

80p

WIN A  
MEMOTECH MTX

# YOUR

# COMPUTER

Canada	C\$ 3.45
Denmark	DKr 30.00
Germany	Dm 7.50
Greece	Dra 210.00
Holland	DFL 7.00
Italy	L 3600
Spain	Pts 300.00
Singapore	M\$ 5.00
Switzerland	SFr 6.40
U.S.A.	\$3.95 (D721631)

FEBRUARY 1984

BRITAIN'S BIGGEST-SELLING HOME COMPUTER MAGAZINE

Vol. 4 No. 2

## 3D SPECTRUM DRAC-MAN

In inner space no one can hear you scream

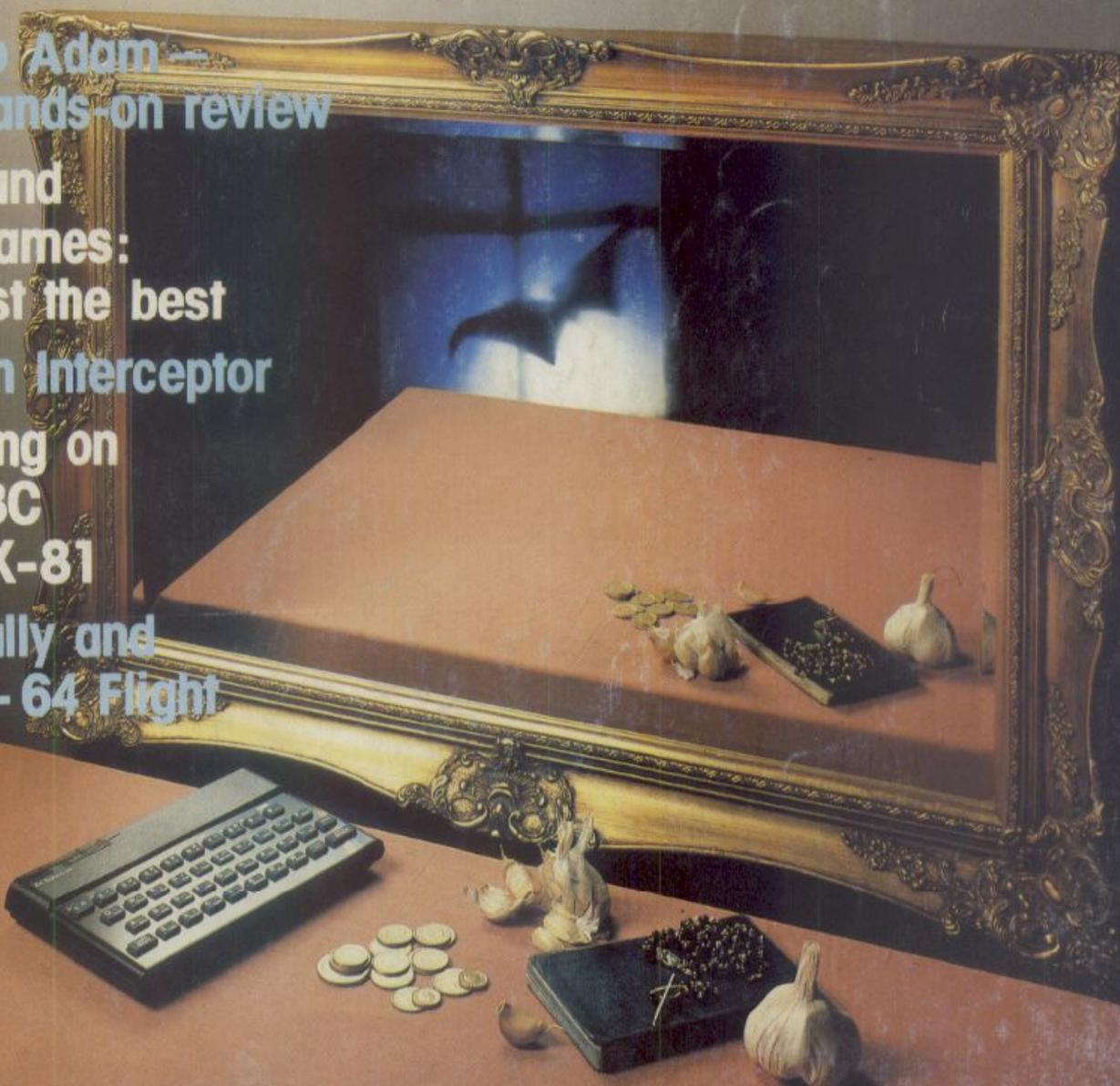
Coleco Adam —  
first hands-on review

Atari and  
Oric games:  
we test the best

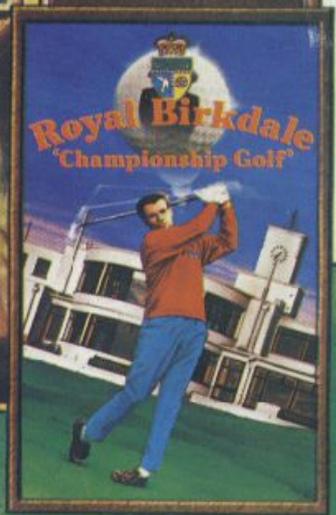
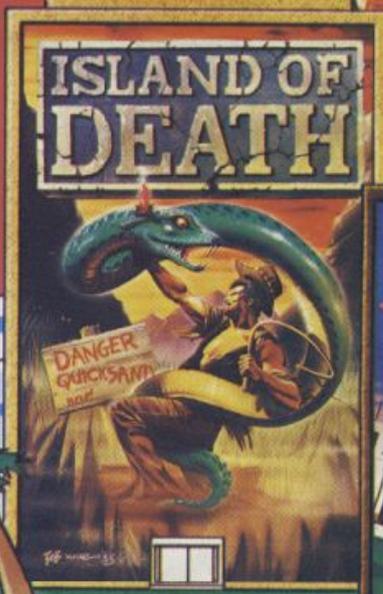
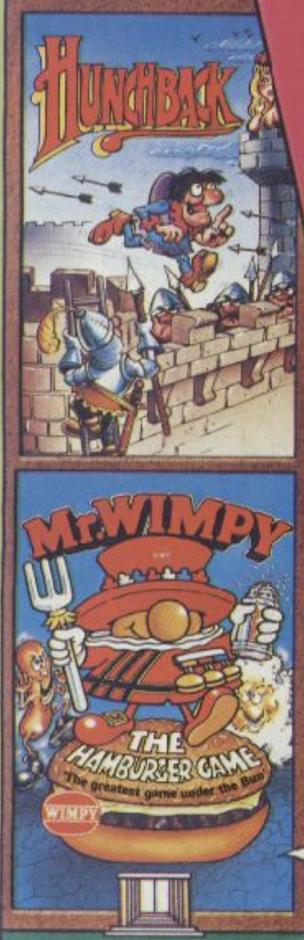
Dragon Interceptor

Frogging on  
the BBC  
and ZX-81

Vic Rally and  
CBM — 64 Flight



# Don't miss the boat!..



## Discover five fantastic new Oceans

The escapades of Moon Alert could turn even you into a complete Lunartic!

On the testing greens of Royal Birkdale emulate the golfing 'greats' using your own skill and talents.

Seek out treasures on the Island of Death but beware the dangers of quicksand, tunnel bugs, giant ants and snakes... to name but a few!

Just like the Arcade original, rescue Esmeralda from her castle strong hold and pit your wits against the arrows, fireballs and knights.

Mr Wimpy - the zanies: burger battle to sizzle your screens.

- Moon Alert** Spectrum **5.90**
- Royal Birkdale** Spectrum **6.90**
- Island of Death** Oric **6.90**
- Hunchback** Spectrum, Oric, Comm. 64 **6.90**
- Mr Wimpy** Spectrum **5.90**, Oric, Comm. 64 **6.90**



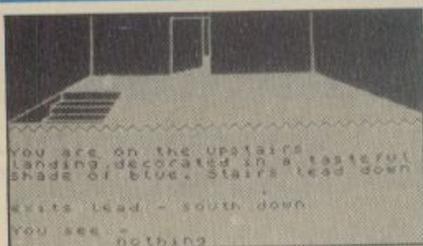
Ocean Software,  
Ralli Building, Stanley Street,  
Manchester M3 5FD.  
Telephone: 061 832 9143.

Ocean Software is available from selected branches of: **WOOLWORTH**, **W H SMITH**, **Boys**, **John Menzies**, **LASKYS**, **Rumbelows**, **Spectrum Shops** and all good software dealers. Trade enquiries phone: 061 832 7049.

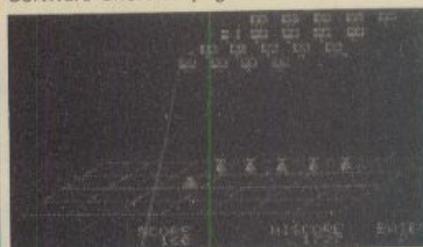
# YOUR COMPUTER

# Contents

FEBRUARY 1984



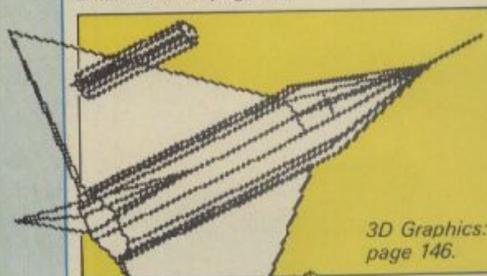
Software Shortlist: page 59



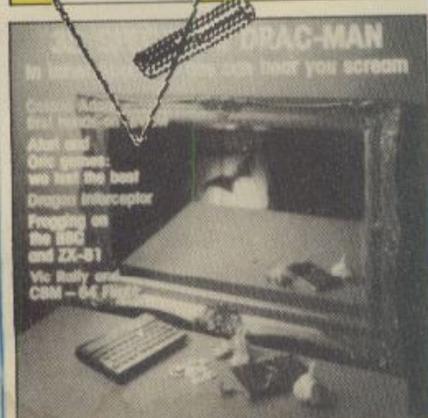
Oric Software: page 64



Draw routine: page 107



3D Graphics: page 146.



Cover photograph by Stephen Oliver

- 44 EDITORIAL AND YOUR LETTERS:** Quit knocking the Dragon's sound capacity; alternative Lynx screen memory; the spectre of chip famine.
- 47 NEWS:** To Sinclair, a new baby — a ZX-83 or what will it be? Amstrad's hi-fidelity novelty with built-in monitor and 64K for £200; new Oric.
- 51 FIRST BYTES:** Taking your first tentative steps into microcomputing? Our special beginners section looks at types of Basic and the best games computers.
- 55 COMPUTER CLUB:** Cider is made from apples but BBC Micros, NewBrains and Dragons predominate in Paul Bond's report from the West Country.
- 59 SOFTWARE SHORTLIST:** flying an F15; delinquency in Scarthorpe; finding out about your love life, and pterodactyls' eggs for breakfast.
- 62 ATARI SOFTWARE:** Merion Jones experiences the Atari satori.
- 64 ORIC SOFTWARE:** Paul Bond hears and sees the latest releases.
- 68 COLECO ADAM REVIEW:** First hands-on review by Kathleen Peel. Is it just a rich man's plaything or the ultimate all-purpose home computer?
- 72 SPECTRUM 3D DRACMAN:** This month's star game from Mark Jones. Just when you thought it was safe to go back in the maze.
- 79 FLIGHT 64:** Time to put a little bristle back in your handlebar moustache, close the cockpit, and blast off into the blue with Malcolm Phillips.
- 82 ZX-81 FROGGIE:** What's green and red and lies flat on the motorway? Richard Braunton's game is in black and white so you'll never know.
- 94 DRAGON INTERCEPTOR:** Vera Parkin takes up the cudgels on behalf of the earthlings in this zap-pow game with smooth movement and colour.
- 100 VIC RALLY:** Two choices of landscape as you vicariously experience the thrill of the open road with Neil Kirk.
- 107 ZX-81 DRAW:** An intriguing graphics program by Spencer Collyer.
- 110 ATARI LAIR:** David Hitchens bids you beware in the nightmare lair.
- 116 ORIC WARLOCK:** Climb every mountain, ford every stream, follow every data statement. A J Edgington takes us to the top.
- 120 SPECTRUM MUSIC MAKER:** Forget Gary Numan. Robert Newman allows you to play music over a range of four and a half octaves on your Spectrum.
- 126 DRAGON SOFT KEYS:** John Nash elasticates the Dragon's Basic.
- 130 ZX-81 DATACALC:** Spreadsheet for the ZX-81 by Bryan Law.
- 137 MICRODRIVE FILE:** Kathleen Peel creates some new commands in her series aimed at making the most of the Microdrive.
- 143 COMMODORE 64 MACBASIC:** An easy way of inserting machine code in your Basic data statements. Malcolm Phillips' menu-driven program.
- 146 BBC 3D GRAPHICS:** Ian Angell describes a step-by-step approach to the construction of objects in 3D which can be rotated in space.
- 155 HEARTSTOP:** John Dawson continues his throbbing series about Slagthorpe Hospital. Learn about games programming.
- 161 VIC CENTRONICS PRINTER SOFTWARE INTERFACE:** Chris Thorpe gets you out of the IEEE dilemma: this enables the Vic-20 to drive Centronics printers.
- 169 RESPONSE FRAME:** Tim Hartnell looks at some queries.
- 171 COMPETITION:** Win a Memotech MTX in this month's competition.
- 175 SOFTWARE FILE:** Ten packed pages of free software for Spectrum, ZX-81, Vic-20, Commodore 64, BBC, Oric-1, and many more home micros.
- 201 COMPETITION RESULTS:** 39 Steps across the Buchan River winner — and the runner-up in the Microdrive competition.
- 242 DATABASE:** Paul Bond rounds up the latest events in the micro world. Write in and let us know what your local club is doing.



“ I'm very sorry about your programming headache... why not call at the next counter and buy some Aspirin? ”

“ I'm afraid we can't help you with that fault, maybe you'd better write to the manufacturer! ”

“ No! We haven't that on disk... but we have the latest DURAN DURAN. ”

# If you want service, sense and Computers For



## The shops where people matter:

### AVON

MERCATOR COMPUTER SYSTEMS  
3 Whiteladies Road, Clifton,  
Bristol. 0272 73 1079.

### BERKSHIRE

KENNETH WARD COMPUTERS  
Verve House, London Road,  
Sunningdale. 0990 25025

### CHANNEL ISLANDS

MEGA LTD.  
7 Anley Street, St. Helier,  
Jersey. 0534 72263

MICROTEL  
Camp-Du-Roi Vaie  
Guernsey. C.1  
0481 53436

### CHESHIRE

THE COMPUTER CENTRE  
68 Chestergate, Macclesfield,  
0625 618827

### CORNWALL

COMPUTAVISION  
4 Market St., St. Austell,  
Cornwall. 0726 5297

FAL-SOFT COMPUTERS  
8 St. George's Arcade,  
Falmouth TR11 3DH. 0326  
314663

### DEVON

A & D COMPUTERS  
"Computerland", 6 City Arcade,  
Fore Street, Exeter.  
0392 77117.

BITS AND BYTES  
44 Fore Street, Ilfracombe,  
N. Devon EX34 9JD. 0271 62801

COMPUTER SYSTEMS  
(TORBAY)  
Pump Street, Brixham,  
08045 6565/6

CRYSTAL COMPUTERS  
209 Union Street, Torquay  
0803 22699

SYNTAX LTD.  
Midhurst, Grenofent  
Tavistock, Devon  
0822 2392

DORSET  
DENSHAM COMPUTERS  
329 Ashley Road, Parkstone,  
Poole. 0202 737493

ROBERTS ELECTRICAL  
(BLANDFORD) LTD.  
14 Market Place, Blandford  
Forum, Dorset. 0256-55898

### ESSEX

AKHTER INSTRUMENTS  
Unit 19, Aringhyde Estates,  
South Road, Harlow,  
0279 412639.

CHELMSFORD  
COMPUTER CENTRE  
3 Baddow Road, Chelmsford,  
0245 356834.

COMPUTERAMA  
88-90 London Road,  
Southend-on-Sea,  
Essex. 0702 335443.

COMPUTERS FOR ALL  
72 North Street, Romford,  
0708 752862

### HANTS

MICRO VIDEO STUDIOS LTD.  
60 Normandy Street, Alton, Hants.  
0420 82055.

### HERTS

VIDEO CITY  
45-47 Fishers Green Road,  
Stevenage. 0438 53808.

THE COMBINED TRADING CO.  
10 & 11 Salisbury Square,  
Old Hatfield. 07072 65551.

### KENT

ANFOG COMPUTERS  
29 West Hill, Dartford.  
0322 92513.

APHROS SOFTWARE CO.  
47 Fawley Square, Margate.  
0843 294699.

DATA STORE  
6 Chatterton Rd., Bromley, Kent.  
01-460 8991.

### JUTEA LTD.

92 High Street, Bridge,  
Canterbury, Kent. 0227 831183.

LEAKES LTD.  
63 Sidcup High Street,  
Sidcup, Kent. 01-300 1142.

### LANCS

P.C.S.  
39 Railway Road, Darwen,  
0264 778677.

4MAT COMPUTING  
67 Friargate, Preston.  
0772 561952.

SUMLOCK  
Royal London House,  
198 Deansgate,  
Manchester M3 3NE.  
061 834 4233.

### LEICS

DIMENSION  
27-29 High Street, Leicester.  
0533 57479.

MOVIES COMPUTER CENTRE  
5 Church Street, Melton Mowbray.  
0664 61169.

### LONDON

EROL COMPUTING  
125 High Street, Walthamstow,  
London E17. 01-520 7763

KAYDE HOME COMPUTERS  
1 Station Approach, New Eltham,  
London SE9. 01-859 7505.

KELLY'S COMPUTERMARKET  
227 Dartmouth Road,  
Sydenham, London SE26 4QY.  
01-699 4399/6202.

MICRO ANSWERS LTD.  
70-71 Wilton Road, Victoria,  
London SW1. 01-630 5995

### MIDDLESEX

SCREENS

MICROCOMPUTERS

6 Main Avenue, Moor Park,  
Northwood. 09274 20664

TWILLSTAR COMPUTERS

17 Regina Road, Southall  
01-574 5271.



“I'm afraid we don't know about Word Processing, but we have today's newspapers.”

“No! We haven't any Monitors, but can I show you how to get great pictures from this camera?”

“Never heard of that cassette, but we have “I Spit On Your Grave” in VHS or BETA.”

# sound advice, see your local All Dealer today!

You'd be amazed at some of the stories you get from shops and stores that try hard to be Computer Dealers.

That's why it's best, if you are serious, to visit a Computer Dealer that takes the job of selling computers seriously.

And it's so easy...  
...just visit your local COMPUTERS FOR ALL Dealer today!

You'll be amazed at the difference it makes.

Talk about any Computer or peripheral. Ask about software, hardware, programming, drives, printers, processors... in fact anything that interests you in computing.

One thing you can be sure of: you'll get service, sense and lots of sound advice from a COMPUTERS FOR ALL Dealer.

See for yourself... TODAY.

**N. IRELAND**  
D. V. MARTIN LTD.  
13 Bridge Street, Belfast.  
BT1 1LT. 0232 226434.

**OXFORDSHIRE**  
SCIENCE STUDIO  
7 Little Clarendon, Oxford  
OX1 2HP. 0865 54022.

**SURREY**  
ANIROG COMPUTERS  
8 High Street, Horley  
02934 6083.

**COMPUTASOLVE**  
8 Central Parade, St. Marks Hill,  
Surrey. 01-390 5135.

**KWX BUSINESS SUPPLIER**  
Old Coach House, Belmont,  
Sutton, Surrey. 01-642 9471.

**SNOW-BEECH**  
1 East Grinstead Road,  
Lingfield, Surrey.  
0342 832476.

**THE COMPUTER-WAY LTD.**  
738 North Street,  
Guildford, Surrey. 0483 62626

**SUSSEX**  
WORTHING COMPUTERS  
32 Liverpool Road, Worthing,  
W. Sussex. 0903 210861.

**WALES**  
MICRO-CARE COMPUTING LTD.  
18 Banerwell Rd., Newport,  
Gwent NP1 4BP. 0633 50482.

**TRYFAN COMPUTERS LTD.**  
57 Madoc Street,  
Llandudno, Gwynedd.  
0492 70802.

**TYNE & WEAR**  
THE COMPUSHOP  
10 Newgate Centre,  
Newcastle-upon-Tyne NE1 5RE.  
0632 618673.

**WARWICKSHIRE**  
IMPULSE MICRO SYSTEMS LTD.  
6 Central Chambers, Cooks Alley,  
Wood Street, Stratford-Upon-Avon.  
0789 295819.

**W. MIDLANDS**  
CALISTO COMPUTERS  
119 John Bright Street,  
Birmingham B1 1BE.  
021-632 6458

**JBC**  
200 Earlsdon Ave. North,  
Earlsdon, Coventry.  
0203 73813.

**WORCESTERSHIRE**  
EVESHAM COMPUTER  
CENTRE  
Crown Court Yard, Bridge St.,  
Evesham. 0386 48635.

**YORKSHIRE**  
COM-TEC  
6 Eastgate, Barnsley,  
South Yorkshire. 0226 46972.

**EMPIRE ELECTRO CENTRES**  
783-789 Leeds Road, Bradford  
BD3 8DY. 0274 662476.

**HARROGATE COMPUTER CENTRE**  
18 Chalfenham Parade,  
Harrogate, N. Yorkshire.  
04 23 57126.

**TOWERLIGHT LTD.**  
7 Crown Street, Hebden Bridge,  
W. York HX7 8EH.  
0422 843520.



# They may be smiling now, but they are about to encounter...



## PSYCLAPSE COMMODORE 64 & BANDERSNATCH. 48K SPECTRUM

How will these four master computer game writers be feeling in a few weeks time?

