. Then, having exercised our wossname, er civic duty, feeling slightly smug, we'll leave it there for now.

More next time.

Hatter's homeland

I had quite forgotten what a flattering picture of me there is on the loading screen of **Wonderland** until I loaded it up once more for the purposes of this hallowed column.

When I reviewed the game, yonks ago now, one reader chastised me for giving too much by way of clues. I wrote back to him and said that I had revealed less than the initial five percent of the game. Wonderland is truly enormous and was the culmination of the series of superbly illustrated adventures by Magnetic Scrolls.

For once, I am going to use a reader's solution: Max Kolombos has done such a good job that I don't see how I could improve on it with my own one – so he might as well get the credit, even if he did do things slightly differently from me.

The end result is just the same. Those who have the game will be aware that it runs either in wimp mode or via text input. For this solution, indicating the text input is simplest – this can then easily be translated into mouse operations.

You start off on a drowsy afternoon by a tranquil river and your sister Emily is busy reading a book. If you move east from here to the pear grove you can then take a pear and gain four points. Once the White Rabbit arrives all the pears will transform into lanterns: You now have your light source.

Once the White Rabbit has gone by, you should follow him west, southwest, west and west into his hole. Two moves south and you will start to fall – and a lovely pictorial sequence this is – so take the jar as you fall past it and then wait until you land on a heap of leaves. Get up

The never-ending story

Ploughing through my **Elite** postbag, I came across a comment about Elite 2: Nicholas Hunt enjoys the general gameplay but bemoans the ease of combat, saying *it is far too easy and involves no skill.*

I know what he means. Once you get to a certain standard, you are pretty well invincible, but I still find assassination missions quite challenging. If an Arc/Risc PC version does emerge, maybe the conversion will be a tad more difficult.

I've unearthed a long and interesting letter from Simon Challands with advice on various aspects of ArcElite which will be of help to less experienced spacefarers. He deals with Zartid by missiling four of his escorting Mambas and shooting the rest.

Then, when Zartid attempts to flee, don't follow too closely or you will mop up a lot of rear laser fire: Let him get just far enough away for him to stop firing, and he should still be within your own laser range (just). Finally don't get distracted: Laser a single Mamba reinforcement but energy-bomb multiple Mambas.

Funnily enough, Simon triggered that particular mission before getting to save Xeaan. He's Elite, wealthy and has done the four missions – but he doesn't give any indication of how the fourth was triggered when he was Deadly.

Simon has noticed that the victor of any inter-piratical combat always then goes after you: Hence experienced commanders can wade in at once (what I do) while novices need to run away like anything.

He recommends the following manual docking technique: Ignore the rotation, centre yourself as best you can and go full bore – adding *this method is useless when several ships are trying to dock (for anyone with a conscience, anyway).*

Simon, my son, I have no conscience whatever in these matters – if anyone has the misfortune to be in my way when I am docking they get splattered all over the place.

Matt Bloch has encountered a mystery ship in ArcElite: Mostly yellow, fairly small, shaped a bit like a Worm, it has a black broad-headed arrow on top. Matt's drawing doesn't match any of the pictures on the identification cards supplied with the Gold edition of ArcElite.

Chris Coe has supplied a list of the kills required for each rating in ArcElite – so here they are. Mostly Harmless, 50; Poor, 400; Average, 1000; Above average, 1500; Competent, 2500; Dangerous, 4500; Deadly, 6000; Very deadly, 8000 and Elite, 9800. This compares with the following incremental scale in Elite of 8, 16, 32, 64, 128, 512, 2560 and 6400. Elite has no Very deadly rating.

Chris has been rummaging around inside ArcElite and has come up with a whole heap of interesting information. Here's some about acquisition of kill points: Apart from pirates, asteroids and escape capsules are the only things he reckons will uprate your score. Good shooting Commander messages come every 50 kills but his Right on Commander message lacks logic, apparently.

The first mission, Chris says, is triggered by the following conditions: Most important is that you must be in Santaari, have Cr1200 minimum, have one Good shooting Commander after you have got a Poor rating, plus somewhere between one and 16 kills thereafter. Okay?

Next, legal status: In your commander file is a counter showing how many offences you have committed. 0-40 is Clean, 41-1000 renders you Offender and over 1000 you are Fugitive.

However, Chris says that whenever you dock at a new system 40 points are deducted from your score so even a hardened Fugitive can turn over a new leaf and expect to become Clean again eventually.

The following is a list of offences on an incremental scale: Dealing in furs, narcotics, firearms then slaves. Worst offences are shooting up craft minding their own business and police Vipers. Thanks, Chris.

A letter from Jamie Nicol enquired about the Arries-Diquer rally, so I'll quote from DataCard 11 from the Gold edition. *'The Gecko has a chequered history of backyard manufacture and photocopied blueprints. It has thus evolved into the craft flown by so many pirates today. Commanders are advised to remain docked during the infamous Gecko enthusiast Arries-Diquer rally.'*

Clive Gringras was exercising his wit and punning on the fact that, from time to time, there is a rally staged between Paris and Dakar in Africa. Didn't the Iron Lady's son go astray on that one?

Anyway, we thought a competition based on it would provide some harmless fun and a bit of head-scratching too, in view of the way Galactic Hyperspace works.

See you next time. Mad Hatter.

to the polls

The Mad Hatter continues with his Pawn and Wonderland solutions as well as a touch of Elite help

and then search the heap: You'll find a No. 10 key, so take it.

Now go east and southeast to the long hall. Take the potion bottle (shrink mix) and then look under the table to find a glass box containing a cake, (eat this and you'll make a giraffe feel vertically challenged), and take it.

After this, travel northwest, and west twice to the musical door, which you should open. A move northwest takes you into the music room where chairs are merrily dancing – playing musical chairs, I guess.