They have been brought together to pool their awesome talents to create the two most sensational, mind boggling games ever imagined...**Psychclapse and Bandersnatch.**

When such computer wizards as (from left to right) Ian Weatherburn, Mike Glover, John Gibson and Eugene Evans are locked away for weeks on end, anything can happen, will they maintain their sanity, or whats more to the point can you control your patience?



**..the name of the game**

**Coming soon from Imagine...Psychclapse and Bandersnatch... the two most exhilarating experiences ever. Can you wait?**

Imagine Software Limited, 5 Sir Thomas Street, Liverpool, Merseyside L1 6BW.  
Dealer Enquiries Contact: Colin Stokes on 051-236 8100 (20 lines).

# QUITE SIMPLY, IF IT'S SPECTRUM SOFTWARE, WE'VE GOT IT!

**\* FREEPOST SERVICE!  
\* FREE CATALOGUE WITH FIRST ORDER!**

Please tick the titles you wish to purchase

# OVER 300 GAMES IN STOCK!

AND THESE ARE JUST A FEW OF THEM!

- Abacus ■ SENTINEL 16K £5.00 \*\*\* Abbex ■ COSMOS 16K £5.95 ■ FAUSTS FOLLY 16K £5.95 ■ E.T.X. 16/48K £5.95 \*\*\* Abercrombie ■ WIZARD'S WARRIORS 48K £4.95 \*\*\*\*\*
- Addictive Games ■ FOOTBALL MANAGER 16K £6.95 \*\*\* A+F ■ CRAZY BALLOONS 16K - £5.75 ■ FROGGY 48K £5.75 ■ JUNGLE FEVER 16K £6.90 ■ PAINTER 48K £5.75 \*\*\*
- Anirog ■ MISSILE DEFENCE 16K £5.95 ■ SLAP DAB 16K £5.55 ■ KONG 48K £5.95
- GALACTIC ABDUCTORS 16K £5.95 \*\*\* Arcade ■ LAST SUNSET FOR LATTIOA 48K £5.50
- THE DETECTIVES 48K £5.50 ■ RAIDER OF THE CURSED MINE 48K £5.50 ■ GRIDRUM - 48K £5.50 \*\*\* Artic ■ 3D COMBAT ZONE 48K £5.95 ■ KRAKIT 16K £9.45 ■ COSMIC DEBRIS 48K £4.95
- DIMENSION DESTRUCTORS 48K £5.95 ■ GALAXIANS 16K £4.95 -
- CHESS II 48K £9.95 \*\*\* Blaby ■ GOZCHA 48K £5.50 ■ PLUGGIT 48K £5.50 -
- BARMY BURGERS 48K £5.50 ■ KILLER KONG 48K £5.50 ■ DODO 48K £5.50 ■ CHOPPER RESCUE 48K £5.50
- SHUTTLE 48 £4.95

contd.



# CRASH

MICRO GAMES ACTION

Blaby contd.

- CONFUSION 48K £4.95
- HIGH RISE HARRY 48K £4.95 - -
- KOSMIC PIRATE 48K £4.95 ■ GOLD DIGGER - 48K £4.95 \*\*\* Automata ■ PIMANIA 48K £10 .....
- GROUCHO 48K £10 ■ GO TO JAIL 48K £6 ■ BUNNY plus E.T.A. 16K £5 \*\*\* A.W.A. ■ BEDLAM 16K £5.95 \*\*\*\*\*
- Boas UK ■ TURBODRIVER 16K £5.95 \*\*\* Bug-Byte ■ MANIC MINER 48K £5.95
- STYX 16K £5.95 ■ POOL 16K £5.95 ■ GENERAL ELECTION 48K £6.95 \*\*\*\*\*
- Bytewell ■ HIDDEN CITY 16K £5.95 \*\*\* C.C.S. ■ GANGSTERS! 48K £6.00 - -
- PLUNDER 48K £6 ■ DALLAS 48K £6 ■ CORN CROPPER 48K £6 ■ AURO CHEF 16K £6
- BRITISH LOWLAND 48K £6 ■ SMUGGLER 48K £6 ■ POLARIS 48K £6 ■ BYTB 48K £5
- ABYSS 48K £5 ■ CAMELOT 48K £5 \*\*\* C.D.S. ■ BOZY BOA 16K £5.95
- GOBBLE A GHOST 16K £5.95 ■ SPECTRUM SAFARI 48K £5.95 ■ REVERSI 16K - £5.95 \*\*\* OP Software ■ SUPER CHESS II 48K £7.95 ■ 2X DRAUGHTS 48K £5.95 \*
- \*\* C.R.L. ■ TEST MATCH 48K £6.95 ■ STAR GAZERS SECRETS 48K £6.95 ■ DERBY DAY 48K £5.95
- WOODS OF WINTER 48K £5.95 \*\*\* Crystal ■ ROMMEL'S REVENGE - 48K £6.50
- INVASION OF THE BODY SNATCHERS! 48K £6.90 ■ THE ISLAND 48K £7.50
- DUNGEON MASTER 48K £7.50 ■ HALLS OF THE THINGS 48K £7.50 ■ COSMIC GURRILLA 16K £5.50
- \*\*\* D.J.L. ■ FROGGY 16K £5.95 \*\*\* DK Tronics ■ TROM 16K £5.95 .....
- 2003 A SPACE ODDITY 48K £4.95 ■ MARIACS 48K £6.95 ■ TRAMIX 16K £4.95 .....
- SPEED DUEL 48K £5.95 ■ APPLE JAM 48K £5.95 ■ STAR TREK 3000 48K £4.95 ...
- HARD CHEESE 16K £4.95 ■ JUMBLY 48K £6.95 ■ 3D TANX 16K £4.95 ■ DICTATOR 48K £4.95
- GOLDMINE 16K £4.94 \*\*\* Fantasy ■ PYRAMID 48K £5.50 ■ VIOLENT UNIVERSE 16K £5.95
- THE BLACK HOLE 16K £5.50 \*\*\* Galeoft ■ 3D MAZE OF GOLD 16K £5.95 ..
- MAGIC SPACE 48K £4.95 \*\*\* Hewson ■ HEATHROW A.T.C. 16K £7.95 ■ QUEST 48K - £5.95
- 3D SPACE WARS 16K £5.95 ■ NIGHTFLITE 16K £5.95 ■ BACKGAMMON 16K £5.95 ..
- COUNTRIES OF THE WORLD 16K £5.95 \*\*\* I.C.L. ■ EMBASSY ASSAULT 16K £4.95 \*\*\*\*\*
- Imagine ■ ZOOM 48K £5.50 ■ ZIP ZAP 48K £5.50 ■ JUMPING JACK 16K £5.50 ■ MOLAR MAUL 16K £5.50
- AH DIDJUMS 16K £5.50 ■ ARCADIA 16K £5.50 ■ SCHI-SOLDS 16K £5.50
- \*\*\* Impact ■ DESTROYER 16K £6.50 ■ ZX TRK 48K £6.50 ■ THE QUEST 48K £6.50 ■ 3D MAZE 48K £5
- ORB 48K £5 ■ SPEDMAN 16K £5.75 \*\*\* J.K. Greve ■ 3D VORTEX 16K £5.95 \*
- \*\* Legend ■ VALHALLA 48K £14.95 \*\*\* Lothlorien ■ ROMAN EMPIRE 16K £5.50 ■ TYRANT OF ATHENS 16K £5.50
- WARLORD 48K £5.50 ■ SAMURAI WARRIOR 16K £5.50 ■ JOHNNY REB - 48K £5.50
- REDWED 48K £5.50 \*\*\* Micromania ■ CYBOTRON 16K £5.95 ■ TUTANKHAMUN 48K £5.95
- \*\*\* Melbourne Hse ■ HOBBIT 48K £14.95 ■ PENETRATOR 48K £6.95 ■ TERROR DAKTIL 4D 48K £6.95
- MELBOURNE DRAW 48K £8.95 \*\*\* Micromega ■ LUNA CRABS 16K £6.95 ■ HAUNTED HEDGERS 16K £6.95
- \*\*\* Mikrogen ■ SCRAMBLE 16K £5.50 ■ SORCEROR'S CASTLE 16K £5.50 ..
- MASTER CHESS 48K £6.95 ■ COSMIC RAIDERS 16K £5.95 ■ MAD MARTHA 48K £6.95
- MAD - MARTHA II 48K £6.95 ■ GREAT BRITAIN LTD. 48K £6.95 ■ INHERITANCE 48K £6.95 ■ PANIC 16K £5.95
- \*\*\* Neptune ■ STARTREK/MUNCHMAN 48K £5.50 \*\*\* New Generation ■ CORRIDORS OF GENOM 48K £5.95
- KNOT IN 3D 48K £5.95 ■ 3D TUNNEL 16/48K £4.95 ■ ESCAPE 16K £4.95 \*\*\*\*\*
- Ocean ■ TRANSVERSION 16K £5.90 ■ WIMPY 48K £5.90 ■ RESCUE 48K £5.90 ■ KONG 48K £5.90
- ROBOTICS 16K £5.90 ■ DIGGER DAN 16K £5.90 ■ ARMAGEDDION 16K £5.90 \*\*\* Passoft ■ PASE MAN 48K £4.99
- \*\*\* Phinna Assoc ■ THE FOREST 48K £9.95 ■ GREEDY GULCH 48K £4.95 ■ MAGIC MOUNTAIN 48K £4.95
- PHAROAH'S TOMB 48K £4.95 ■ KNIGHT'S QUEST 48K £5.95 ■ GORGON 48K £4.95
- THE BLACK PLANET 48K £5.95 ■ SPECTRUM POCKET BOOK 16K £5.95 ■ DOMINOES 16K £4.95
- NOWOTNIK PUZZLE 16K £4.95 \*\*\* Postern ■ 3DEEP SPACE 48K £7.95 ■ SHADOWFAX 16K £6.95 ...
- SNAKE PIT 16K £6.95 ■ SIBGE 16K £6.95 \*\*\* Paion ■ HUNGRY HORACE 16K £5.95 ■ HORACE GOES SKIING 16K £5.95
- HORACE & THE SPIDERS 16K £5.95 ■ FLIGHT SIMULATION 48K £7.95 ■ COMPUTER SCRABBLE 48K £15.95
- \*\*\* Procom ■ BREAKAWAY 16K £5.95 \*\*\* Protek ■ HUNTER-KILLER 48K £7.95 ..
- AIRLINER 16K £5.95 ■ ROADRUNNER 16K £5.95 ■ SPECTRAFEDE 48K £5.95
- P.S.S. ■ LIGHT CYCLE 16K £5.95 ■ DEEP SPACE 48K £5.95 ■ MAZE DEATH RACE 16K £4.95 ...
- GHOST HUNT 16K £4.95 \*\*\* Perfection Software ■ ODYSSEY I 16K £5.95 \*\*\*\*\*

### Puffin Books

- WARLOCK OF FIRETOP MOUNTAIN 48K £6.95 \*\*\* Quicksilver
- GAMES DESIGNER 48K £14.95 ■ 3D ANT ATTACK 48K £6.95 ..
- BUGABOO (THE FLEA) 48K £6.95 ■ THACK 48K £6.95 ■ GRID - RUNNER 48K £6.95
- AQUAPLANE 48K £6.95 ■ 3D STRATEGY 16K £6.95
- SMUGGLER'S COVE 48K £6.95 ■ MADON 48K - £6.95
- VELNOR'S LAIR 48K £6.95 ■ ASTRO BLASTER 16K £4.95
- THE CHESSPLAYER 48K £6.95 ■ EASYSPEAK 48K - £4.95
- MINED-OUT 48K £4.95 ■ TIMEGATE 48K £6.95 ...
- FRENZY 16K £4.95 ■ TRADER 48K £5.95 ■ METEOR STORM 16K £4.95
- \*\*\* Rabbit Software ■ ESCAPE M.C.P. 16K £5.99 ■ RAGE FUN 48K £5.99
- PHANTASIA 48K £5.99 ■ PROGGER 16K £5.99 ■ QUACKERS 16K £5.99
- CENTROPIDS 16K £5.99 \*\*\* Richard Shepherd ■ DEVILS OF THE DEEP 48K £6.50
- INVINCIBLE ISLAND 48K £6.50 ■ SHIP OF THE LIND 48K £6.50
- SUPER SPY 48K £6.50 ■ EVEREST ASCENT 48K £6.50 ■ SUPER SPY 48K £6.50
- TRANSYLVANIAN TOWER 48K £6.50 \*\*\* Romik ■ SHARK ATTACK 16K £5.99
- SPECTRA SMASH 16K £6.99 ■ 3D MONSTER CHASE 16K £6.99 ..
- COLOUR CLASH 16K £7.99 ■ GALACTIC TROOPER 16K £5.99 \*\*\*\*\*
- Silversoft ■ ORBITER 16K £5.95 ■ GROUND ATTACK 16K £5.95 ■ CYBER RATS 16K £.95
- SLIPPERY SID 16K £5.95 ■ MUNCHER 16K £5.95 .....
- ARMAGEDDON 16K £5.95 ■ EXTERMINATOR 16K £5.95 ■ MISSION IMPOSSIBLE 16K £5.95
- BRAIN DAMAGE 16K £5.95 ■ STARSHIP ENTERPRISE 48K £5.95
- \*\*\* Softek ■ FIREBIRDS 16K £5.95 ■ OSTRON 16K £5.95 ..
- MONSTERS IN HELL 16K £5.95 ■ ROBON 16K £5.95 ■ REPULSAR 16K £5.95
- \*\*\* Sunshine Books ■ CRUISING ON BROADWAY 16K £4.95 .....
- BLIND ALLEY 16K £4.95 ■ GALAXY ATTACK 48K £5.95 ■ ANDROIDS 48K £5.95
- \*\*\* Titan ■ GROUND FORCE ZERO 16K £5.00 ■ ALIEN --- SWARM 16K £5.00
- \*\*\* Ultimate ■ LUNAR JETMAN 48K £5.50 ■ ATLAS ATAC 48K £5.50
- JETPAC 16K £5.50 ■ TRAZZ AM 16K £5.50 .....
- PPSST 16K £5.50 ■ OOKIE 16K £5.50 \*\*\* Virgin Games .....
- YOMP 16K £5.95 ■ GOLF 16K £5.95 ■ SHEEPWALK 48K £5.95 ..
- STARFIRE 48K £5.95 ■ RACING MANAGER 48K £5.95 ■ ROCKET 48K £5.95
- LOJIX 48K £5.95 ■ QURBALOOLAT 48K £5.95 .....
- SPECTRON 48K £5.95 ■ LOST 48K £5.95 \*\*\*\*\*
- Workforce ■ WINGED AVENGER 16K £5.00 ■ JAWS REVENGE 16K - £5.00
- DOOM, BUGS 16K £5.50 ■ HIGH NOON/BASE INVADERS & SCRAMBLE 16K £6.50
- TRIPLEX 48K £5.90 ■ PIRATE ISLAND - 48K £5.50
- DO NOT PASS GO 48K £5.95 ■ YAHTZII 48K £5.50

- Artic Adventures ■ (A) PLANET OF DEATH 16K £6.95 ■ INCA CURSE 48K £6.95
- (C) SHIP OF DOOM 48K £6.95 ■ (D) ESPIONAGE ISLAND 48K £6.95
- (E) GOLDEN APPLE 48K £6.95 \*\*
- Intelligent Software ■ OYAU IS CHESS 16/48K £9.95 \*\*
- Digital Pantania (Mysterious Adventure Series)
- each 48K £9.95 ■ (1) THE GOLDEN BALON ■ (2) THE TIME MACHINE ■ (3) ARROW OF DEATH PART 1 ■ (4) ARROW OF DEATH PART 2 ■ (5) ESCAPE FROM PULSAR 7 ■ (6) JIGSAW ■ (7) PROBABILITY EXPERIMENT ■ (8) THE WILDARD ARYEL ■ (9) PERSEUS & ANDROMEDA ■ (10) TEN LITTLE INDIANS

## SPECIAL INTRODUCTORY OFFER!

(only with this coupon)  
**£1 off purchase price for 2 cassettes**  
**£2 off purchase price for 3 cassettes**  
(subtract from the total on the order form)

Please send me your catalog only   
I enclose 50p (stamps or P.O.)   
which I understand will be refunded with my first purchase

**TOTAL ENCLOSED**  
£

No stamps needed! Just use the FREEPOST address below.

(Remember to subtract offer amount)

\*Please make checks & postal orders payable to CRASH MICRO.

If you would prefer a fasterservice than FREEPOST can offer - send your order form with a **FIRST CLASS STAMP** to the freepost address & we'll send your games by return, first class.

All prices shown include VAT & postage

Name  Address  Postcode

**CRASH MICRO, FREEPOST (No stamps), LUDLOW, SHROPSHIRE SY8 1BR ☎ 0584 5620** YC

# W.H. Smith Computer Shops.

## The biggest range on the High Street.

A W. H. Smith Computer Shop is the first place to go when you're thinking of buying a computer.

Located on High Streets all over the country (see list opposite) they offer a comprehensive range of computers, peripherals and software.

And, not only are our staff fully trained to

answer all your questions, but we've used our experience to build a range of Computer System Packages, each one offering a complete system at a special low price.

So whatever it is you're looking for, you can be sure to find it at one of our W. H. Smith Computer Shops.

### COMPUTERS

Sinclair ZX 81 Starter Pack (includes 16K RAM)	£45.00
Sinclair Spectrum 16K	£99.95
Sinclair Spectrum 48K	£129.95
Oric-1 48K	£139.95
Commodore 64	£199.00
Acorn Electron	£199.00
BBC Micro 'B'	£399.00
BBC Micro 'B' with disk interface	£469.00
Apple IIe starter pack	£999.00

### PRINTERS

Sinclair ZX	£39.95
Alphacom 32 (Thermal)	£59.95
MCP 40 (4 Colour)	£129.95
Commodore MPS 801	£230.00
Shinwa CP80	£299.00
Epson RX 80 F/T	£359.00
Juki 6100 (Daisywheel)	£450.00

### CASSETTE RECORDERS

W. H. Smith CCR700 Computer Compatible Recorder	£24.95
Commodore C2N	£44.95
W. H. Smith CPD8300 Computer Compatible Data Recorder	£39.95

### DISK DRIVES

Apple (without Controller)	£280.00
Apple (with Controller)	£395.00
Hitachi 3" (for BBC)	£229.00
Commodore 64	£299.00
Cumana CS100 (for BBC)	£250.00

### MONITORS

Sanyo SM12N (Monochrome)	£125.00
Apple IIe Monitor Monochrome	£169.95
Kaga Vision 1	£275.00
Sanyo SCM 14N	£295.00
ITT Monitor/Receiver	£299.00

### SOFTWARE

W. H. Smith Computer Shops carry a massive range of more than 400 leisure, educational and business software titles, available on cassette, disk and cartridge.

#### Acorn BBC

#### Word Processing Software

VIEW	£59.80
WORDWISE	£46.00
WORDSWORTH	£19.50

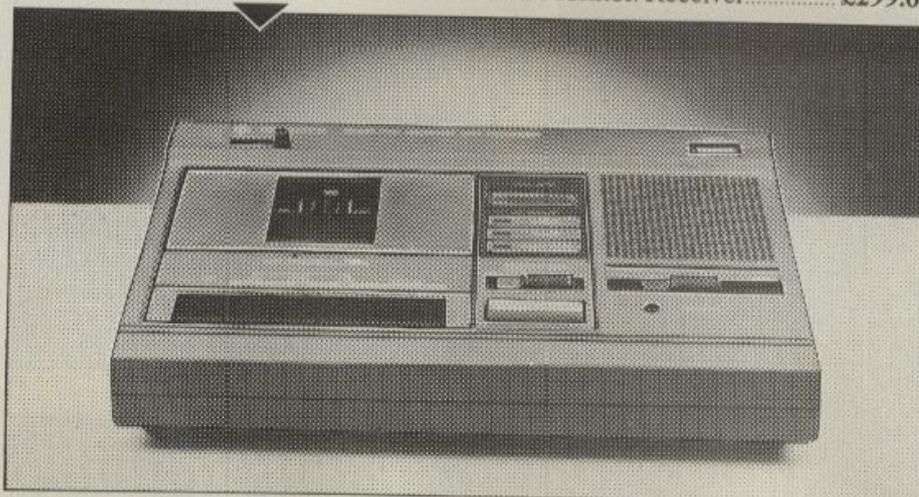
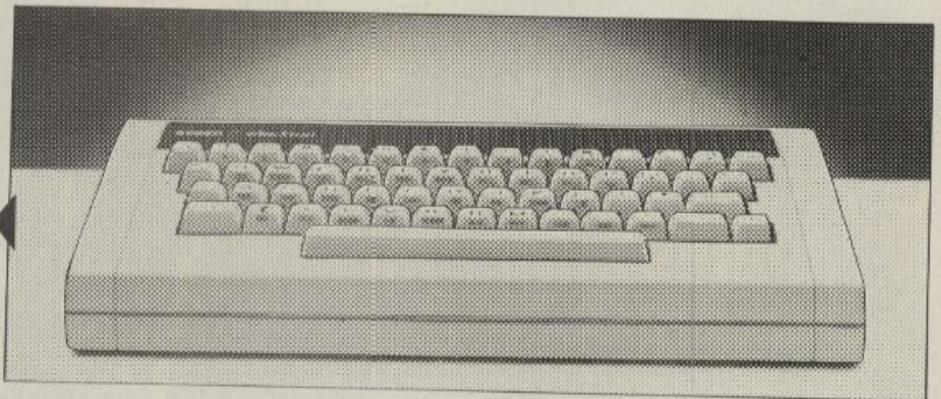
### BOOKS

There are over 200 titles covering everything that the computer novice and enthusiast will need to know about computing in general and specific machines.

### ACCESSORIES

Listed below are just a few from our wide range.

Monitor Stands	
Joysticks	
Printer Ribbons	
Continuous Stationery	
Disk Boxes	
Cassette Storage Cases	
Leads and Cables	
Speech Synthesisers	
Floppy Disks	
Blank C15 Cassette Packs	
BBC Buggy	£189.00



## COMPUTER SYSTEM PACKAGES



Monitor and stand not included.

### APPLE

#### Apple Executive Home Computer Pack

Apple IIe Computer  
Disk Drive with Controller  
Epson RX80 F/T Printer  
Printer Interface and Cables  
500 sheets of fanfold paper  
Home Solutions Box.

**Package offer price £1,299**

**Saving on our normal price £172**

With the Juki 6100 Printer replacing the Epson RX80 F/T Printer.

**Package Offer Price £1,399**

**Saving on our normal price £163**

#### Apple Professional Word Processing Pack

Apple IIe Computer  
Disk Drive with Controller  
Epson RX80 F/T Printer  
Printer Interface and cables  
80 character/line card  
APPLEWRITER Software Pack  
APPLEWRITER Software Trainer  
500 sheets of fanfold paper  
Home Solutions Box.

**Package Offer Price £1,649**

**Saving on our normal price £246**

With the Juki 6100 Printer replacing the Epson RX80 F/T Printer.

**Package Offer Price £1,749**

**Saving on our normal price £237**

#### Apple Professional Home Computer Pack

Apple IIe Computer  
Disk Drive with Controller  
Home Solution Box.

**Package Offer Price £999**

### COMMODORE

#### Commodore 64

##### Word Processing Pack

Commodore 64 Computer  
MPS 801 Printer  
1541 Disk Drive  
EASYSRIPT Word Processing pack  
Commodore Games Diskette  
500 sheets of fanfold paper.

**Package Offer Price £640**

**Saving on our normal price £123**

With the Juki 6100 Printer replacing IEEE Interface and MPS 801 Printer.

**Package Offer Price £899**

**Saving on our normal price £149**

#### Commodore 64 Disk Drive Pack

1541 Disk Drive  
EASYSRIPT Word Processing package. Commodore Games diskette.

**Package Offer Price £229**

**Saving on our normal price £105**

### BBC

#### BBC Disk Drive System

BBC Micro 'B' Computer with disk interface Cumana CS100 Disk Drive.

**Package Offer Price £699 Saving on our normal price £42**

#### BBC Word Processing Package

BBC Micro 'B' Computer with disk interface  
Cumana CS100 Disk Drive.  
Juki 6100 Daisywheel Printer  
VIEW ROM Word processing chip  
500 sheets of fanfold paper.

**Package offer price £1,175**

**Saving on our normal price £75**

#### BBC Monitor/Disk/Printer System

BBC Micro 'B' Computer with disk interface  
Cumana CS100 Disk Drive  
Shinwa CP80 Printer  
Sanyo SCM 14N Monitor  
500 sheets of fanfold paper

**Package Offer Price £1,225**

**Saving on our normal price £110**



Monitor not included

Birmingham Bradford (Broadway) Bristol Cambridge (Lion Yard) Cardiff Edinburgh Exeter Glasgow  
Hull Leeds Leicester Liverpool London: Brent Cross, Croydon, Ealing Broadway, Hammersmith, Heathrow Airport,  
Holborn Circus, Kensington High Street, Kingston-upon-Thames, Sloane Square, Wood Green  
Manchester Newcastle Northampton Nottingham (Listergate) Plymouth Reading Sheffield Southampton

# WHSMITH Computer Shops



Prices correct at time of going to press. Subject to availability. Normal package prices refer to prices of individual product purchases.



# KICK-OFF

the latest in the line of magical programs for the Commodore 64 from bubble bus

A unique game based on the famous Table Football game with moving rods through the players. Amazing graphics and music. For one or two players. Two players use two joysticks simultaneously. Machine code.



**New**

## WIDOWS REVENGE

Similar to our 'Best Seller' Exterminator, but this game fires back! Obliterate all of the Widows Warriors but watch out for Photon Webbs and devious Egg Layers. Machine code.



**New**

## HUSTLER

Written in machine code and using Sprite graphics HUSTLER takes the 64 to its limits. There are six 'pool' type games for one or two players, high scores kept and super music. Machine code. See the great press reviews. You won't find a more realistic snooker type game.

"Another gem - a must for the collection"  
*Commodore Computing*



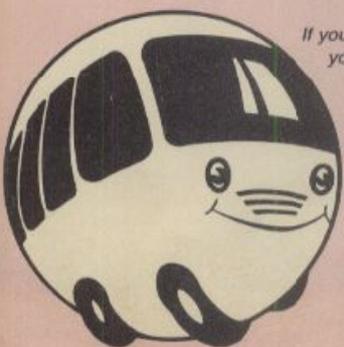
## EXTERMINATOR

Definitely one of the best arcade action games around for the 64. Shoot the worm and everything else in the garden whilst avoiding the deadly spider and swooping eagle. Machine code using high resolution and Sprite graphics with excellent sound. Beware, it's very addictive.

"Finger pressing good!"  
*Personal Computing Today*  
"Brilliant!"  
*Home Computer Weekly*



Price £6.99 each



**bubble bus software**

87 High Street, Tonbridge  
Kent TN9 1RX  
Telephone: 0732 355962

*bubble bus products are available from:*

LIGHTNING and SPECTRUM DEALERS, LASKY'S, GREENS, SELECTED HMV SHOPS, JOHN MENZIES, GAMES WORKSHOPS, CENTRESOFT and PCS STOCKISTS.

*If you have any trouble buying our products, you may buy direct from:*

# The Electron and Carto

Pack up your paintbox, throw away your paintbrushes and move into the electronic age of art with our amazing new PIXSTIK™

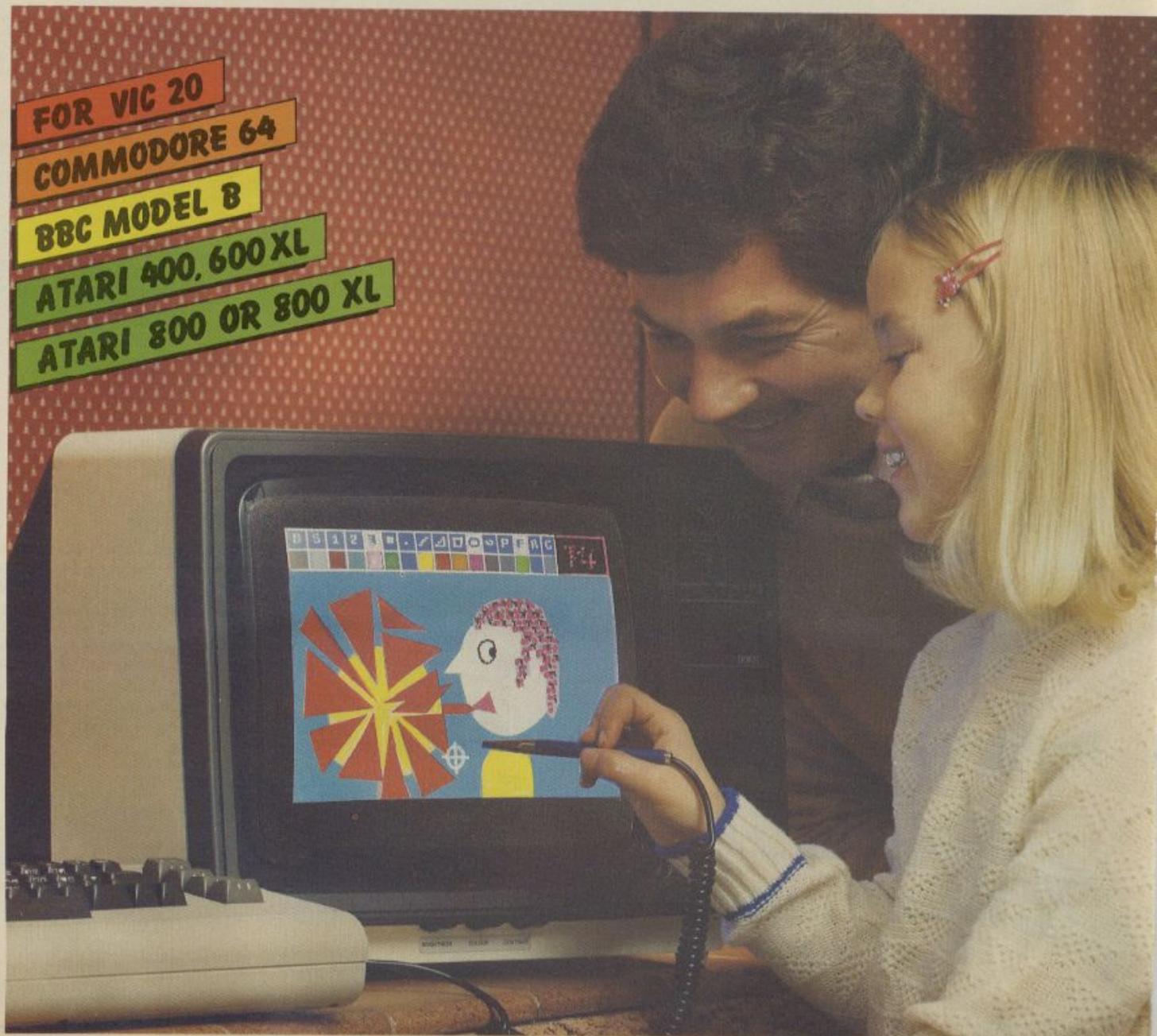
PIXSTIK™ opens the way for all the family to create colourful designs and pictures – yet it's so much cleaner and simpler to use than conventional crayons and paints. Plus you have the built-in advantage of the exclusive ABC feature. ABC stands for animate, bounce and cartoon, meaning you can even add movements to your sketches and drawings. It's just like creating your very own cartoon clips.

With PIXSTIK™, the colours never run dry and you don't have to worry about paper supplies.

You just plug in and all the materials you need are listed on the screen. You'll have access to up to 16 exciting colours and 16 separate commands. Simply give your instructions by pointing PIXSTIK™ at the appropriate colour or command.

PIXSTIK™ couldn't be easier to operate. Whether you're eight or eighty, you'll find it fascinating, especially when you discover the range of pictures you can produce.

Wherever your imagination goes, PIXSTIK™ will follow. It gives



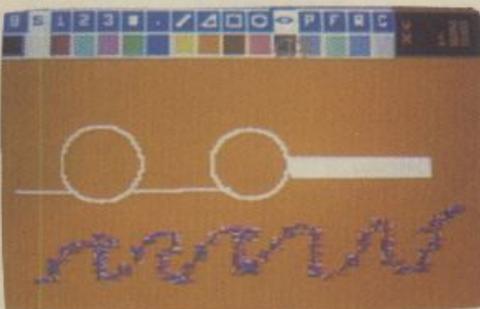
# ic Paint Box on Set

you freehand freedom or creates straight lines, triangles, rectangles, circles and ellipses with geometrical precision.

Choose whether to fill your shapes with solid colour or leave them blank. And if, after that, you still favour a paintbrush effect, simply move PIXSTIK™ into paintbrush mode and it will do the rest.

What makes PIXSTIK™ even more special is that it doesn't simply stop with a completed picture. Because it incorporates the special ABC feature, you can use individual designs as part of animated sequences and cartoons.

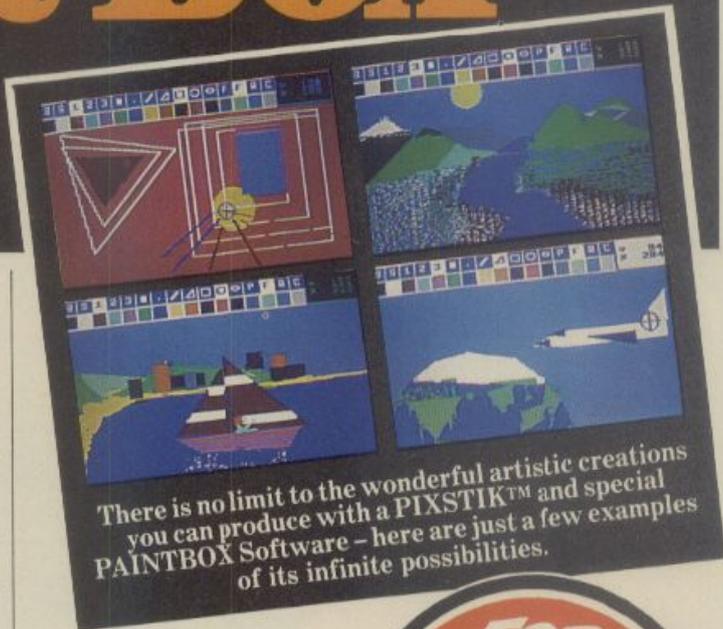
At the "animate" command, pictures stored in memory will reappear in turn. On the "bounce" instruction, your pictures will move forwards and backwards and when "cartoon" is called up, they will reappear continuously in sequence with just the effect of a professional cartoon clip.



Pictures can be drawn using fine lines, blocked lines or paintbrush effects for extra variety.

PIXSTIK™ can bring all your pictures to life. Use it to show the sun moving across the sky, smoke curling from a chimney and an arrow hitting its target.

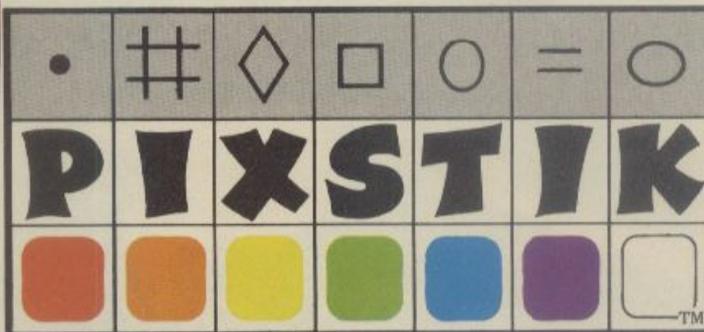
The only limit on PIXSTIK™ designs is your own inventiveness. There are even three different stick modes to ensure different colours can be drawn across each other without merging.



There is no limit to the wonderful artistic creations you can produce with a PIXSTIK™ and special PAINTBOX Software - here are just a few examples of its infinite possibilities.

For only £29.95, the PIXSTIK™ pack includes three superb computer games to play with your stick, plus a comprehensive instruction manual.

No paintbox could ever offer so much. So swap your paintbrush for a PIXSTIK™ today. It's the paintbox of the future.



PIXSTIK™ is available by mail order only, exclusively from Computapix Ltd., Gores Road, Kirkby Industrial Estate, Liverpool. Dealers: Contact Selena on 051-547 2741

**COMPLETE MULTIPACK**  
including  
**PIXSTIK™**  
Paintbox Software  
Instruction Manual  
and  
**3 FREE GAMES!**



To order send cheque/P.O. for £29.95, payable to:

**COMPUTAPIX LIMITED**

Credit card holders simply phone in your number on: 051-548 2020 (24 Hour)

or complete the following:

Credit card no.....

Access  Visa  Diners  American Express (Please tick)

Type of Computer: (Please tick)

VIC 20

COMMODORE 64

BBC MODEL B

ATARI 400, 800, 600XL OR 800XL

Name.....

Address.....

Tel No.....

Mail to: Computapix Limited  
FREEPOST (No stamp required)  
LIVERPOOL L33 7XS.

Please allow 28 days for clearance and delivery.

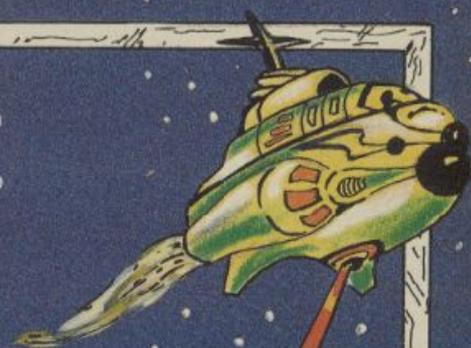


YC 2



### METAGALACTIC LLAMAS BATTLE AT THE EDGE OF TIME

A fast and original game for the unexpanded VIC. Challenging and colourful, with good sonics and a unique game action and design, this promises to be the most exciting new 3.5K VIC game since the introduction of GRIDRUNNER nearly a year ago. £5.50



### LASER ZONE

Experience Laser Zone – an utterly NEW totally ORIGINAL masterpiece of Video games design. Learn to control two spaceships at once. Feel the EXHILARATION as, after long hours of practice, you control the two ships so that they function as a smooth, co-operative team! Feel the raw POWER as you lunge for the electro button and BLAST your enemies into expanding clouds of SPACE JUNK!! Feel the humiliation as a carelessly aimed BLAST slams into the side of your last remaining ship!! 8K expansion required. Available for Commodore 64 £7.50 and VIC-20 £6.



### MATRIX

Jeff Minter has taken Gridrunner – the game that topped bestseller charts in USA and UK – and created an awesome sequel. Graphically superb, it features multiple screens, new aliens and attack waves, mystery bonuses, renegade humanoids, deflexor fields, diagonal tracking, countdown/panic phase and much, much more... Packed into 20 mind-zapping zones and accompanied by incredible sonics. 8K expansion required. Available for Commodore 64 £7.50 and VIC-20 £6.



### HOVER BOVER

A totally original arcade game for C64 featuring outstanding graphics and a sound track created by a professional Piano Wizard. Gordon Bennet has borrowed his neighbour's Air-Mo lawnmower. Mow your way through as many of the 16 lawns as you can before the pursuing neighbour retrieves his mower. Set your dog onto the neighbour to help you out of tight spots and don't annoy the gardener. Try not to plough through the neat flower beds or overheat your mower! £7.50



### ATTACK of the MUTANT CAMELS

Planet earth needs you! Hostile aliens have used genetic engineering to mutate camels from normally harmless beasts into 90 foot high, neutronium shielded, laser-spitting death camels!! Can you fly your tiny, manoeuvrable fighter over the mountainous landscape to weaken and destroy the camels before they invade the humans stronghold! You must withstand withering laser fire and alien UFOs. Game action stretches over 10 screen lengths and features superb scrolling, scanner 1/2 player actions and unbelievable animation! Play this game and you'll never be able to visit a zoo again without getting an itchy trigger finger! Awesome m/c action! Available for Commodore 64 £7.50.

### REVENGE OF THE MUTANT CAMELS

At last the long awaited sequel to Attack of the Mutant Camels is available. You are controlling a ninety foot high, neutronium shielded, laser spitting death camel, leading a rebellion against your evil Zzyaxian overlords. The game features beautiful smooth scrolling graphics and no less than 42 different attack waves, more than any game in video history. The challenge of play will last for months as you battle to see what's on the next wave.



### GRIDRUNNER

Finally true arcade quality on the unexpanded VIC! Shoot down the segmented DROIDS invading the grid. Beware of the pods and zappers! The awesome speed, sound and graphics gives you the best blast available for unexpanded VIC. Available for VIC-20 £5.00 Commodore 64 £5.00 Atari 400/800 £7.50



# Lamasoft

AWESOME GAMES SOFTWARE

49 MOUNT PLEASANT,  
TADLEY, HANTS. RG26 6BN.  
TELEPHONE: TADLEY (07356) 4478

All orders add  
50p postage and packing

LLAMA SOFT GAMES NOW IN BOOTHS,  
LASKYS AND MANY OTHER RETAILERS

# ORIC Software

## TANSOFT

# ultima ZONE

A 100% machine code space trilogy—shoot the Walkons, avoid the bouncing Brunos, battle your way through the satellite zone. Requires 48k Oric.

**£8.50**

inc. V.A.T. post free



# The HOBBIT

In co-operation  
with  
Melbourne House.

At last, this best selling adventure is available for the Oric based on J. R. R. Tolkien's book The Hobbit. (Included) a complete text and graphics adventure. Requires 48k Oric.

**£14.95** inc. V.A.T. post free



Our software is available from all Oric dealers and most good software suppliers. In case of difficulty please contact us on Teversham (02205) 2261 or write to us at:

## TANSOFT

Unit 1 & 2, Techno Park, Newmarket Road, Cambridge

# Not all home computers stay at home.

The BBC Micro is the ideal family computer—simple to operate, yet fast, powerful, with enormous potential.

But it's nice to know, when you buy one for your home, that the business, educational and scientific worlds agree with your choice.

Here are a few stories to illustrate how the BBC Micro gets out and about. And one to remind you how helpful it can be when it stays at home.

## A practical lesson in business admin.

The contribution of the BBC Micro in the classroom has long been recognised at Perins Community School in Hampshire.

The School has 12 BBC Micros used extensively across the syllabus: in fact some pupils are using them to study for their GCE O Levels in computing.

One of the programs available to Perins teachers

such as David Beck, pictured below with his class, is "Newsagent."

This program contains all the necessary information for the class to run a newsagent's shop; allowing them to organise daily deliveries, make up bills and keep an eye on stock control and ordering.