What you have to do here requires a little careful timing: Keep on examining the chairs until you are told: *One of the chairs is by the piano.* There's a key in C here, too, so take it.

Once a chair is in the right position, take the music from the piano and the chairs will freeze. Open the piano and stand on the chair. Before you can actually get into the piano, though, you will need to be smaller and thus lighter, so open the bottle and drink the potion.

Get on to the piano sharpish and grab that key in G. Get off the piano and you will be told that you feel a tingling sensation – a warning that you are beginning to grow again – so get off the chair too, move southeast into the corridor and you'll be full size again. A move east along the corridor and you can open the door with the key in C.

Go south into the broom cupboard and take the coathanger, the small overall and the card shoe. This last item is important since, every time you collect a playing card, it will land in the shoe. And that's where we will leave things for now.

More next time.

Supergram II

...the games people play

HANDS up those with good memories? Okay, so when did we look at the PD anagram program by William Tunstall-Pedoe? Well the years have passed and there are now three versions of this software available: A demo, a standard edition and a professional version which needs 2Mb ram.

Supergram uses artificial intelligence techniques to find multi-word anagrams which make sense and are relevant to the initial text. For example, Acorn Archimedes could become *Each a modern RISC*.

The Standard Edition comes with a printed manual, automatic updates and has a lexicon of 80,000 words as opposed to 35,000 in the evaluation version.

Both Standard and Professional versions have a Features utility which can permanently remove/restore vulgar and satire options. However, the Professional edition has a 130,000 word lexicon which requires 2Mb ram.

Supergram II is as easy as the original to use and though the manual is well written, the user interface is self-evident. The program is fully multitasking and the options are all available as buttons. The secret is to experiment and the manual gives examples of just what you can create with peoples names and phrases, from *Margaret Hilda Thatcher* to *Computer Concepts Limited*.

You start by inputting the word or words you want to *anagramise*. The more scope you give the program the better the choice of anagram. Words will be produced and scored on their relevance to your selected categories.

You can change these scores if you see a word you particularly like. Then off you go with *Search* which will sort and score words into semi-meaningful phrases.

At all times you have full control over the program, so when the phrases are presented you can then *weed* them out. Choose the best ones and alter the order of the words to your liking.

It is the detail William has gone into with this program that makes it stand out. For instance, on the *Search* stage you are given a rolling estimate of the computer time it will take to finish, while a schedule box will show how the program is running behind or ahead of this estimate. You can pause Supergram at any time and reports, subwords and raw anagrams can be saved for future use. The report is well worth saving as it lists all the best anagrams as well as the longest words, but this file can only be saved from the weeding stage.

Some tips are included in the manual such as avoiding J, Z and Q as they will give you anagrams with lower scores, with the emphasis of the sub-words being towards these rare letters.

If you are unhappy with the results try variants on the words supplementing Limited for Ltd for instance, or go for a different approach.

Creating anagrams is fun, and will let you get your own back on those people who always manage to get the anagrams in crosswords first time.

Teri Paul

● *Enter the words you want anagrams for and set the options*

● *Choose and rearrange the anagrams as you want*

● *If you think a word is wrongly scored, change it*

PRODUCT SPOTLIGHT

Price: £12 (standard edition)
£34.95 (professional edition)
Supplier: William Tunstall-Pedoe, PO Box 395, Cambridge CB3 9PJ.

Karaoke Macbeth

...bard-u-like

NOW this one could fall between two stools – is it entertainment or education? I refuse to give credence to the non-word of *edutainment*. But for anyone interested in Shakespeare then this series will be of use whether you want this for revision, amateur dramatics or just general interest.

This is a conversion from the PC version and there are versions of Midsummer Night's Dream, Romeo and Juliet, Twelfth Night and Hamlet waiting in the wings. The whole play has been recorded by semi-professional actors, though I wouldn't say that their interpretation was definitive for any of the roles.

The presentation is superb though. To begin with you are taken to the Globe Theatre and move film-like around until the King's procession arrives and the play can begin.

This *Movie* window appears at the beginning of each scene, giving you a feel of the area before homing in on the actors. It is nicely done but jerks due to the fact that it is was converted from the PC – a simple change to Replay format would have solved it.

The program is fully multitasking with search facilities, bookmarking and woodcuts as sprite files which can be dragged to other applications.

The *karaoke* aspect comes into play as you can decide which role or roles you want to speak. The lines may be displayed on screen or not as you like. You can also increase the text size so that more people can gather around the screen and see the words, or as a computer prompter on-stage.

In addition, spoken notes are available on the text to help and you can print out or view on screen the entire play in a range of typefaces. You can use the arrows at the bottom of the window to step forward and back through speeches, scenes and acts.

I was impressed by Macbeth as it was reasonably straightforward to use and is an unusual program which should prove popular with actors and students alike.

I would like to see future disks having the ability to record and replay your version of the words as with ILP's Directions 2000. I realise there are problems in doing this and that you can create your own recording with Solent's Oak Recorder – but that doesn't stop me wishing.

Pam Turnbull

PRODUCT SPOTLIGHT

Price: £49.95
Supplier: Cumana, Pines Trading Estate, Broad Street, Guildford GU3 3BH.
Tel: 0483 503121
Requirements: CD-Rom drive, RISC OS 3.1, 2Mb ram

● *Search for Duncan...*

● *...and speak his words*

● *The movie window sets the scene*

Fyarena

...very strange

THIS budget offering is unusual, off-key, difficult to get into and fun. The scenario is basic – you're trapped in Fyarena and have got to get out. Simple and to the point but getting out is neither.

You'll find yourself surrounded by generators – white – and puzzle pieces – red. There are also four scrolls on each level. Collect a scroll and you'll move on to a puzzle screen.