It's a nice example of how the BBC Micro can be used not only to acquaint a class with the language of computers, but also with some of the realities of the community in which they live.

## Correcting Jodrell Bank.

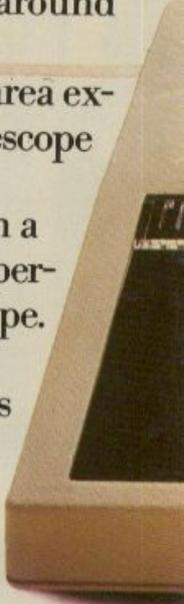
The BBC Micro is a familiar worker around Jodrell Bank.

You'll find it in the reception area explaining the workings of a radio telescope to visitors, for example.

But it's also been helping in a more testing task: to improve the performance of the Defford telescope.

In this application it has been used to make calculations necessary to determine the precise parabolic shape of the dish.

Theodolites are used to do the measuring—then the BBC Micro works out the necessary corrections.



### The end of the scrawl.

If any of you have noticed how much easier it is to read and understand labels on drugs and medicines these days, then you can most probably thank the BBC Micro. John Richardson, a Preston pharmacist, was first to realise how a micro with a suitable printer could produce labels that were accurate and legible and which could include, automatically, such information as drug reaction warnings.

At the same time it could record drug usage for better stock control.

He chose the BBC Micro for its versatility and potential for expansion.

John Richardson believes that this system will be recognised as standard

in the profession and be used in hospitals, health centres and pharmacies throughout the UK.

### Meanwhile back at home.

Dr. & Mrs. Yarwood bought a BBC Micro as a birthday present for their 12 year old daughter.

programs. Mrs. Yarwood is particularly proud of one program she has compiled to help teach her daughter French vocabulary.

They all agree that although the Micro is fast and powerful enough to be at home in Jodrell Bank, it is also the ideal computer at the Yarwood home: simple to set up (virtually any TV set and cassette player is all you need) and simple to use.



### All this for only £399.

The BBC Micro comes with a comprehensive, step-by-step User Guide which introduces you to your micro and shows you how to construct useful programs of your own.

You will also receive a free "Welcome" cassette which contains 15 different programs for you to experiment with, ranging from music and graphics to games like Kingdom and Bat 'n' Ball.

The BBC Micro is available from WH Smith Computer Shops, Boots, John Lewis and local Acorn stockists.

Alternatively if you would like to order one with your credit card or if you want the address of your nearest supplier just phone 01-200 0200 or 0933-79300.

However, it quite quickly became common property.

All three can now write their own

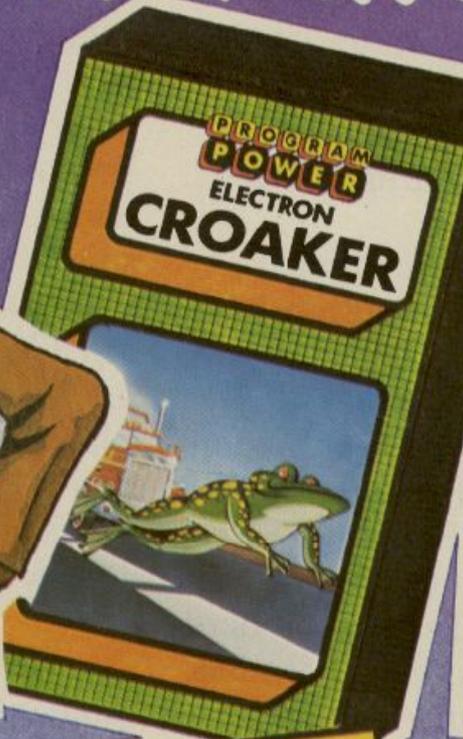
## **The BBC Microcomputer System.**

Designed, produced and distributed by Acorn Computers Limited.

PROGRAM POWER MICRO POWER

# ...READ ALL ABOUT IT... TITLES NOW AVAILABLE

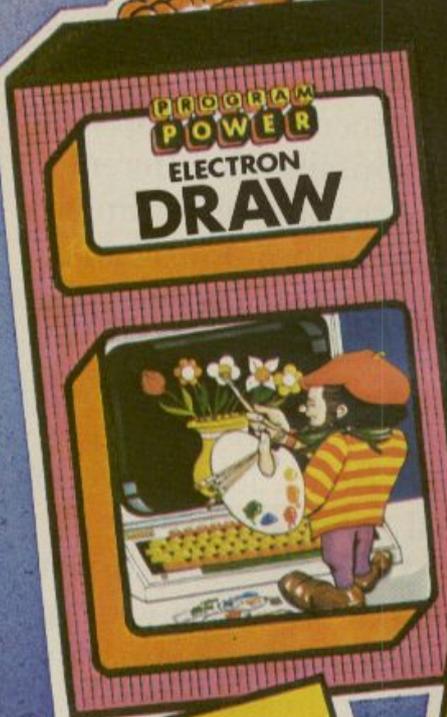
PROGRAM POWER MICRO POWER PROGRAM POWER MICRO POWER



**CROAKER**  
Dodge between the fast-moving traffic then leap from log to log to cross the treacherous river. (ALL MACHINE-CODE) £7.95.



**FELIX AND THE FRUIT MONSTERS**  
Lay ether pools and trigger the magnetic pad to protect the precious fruit from the marauding monsters. (ALL MACHINE-CODE). £7.95.



**DRAW**  
A menu-driven turtle graphics language which is both powerful and easy to use. Complete with 22 page manual. (BASIC). £9.95.



**ESCAPE FROM MOONBASE ALPHA**  
Science fiction and fantasy combined in this 3-D graphic adventure set deep in the heart of the nightmare planet. (BASIC plus MACHINE-CODE) £7.95.

**FELIX IN THE FACTORY**  
Pitchfork the Gremlins and poison the Giant Rat in your search for the oil to top up the Generator. (ALL MACHINE-CODE). £7.95.



PROGRAM POWER MICRO POWER

# MICRO POWER'S LEADING FOR THE ELECTRON....

**MOONRAIDER**  
Penetrate the perilous levels of defences on the Alien Moon to destroy the Central Nucleus. (ALL MACHINE-CODE) £7.95.

**PROGRAM POWER**  
**ELECTRON MOONRAIDER**



**PROGRAM POWER**  
**ELECTRON KILLER GORILLA**



**KILLER GORILLA**  
Scale the ironwork tower leaping barrels and fireballs to rescue the damsel in distress. (ALL MACHINE-CODE). £7.95.

**PROGRAM POWER**  
**ELECTRON CHESS**



**CHESS**  
Ten skill levels. Mode 1 colour graphics, take back moves, replay, analyse, Blitz Chess, and more! (ALL MACHINE-CODE). £7.95.

**PROGRAM POWER**  
**ELECTRON WOOP**



**SWOOP**  
Defend the space lanes against wave after wave of relentless, screaming, egg-laying Birdmen. (ALL MACHINE-CODE) £7.95.

**PROGRAM POWER**  
**ELECTRON BANDITS at 3 o'clock**



**BANDITS AT 3 O'CLOCK**  
Aerial combat challenge in the skies over Belgium in this two player game of dexterity. (BASIC plus MACHINE-CODE). £8.95.

**B.B.C. OWNERS!**

These titles and many more are available for your computer. Send an SAE for our free colour catalogue.

Written any programs for the Electron or BBC Micro? We pay 20% royalties!

Both **ELECTRON** and **BBC MICRO** programs can be obtained from selected branches of **W.H.SMITH, JOHN MENZIES, BOOTS**, all good dealers, or direct from **MICRO POWER**.

Mail Order: Please add 55p per order to cover P. & P.

ALL CASSETTES ARE FULLY GUARANTEED AND CONTAIN TWO RECORDINGS. All prices inclusive of VAT.

**ELECTRONS!**

We have placed large orders for the Electron.

Please 'phone to check availability.

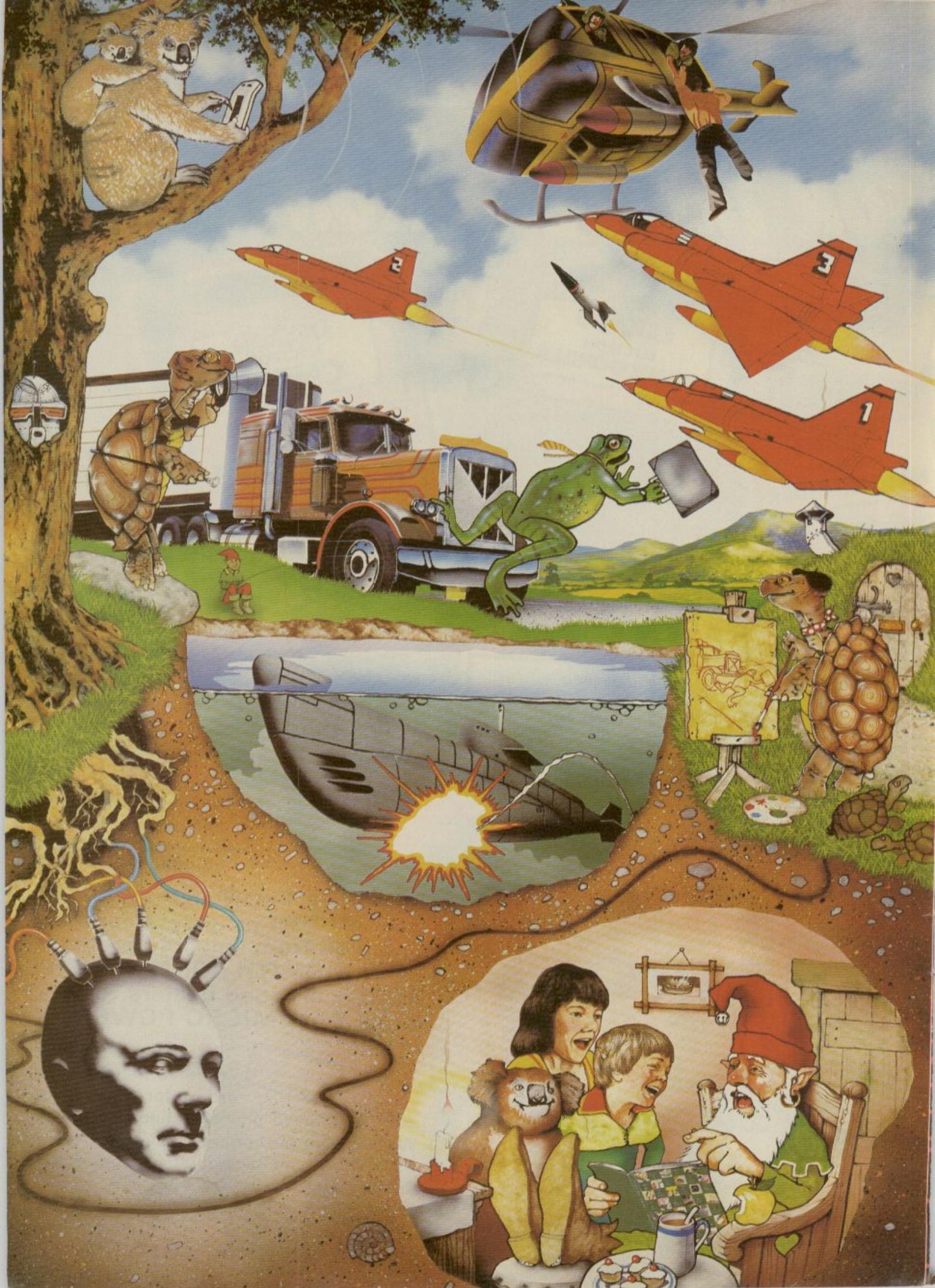
We are also authorised dealers for the **BBC Micro** and have a wide range of disk-drives, printers, books, etc.

... STOP PRESS ... **WE'RE EXPANDING!** ... STOP PRESS ...



SHOWROOM ADDRESS:  
NORTHWOOD HOUSE  
NORTH STREET  
LEEDS LS7 2AA  
Tel: (0532) 458800

MAIL ORDER ADDRESS:  
8/8A REGENT STREET  
CHapel ALLERTON  
LEEDS LS7 4PE  
Tel: (0532) 683186 or 696343



# Your wish is your command.

In another time, another world, not too far away from your own front room, you can be in command of . . .

1. **Zaxxon** by *Datasoft*.

You're the pilot. Climbing, diving, swooping in on an enemy fortress. A barrage of missiles and gunfire will try and stop you. Just when you think you're through, a powerful robot's lethal homing missile zaps you...or does it?

2. **Frogger** by *Sierra On-Line*.

Now you're a frog stranded a long way from home. A perilous journey awaits you. Once across the busy motorway, a surging river full of logs, turtles and alligators awaits. Better flex those Froggy leg-muscles though, the bank is steep, so look before you leap!

3. **KoalaPad Touch Tablet** by *Koala*.

You can't overfeed this Koala — he'll make his own menu selections. He'll also move game players, make musical notes, draw computer graphics and much more. The KoalaPad Touch Tablet is an accessory that'll enhance the capabilities of your home computer system.

4. **Sea Dragon**

by *Adventure International*.

Take a deep breath — you'll need it to navigate your sub through a labyrinthian underwater passage to free the menace of the imprisoned Sea Dragon. Mines, electrifying eels and lethal laser beams await you in this murky underwater world. You've limitless torpedoes, but limited air, so hurry!

5. **Turtle Graphics II** by *HesWare*.

This Turtle's about to paint the town red. Or green. Or blue with pink spots. By teaching him to paint, draw and colour he'll teach you, painlessly and enjoyably, the basics of computer programming — maths, logic, communications and more with over sixty commands. Ideal for children from six to sixty.

6. **Choplifter** by *Broderbund*.

Sixteen hostages are holed up in an inaccessible barracks. Only an ace chopper pilot can free them — you!

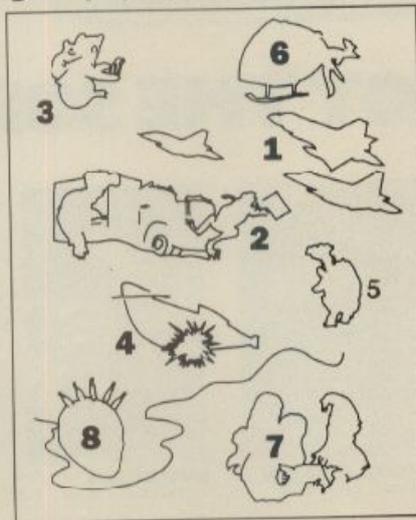
Watch out for the tanks, they'll crush anything. They're just for starters — fighter jets and the awesome homing air-mines are yet to come. Good luck . . . you'll need it!

7. **Kids and the Apple/Atari** by *Datamost*.

These books will teach you, simply, how to write your own programmes. Step-by-step instructions teach you how to create your own action, board and word games. Programme your finances or even learn another language — whatever you do, you'll get the most out of your home computer.

8. **Suspended** by *Infocom*.

20 miles beneath the earth's surface your brain is wired to a computer network. You'll strategically manipulate 6 robots to overcome a myriad of realistic and original problems as you try to maintain surface-side equilibrium. But don't worry, the end is in sight — you're only there for 500 years!



Phew, back to earth! Now beam yourself over to your local dealer and check out his software. He's got just about everything, we should know, we supply it.

## SOFTSEL®

The number one source for software.  
In the world.

Beam yourself to:

Adv. Technology Centre London SE9 859 7696 · Andrews Teddington 977 4716 · Audio & Computer Centre Jersey 74000 · Channel 8 Software Preston 253 057  
Chester Software Centre Chester 431 0015 · Chromasonic Personal Computers London N19 263 9493 · Computarama Shrewsbury 60528, Stafford 41899, Stoke-on-Trent 268620  
Computer Link Chester 316516 · Davinci Computers Ltd London NW4 2022 272 · Devon Computers Ltd Paignton 526303 · Galaxy Video Ltd Maidstone 682575  
Gamer Brighton 698424 · Games Centre London W1 637 7911 · Games Workshop Ltd London NW10 965 3713 · G B Microland Waterlooville 459911  
Guernsey Computers Ltd Guernsey 28738 · Inkey Computer Serv. Ltd Aberlure Glamorgan 881828 · Microchips Southampton 38899, Winchester 68085  
Milton Keynes Music Leighton Buzzard 376622 · Pace Software Supplies Bradford 472 9306 · Percivals London E6 472 8941 · Pilot Software City London W1 636 2666  
Programs Unlimited London W1 487 3351 · Quodport Ltd Manchester 969 8729 · Silica Shop Ltd Sidcup 301 1111 · Silicon Chip Comps Weymouth 87592  
Silicon Chip Ltd Slough 70639 · Singleton Ltd Skipton 660 078 · Small Fry + Hobby Wakefield 436 0551 · Softalic Bristol 877245 · Software City Ltd 382 Kings Road London SW3  
The Atari Centre Birmingham 643 9100 · The Software Centre Birmingham 622 3289 · Vic Odens (Photic) Ltd London SE1 403 1988 · Video Palace London W1 637 0366  
Woodland Software London W1 960 4877 · York Computer Centre York 641862. · Available from all Spectrum Group Members and selected W H Smith-Home Computing Stores.

# WHAT EVER THE HARDWARE...



## WE'VE GOT THE SOFTWARE (WELL ALMOST!)



**SNOOKER £8.95**  
ZX SPECTRUM VS 03-16  
BBC MODEL B V9 01-32  
VIC 20 SE V7 01-03  
COMMODORE 64 VC 01-64  
ELECTRON VE 01-32



**SHEER PANIC £5.95**  
ZX SPECTRUM VS 02-16



**PITMAN SEVEN £8.95**  
ZX SPECTRUM VS 01-48



**RAPEDES £5.95**  
ZX SPECTRUM VS 4-16



**STAR WARRIOR £8.95**  
ZX SPECTRUM VS 02-16



**DARE DEVIL DENNIS £7.95**  
BBC MODEL B V8 03-32  
ELECTRON VE 02-32



**PENGI £7.95**  
BBC MODEL B V8 04-32  
ELECTRON VE 03-32



**ARCTURUS £8.95**  
ZX SPECTRUM VS 10-48



**ARMAGEDDON £9.95**  
COMMODORE 64 VC 05-64



**1994 £9.95**  
(10 YEARS AFTER)  
ZX SPECTRUM VS 07-48



**GUSHER £9.95**  
COMMODORE 64 VC 05-64



**BANANA DRAMA £9.95**  
COMMODORE 64 VC 06-64

FANS PLEASE NOTE! ALSO AVAILABLE MAIL ORDER  
FROM VISIONS (SOFTWARE FACTORY) LTD  
1 FELGATE MEWS, STUPLAND STREET, LONDON W6 9DT

*Visions*

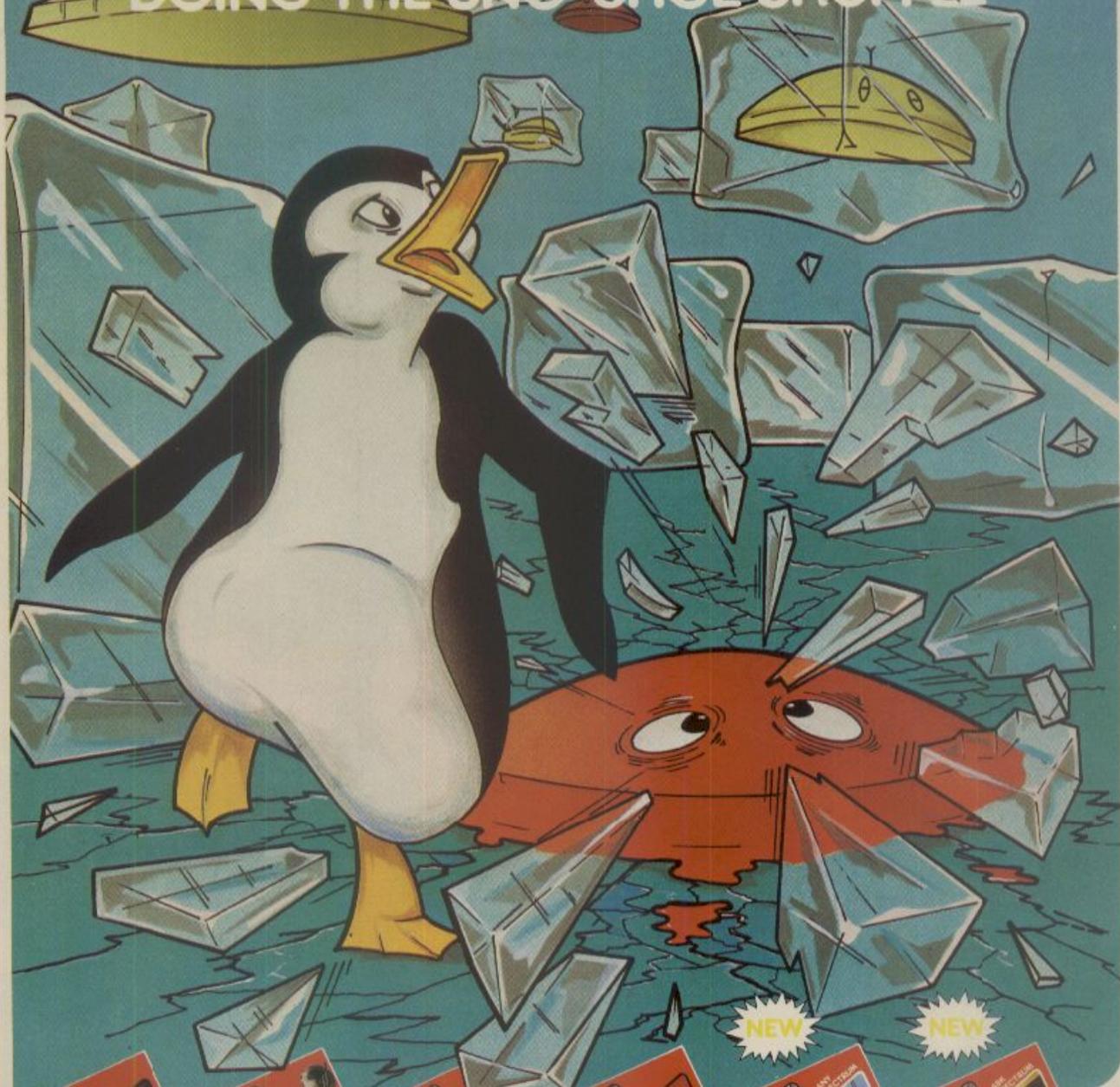
THE NAME IN VIDEO GAMES

Visions (Software Factory) Limited software is available from: Boots CentreSoft Currys (selected stores) Ferranti and Davenport Greens Laskys  
Lightning dealers Makro Menzies Prism dealers Record Faye Rumbelows Software City Spectrum dealers SupaSnapS (selected stores) Tesco

# FREEZ' BEEES!

48K  
SPECTRUM

"DOING THE SNO' SHOE SHUFFLE"



NEW NEW

Selected titles available at  
Boots, W.H. Smith, J. Menzies, Laskys  
and all good computer stores.  
Dealer enquiries welcome Tel: 01-748 4125  
Silversoft Ltd, London House, 271/273 King Street, London W6.