Here you must assemble a complete picture inside a large white rectangle. Put the pieces in the wrong place and you'll incur a five second time penalty. This is really quite straightforward once you have read the instructions – dive straight in and you'll wonder what on earth is happening.

The gameplay is well-balanced and passwords mean that you don't have to re-do each screen. There are 36 levels in all and as I haven't got to the end yet it must be good value for money. The music is excellent but you can toggle this on and off from the main menu.

The first puzzle to solve is a picture of a fish – which bears a striking resemblance to a certain adventure game – but time and energy levels are against you.

I found it best not to place any of the picture pieces until I was certain of the picture or had collected all the scrolls. At this level at least, the edges are shown by a white line so you can make *some* informed decisions. By the way, the generators need despatching as do the robots, and you really should collect the gold as you go.

It reminded me in some ways of the last Repton release but with a shoot-em-up element. The robots and generators take some destroying at later levels. The graphics are chunky but I prefer a good game to good graphics but no gameplay any day.

PRODUCT SPOTLIGHT

Price: £5
Supplier: Michael Elson, 25 Lyttons Way, Hoddesdon, Herts EN11 9NH.

The final frontier

Graham Keeling looks at maths teaching from a different angle

DESIGNED and written by Adam and Sue Hosler, Space City is an attempt to use the power of computer graphics and a good story to help children understand mathematical angles.

The plot is quite simple, Space City, situated between the Moon and Earth, has been hit by asteroids. It is your task to pilot the space craft Blue Fire and to assist in the repair.

This type of scenario has been used many times before but the sheer quality of the graphics and care taken in the tasks presented to the children put this software in a class well above the normal space simulation.

The picture of the pilot, dressed in full space suit, is androgynous enough to be a role model for either boy or girl, while the slightly soviet name of Zara Popov could apply to either sex.

This may seem a small point but had he/she been a man would we have noticed? If a woman, would some of our more overtly masculine boys have considered the whole program rather suspect? Be honest. I know how some of the children in my class would react.

There is a robot within the space ship which adds a comic line to the plot and serves to move the plot along, while reminding the children of the skills they should be using.

The tasks within the adventure are carefully graded to give experience in judging angles before the children are asked to make choices that affect the plot of the adventure. These tasks really hang together well and seem important to the plot.

As the children work they are being continually reminded of the plight of the people they have come to rescue – I actually found myself wanting to do well because I cared what happened.

Another nice touch is the inclusion of simple logic problems and arcade-style shoot-'em-ups within the story line. These are a tiny fraction of the whole but serve to sugar the pill of angle estimation which can get a little daunting after a while.

The program is fully configurable from the iconbar. Teachers can control both the difficulty level and the number of tasks to be completed at any one point within the story. Sound levels and monitor types can be controlled if necessary, while starting and finishing points can also be controlled.

Teachers may wish a group of children to use a specific group of activities when teaching specific skills, while others would be quite happy to allow children to experience the whole adventure as a piece of revision or as a starting point for more extensive work on angles.

Within the program itself there is a substantial range of difficulty, beginning with exercises to tax a six year-old at one end to making bright ten year olds scratch their heads at the other.

This is done consistently within the software so that the children using the program are presented with progressively graded examples and tasks. I wish all educational software was so carefully designed.

A simple manual explains all you will ever need to know in a few pages, while a pack of work sheets allows work to be developed away from the computer with exercises in judging, estimating and measuring angles.

Sherston have even thought about the poor classroom teacher and provided an answer sheet for the more complex worksheets. There are even some games which can be photocopied and used by the children to develop their skills. This is one of the first of Sherston's Primary Maths Series. I look forward to seeing more of them.

PRODUCT SPOTLIGHT

Product: Space City
Price: £29.99
Supplier: Sherston Software, Swan Barton, Sherston, Malmesbury, Wiltshire HA1 2AG.
Tel: 0666 840433

Summing up

Space City is the sort of software teachers of Mathematics in Primary schools have long been looking for. It tackles a difficult subject with just the right blend of inspired use of computer graphics, compulsive story line and humour.

● *To save the station you need a space ship*

● *Use trial and error or educated decisions*

Out and about

Frank Jukes picks up with Pocket Book and explores

IF you haven't seen a Pocket Book leave the room immediately and go and find one. If you don't own one, crack open the piggy bank, sell your granny or write to Santa. I'm hooked on mine.

The Pocket Book's built-in software includes a calculator, spreadsheet, wordprocessor, database and clock and, for a few extra measly pounds, an electronic diary/appointments system that frequently gets me to meetings (almost) on time by beeping a warning that even I find hard to ignore. Now ExpLAN's Explorer adds an electronic worksheet to the list.

Explorer was originally commissioned for use on an IT course at a holiday centre. It was intended to provide a means of asking a series of questions and recording the answers, while undertaking activities away from the centre. The answers could then be downloaded on return to the centre to be used in ongoing work.

Since then Explorer has been revised and now includes a translation module for the A-Link and an application to help in the creation of questions, as well as utilities to alter PocketFS and set up the Pocket Book.

If you are not very confident, the first part of the installation process could be a little scarey. ExpLAN have done what they can to make it easy but, as it involves modifying PocketFS to enable question and answer files to be transferred, I strongly urge anyone undertaking it to use a back-up copy.

Once PocketFS has been modified, the actual installation process is quite easy. Around 28k of memory is needed and an application provides a step-by-step guide to what to do. For users of version 1 of PocketFS, things are a little more complicated but not too much of a problem.

Several question files are included in the package. They give a feel for what can be achieved and working through them can provide ideas for your own version of Mastermind.

All of them are based on visits and this, I feel, is limiting. Files could, for example, be based on classroom or library searches for information or even logging of observations made during experiments.

Actually creating a question file is extremely easy. Explorer, the question maker application provides all that is necessary and ensures that the correct format is adhered to.

Titles may be no longer than 40 characters and questions no longer than 60. That keeps things to the point. Up to 99 questions are allowed in one file and along with each question a comment and short answer may be added.

Once questions have been entered their order may be changed and they may be grouped in different ways. If you are lucky enough to have a class set of Pocket Books, a set of questions grouped and the groups ordered may be the answer to the problem of too many students following the same route around a museum, for example.

Grouping helps to ensure that answers to successive questions are to be found not too far away from each other. With questions shuffled into random order within the group it is possible to encourage more individual responses to them, while ordering the groups in a cyclical way means that different students will start at different points, yet cover them all in the same order. Example files for visits to Bristol Zoo and Chepstow Castle demonstrate the points well.

From this point of view Explorer is very powerful and can really point students in the direction of the important aspects of a visit. Its weakness, though, is in the answers.

Quite obviously it would be impossible to check all of them to ensure that they are full and complete, but I do think that some kind of basic checking should be implemented. At the present time it is possible to complete every question by entering just one character for each of them.

Perhaps a system of checking by reference to key words drawn from the comments and answers entered when the question file was created could be implemented.

Although this may have the disadvantage of limiting the scope of individual responses from individual observations, it would at least ensure that they were focussed.

● *Use your Pocket Book to make the most of a field visit*

PRODUCT SPOTLIGHT

Product: Explorer
Price: £79
Supplier: ExpLAN, St Catherine's House, Tavistock, Devon PL19 8AY.
Requirements: Acorn Pocket Book or Psion 3/3A, A-Link and RISC OS

Summing up

Explorer has potential. It almost certainly won't replace the time-honoured worksheet on educational visits but it will enable an alternative method of collecting information, as well as providing IT with a higher and more mobile profile. Its ability to organise the movements of students is most certainly one of its strengths.

● *Compile and group the questionnaires on your RISC OS machine*

In the

● *The first leg of your journey is to get to the station*

DESIGNED and programmed by Margaret and Peter Hayball, Around the World sets out to re-create the journey of Phileas Fogg in today's climate of environmental awareness, terrorist threats and pollution. We have an attempt to save a beauty spot from development rather than the original wager for crude cash but the plot line is much the same.

Twins Freddy and Frances challenge Wiley Windbag to donate £500,000 to protect wildlife in a conservation area if they succeed in travelling around the world in 80 days without the aid of mechanical air transport. Not surprisingly the sniggering Mr. Windbag dogs their every move and creates all manner of problems for the two children.

As the adventure unfolds both sampled sounds and excellent graphics and animation add to the enjoyment factor of the software. The graphics were all created using Sherston's own Splash graphics package and must serve as a superb example of what can be created using such simple tools.

At the top of many screens can be seen two icons. To the right is a log of the number of days passed and to the left a world map icon. This reveals information about the current country and details about the planned route and the route taken so far. The maps within this area of the package contain highlighted areas which reveal a closer view of the route, with scales clearly marked.

Many parts of the adventure include screens with *Hot Spots*. These can be explored and animations reveal plot developments before the story line continues.

Other challenges include exercises which demand an understanding of European or World geography. These are usually presented to the child as a timed test with the option of re-doing the test and attempting to improve on the time taken.

This really works with the children and my own take it as a point of honour to recreate the map

PRODUCT SPOTLIGHT

Product: Around the World in 80 Days
Price: £39.95
Supplier: Sherston Software, Swan Barton, Sherston, Malmesbury, Wiltshire HA1 2AG.
Tel: 0666 840433

● *Can you reconstruct Europe in time?*

● *Facts about the world are scattered about liberally*

steps of Fogg

With Pas Partout at his side, Graham Keeling sets off on an ecological adventure

of Europe in less than 30 seconds. Children become familiar with the country's shapes, names and capital cities in a remarkably short period of time.

24-hour clocks and timetables are covered along with eight point compass work, longitude and latitude, port and starboard, time zones, navigation using scale and bearings and contours.

All activities are important to the plot of the adventure and not just tagged on to fill a space. The geographical skills are carefully taught and explained as only well-produced computer software can teach and explain, using animation and clear graphics which the child can progress through at their own pace. At last, contours can be made solid and four figure grid references become far easier to understand.

This package has been designed for use in Key Stage 2 and I have found it to be very successful with both Year 3 and Year 6 pupils. Like all good adventure software it works on more than one level, with children taking what they find appropriate from the story line. Some of the jokes may well only be spotted by adults but at least they are there.

The program comes on three disks, one of which acts as a key disk which must be present when the program is started. A fourth disk contains screens from the package for use in other applications.

Teachers can set up the program to start at any point within the story line, control volume and the speed at which text appears on the screen. This last option is important as the sense of the screens depends upon the text being read in the correct order.

Support materials include photocopiable maps and exercise sheets which really do enhance the work developed away from the computer. A book of classroom ideas even includes a list of useful addresses which the children could access for their own enquiries.

Summing up

This package covers a great deal of geography and geographical skills. It could sit at the centre of a topic or be used for revision. Given enough time at the computer and an insistence on note taking, the software is quite capable of teaching a number of skills.

With the total overload of subjects within the National Curriculum, such software could be a real life saver to any teacher willing to let the computer take the strain.

Excellent software which takes children into an adventure which, when completed will leave them with an enhanced understanding of world geography and geographical skills.