All games  
only  
**£5.95**  
Inc VAT and P&P  
for a free catalogue  
send SAE.

# SILVER SOFT





By Ian York

## SPACE JOUST

VIC 20 UNEXPANDED

Arcade action for the unexpanded VIC 20. Manoeuvre your space craft around the screen, avoiding waves of enemy space ships - meanwhile trying to destroy them by landing on them from above, also can you destroy the pods before they return to destroy you. (Joystick only)

**£5.95**

ALSO AVAILABLE

MANIC MINER	48K SPECTRUM
JET SET WILLY	48K SPECTRUM
OMETRON	48K SPECTRUM
ORION	48K SPECTRUM
PUSH OFF	16/48K SPECTRUM
THRUSTA	16/48K SPECTRUM
SPACE SWARM	UNEXP. VIC 20

**ALL £5.95 EACH**

CRAZY BALLOON	COMMODORE 64
MANIC MINER	COMMODORE 64
LEGION ADVENTURE	BBC B

**ONLY £7.95**

# SOFTWARE PROJECTS

Bear Brand Complex,  
Allerton Rd., Woolton, Liverpool,  
Merseyside L25 7SF

# McKensie

By E. E. K.

## McKENSIE

48K SPECTRUM

An adventure for the 48K Spectrum. Answering distress calls from space stations can be very hazardous as you will find out. Lithium crystals, bandits, limited air supply all add to the ingredients of this exciting adventure.

£5.95

AVAILABLE AT SELECTED BRANCHES OF MENZIES

### DISTRIBUTORS CONTACT:

SOFTWARE PROJECTS,  
BEAR BRAND COMPLEX,  
ALLERTON ROAD,  
WOOLTON,  
LIVERPOOL L25 7SF  
051 428 7990

### DEALER ENQUIRIES TO:

TIGER DISTRIBUTION,  
4 VICTORIA ROAD,  
WIDNES,  
CHESHIRE  
051-420 8888

# The BBC Micro can now give your children a private education.

The BBC Microcomputer now accounts for 80% of the computers being ordered under the current D.O.I. Primary School Scheme.

It's also the computer which a rapidly increasing number of people are choosing for their homes.

One of the reasons for its success is that it makes learning highly entertaining for everybody. From children who are getting to grips with the alphabet, to adults who want a gentle but intensive introduction to the complex world of computing.

Now, there's a substantial new catalogue of educational programs specially for the BBC Microcomputer.

It has been developed by Acornsoft, the software division of Acorn Computers who manufacture the BBC Micro.

## Making faces without getting scolded.

With the new Facemaker program, your children can make over a million faces. It's like an identi-kit, allowing them to depict anyone they want. They start by choosing the eyes. Then they can choose the mouth, the ears, the nose, the facial outline and the hairstyle.

And if they really fancy dressing up, they can add earrings and hats.

In doing all this, they learn to read and spell, as well as developing their powers of description.

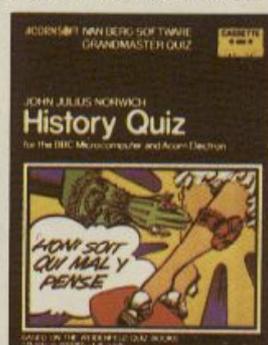
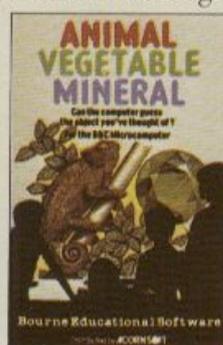
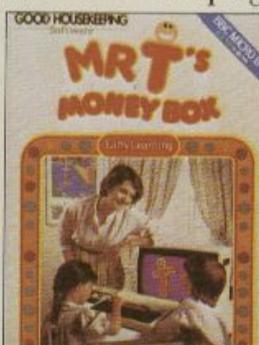
## The money program, two games for the price of one.

Mr. T. is an engaging little figment of the microchip who can teach your children all the complexities of our coinage system.

His Money Box program has two games, each of which can be played at different levels.

In Money Match, the challenge is to collect a set of coins, matching them according to shape, size and value.

In Money Box, you can give your child and Mr. T. a helping hand to get all the coins on the screen into the box. (It's always different, because the coins on the screen are based on the small change you have to hand.)



A chance to teach the Micro a thing or two.  
With the Animal, Vegetable, Mineral program, the children can get the computer guessing.

They think of an object. The BBC Micro has to decide what it is.

If it doesn't come up with the answer, the children can keep giving it hints.

In doing so, they are encouraged to question the difference between such things as crocodiles and alligators, or whether oil is vegetable or mineral.

The program also encourages them to consult refer-

ence books so that they can ask the computer increasingly tough questions.

## Questions on Julius Caesar from J. Julius Norwich.

John Julius Norwich's History Quiz is one of the new BBC Micro Grandmaster quiz series which also covers theatre, crime and detection, music, science fiction and royalty.

On the history front, there are 300 brain-testing questions, covering all aspects of British history from Julius Caesar to Margaret Thatcher.

And to increase the educational value, Mr. Norwich has posed the questions from angles which will give a broader understanding of events.

## For the full catalogue, clip the coupon.

There are thirty more new BBC Micro programs in Acornsoft's new catalogue.

For a free copy, complete the coupon, or telephone 0933-79300. Or ask your local BBC Micro dealer.

If you're not yet a BBC Micro owner, you can get full details of the computer at the same time.



To Acornsoft, c/o Vector Marketing, Denington Estate, Wellingborough, Northants NN8 2RL. Please send me the new Acornsoft catalogue "At Home With The BBC Microcomputer."

I would also like details of the BBC Micro  (tick)

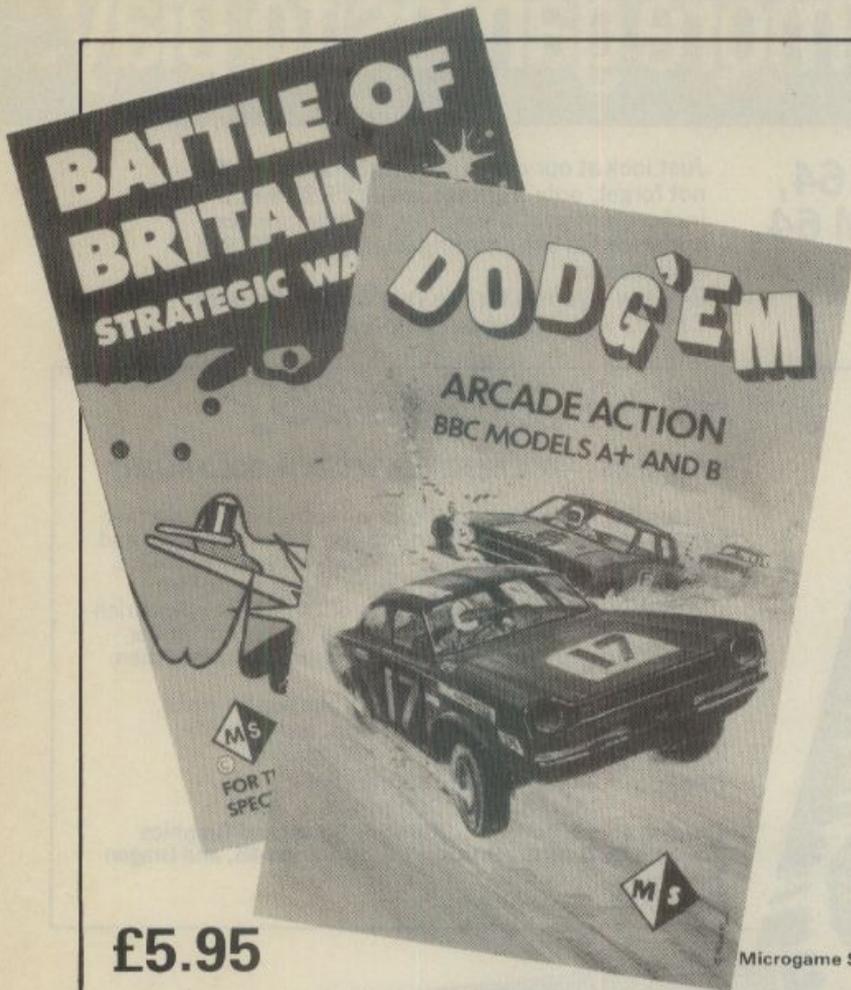
Name \_\_\_\_\_

Address \_\_\_\_\_

Postcode \_\_\_\_\_

Selected home education programs distributed by Acornsoft.

**ACORNSOFT**



**£5.95**

## Battle of Britain

48K Spectrum £5.95

A strategic simulation of a German bomber offensive featuring Hi-res screen map and optional morse sound.

## Dodg'em

BBC Model B £5.95

A machine code version of the popular arcade game featuring 15 difficulty levels & up to three computer controlled 'jam' cars.

And new

## Spec-FX

Spectrum £5.95

100 amazing machine code sound effects to use in your own Spectrum games. Includes explosions, guns, space effects, machinery and many others. Each sound is a self contained m/c routine which can be saved to tape or incorporated directly in your own listings.

## Pearl Harbour

BBC B

A strategic wargame set in the Pacific, Featuring Hi-res screen map and optional morse sound.

Microgame Simulations, 73 The Broadway, Grantchester, Cambridge, CB3 9NQ

**48 K SPECTRUM**

# Mah Jong

THE FASCINATING AND TIMELESS ORIENTAL GAME OF THE FOUR WINDS, CAN BE USED AS A GAME AND OR TUTOR WITH SAVE GAME FEATURE, SUPERB GRAPHICS, EXPERIENCE THE CHALLENGE OF FAST AND COMPETITIVE PLAY. A COMPREHENSIVE INSTRUCTION BOOK IS INCLUDED WITH EACH PACKAGE. THIS IS THE MOST COMPREHENSIVE VERSION WE HAVE EVER SEEN FOR A MICRO-COMPUTER!

**£ 9-95**

**16: 48 K SPECTRUM**

# YAHTZEE

AN EXCITING GAME OF CHANCE FOR 1-4 PLAYERS.

**£ 5-95**

**16: 48 K SPECTRUM**

# PENTOMINOES

THE " JIGSAW " WITH A SUBTLE DIFFERENCE !

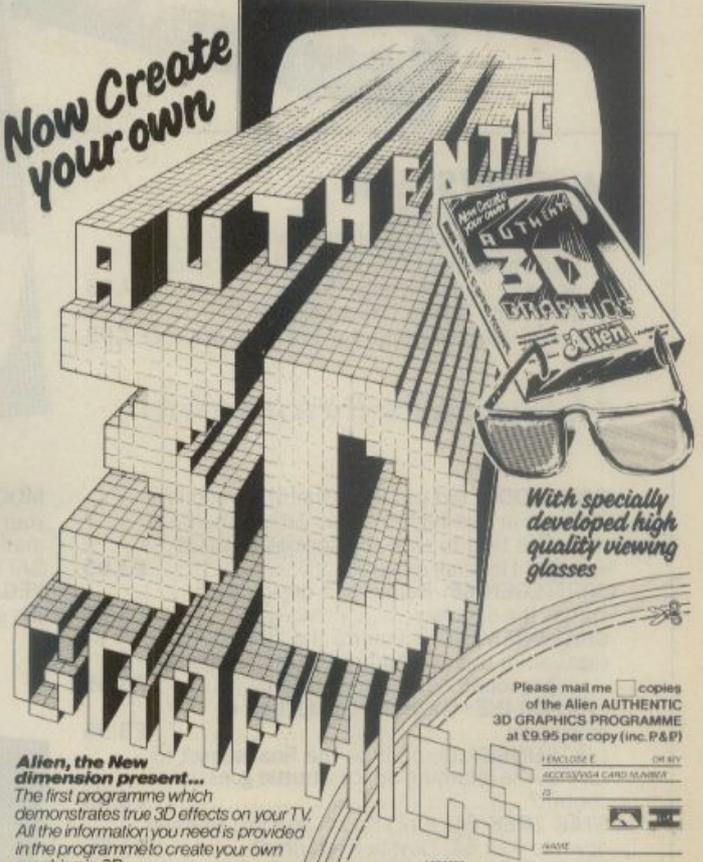
**£ 5-95**

**Spectre**

ENFIELD HOUSE, SWARDISTON NORWICH, NORFOLK.

ALSO AVAILABLE  
 48K DIGITAL CIRCUIT DESIGNER £ 9.95  
 48K A.C. NETWORK ANALYSER £ 14.95  
 48K MULTI-FUNCTION MATHS AID £ 9.95  
 48K PERSONAL DIETARY ADVISOR £ 8.95  
 48K INVESTMENT MONITOR £ 8.95

Now Create your own



With specially developed high quality viewing glasses

**Alien, the New dimension present...**  
 The first programme which demonstrates true 3D effects on your TV. All the information you need is provided in the programme to create your own graphics in 3D.  
 Just imagine the games that could be written using this technique. Hours of fun and really dramatic visual effects.



BBC model B only **The New Dimension**

The Alien, Arndale House, Church Street, Blackburn, Lancs., BB7 5AF Tel. Blackburn (0254) 52638

Please mail me  copies of the Alien AUTHENTIC 3D GRAPHICS PROGRAMME at £9.95 per copy (inc. P&P)

ENCLOSURE OR BY ACCESS/VISA CARD NUMBER

OR

NAME

ADDRESS

POSTCODE

Please allow 14 days for delivery

YC.1.84

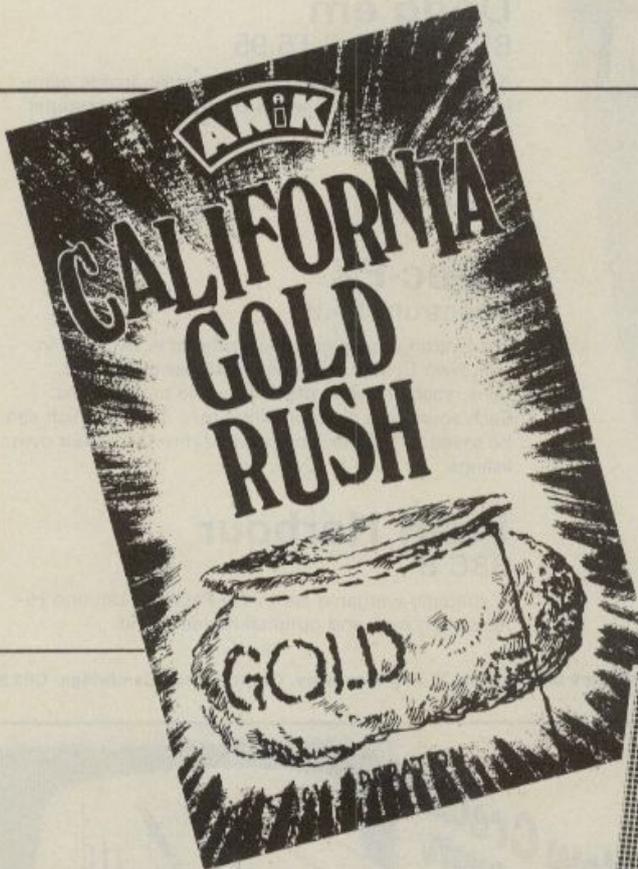


# gives you more games to play...

## GAMES FOR COMMODORE 64, DRAGON, SPECTRUM, CBM 64.

Just look at our range . . . and prices! and do not forget, only 3 games are at £7.95 each inclusive of post & packing, all other games are priced at the amazing low price of £3.99! all inclusive.

Buy any 6 games for the Very Special Price of £19.95 inclusive of post & packing.



### HOW-DE-DO PARDNERS?

**YEP FOLKS — IT'S HERE "CALIFORNIA GOLD RUSH"**

This here's Prospector Jake, I sure am havin' one helluva time tryin' to peg ma claim with those damned Injuns a hootin' and a hollerin' all over this territory. Ma job gets harder as I move from one Gold Field to another. I know, that is me an' ma stubborn horny ol' Mule here know of 24 rich an' I mean rich seams of pure Gold. All it needs to make this here ol' critter happy is that you help me peg every doggone last one of them claims.

Can YOU help Jake become rich, help him peg his claim, dodge the arrows, avoid the tomahawks, and plant the Dynamite in just the right place? . . . YOU CAN!!!

**YIPPEE . . .** Git yer Picks an' Shovels and join the CALIFORNIA GOLD RUSH . . . NOW

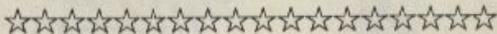
Amazing Arcade Action . . . Stunning Sound and Graphics Available NOW for Commodore 64, Spectrum 48, and Dragon

**£7.95** including P & P

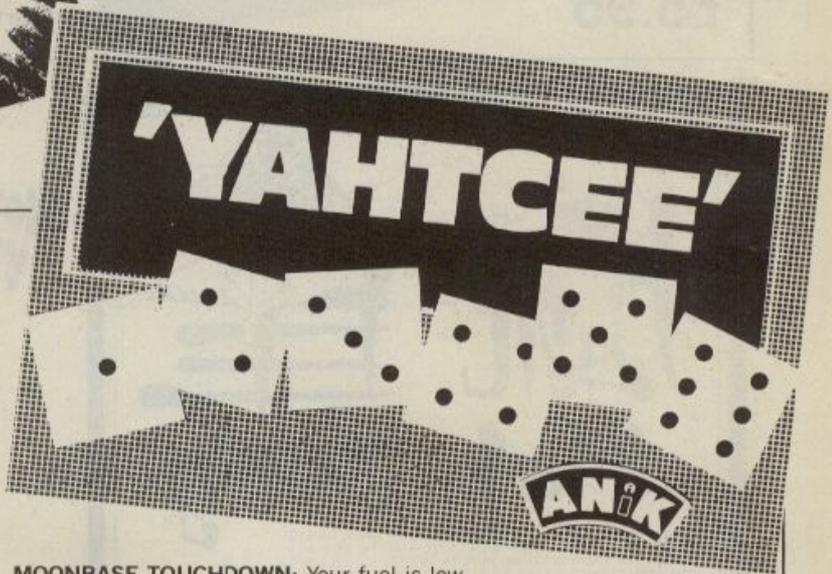
### MICROSYSTEMS

#### COMMODORE 64

- \* CALIFORNIA GOLD RUSH: PNC says " . . . could be another Pac-Man" What more can we say!!! (Joystick required) . . . . . £7.95
- \* YAHTCEE: This is THE version of the traditional dice game. For 1 or more players £7.95



- DOZY DODO:** Did you know that the Dodo lays it's eggs in mid-flight? Conservation Charlie is doing his best to save the species but is it enough? (Joystick required) . . . . . £3.95
- SPRITEGEN 64:** Define and design your sprites the easy way . . . . . £3.95
- CHAIN REACTION:** Control the atomic reaction in this game of skill. Great graphics — super sound . . . . . £3.95
- LINK-A-LINE:** Make the connection 4 enjoyment . . . . . £3.95
- L.A. SUNSET:** Could it be the final sunset for L.A. as the returning Space Shuttle goes out of control? . . . . . £3.95
- STAR TREK 64:** Kirk, Spock and Co. beamed down to your 64. (Joystick required) . . . . . £3.95
- COLOUR ME QUICK:** A fascinating game of logic that is highly addictive . . . . . £3.95
- NAUTILUS NAVIGATOR:** Manoeuvre your nuclear powered Sub thro' undersea chasms, vaults and maybe tombs. But what other creatures lurk in the Deep!!! (Joystick required) . . . . . £3.95



- MOONBASE TOUCHDOWN:** Your fuel is low, your Astro-module has an intermittent malfunction, can you reach your base . . . . . £3.95
- SAFELY!!!** (Joystick required) . . . . . £3.95
- VEGAS SLOT:** You'll hand it to this Bandit . . . . . £3.95
- It's great . . . . . £3.95



### STOCKING FILLER . . .

**VIDEO LIBRARY CASES**  
Amazing Value at only £1.45 for 3 incl P & P.  
5.25" Disk Library Cases hold 18 disks, blue plastic, just the thing for that extra present. Normally £1.98 each. Our price: 2 for £1.95 incl P & P.