● *Think carefully before making your decision*

● *More exotic locations and trickier problems*

● *Map work is entertaining as well as educational*

Accessing the facts

With data as diverse as dinosaurs and the stars, Frank Jukes looks at some PinPoint datafiles

I'VE always believed that data handling applications in education were most valuable when they were being used to compile and manipulate datafiles. Now Longman have produced a whole series of datafiles for their Pinpoint and Junior Pinpoint data handling applications which means the collection of data is bypassed.

This isn't the first time that such files have been produced, of course. They have been available for many applications from a number of publishers for a long time but I've always avoided buying them.

I want my pupils to investigate the subject and provide the data that interests them and that they themselves have unearthed. The trouble is, Longman's files are very good and I can see how useful they could be.

Each of the topics comes on a disk containing a ready-made database and is accompanied by an explanatory booklet and a set of photocopy masters to help pupils develop their data handling.

Dinosaurs and The Solar System are two of the files from the series and give a good coverage of their respective subjects. Dinosaurs is aimed at Key Stage 2 and 3 pupils while The Solar System is more advanced and aimed at Key Stages 3 and 4.

The dinosaurs file contains details of 62 different dinosaurs with both the well known and the relatively obscure represented. Information is provided on the meaning of the creature's latin name, its diet, mode of movement and length, as well as its geographical location, the period in which it lived and the group of dinosaurs to which it belonged.

Under the heading of *Special* is information that does not readily fit into the other fields. The Homalocephale, for example, is listed as having a thick flat skull while the Ankylosaurus had an armoured club tail and spikes. I'm sure that not a lot of people knew that.

As everyone has come to expect from Longman Logotron, the written resources which come with the datafiles are of a high standard. The booklet to support the dinosaurs file gives a brief but clear explanation of the way in which dinosaurs are grouped and provides work to complement this. The set of photocopiable sheets develops learning about dinosaurs and, at the same time, the skills of data handling.

The Solar System package works in a similar way but at a higher level. There is still a progressive introduction into exploring and interacting with the data, but the searching which is required is more complex and Pinpoint's graphical capabilities are exploited too.

Data on planets, moons and asteroids is included and much of it is quite detailed. It is in this kind of file that my initial misgivings may well be unfounded. To research a lot of this information would be quite daunting unless undertaken by a group of students and even then it may not make much sense to them in terms of an overall view of the subject.

Actually using the files to search for patterns can quickly make a lot of points. Worksheet 3, for example, draws out the link between a planet's distance from the Sun and the length of its year, as well as the link between its mass and its gravity by just a couple of searches.

Further worksheets continue this exploration of connectivity and also help to demonstrate Pinpoint's capabilities.

PRODUCT SPOTLIGHT

Product: Pinpoint Datafiles – Dinosaurs and The Solar System
Price: £12 per datafile
Supplier: Longman Logotron, 124 Cambridge Science Park, Milton Road, Cambridge CB4 4ZS.
Requirements: Junior Pinpoint, Pinpoint or Pinpoint 2

Summing up

I still believe that, wherever possible, data should be collected by those who are going to use it. However, the Pinpoint Datafile series does offer a high quality, ready-made entry into data handling at a very reasonable cost.

Anyone with an interest in subjects as diverse as the Second World War, the 1851 Census, Festivals and the Junior Olympics, among others, will be pleasantly surprised by the breadth and quality of the information contained in the files.

A word of caution. Before using the files it may well be worth upgrading to Pinpoint 2. Although Longman Logotron advertise them as suitable for use with older versions, I did have some problems until I upgraded.

● *Pictures of the ancient creatures*

● *Data is presented in a consistent format*

SUITABILITY

PINPOINT DATAFILES

NATIONAL CURRICULUM

The Solar System – Technology AT5, Science AT4
Dinosaurs – Technology AT5, Maths AT5, Science AT5, KS2-4

Ages 7-16

PHOTO touch

Photo Retouching, Image Processing and Colour Painting

Oregan PhotoTouch is a painting, professional prepress, and processing system all in one powerful package. Working with photographic quality images up to 24bpp (16.7 million colours), take any photo and turn it into your own creation. Add special effects, and realistically retouch the image until it suits the task for which it is required.

PhotoTouch is an essential tool for owners of all graphics enhancer boards, including the **ColourCard Gold**, which will allow you to be creative in a 16bpp desktop.

For those not owning such hardware, PhotoTouch uses sophisticated rendering techniques to produce a 256 colour image for editing, whilst the 24bpp image is continuously updated in memory, ready for saving when you've finished.

The powerful tools of PhotoTouch include:

- Transparent, translucent, and opaque painting tools
- Colour filters, correction, addition and subtraction
- 24bpp, freehand cut and paste
- Sophisticated protection masking
- Airbrushing, blurring and smudging
- Many varied linear, and radial gradient fills
- Morphing, swirls, distortions, and bubbling
- Scratch, ripple and embossing
- Virtual memory management option
- Allows editing of Replay files
- Exports as TIFF, JPEG, Clear, and Sprites
- Imports over 40 foreign file formats

• Requires RISC OS 3.10 or greater •

This represents just a small fraction of the staggeringly powerful facilities offered by PhotoTouch. What's more, Oregan intend to develop this package further still, and upgrades will be sent to existing users, absolutely free of charge.

PhotoTouch supports VIDC20 display modes, ensuring complete compatibility with the new RISC PC.

Oregan is offering this package at an incredibly low launch price of just **£79.95**. However this fully inclusive price will only be held for a short period.

Oregan Software Developments
36 Grosvenor Avenue : Streetly : Sutton Coldfield : B74 3PE
Tel : 021 353 6044

Oregan
DEVELOPMENTS

Are you being served?

Mike Cook takes up the challenge of setting another project for you to enhance the scope of your computer

ONE of the best things you can do with computers is to get them to move something in response to your program. In the past we have looked at various ways of controlling many different types of motors but so far we have neglected servo motors, so let's put that right.

A servo system is one that controls the rotation angle of a shaft. For example, supposing you had your TV aerial connected to a motor, you could get a servo system to make it point in any direction you like.

Basically a motor drives the shaft, usually through some reduction gearing, and the position of the shaft is sensed. You can have many types of sensor but a potentiometer, or variable resistor, is the most common.

Now the difference between where it is pointing and where you want it to point is known as the *error signal* and is usually expressed as a voltage.

This error voltage is processed and the result is used to drive the motor, forming a closed loop feedback system. The trick is to get the error processing to produce a motor movement that minimises the error, so that when the shaft is pointing where you want it to, the error signal is zero. When this occurs we say we have a stable system – the basic arrangement is shown in Figure I.

Going with a bang

The simplest form of error signal processing or control is known as the *bang-bang* method. In this, if the error signal is negative the motor is made to turn one way and if positive, it turns the other way. This is quite crude but works in many situations, especially where the speed of response is not too critical.

However, supposing you have a situation where you want to point as fast as you can, for example in an anti-aircraft missile launcher – something, as I'm sure you'll agree, we all need.

You might think the answer would be simply to have faster motors moving the shaft, but a fast moving motor takes time to stop. By the time it has stopped it has overshot the required position and the error signal is in the other direction. So the motor sets off in the other direction and can overshoot again.

With luck it might settle down to point in the right direction or it might go on oscillating forever. This would then be an unstable system that could be stabilised by *damping*.

Damping occurs naturally in any mechanical system due to the inertia of the moving components. This can be increased by adding extra restraining forces to absorb energy.

A good example of this is the damping system on the suspension of a car. If a system oscillates before coming to rest we say it is *under-damped*, if it creeps up to the final position we say it is *over-damped*.

The ideal arrangement is where a system makes one small overshoot and then goes to the final position. This is known as a *critically-damped* situation and occurs when the system is operating at its fastest possible response time.

It turns out that what you need for the perfect control system is not a simple bang-bang strategy but one that varies the speed of the motor depending on how far away from the desired position the shaft is. When it is far away the motor turns at full speed and as it approaches the required position it slows down, thus minimising overshoot.

Adding control

This requires some quite complex processing of the error signal and can involve some heavy maths. This branch of engineering is known simply as *control*.

Fortunately, there is a supply of ready-built, off-the-shelf servo control systems available at quite reasonable prices, thanks to the mass production of radio-controlled models.

Therefore most model shops sell a variety of *servos* as they are called. They provide precision movement of a disk through approximately 100 degrees, but larger ranges are available.

These are linked to rudders and wing flaps through ridgid wire links and can control most aspects of a model. It is even possible to make robot arms, plotters and all sorts of actuators using these systems.

Servos are normally connected to a radio control system but we can make our computer generate the correct signals needed to drive them. What we have to do is generate the position signal, or where we want to be signal.

In virtually all servo systems this is in the form of a pulse width modulated signal. That means the width of the pulse determines how far

● *Figure I: A general servo feedback system*

● *Figure II: Pulse width modulated contol system*

a shaft should swing – see Figure II.

The simplest way of generating a signal like this is by using the shift register in the VIA of the user port but as we will see later we can do this purely in software.

The shift register can be set up to work in a recirculating mode – that is the bits that fall out of the end of the register are pushed back into its input. This means that you can get a circulating bit pattern. If we arrange this pattern correctly we can get a pulse out, whose width depends on the bit pattern we put in – see Figure III.

The best thing about this system is that once it is going we don't need to do anything in software to keep it going, the hardware keeps on generating the signal. If we want to change the shaft position we simply poke another bit pattern into the shift register. Once set up only a complete reset will stop the pulse train and there is no software overhead.

The wiring is simple and is shown in Figure IV with a program on the subscription disk called Servo1 showing you how to drive it. However, this has been written for RISC OS machines, but you can do the same thing for any Acorn computer with a user port using the same OS_Byte calls.

The number you put into the T2 latch determines the frequency of the pulse train. This might vary with different makes of servos. I found that the one I got – Futaba FP-S128 – worked best with a 1.5mS wave or about 660Hz. You can experiment with different values.

Potential problems

Despite the simplicity of this system there are a few drawbacks. First of all you can only control one motor and secondly you only have control of about six different positions of the shaft. Finally, you have to have a User Port in the first place.

To overcome all of these you can generate the pulse train in software. This involves using timer T1 to continually interrupt the computer at intervals of 0.1 mS. This gives a resolution of about 14 different shaft positions for a 1.5 mS pulse wave form or more if your system can stand a longer period control system.

Also, because we are using software we can control as many motors as we like. My program, Servo2, controls eight motors at once connected to the printer port.

Each time T1 times out it calls a background interrupt service routine. This increments a master timer held in memory (label TM) which resets when it reaches 15.

Also, for each motor a single byte counter is decremented and if it has passed through zero – the 8-bit count is greater than 128 – a zero is sent to the motor, otherwise a one is sent. All the motors are looked at in turn and the bit pattern is constructed in a register which is then sent out to the printer port.

Each time the master counter resets the motor counts are renewed from the master store. Once this is going all you have to do to change a motor position is to poke the position number into the appropriate master store. As this is a background task it will keep running even when your program stops.

However, if you try and modify the memory that contains the interrupt service routine code the computer will freeze. Therefore, you always have to stop the interrupt procedure before doing anything to the program. I do this automatically by having the error trapping routines disable the interrupts on an Escape or any error.

If you want to have finer control over the motor movement all you need to do is to reset the master timer on a bigger value – however this will decrease the period of the pulse train. Nevertheless, I found that I could stretch things to a count of about 24 using my servo.