# for a package you can pay!

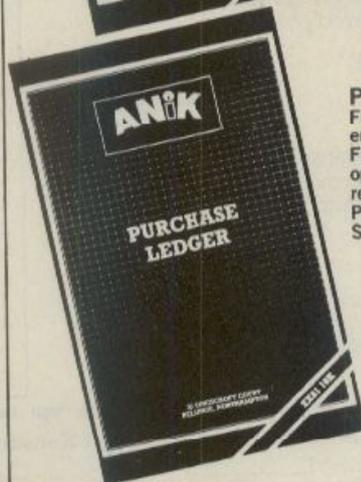
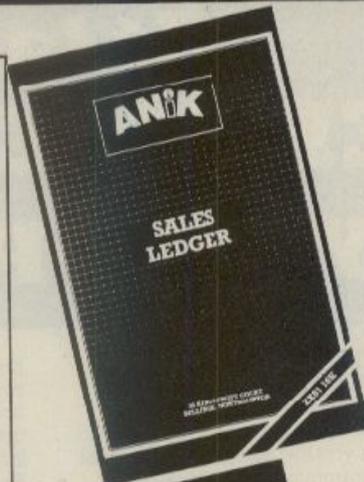
**FLASH!**  
**BUY 6 GAMES**  
**and SAVE**  
**£4** Games at £3.95 each

## SPECTRUM

- STARSHIP 2100RD:** Repel the Invaders from Zenos and thwart their plans to take over the Galaxy ..... £3.95
- POLARIS PATROL:** Rid our shores of the darstardly aggressors!!! (Joystick required) ..... £3.95
- USS ENTERPRISE:** Boldly go on a dangerous voyage to the very limits of your Spectrum (Joystick required) ..... £3.95
- COSMIC ATTACK:** Dorks, Wapraz and Neutra-Zemals in combat!!! (Joystick required) ..... £3.95
- DUMB DUCK:** Blow their tiny beaks off!!! (Joystick required) ..... £3.95
- THE SEVEN HILLS:** You'll jump at the chance to ski on these slopes. (Joystick required) ..... £3.95
- BATTLE STATIONS:** Cosmic attackers threaten Civilisation. Is there no escape, are we doomed? (Joystick required) ..... £3.95
- PANE DAMAGE:** People who live in glass houses shouldn't . . . Dynamic action. (Joystick required) ..... £3.95
- PHASOR POWER:** The Ultimate weapon. Use it carefully against the planets enemies!!! (Joystick required) ..... £3.95
- HOTHOUSE HELL:** Fiery, frantic, furious action with truly brilliant graphics. (Joystick required) ..... £3.95
- ALL SYSTEMS GO:** Blast off into the great blue yonder and face the peril that awaits you!!! (Joystick required) ..... £3.95
- VISCIOUS VERMIN:** Giant plague carrying rodents turn on the Human race and try to take over!!! (Joystick required) ..... £3.95
- ANIKMAN:** Our version of the greedy gulper . . . not to be missed!!! (Joystick required) ..... £3.95
- PIGGOTT'S PONY:** We bet this will be winner. You can put your shirt on it!!! (Joystick required) ..... £3.95
- MISSION POSSIBLE:** Have you the qualities to cope with tomorrow's technology . . . in Space? (Joystick required) ..... £3.95
- GHASTLY GHOULS:** All kinds of creepies make this game a nightmare!!! ..... £3.95
- THE FORCE . . . BEYOND!:** Cosmic energy — Anik style!!! (Joystick required) ..... £3.95
- \* YAHTCEE:** Thirteen ways to roll out a winner. Multi player game — lots of fun . . . if you don't lose!!! ..... £7.95

## DRAGON

- LEAPIN' LANCELOT:** Medieval machine magic as Lancelot endeavours to rescue fair Gueneviere. (Joystick required) ..... £3.95
- GALLACTIC SURVIVAL PAK:** No Astro-traveller should be without this. A collection of 3 of the best astro-games around!!! (Joystick required) . £3.95
- MINDBENDERS:** 3 puzzles to enthrall and mystify you. Hours of mindbending fun to pass the long Winterevenings ..... £3.95
- \* YAHTCEE:** Five times as nice with our Yahtcee dice. For one or more players ..... £7.95
- GEE UP NEDDY:** The odds-on favourite with all the Family. (Joystick required) ..... £3.95
- THE SEVEN HILLS:** You'll jump at the chance to ski on these slopes. (Joystick required) ..... £3.95
- PHASOR POWER:** The Ultimate weapon. Use it carefully against other planets enemies!!! (Joystick required) ..... £3.95
- ANIKMAN:** Our version of the greedy gulper . . . not to be missed!!! (Joystick required) ..... £3.95
- BATTLE STATIONS:** Cosmic attackers threaten civilisation. Is there no escape, are we doomed? (Joystick required) ..... £3.95
- ALL SYSTEMS GO:** Blast off into the great blue yonder and face the peril that awaits you!!! (Joystick required) ..... £3.95
- PANE DAMAGE:** People who live in glass houses shouldn't . . . Dynamic action. (Joystick required) ..... £3.95



Serious Applications Programs.

**SALES LEDGER**  
 Specification as for Purchaser Ledger.  
 SALES LEDGER for CBM 64,  
 SPECTRUM, DRAGON . . . £14.95

**DATAHOLD**  
 The DBMS for the CBM 64. Up to 15 fields per record. Sort and search by any field. Calculations. Report generation.  
 MAIL LABELLER incl. with DATAHOLD — fully user definable.  
 DATAHOLD for CBM 64 . . . £24.95

**PURCHASE LEDGER**  
 Fully user definable. Allows for multiple entry, invoicing and payment control. Full search and sort facilities. Print option. VAT account and analysis. Status report generation.  
 PURCHASE LEDGER for CBM 64,  
 SPECTRUM, DRAGON . . . £14.95

## HOW TO ORDER

To order any games all you have to do is enter the title you wish to receive in the coupon below, write your name and address, enclose your cheque or postal order made payable to ANIK MICROSYSTEMS and post to us. **DON'T FORGET—Buy any six games at £3.99 each and pay only £19.95—SAVE £4!** Your games will be despatched within 48 hours!

## ANIK MICROSYSTEMS

30 KINGSCROFT COURT · BELLINGE · NORTHAMPTON · NN3 4BH

TEL : (0604) 411013

Post to: ANIK MICROSYSTEMS · 30 KINGSCROFT COURT · BELLINGE · NORTHAMPTON · NN3 4BH

Please send me the following games: \_\_\_\_\_

I enclose my cheque/P.O. for £ \_\_\_\_\_

Name \_\_\_\_\_

Address \_\_\_\_\_

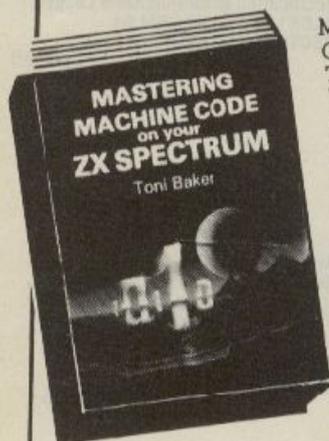
Tel: (day) \_\_\_\_\_

Tel: (eve) \_\_\_\_\_

# At last!

# MASTER MACHINE CODE

## on your Spectrum



### MASTERING MACHINE CODE ON YOUR ZX SPECTRUM

Toni Baker £9.95

This 315-page book is designed to teach you the essential elements of programming in machine code.

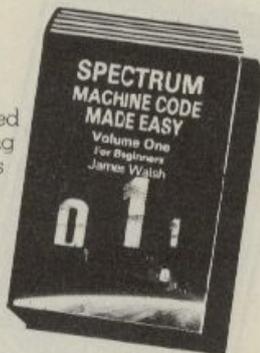
Written by Toni Baker, author of the highly successful 'Mastering Machine Code on the ZX81', this new book assumes absolutely no previous knowledge of machine code whatsoever, and yet promises to take you to a level of proficiency beyond your wildest dreams. Starting with simple addition and subtraction you'll be slowly guided through the entire subject of machine

code. The book explores and utilises the incredible speed of machine code, giving you real time graphics games like BREAKOUT and leads you up to a full working DRAUGHTS program. Among other useful skills you'll acquire the ability to create music in real time (impossible in BASIC) and to plot in high-resolution graphics faster than you would have believed possible.

### SPECTRUM MACHINE CODE MADE EASY

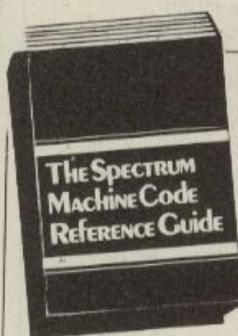
Volume One — James Walsh  
Volume Two — Paul Holmes

These two books provide a graduated course in machine code programming on the ZX Spectrum. Book one starts off with the basic concepts of machine code, followed by an explanation of binary maths, hexadecimal and base conversion, leading as quickly and painlessly as possible onto the rules and types of addressing the Spectrum's



powerful Z8C microprocessor. Book two is designed for those who already understand the rudiments of machine code programming; and now wish to increase their skills.

Each book is just £5.95



### THE SPECTRUM MACHINE CODE REFERENCE GUIDE

Microdrive, Interface 1, and ROM Disassembly

Richard Ross-Langley £4.95

This 170-page reference work for Spectrum machine code programmers contains a full disassembly of the Spectrum ROM, with details of the Microdrive and Interface 1.

Features of the disassembler include: Zilog mnemonics are used, eg LD A, (HL) instead of MOV A, M; relative jumps show the signed decimal offset and the result; hex values are default and are printed without suffix; decimal values are preceded by a plus or minus sign; and some restart instructions are followed by data bytes. The absolute addresses of all system variables and several important routines have been named, using where possible the standard names shown in the manual. The chapter headings in the Microdrive/Interface 1 section of the book include the RS232 Interface; Microdrive Channel data; Local Area Network; Network Algorithms; System Variables; and a summary of functions. **This book is a must reference work for serious Spectrum machine code programmers.**

Interface Publications, Dept. YC, 9-11 Kensington High Street, London W8 5NP.

Please send me the following books. I enclose £ \_\_\_\_\_

- Mastering Machine Code on your ZX Spectrum — Toni Baker — £9.95
- Spectrum Machine Code Made Easy, Volume One for beginners — James Walsh — £5.95
- Spectrum Machine Code Made Easy, Volume Two for advanced programmers — Paul Holmes — £5.95
- The Spectrum Machine Code Reference Guide — Richard Ross-Langley — £4.95
- Creating Adventures on your ZX Spectrum — Peter Shaw and James Mortleman — £4.95
- Putting Your Spectrum to Work (includes 15 major programs, including a word-processor and spread-sheet calculators) — Chris Callender — £4.95
- Creating Arcade Games on the ZX Spectrum — Daniel Haywood — £3.95
- Programming Your ZX Spectrum — Hartnell/Jones — £6.95
- 60 Games and Applications for the ZX Spectrum — David Harwood — £4.95
- Beyond Simple BASIC — Delving Deeper into your ZX Spectrum — Dilwyn Jones — £7.95

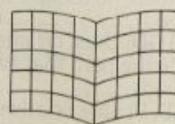
- Instant Spectrum Programming (tape and book) — Tim Hartnell — £4.95
- 20 Simple Electronic Projects for the Spectrum — Stephen Adams — £6.45
- Giant Book of Computer Games — Tim Hartnell — £7.95

Name: .....

Address: .....

**INTERFACE**  
**PUBLICATIONS**

**We're the experts!**



All books available from computer and book stores, including WHSmiths, Menzies, and Dixons.  
Trade supplied by: The Computer Bookshop, 30 Lincoln Road, Olton, Birmingham B27 6PA (021 707 7544, telex 334361).

## Joystick and Interface

for Sinclair Spectrum with these features to give you endless hours of enjoyment.

1. Super positive response fire button.
2. Firm suction cups for stable one hand operation.
3. Snug fit hand moulded grip.
4. Additional fire button.
5. Extra long 4 ft lead.

The interface supplied with the Quick Shot <sup>TM</sup> has a two joysticks facility.

The first port simulates 6789 & 0 keys. The second port simulates in (31) command. It will run any Software.

1. Using keys 6, 7, 8, 9 and 0.
2. Having redefinable key function.
3. Using in (31) i.e. Kempston.
4. Any Software you write yourself.

# A New Dimension in Spectrum Hardware

## Light pen

The LIGHT PEN enables you to produce high resolution drawings on your own TV screen simply by plugging into the ear socket of your Spectrum. The controlling software supplied with the light pen has 16 pre-defined instructions. You can change colour (Border, Paper, Ink), draw circles, arcs, boxes, lines and insert text onto the screen at any chosen place, you can also draw freehand. There is a feature to retain the screens and animate. On the 48K Spectrum you can retain 5 screens. You can also use the machine code on its own in your own programs, for selecting out of a menu etc. The LIGHT PEN is supplied with a control interface, to adjust the sensitivity/pen alignment.

£19.95

£22.95

## Keyboard for use with a Spectrum or ZX81

Our cased keyboard has 52 keys, 12 of which form a numeric pad. The 12 keys comprise 1-9 numeric plus full stop and shift keys, all in red, to distinguish from the main keyboard keys which are in grey, the keys contrast with the black case to form a very attractive unit. The case has been designed to take a ZX81 or Spectrum computer. 16K, 32K or 64K can also be fitted to the motherboard inside the case (81 model only). The case is also large enough for other add-ons like the power supply to be fitted, giving a very smart self-contained unit with which other add-ons e.g. printer etc. can still be used. Our ZX Professional keyboard offers more keys and features than any other model in its price range making it the best value keyboard available.

£45.00

## Spectra-Sound

The so-called speaker in your Spectrum is really on a 'buzzer'. With the DK Tronics "SPECTRA SOUND" you can generate fully amplified sound through the speaker on your TV set. SPECTRA SOUND is a very simple but highly effective add-on. This means that you no longer have a faint beep but a highly amplified sound, which can be adjusted with the TV volume control. The SPECTRA SOUND fits compactly and neatly inside the Spectrum case and is connected by three small crocodile clips.

£9.95

# dktronics

DK Tronics Ltd., Unit 6, Shire Hill Industrial Estate, Saffron Walden, Essex CB11 3AQ. Telephone: (0799) 26350 (24 hrs) 5 lines

Please send me ..... @ £.....

Please send me ..... @ £.....

Please add on £1.25 for post and packing.

I enclose cheque/PO payable to DK Tronics total £..... or debit my Access/Barclaycard No. ....

.....

Signature .....

Name .....

Address .....

Send to: DK Tronics Ltd., Unit 6, Shire Hill Ind. Est., Saffron Walden, Essex CB11 3AQ. Tel: (0799) 26350 (24 hrs) 5 lines

# LVL COMPUTERTOWN

Whether its your first computer or whether you're already an enthusiast, LVL COMPUTERTOWN offers you the quality of service you expect from experts. If you invest money, you go to a bank or a broker - a specialist who can guide and advise you on the best return for your capital. At LVL COMPUTERTOWN we're specialists too. We're there to help guide you through the micro maze, keep you up to date on innovations, help you get the best value for money, whether your computer is for you, your children or your business. Your computer can change your life - make sure you change it for the better: Come and talk to the experts and move into micros with LVL COMPUTERTOWN



## A REFLECTION OF SUPERIORITY

(WHICH EVER WAY YOU LOOK AT IT).

£39.95

- The Bell & Howell/LVL Computer Compatible Data Recorder.
- Automatic Level Control
  - Automatic Tape Stop
  - Tape Counter
  - Remote Motor Control.



### MONITORS

**BBC MICROCOMPUTER**

MODEL A .....	£299
MODEL B .....	£399
MODEL B with ECONET	£446
MODEL B with DOS ....	£469
Model B with DOS & ECONET .....	£516



**SABA 14" COLOUR MONITOR/ COLOUR TV.** £274.45

**MICROVITEC 14" Colour Monitor** £247.25

**DECCACOLOUR**  
14" Colour Monitor  
£247.25

**SANYO**  
12" Green Screen  
£102.35

# PRINTERS



£503.70



£734.85

## EPSON FX-80

An astonishing 160 characters per second, proportional spacing, quick forms tear-off, superscripts, subscripts, dot addressable graphics and down loadable character set.

## TRI-WRITER

\* IT'S A PORTABLE COMPUTER TERMINAL!  
\* IT'S A LETTER QUALITY COMPUTER PRINTER  
\* IT'S A FULL FEATURE ELECTRONIC TYPEWRITER

# SOFTWARE

DESIGNED FOR THE BBC MICROCOMPUTER

### LANGUAGES

LISP ..... £16.85  
FORTH ..... £16.85

### GAMES

Monsters ..... £9.95  
Snapper ..... £9.95  
Planetoid ..... £9.95  
Arcade Action ..... £11.90  
Rocket Raid ..... £9.95  
Meteors ..... £9.95  
Arcadians ..... £9.95  
Sliding-Block Puzzle ..... £9.95  
Cube Master ..... £9.95  
Starship Command ..... £9.95  
Snooker ..... £9.95  
Super Invaders ..... £9.95  
Hopper ..... £9.95  
Colditz ..... £9.95  
Doctor Who ..... £10.00  
White Knight II ..... £10.00  
Missile Base ..... £9.95  
Draughts & Reversi ..... £9.95

### ADVENTURES

Philosophers Quest ..... £9.95  
Castle of Riddles ..... £9.95  
Countdown to Doom ..... £9.95  
Sphinx Adventure ..... £9.95

### GENERAL

Desk Diary ..... £9.95  
Creative Graphics ..... £9.95  
Graphs & Charts ..... £9.95  
Tool Box ..... £21.00  
Record Keeper ..... £13.80  
Magic Garden ..... £9.95

### EDUCATIONAL

Business Games ..... £9.95  
Tree of Knowledge ..... £9.95  
Peeko Computer ..... £9.95  
Algebraic Manipulation ..... £9.95  
Word Sequencing ..... £11.90  
Missing Signs ..... £11.90  
Number Balance ..... £11.90  
Word Hunt ..... £11.90  
Density Circuit ..... £11.90  
Chemical Analysis ..... £13.80  
Chemical Structures ..... £13.80  
Jars ..... £11.90  
Vu-Type ..... £16.10

# BOOKS

### GENERAL

Programing for the BBC . £8.95  
Advanced User Guide . £12.95

### ACORN

Creative Graphics ..... £7.50  
Graphs and Charts ..... £7.50  
Forth Book ..... £7.50  
Lisp Book ..... £7.50  
View Guide ..... £2.50  
Into View ..... £2.50  
BCPL User Manual ..... £15.00

### BBC

The Computer Book ... £6.75  
The Book of Listings ... £3.75  
30hr. Basic ..... £5.95  
Beyond Basic ..... £7.25  
The Friendly Computer . £4.50  
Sound & Graphics ..... £7.95

ALL PRICES  
INCLUDE  
VAT.

The items featured represent a very small selection from our vast product range.

Further information of both product and services available can be obtained by telephoning or visiting your nearest LVL Computertown Dealer.

## CHESHIRE

C-TECH SOFTWARE  
184, Market St.  
**HYDE**  
Cheshire  
061 366 8223  
\* **COMPUTER CITY**  
78, Victoria Rd.  
**WIDNES**  
Cheshire  
051 420 3333  
\* **OAKLEAF COMPUTERS**  
100, Boughton  
**CHESTER**  
0244 310099

## CUMBRIA

\* **THE COMPUTER SHOP**  
56/58 Lowther St.  
**CARLISLE**  
Cumbria  
0228 27710

## ESSEX

A.C.L.  
1, Northmall  
**GRAYS, ESSEX**  
0375 79834  
BROADWAY MUSIC  
AND VISION  
Woodford Green  
**ESSEX**  
01 504 7500

## GREATER MANCHESTER

\* **LOMAX**  
8, Exchange St.  
St. Annes Square.  
**MANCHESTER**  
061 832 6167  
**WORC'S**  
SPURTREE COMPUTING  
LTD.  
Council Buildings,  
Teme Street,  
**TENBURY WELLS,**  
Worcestershire  
0584 811353/811304

## MERSEYSIDE

\* **THORNGUARD**  
46, Penaby Rd,  
**HESWALL**  
The Wirral,  
Merseyside  
051 342 7516

## NOTTS'

\* **BASIC BUS. SYS.**  
Trent Boulevard  
**WEST BRIDGFORD**  
Nottingham  
0602 819713  
**S P ELECTRONICS**  
48, Linby Rd.  
**HUCKNALL**  
Notts.  
0602 640377

LEASALINK VIEWDATA Ltd  
230, Derby Rd.