Remember you can always shorten the pulse train period by placing a smaller number in the timer T1. This will increase the number of times the computer has to execute the interrupt service routine and so, in effect, slow it down for all other tasks.

You reach the limit when you are interrupting so fast that you can't even execute the interrupt service routine before the next interrupt comes along.

One final point, I found that my servo couldn't cope with very narrow pulses. When a servo is in position it should be silent. However, using narrow pulses it produced a high-pitched whine. This is because the position sensor potentiometer was at its fullest limit of travel and the motor was trying to drive it further round.

The motor suffers no harm if this occurs for a short length of time but I imagine it won't do it any good if left in that position for long. If you hold the motor to your ear there is the occasional noise of motor activity but the position actuator remains stationary. This is due to the fact that the computer does not produce a stable pulse waveform.

● *Figure IV: Wiring the servo to the User Port*

You see, it's not only our program that is causing interrupts – there are many sources from the operating system, for example the timer interrupts every 10mS. If the computer is in the middle of one of these interrupt service routines we have to wait for our turn.

This leads to a slightly longer delay for that count period and if we are currently on the period that marks a change over in logic state, the pulse produced will be slightly longer. This starts the servo motor off but the next cycle puts things back to normal so the motor stops.

Well there you have it, a control system that can handle eight motors. Let me know what you do with it. See you next month.

● *Figure III: The relationship between shift registar value and pulse produced*

David West, an ex RAF Pilot with over 20 years service, took part in the Normandy Landings. Now 83 years old, and a widower, he recently suffered two strokes resulting in poor circulation in both legs and deafness. A man used to fending for himself, he found it increasingly difficult to cope at home. David's local RAF Association Welfare Officer arranged for him to move into Sussexdown, our nursing home in Storrington. He is now receiving the care he needs, back with his RAF family.

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Why, oh why...

NO ONE was as pleased as I at the specification of the new Acorn Risc PC. However, I was slightly disappointed by the lack of a digital signal processor chip.

You stated that such a device was *under consideration* as a processor for the Open Bus expansion slot. If that is the case we should all urge Acorn or the relevant third parties to develop and produce this hardware.

The availability of the PC co-processor will breathe a new lease of life into the Acorn but a DSP would ensure its place at the forefront of technology.

Clearly, over the next few years we will see an evolution of what we use computers for and how much they cost, the end result being one *smart* possibly voice-responsive machine filling the niches of the VCR, TV, telephone, answer-machine, fax and hi-fi.

The pioneers of this technology are Apple whose A/V series Macs and PowerMacs and forthcoming TV Macintosh are eminently sensible, economic and exactly what is needed to drive the elevated world of computing down to the consumer with incredible functionality at reasonable prices.

A DSP combined with the right expansion cards could give Acorns that functionality and increase sales hugely. Computers must embrace these new technologies and if Acorn wants to stay ahead they ought to follow Apple's example.

I am sure that with some basic technology two co-processors could be fitted in one machine, thus giving us the ability to house PC as well as advanced multimedia compatibility.

We are on the threshold of owning a computer that will provide ultimate compatibility, ease of use and practicality. It would be a shame if the possibilities of the Open Bus were wasted and Power PC technology loses us in its wake.

James Gaynor, Abingdon, Oxford

I AM not sure if the Risc PC should make me laugh or cry. By all accounts a marvellous future-proofed machine with wonderful expansion capabilities, but is it?

If I were to upgrade to a Risc PC I would *worry* about it only having two ram SIMM expansion slots. You may be able to fit gadgets to expand each of the two into two or three, or you can trade in your old SIMMs, but both these involve extra cost. It would have been better if Acorn had put in four or eight and boasted that you can have 128Mb.

The same applies to vram but more so. Not only is there only one slot but apparently 2Mb is the absolute limit. IBMs can have a maximum of 2Mb but many have separate graphic cards so when 4Mb is wanted they can swap boards.

What happens when you want XGA standards and bank switching? If the answer is that the processor or VIDC20 cannot cope, this either means that Acorn do not believe that the ARM will keep increasing its power or that VIDC20 is under specified.

Then comes the expandable case, very clever, too clever. All you have as standard is room for one drive and two cards unless you part with another £100.

My disappointment is mostly because Acorn should have been able to see that if you are supplying a large hard disk the average prudent user will want a tape drive which is much cheaper as an internal unit, as is a CD-Rom.

Then come the number of podule slots – two. Using standard cards you need one for a CD-Rom unless it's an IDE, one for a fax modem and another for a scanner and you have already run out. I can foresee a new market for modified podule cards, if the case allows.

I have an odd vision of the user who has a machine set up for multimedia with a four slice case of which two slices are just to house three podule cards.

Just imagine, if Acorn had designed their new mother board to fit into a standard IBM case they could have offered a slimline desktop, standard desktop or full tower for only an extra £50.

One feature which is ahead of the field is the second processor. The only thing is, it seems to have received the same limited view in hardware that has dogged the ARM machines since the A310 and its 1Mb limit.

When asked what you can fit there the answer is an Intel series chip or a graphics co-processor or possibly a DSP chip. I use *or* and not *and*, as with only one spare you do one without opening up the machine and physically swapping them.

Would it have been so difficult to have four processor slots? Just imagine the selling strength of a machine capable of ARM, Intel and PowerPC in one box.

The hardware is changing rapidly and what is *more than any user would want* today is a crippling disadvantage tomorrow. The only way of being sure that you can keep up is to decide what is the most you will need, double that number, double it again for luck and provide the minimum hardware to support that possibility.

On that basis MEMC1 should have been capable of 16Mb and I doubt that they would have been significantly more expensive.

Finally comes the price. A bit of aggressive pricing would not have gone amiss in a world of ever-cheaper PC clones and RISC rivals.

I do not want to appear to be knocking the machine, which for today is an incredible shot in the arm. But it is tomorrow that seems far too close for my liking, I just hope that I am mistaken.

M. Foweraker, Caerphilly, Mid Glamorgan

The design of any computer is a compromise between features and price,

Taking fonts to task

I WRITE concerning the MegaDisk from the June 1994 issue. Flashback is great but the effect on the computer video handling is severe. I have a Risc PC 600 with 8Mb of ram and it has a 210Mb hard disk. The video mode in use was 800x600 with 16 colours and no other software was loaded apart from the magazine software for a temporary directory.

After quitting Flashback, any attempt to move a window is seriously delayed such that it initially refuses to follow the pointer. The more windows the worse the effect.

My concern is that the type of software I will be using involves computationally intensive design graphics handling. If a program can run apparently without problem and then leave the machine handicapped in this fashion I need to find out why.

Don Wheatley, Nelson, Lancs

All that has happened is that Flashback has reduced your Font cache to a very small size. This is very inconvenient and we wish it didn't do it but it's not harmful. Either re-boot the machine or go into the Task manager and drag the Font cache size up to 256k.

every improvement you ask for would have put the production costs up and so reduced the saleability of the product. Do you want a machine at price £X which a lot of people want, or one at price £2X that only a few want?

New jargon for old

As technology advances it brings benefits and disadvantages and one of the most insidious of the latter being jargon and jumbles of meaningless letters.

For instance, in August *Acorn Computing* News you reported on Online Media and the *STBs* – or Set Top Boxes. So explain to me why they are *under* the TV in the picture. Should they not be USBs – Under Set Boxes?

N. Carruthers, London

Yes. However, the term was first used and thus defined in the US where TV sets are bigger (everything is, so we're told) and these units sit happily on the top.

The units can go under or on – the defining feature is the size of your TV. We could call them USBs but there's enough contradictory jargon about already, isn't there?

Comfort and aid

HAVING programmed in Basic for several years – first on a BBC B and now on an A3020 – I am interested in learning to program the Wimp. Could you suggest a suitable book as I have seen several advertised but am unsure which one to get? Should I get a copy of the RISC OS 3 Programmer's Reference Manuals as well?

David Starmer, Bognor Regis, West Sussex

For any serious work on a computer nowadays you really have to have a hard disk, whether word-processing or programming, the answer is yes.

There's no definitive book on Wimp programming, they all have their good and bad points, but we'll be starting our own series on the subject fairly soon.

Portable computing

NEXT year I will be doing my GCSEs and I use a word processor to type up much of my coursework. Therefore, I am thinking of buying either the Acorn or one of the Psion Series 3 Pocket Books. My family currently owns an A4000 and a BBC Master.

Would it be possible to download text which has been word-processed on a Pocket Book to the A4000 into Impression so that it can be improved using extra fonts and better layout?

This would be useful since our A4000 is always in great demand and the main work could be done on the Pocket Book and then later transferred to the A4000. How many fonts are built into the Pocket Book and how much memory is there?

What accessories are available and has it got any built-in features such as calculator, wordprocessor and so on? Can you print from the Pocket Book and if so, how good is the quality?

I have heard of the following but don't know what they are: A-Link, Flash Disk, Ram Disk, OPL Editor, Schedule, Mains Adaptor 9V AC and a RS 232 Serial link.

Laura Cowen, Darwen, Lancs

The Acorn Pocket Books are exactly the same as the Psion Series 3 being bought from Psion and re-badged with extra software. With the existing Pocket Book you can transfer your text from the Pocket Book's Write application as a text file to any word processor, DTP package on your desktop Acorn machine via the A-Link which is a serial link which fits into the serial port (also called RS 232 port) on your Acorn RISC OS machine. This port also lets you add a printer or modem.

The same applies to the database, Cards, and the spreadsheet, Abacus. Schedule is a diary management program which links with Event on the desktop machines. Yes, you can print too and the quality depends on the quality of your printer. There is also an optional parallel link giving a Centronics interface for parallel printers.

The Pocket Book uses batteries or mains (with the mains adaptor) but the Flash SSD, which doesn't rely on battery power, is used for storing important or finished data.

There are two forms of SSD, Flash SSD (Flash Solid State Disk) and Ram SSD. The latter stores information such as OPL programs or word processor documents for day-to-day use and has a built-in battery to preserve the information when the SSD is out of the Pocket Book. A fresh battery will preserve data for at least three months.

The OPL Editor/Translator is a separate product and is a full script language and allows you to program your own applications for the Pocket Book.

Zero termination

I HAVE had problems with Assembly language when trying to use labels as pointers to data. As this is essential for zero-terminated strings, my programming has been hampered. I would appreciate some help on the matter.

This is an example of what I am trying to achieve:

```
.Zerostr        (Data for "ABC")
EQUB 65:EQUB 66: EQUB 67: EQUB 0
ALIGN
.Test
MOV R0,Zerostr  (To load the address
                of data into R0)
SWI"OS_WriteO"  (Calls the operating
                system)
MOV R14,PC      (Leaves Assembley lan-
                guage)
```

I hope you can help with this problem.

Peter Hague, Dronfield, Sheffield

What you are trying to do is load R0 with a 32-bit integer address, but your instruction is specifying a register with some huge number. You ought to have something like this:

```
MOV R0,#Zerostr
```

which makes the processor load R0 with an immediate number. But this won't work either because there are limits to the number that can be loaded – the constant is actually part of the instruction.

What you want to do is a very common requirement. There is a way which involved the use of a pseudo-instruction *which is simply:*

```
ADR R0,Zerostr
```

This is converted to two instructions when assembled and, when executed, the two instructions calculate and load the absolute address of Zerostr. It will work regardless of where the code is located in memory.

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