## STAPLEFORD

Notts  
0602 399484  
**OXFORD**  
ABSOLUTE SOUND  
AND VIDEO (Oxford) Ltd.  
19, Old High St, Headington

## OXFORD

## AVON

**K & K COMPUTERS**  
32, Alfred Street,  
**WESTON**  
**SUPERMARE**  
Avon  
0934 419324  
**COLSTON COMPUTER**  
CENTRE LTD.  
The Colston Centre,  
11, Colston Ave.  
**BRISTOL**  
0272 276619

## WARWICKSHIRE

**CARVELL**  
9, Bank St.  
**RUGBY**  
Warwickshire  
0788 65275

## WEST MIDLANDS

**RICHARD MORRIS**  
523, Bearwood Rd.  
Smethwick  
**WARLEY**  
021 429 1161  
**JBC MICRO SERVICES**  
200 Earlsdon Ave,  
Nth. Earlsdon  
**COVENTRY**  
0203 73813

## WILTSHIRE

**WILTSHIRE MICRO**  
CENTRE  
Unit 6,  
Central Trading Estate,  
Signal Way,  
Old Town,  
**SWINDON**  
0793 612299

## BUCKS'

**HI-VU ELECTRONICS**  
38, Church St. Wolverton  
**MILTON KEYNES**  
Bedford  
0908 312808

## SUSSEX

**C.J.E. MICROS**  
18, Brighton Rd.  
**WORTHING**  
West Sussex  
0903 213900

## ISLE OF WIGHT

**EXCELL**  
4, Foreland Rd.  
**BEMBRIDGE**  
Isle of Wight  
086 387 2578

YOUR  
LOCAL



DEALER

## HEREFORD

**KEMPSONS**  
26, St. Owen St.,  
**HEREFORD**  
0432 273480

## KENT

**KENT MICRO**  
57, Union St  
**MAIDSTONE**  
Kent.  
0622 52784  
**GRAVESEND**  
COMPUTERS  
39, The Terrace,  
**GRAVESEND**  
0474 50677

## NORTHANTS'

**M A ELECTRICAL**  
7, High St.  
**IRLINGBORO**  
N'Hants  
0933 650133

## LEICESTER

**PERCY LORD & SON**  
63, Blaby Rd.  
**WIGSTON**  
Leicester.  
0533 785033

## LINCOLNSHIRE

\* **OAKLEAF COMPUTERS**  
121, Dudley Rd.  
**GRANTHAM**  
0476 70281

## LONDON

**CANNONBURY RADIO**  
185 Upper St.  
**ISLINGTON N1**  
London  
01 226 9392  
**PAUL ELECTRICAL**  
250/2 Grand Drive,  
Raynes Park,  
**LONDON SW20**  
01 542 6546  
**WOODS RADIO**  
257, Lavender Hill,  
Battersea,  
**LONDON**  
01 228 1768

## SALOP

**MEDICOTT BROS**  
53, Mardol  
**SHREWSBURY**  
Shropshire  
0743 3060

## SUFFOLK

**S J EMERY & CO**  
10, Market Place  
**BUNGAY,**  
Suffolk  
0986 2141

## IRELAND

**EVERYMAN COMPUTER**  
SERVICES

## BALLYMONEY

Co-Antrim  
N. Ireland  
026 56 62658  
**NEWBURN**  
ELECTRONICS  
**BALLYCARRY**  
Co.-Antrim,  
09603 78330

## STAFFS

**J W BAGNALL**  
18, Salter St.,  
**STAFFORD**  
0785 3420

## KIRKLANDS

City Rd., Fenton.  
**STOKE ON TRENT**  
0782 415787

## COMPUTERAMA

59, Foregate St.  
**STAFFORD**  
0788 41899

## SURREY

\* **HASLEMERE COMPS**  
25, Junction Place,  
**HASLEMERE**  
Surrey  
0428 53850  
**P & H ELECTRONICS**  
5, The Parade,  
Reading Road,  
**YATELEY**  
Surrey.  
0252 - 877 222  
\* Spectrum Members

## LANCASHIRE

\* **P V MICROS**  
18A Water St  
**ACCRINGTON**  
Lancs.  
0254 36821  
Home & Business  
Computers Ltd.  
54, Yorkshire Street,  
**OLDHAM**  
061 633 1608  
Home & Business  
Computers (RCH) Ltd.  
73, Yorkshire Street,  
**ROCHDALE**  
0706 344654

## WALES

**IUCON**  
18, Mansel St.  
**SWANSEA**  
0792 467980  
  
**S.I.R.**  
91, Whitchurch Rd.  
Cyncoed  
**CARDIFF**  
Wales  
0222 621813

## THE COMPUTER SHOP

41, The Hayes,  
**CARDIFF,**  
Wales.  
0222 26666

## SCOTLAND

**COMMSCOT**  
30 Gordon St.  
**GLASGOW**  
041 226 4878

## NORTH LAND

**NEWTONS**  
Main St.  
**SEAHOUSES**  
0665 720307

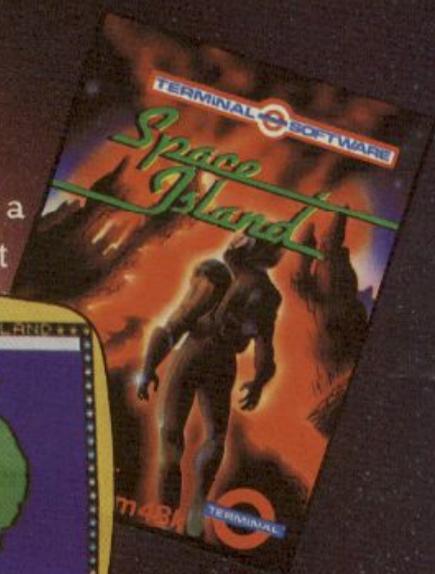
# TERMINAL SOFTWARE

## VAMPIRE VILLAGE

In a ruined castle near the village of Vladsdorf lurks a vampire who roams by night.

As mayor you must organise volunteers to save the villagers.

This is a REAL-TIME graphic adventure and every game is different from the one before.



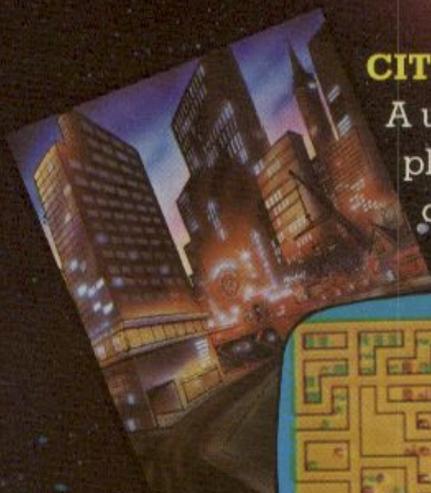
**SPACE ISLAND** Reports of a time distortion around a distant planet lead you into the strange world of an ancient civilisation that although long dead, now threatens the present.

This is a REAL-TIME graphic adventure and every game is different from the one before.

## CITY

A unique REAL-TIME better-than-a-board game for 1-4 players that combines simplicity of use with complexity of form as the city you build takes on a life of its own.

A functioning economic model for you to play while the Spectrum keeps track of the time, the money, the properties and the people.



For the

**Sinclair Spectrum 48k**

All Super Value at Rec. Price £6.95

TERMINAL

TERMINAL SOFTWARE  
28 CHURCH LANE, PRESTWICH, MANCHESTER M25 5AJ.  
TEL: 061-773 9313



# HEWSON CONSULTANTS

## 3D SPACE WARS



### 3D SPACE WARS

Fast and furious action. Joystick or Keyboard control. Locate the Seiddab on your galaxy scanner. Scour the star studded blackness for your first sight of the enemy. Track their course and react rapidly as they try to break away. Let them grow in your sights and punch the fire button as they come into range. 16K or 48K Spectrum.

**£5.95**



The Seiddab have broken through the Earth's defenses and are attacking the cities. You are patrolling the city streets in the latest Knat Tank with its surface to air missiles.

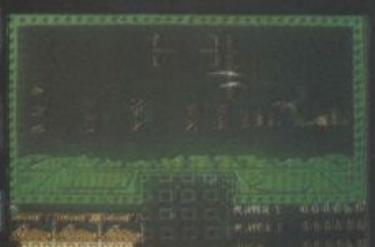
Trundling along you observe the tell tale blips of the Seiddab as they appear on your scanner. They break formation and scatter across the city. Suddenly you catch sight of an alien craft swooping over the buildings to your right. He fires a plasma torpedo at your tank. You attempt to dodge but the missile finds its mark, shaking your tank and leaving a hole in the armour.

You unleash a missile and guide it accurately to the target. The Seiddab explodes and crashes from sight. You hunch over the controls once more, because this is only the beginning...

**£5.95**

## 3D

## SEIDDAB ATTACK



This game incorporates moving 3D graphics of city buildings and alien craft. It gets progressively harder with two types of landscape, 3 lives, high score, player one and player two score.

We are on the lookout for high quality simulations for all the popular home computers. Top royalties paid. Send in your samples today for fast evaluation and prompt reply.

Selected Hewson Consultants software is available through John Menzies, larger branches of Boots, all leading micro computer retailers and software stockists.

If you have any difficulty obtaining these products locally, then mail order to HEWSON CONSULTANTS LTD., 60A, ST. MARY'S STREET, WALLINGFORD, OXON. OX10 0EL.



# The PARATROOPERS have landed

**They will make your computer  
go crazy with fear.**

*"One of the best examples of user-defined graphics that I have  
ever seen, along with excellent sound effects."*

... Home Computing Weekly

*"One of our best games yet."*

... Terry Grant, Rabbit software director

*"An obscene celebration of slaughter."*

... Home Computing Weekly

*"My Terry wouldn't do a thing like that."*

... Terry's mum

Now appearing at your local computer games shop, Boots,  
WH Smith and Rumbelows.

**THESE PEOPLE  
AREN'T NICE.  
I'M GETTING OUT  
OF HERE!**



RRP  
**£5.99**  
inc. VAT



## RABBIT SOFTWARE LTD

*Brilliant on Spectrum, VIC-20 & CBM-64.*

RABBIT SOFTWARE LTD  
Please terrify me with a copy of your catalogue  
NAME \_\_\_\_\_  
ADDRESS \_\_\_\_\_

THE WARREN (UNIT 11), FORWARD DRIVE,  
WEALDSTONE, MIDDLESEX HA3 8NU.

VC 2/P



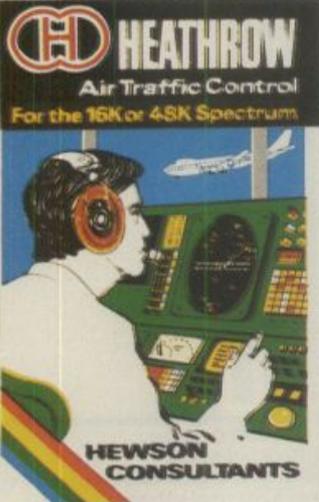
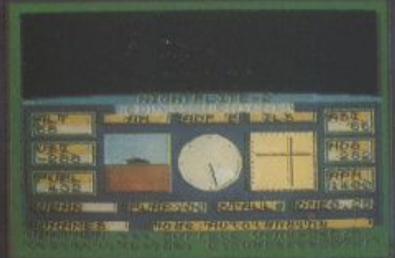
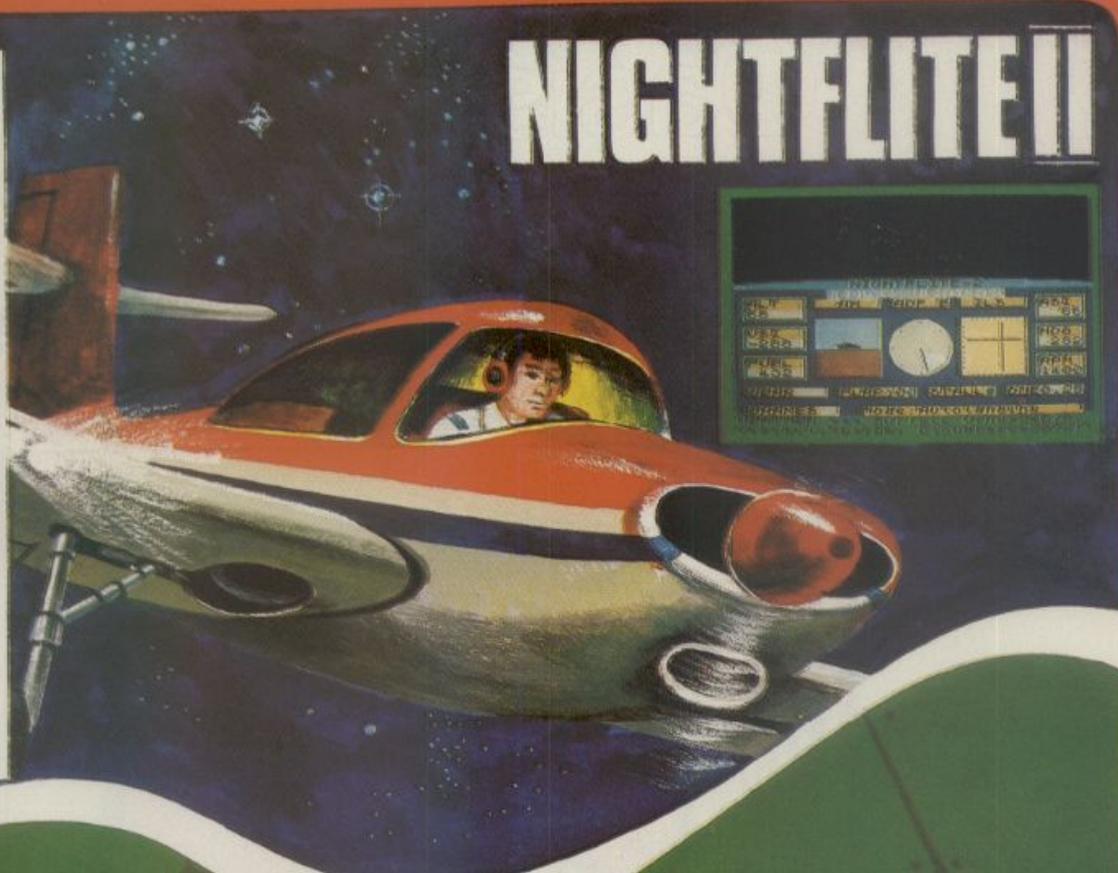
# HEWSON CONSULTANTS

## NIGHTFLITE II



New all machine code version of our highly successful flight simulator. Now with perspective cockpit view, improved instruments, detailed map, four beacons and other enhancements. Multiple levels of play to develop your flying skills. Complete with printed flight debrief at the end of your flight — signed by the program author! The most realistic simulator on the market. 16K or 48K Spectrum.

£7.95



**YOUR TASK:** to direct incoming aircraft from holding stacks to runway — smoothly, safely and expeditiously.  
**YOUR INSTRUMENTS:** Radar screen showing aircraft call signs, blips and trails. Four stack displays giving altitude, heading, speed and size.

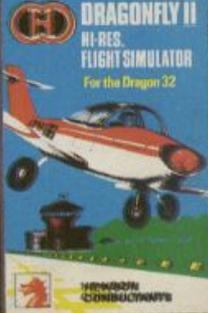
£7.95

**REVIEW QUOTES**  
... "directions are well explained"... — HCW September 13  
... "highly absorbing — very well implemented"... — WHICH MICRO September  
"Every possible variable has been programmed into this game"... — PCN July 14  
... "Immensely challenging"... — SOFT August

## HEATHROW Air Traffic Control



The most sophisticated simulators on the market



### URGENT

We are on the lookout for high quality simulation for all the popular home computers. Top royalties paid. Send in your samples today for fast evaluation and prompt reply.

- Selected Hewson Consultants software is available through John Menzies, larger branches of Boots, all leading micro computer retailers and software stockists.
- If you have any difficulty obtaining these products locally, then mail order to HEWSON CONSULTANTS LTD., 60A, ST. MARY'S STREET, WALLINGFORD, OXON. OX10 0EL.



# Oasis Software present...

## The first basic compiler for the DRAGON 32



### SPRINT BASIC COMPILER by Dr. David Gray FOR THE DRAGON 32

The Technique used is based on the approach used in U.C.S.D. Pascal where the Basic program is first reduced to intermediate code and this is then executed using a run time package which is saved with the rest of the compiled program.

- ★ Programs will run 5—10 times faster.
- ★ Almost the entire Basic is supported, with the exception of floating point commands.
- ★ Code produced will run independently of the compiler (for potential authors!)
- ★ Programs are compiled from tape under remote control so that much larger programs can be compiled.
- ★ SPRINT is designed for ease of use and a comprehensive manual is included.
- ★ Free demonstration program with each program bought to illustrate the full power of the Compiler.
- ★ All Oasis products are covered by a lifetime Guarantee.

OASIS SOFTWARE Alexandra Parade  
Weston-super-Mare Avon BS23 1QT

Please send me

SPRINT Basic Compiler £14.95

Name .....

Address .....

ACCESS orders  
taken by phone  
24 hours a day — 0934 419921

### COMING SOON .....

DRAGON PASCAL £14.95

Dragon Pascal is an extended integer subset of the structured programmed language Pascal. A few of its many features include:—

- ★ A complete set of structured programming constructs  
IF . THEN . ELSE WHILE . DO CASE . OF
- ★ COMPILER, EDITOR and SOURCE simultaneously resident for a rapid development cycle and total ease of use.
- ★ Very rapid compilation. Source can actually be compiled more rapidly than it can be listed!
- ★ Fully recursive.
- ★ Supplied complete with sample programs including routines which demonstrate techniques for simulating floating point functions such as SINE and COSINE.

## DRAGON CHESS £9.95



- ★ Six levels of play.
- ★ All legal chess moves including en-passant, castling and pawn to queen promotion.
- ★ List of previous moves stored which can be displayed or printed.
- ★ Loading and saving of games positions from tape.
- ★ High resolution graphics which can be flipped round to make black or white play from either end.
- ★ Simultaneous text and graphics.
- ★ Slides can be exchanged at any stage.
- ★ Best move hint.
- ★ Set up from any position.
- ★ Opening move library.
- ★ Moves may be taken back and play resumed from any point
- ★ Change level of play at any point in the game.
- ★ Will adjudicate games between humans.
- ★ Very high standard of play.
- ★ Professional packaging and life-time guarantee.

**Dragonchess is without doubt the best value chess on the market today. . . . MICRODEAL**

**BACKGAMMON**  
£5.95

**OTHELLO**  
£5.95

**INVADER CUBE**  
£5.95

**DOMINOES**  
£5.95



The well known game of backgammon complete with full instructions and computer demonstration for beginners.

At last. Othello or Reversi as it's sometimes known running on your Dragon 32. 2 levels of play, full instructions and computer demonstration for beginners.

As well as being one of the best games of skill written for the Dragon 32 it also has some of the best pure machine code graphics we have ever seen.

Two games in one with full instructions. Hours of frustrating fun this program has 6 levels of play and on the higher levels adapts it's play to it's assessment of your ability.

## Mind Games Compendium — All five games for just £19.95

ALL OASIS PRICES INCLUDE VAT AND P&P AND EVERY OASIS PRODUCT IS PROMPTLY DESPATCHED AND INCLUDES A LIFETIME GUARANTEE.

If your local dealer does not stock these products then let us know his address and we will contact him.

ACCESS ORDERS TAKEN BY PHONE 24 HOURS A DAY



0934 419921

OASIS SOFTWARE  
ALEXANDRA PARADE  
WESTON-SUPER-MARE  
AVON BS23 1QT  
TEL 0934 419921

Please send me

DRAGON CHESS	£9.95 <input type="checkbox"/>
BACKGAMMON	£5.95 <input type="checkbox"/>
OTHELLO	£5.95 <input type="checkbox"/>
DOMINOES	£5.95 <input type="checkbox"/>
INVADER CUBE	£5.95 <input type="checkbox"/>
MIND GAMES	
COMPENDIUM	£19.95 <input type="checkbox"/>

I enclose cheque/PO for £  
NAME .....

ADDRESS .....

**OASIS SOFTWARE** —  
**The Company that specialise in computer utilities.**

# Personal and Profes



**MTX512: 64K RAM - £315**  
**MTX500: 32K RAM - £275**

Please phone for the address of your nearest Dealer

MEMOTECH LTD STATION LANE WITNEY OXON OX8 6BX TEL·0993-2977 TLX· 83372 MEMTEC G

# Professional



## The All-Purpose System

The MTX Series is a new departure in micro-computer technology. Whether your needs as a user are for personal programming, games playing, scientific or process control, educational or business use the MTX Series is already capable or very easily adaptable to almost every application. Glance through the standard features below - you'll see what we mean.

### Hardware - 32K RAM on the MTX500, 64K on the MTX512.

The MTX500 has 32K of user RAM as standard (64K on the 512), expandable to 512K plus 16K of video RAM, controlled by a separate Video Processor. Sixteen colours, 40 column text, 256 x 192 high resolution graphics with all sixteen colours available, and 32 easily moveable user defined graphics characters (Sprites) combine to make effective screen displays quick and simple to achieve. Standard outputs are centronics printer port, two joystick ports, an uncommitted I/O port, 2400 Baud Cassette port, separate TV and Video Monitor ports, 4 channel sound with hifi output plus a dedicated cartridge port. Other standard features include the Z80A processor running at 4MHz, real time clock, full moving key keyboard with 79 keys including eight 2-function keys and separate numeric pad.

### Software

The MTX's 24K ROM contains several languages and routines which enable the novice or the experienced programmer to make full use of the machine. Standard languages are MTX BASIC, MTX LOGO commands, NODDY. ROM routines include an ASSEMBLER/DISASSEMBLER with screen display of the Z80 CPU registers, memory and program, which can be manipulated from the keyboard. Machine code programs can be stepped through one instruction at a time, and easily called from within BASIC programs. A further feature is the Virtual Screen facility which enables the programmer to split the screen into a maximum of eight sections to work independently whilst maintaining all full screen facilities. Pascal is available as an add-on ROM pack.

### The Disc Based Computers from Memotech

Designed to use the full power of the MTX computers the FDX and HDX make perfect business systems at prices which make perfect business sense. Both feature the CP/M operating system, giving instant access to a wide range of proven application software.

Available in October these feature:

- Full Western Digital floppy disc controller set with SASI interface for 4 drives, CP/M types 0-13.
- minimal latency, very high data transfer rates
- optional Colour 80 Column Board
- optional Silicon Discs (1/4 Mb) which dramatically increase the efficiency of 8 bit software to those of 16/32 bit software; increases life and reliability of mechanical drive
- permits single disc CP/M operation

### FDX - Floppy Disc System

1 or 2 5 1/4" Qume drives 500K unformatted, 347K formatted,

### HDX - Hard Disc System

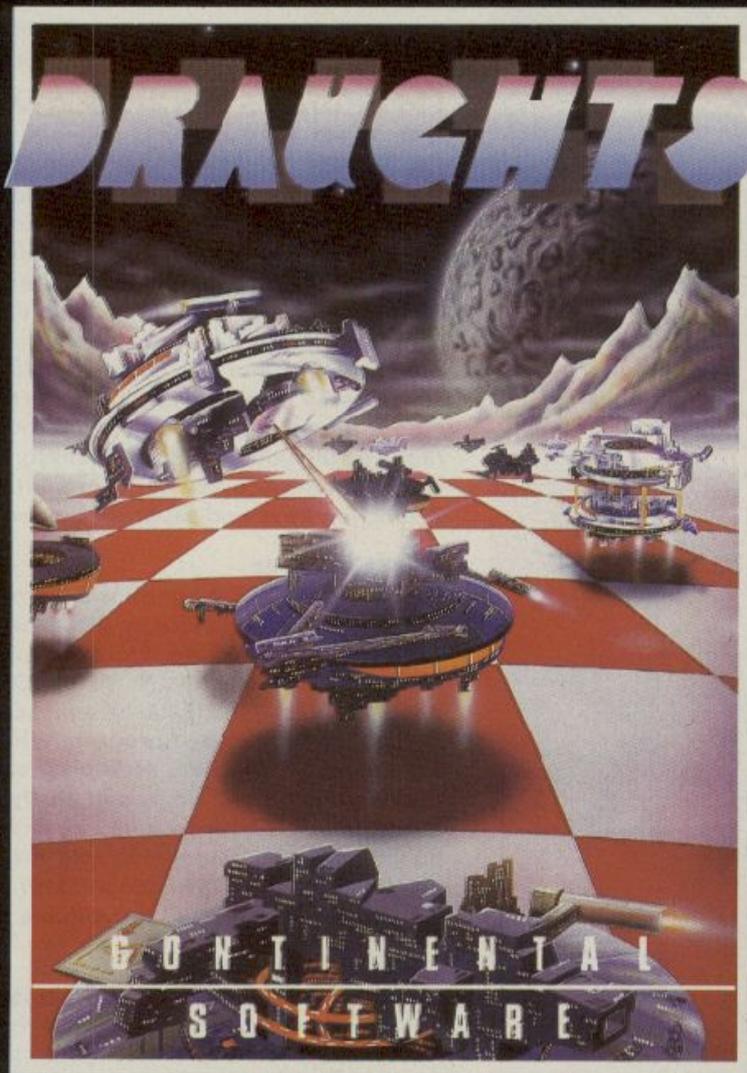
5 1/4" Qume drive, 500K unformatted, 347K formatted,  
5 1/4" Winchester which may be 5, 10, or 20 Mb

All Memotech products are designed and manufactured in Oxfordshire, England

CP/M is a trademark of Digital Research Inc.

**MEMOTECH**  
**MTX**  
**SERIES**

# CONTINENTAL SOFTWARE



## We're not just playing games...

### BLOBBO

A fast maze chase with untold perils and hazards.

### TOADO

Get the toad back to his nest - but don't get run over or drown on the way.

### SUPER MINEFIELD

You may have seen other Minefield games but ours has tanks that lay invisible mines, and spiders that are very tricky to avoid.

### CONTINENTAL INVADERS

Classic arcade action, with all the features that make this game so popular.

### KILOPEDE

This one is very fast - its not easy to get past level two.

### RADAR/SONAR

Eliminate submarines with a combination of radar screen and sonar, very realistic.

### FLIGHT SIMULATOR

Take off, navigate and land your high powered light aircraft. All the features of true flight.

### ALSO AVAILABLE:

RESCUE, BEAVER, CONTINENTAL RAIDERS, PILE UP, SIGNAL MAN and many more.

## we mean business too.

### MTXCALC

Sophisticated and powerful, the professional spreadsheet program.

### MTX WORD PROCESSOR

All necessary features are included to give a powerful business tool.

### ACCOUNTING PACKAGE

Sales and Purchase Ledgers, stock control, payroll - the complete business system.

### PROJECT PLANNER

Speaks for itself, and helps you achieve deadlines efficiently and effectively.

### STRATEGY BOARD GAMES

CHESS, BACKGAMMON, OTHELLO, DRAUGHTS.

### EDUCATION PROGRAMS

MATHS 1 PHYSICS 1

The first two programs in a series of specially written software designed to teach at the pace and level best suited to the user.

CONTINENTAL SOFTWARE UNIT 24 STATION LANE WITNEY

Software for the  
**MTX**  
SERIES

# The problems of looking after your Micro...

As well as providing the solution to many a problem, Micro's however do present more than a few of their own.

Like how do you prevent it gathering dust when not in use, stop it from getting kicked when Mum's cleaning the lounge, divert the dog from showing it his affections, or even ensure it at least "arrives" safely when Dad decides to take it down to the local.

We at P.A.S. realising these needs, have now developed a range of three superbly made protective cases designed specifically for Micro's.

Each case is constructed from Solid Resin Fibreboard has a fully protective foam lining a carrying handle internal retaining strap, a double snap-fastening lid and a price that defies even Micro logic.



HC/A  
**£19.49**  
INCL. VAT  
and P & P



HC/2  
**£16.75**  
INCL. VAT  
and P & P



HC/1  
**£13.25**  
INCL. VAT  
and P & P



**PAS COMPUTER PRODUCTS LIMITED**  
UNIT 18, CENTRAL TRADING ESTATE,  
STAINES, MIDDLESEX TW18 4UX.  
Telephone Staines (STD 0784) 62781

Please help, I am a long suffering Micro owner and wish to purchase ..... case/s (tick appropriate box)

HC/1  HC/2  HC/A

I enclose cheque/P.O. to the value of .....

NAME .....

ADDRESS .....

Please allow 21 days for delivery. Trade enquiries welcome.

CASE HC/1 Takes Micro's - ZX81, ZX Spectrum, Oric 1, CGL M5. CASE HC/2 Takes Micro's - VIC20, BBC 'B', Commodore 64, Texas TI/99, Oric 1, Dragon 32, Colour Genie, Sharp MZ700, Acorn Electron, Lynx, Tandy Colour, Atari 600XL, Acorn Atom. CASE HC/A Can be adapted to take any of the above computers and various accessories such as Tape Recorder, printer etc.

# YOUR LETTERS

## THE ROAR OF THE DRAGON

While I agree that the single sound on the Dragon is a limitation, the comparison with the other machines — First Bytes, November — is decidedly unfair on the Dragon.

The table shows three machines with single channels — Spectrum, Oric and Dragon — of which only the Dragon gets the comment "poor". True, the Spectrum has white noise and the Oric has some nondescript predefined sounds, but only the Dragon produces the sound via the TV, rated as a distinct advantage in the accompanying text.

Further, the text points out the difficulties arising from the many necessary parameters in the more complex systems with the envelope facility and wishes "that you could just use musical notation, and say how long you want it to play for". In fact, this is just what the Dragon Play command allows: notes are entered as A, B... etc. — or even 1 to 12 for 12 tone composers — sharps can be programmed using a hash symbol as near the real musical symbol as makes no difference although flats only come with a "."; note lengths and rests are in whole, half, quarter etc. values as in music and the "." has the usual musical conotation.

Volume and tempo — which have no absolute musical notation — can be easily defined. Indeed, apart from programming music, this flexibility makes it possible to program different arbitrary sounds.



F G Holliman, Harrogate.

## SKYSHIELD

Referring to Sky Shield program in the December issue, there are twelve numbers missing. They read as follows:

Address	Value
10240	134
10241	8
10242	51
10243	195
10244	48
10245	0
10246	31
8514	0
8515	240
8516	37
8517	244
8518	57

A M Richards,  
Haywards Heath,  
Sussex.

## BETTER STOMP

Having recently bought DK-Tronics Centipede, I was amazed to find a superior program in November issue of *Your Computer*.

Maggot Stomp by J Charlesworth continues *Your Computer's* trend of providing professional quality software for the Spectrum.

To make the game slightly more playable, if you

POKE 31435,0

then the maggot returns to the top of the screen once it reaches the bottom.

On the machine code: I notice J Charlesworth uses the powerful Z-80 instruction LDIR, but further savings could be made in the keyboard subroutines. Instead of, for example:

```
IN A,(c)
AND 16
CP 16
JR Z,d :
```

to mask off one key,

```
IN A,(c)
BIT 4,A
JR NZ,d
```

does the same with a 2 byte saving, etc.

E A Kissack,  
RAF Wildenrath.

## SAVE BYPASS

Here is the answer to a problem that seems to have been irritating some Spectrum programmers, recently, ie: how to by-pass the cassette-saving message during multiple Saves.

Simply precede each Save with Poke 23736,181 ie.,  
1000 FOR a = 1 to 5: PRINT a : SAVE n\$(a) : PAUSE 150 : PCKE 23736,181 : NEXT a

The first Save is normal, that is, the message "Start tape, then press any key" is Printed, and you must press a key, but all subsequent Saves are automatic.

The Pause 150 simply allows a three-second gap between recordings. The Poke is not permanent; after each Save, the operating system re-writes the normal value back into 23736.

It works by altering the pointer in Chains storing the address of the keyboard input subroutine, so that the routine is entered several bytes further forward into the routine, at a point normally reached only after a normal, valid key press, so that as far

as the Save command is concerned, you have just pressed a key, so the message is cleared and Saving starts immediately.

This is therefore a neat, simple solution to an irritating problem.

You may also be interested to know that the Sinclair Spectrum manual is incorrect in stating that a Pause may be terminated by a key press only after the Pause has started. Try this:

```
10 For a = 1 TO 100 : NEXT a :
PRINT "Loop done"
20 PAUSE 0
30 PRINT "PAUSE TERMINATED"
```

If you Run this program, and press a valid key during the For/Next loop, the Pause will wait exactly one interrupt then terminate.

On entry to the Pause routine, the programmer ought to have reset bit 5 of Flags — bit 5 = 1 when a valid key code is in the key buffer — so that only subsequent key presses could terminate a Pause, instead of previous ones.

The cure is simple: precede your Pause with Pause 1. Add this line to the above program, and all will be well.

15 PAUSE 1

Michael J Sims,  
Dundee.

## VARIABLE SAVE

While writing an adventure program I discovered a method of Saving a program's variables. This may be of special interest to D A C Patrick in December's Response

Frame. This works by moving the beginning of the Basic program stored in the system variable program to the beginning of the variables stored at Vars. This effectively makes the program lines disappear, though the program still runs as the current line is stored elsewhere in the memory. The program is then Saved on tape i.e. only the variables. Next the Basic program is returned so the program can continue.

To load the variables use the instructions:

```
MERGE "name"
20 GOSUB 1000 : REM SAVE
1000 REM SAVE ROUTINE
1010 LET PK1 = PEEK 23635: LET PK2
= PEEK 23636: POKE 23635,
PEEK 23627: POKE 23636, PEEK
223628: SAVE "name": POKE
23635,PK1: POKE 23636,PK2
1020 RETURN
```

Line 1010 must not be split up.

Michael Horner,  
Horsforth,  
Leeds.

## 3D ON 16K

Not wishing to see 16K Spectrum owners missing out, I would like to point out that Ian Brissenden's 3-D graphics plotter will work on a 16K Spectrum, not just on a 48K machine.

I was interested by his point on integers, and so decided to investigate. The following program and print out explain the anomaly: that when  $x=1$ ,  $INT(X)=0$ , but only in some cases.

## 'OVER-CAUTIOUS' ON BREAK-IN

With reference to the letter from Mr J Keery, December *Your Computer*: There is a very simple solution to improve Response Frame without further cost or drastic change on the part of *Your Computer*.

Merely include the full address of the reader requiring information — assuming the reader is agreeable — then, should any reader, such as Mr Keery, believe they can expand on the advice given, then it would be a simple matter to write direct to the reader concerned.

My only criticism of Response Frame is the over-cautiousness displayed when dealing with queries regarding breaking in to commercial cassettes.

Response Frame, in my opinion, might just as well answer this type of query honestly and give the details required for two very good reasons:

First, the fear that copyright will be breached is somewhat unfounded. Anyone who wished to copy tapes for profit would not approach any computer magazine to ask how! In any case there are many cassettes available for just that purpose.

The second reason is that any reader who innocently writes to ask how to break into a cassette, hoping to learn better programming techniques, has probably not reached the level of programming skill needed to make use of the information so gained. Take for example that popular tape for the Spectrum, the Hobbit. It is not difficult to break in and in fact it only takes slightly longer to break in than to load it normally. Thus an inexperienced programmer who has been told how to break in to such a tape has two choices, either forget it or learn machine-code and tackle it.

I would suspect that the writers and publishers of such a tape would be more concerned about wholesale illegal copying of their product than someone breaking in to it to find out how it was written.

P Sutton, Brighton, Sussex.

In this case the Spectrum stores the number in five byte floating point format, ie., to see what the number is we apply:  
 $\text{number} = m \times 2^e$   
 where  $m$  is the mantissa ( $1 > m > 0.5$ ) and  $e$  is the exponent (a whole number, byte value -128)

To avoid to much waffle see Chapter 24 of the Spectrum Manual. As will be seen from the print out when  $n=1$  the exponent is 128 and the mantissa is 0.9999999999999r.

Therefore  
 $n = 0.9999999 \times 2^{(128-128)} = 0.9999999 \times 1$   
 $\text{INT}(n) = 0$

To get around this in a program use:  
 PRINT INT VAL(STR\$(X))

T Deacon,  
 Leicester,  
 Leicestershire.

## LYNX GREEN BANK

The following short program is for the 48K Lynx and demonstrates the power of the alternative green bank of screen memory for animating graphics.

Other effects can also be obtained by replacing line 280 or 300 with either OUT &008C,4 or OUT &0080,20 or OUT &0080,8.

```

100 CLS
110 INK CYAN
120 DPOKE &6292,&A000
130 CLS
140 LET X=0
150 FOR J = X TO X+3.142/4 STEP
    0.017
160 LET A = 18* SIN(J), B = 60*
    COS(J)
170 MOVE 70-A, 120-B
180 DRAW 198-A, 120-B
190 MOVE 200-A, 120-B
200 DRAW 200+A, 120+B
210 NEXT J
220 LET X = X + 3.142/4
230 IF FRAC (2*X/3.142) = 0 THEN
    DPOKE &6292,&A000
240 ELSE DPOKE &6292,&C000
250 IF X <> 3.142 THEN GOTO 150
260 DPOKE &6292,&C000
270 PAUSE 1300
280 OUT &0080,2
290 PAUSE 1300
300 OUT &0080,16
310 GOTO 270
    
```

John Wilkinson,  
 Crawley,  
 West Sussex.

## CORRECTIONS

A couple of corrections for January's issue: the listing for the Spectrum Clone in January's Software File is correct but the instructions for running it need a little more explanation. When you typed in Goto 120 and have pressed Enter the program will Poke the machine code data into the Ram statement and then stop at line 160. Now delete lines 120 to 160 inclusive and save the program. It will now run without throwing up the error message "Ramtop No Good".

Lines 500 to 600 in the ZX81 Plane Annoying program, January, have been corrupted. The correct lines are given below.

```

500 CLS
505 LET A$="124"
510 PRINT "BOARD DIVISIONS AVAI
TABLE."
520 PRINT "1 10 X 16"
530 PRINT "3 4 X 4"
540 GOSUB 1000
550 LET X=VAL A$(VAL I$)
560 PRINT AT 8,0," NOW CHO
OSE MODE."
570 PRINT "1 EASY (SINGLE RO
US)"
580 GOSUB 1000
590 IF I$="2" THEN GOTO 530
600 POKE 17153,X+X*(I$="2")
    
```

FIVE YEARS AGO the first real home computer, the ZX-80, was no more than a twinkle in a thwarted watch-maker's eye-glass. In the early seventies the then plain Clive Sinclair had been forced out of the watch and calculator business by stiff competition from the Far East despite his innovations.

Now Sir Clive has announced the birth of the £399 QL. He hopes that it will grow up to be the fourth success in his happy family of computers, and the days when the Japanese could frustrate his ambitions in the field of electronic time-pieces seem so far off it is almost as if they didn't happen — and certainly couldn't happen again.

But is the QL really part of the same computing family? Its 32-bit processor, on paper at least, appears to make it the first of a new home-computer generation, an advance at least as significant as the ZX-80 breaking the £100 barrier for the first time early in 1980.

But before we are swept away in a flood of Sinclair euphoria, one should realise that the 32-bit chip that holds pride of place in the QL's specification is anchored firmly at the bottom of Motorola's 68000 range.

The 8 at the end of 68008 means that its data bus only handles eight bits at a time even though the internal architecture of the chip is the full 32. That limitation on the speed at which data can be moved in and out makes it considerably slower than the full-blown 68000 although in theory it should still be streets ahead of its nearest eight-bit rival.

All that is really only an extra enticement anyway. The real feature that will turn the QL into a success is Sinclair's name on the box — that together perhaps with the quality of the plug-in Microdrive software that comes with it.

Software will be the key to the new business

market that Sinclair aims to open up. Some say that if that is the case he has put his latest machine out on a limb by giving it a new operating system, QDos, and an incompatible Basic. The biggest-selling business software titles will not run on the QL and work has not begun on converting them.

That criticism misses the point and overlooks the classic Sinclair gamble. As with the Spectrum and the ZX-81 before it, if the QL sells in the right quantities its idiosyncracies will in turn become standards in their own right. The four programs on Microdrive cartridges supplied with each machine are Sinclair's way of tiding the QL over until the independent software houses find its volume sales irresistible and start to fight to produce programs for it. The promise of its success may alone be enough to set them writing immediately. One obstacle to that could be the price Sinclair charges for blank Microdrive tapes — he is the sole supplier.

The other thing standing between the QL and business success could be the Microdrive itself. Not only is it slower than the conventional floppy disc, its reliability has yet to be proven. Would you entrust valuable business data to a device that in a single crash could cost you more than an IBM PC? If an integral Microdrive were to break down it could be the old music centre problem all over again: the whole computer might have to be returned for repair.

Pushing the range up to the £400 mark has produced a gap at £200 that Sinclair may be eager to plug. A Spectrum with a single Microdrive, interfaces and a real keyboard would involve him in virtually no new development costs and produce a computer that would take the wind out of the sails of Oric's new Atmos.

## How to write for Your Computer

We called this magazine *Your Computer* precisely because we welcome your views, tips and hints and even your criticism of machines and software in general. If you would like to see your name in print, whether on a Software File program or a full-blooded article, here is how to go about it. Ideally, all articles should be typed double-spaced on one side only of uniform sheets of paper. If listings can be dumped directly from a printer — you can always use a friend's or user group's — this minimises the risk of error. In a perfect world a cassette would accompany the article. That considerably speeds up the checking process. Not only do you get to air your own discoveries and opinions, but we will even pay you for the privilege. We pay £35 per published page — that's as it appears in the magazine and includes illustrations.

Why not give it a try? You have nothing to lose but your postage.

Editor  
 TOBY WOLPE  
 Assistant Editor  
 MEIRION JONES

Staff Writer  
 SIMON BEESLEY  
 Production Editor  
 IAN VALLELY

Sub-editor  
 PAUL BOND  
 Editorial Secretary  
 LYNN DAWSON

Editorial: 01-661 3144  
 Subscriptions: U.K. £10.50 for 12 issues.

Printed in Great Britain for the proprietors  
 Business Press International Ltd, Quadrant House, The  
 Quadrant, Sutton, Surrey SM2 5AS. Tel: 01-661 3500  
 Telex/grams: 892084 BIPRESG. ISSN 0263-0885.  
 Printed by Riverside Press Ltd, Whitstable, Kent, and  
 typeset by Instep Ltd, London EC1.

ABC

Advertisement Manager  
 SHOBHAN GAJJAR 01-661 3127  
 Assistant Advertisement Manager  
 NICHOLAS RATNIEKS 01-661 8548

Advertisement Executives  
 NIGEL BORRELL 01-661 3660  
 JULIAN BIDLAKE 01-661 8458  
 KAY FILBIN 01-661 8484

Northern Office  
 RON SOUTHALL 061-872 8861

Advertisement Secretary  
 JEANETTE MACKRELL

Classified  
 CLAIRE NOTLEY 01-661 3036

Publishing Director  
 CHRIS HIPWELL  
 Your Computer, Quadrant House, The  
 Quadrant, Sutton, Surrey SM2 5AS.

© Business Press International Ltd 1984

# SIMPLY CREATIVE

Now available for  
**the BBC Micro  
 and ZX Spectrum**

## The RD Digital TRACER

High resolution colour graphics facilities on micros provide outstanding opportunities for creative presentation of complex or irregular images. Maps, technical drawings, illustrations, even personalities can be accurately reproduced. But full use of these facilities is inhibited by the tedious and time-consuming plotting of individual coordinates.

The RD Digital Tracer solves the problem of tedious plotting by providing genuinely instant transfer from original drawings to display file. But a Tracer does more than that...

### ● Instant Full Colour Image Transfer and Scaling

Faithful reproduction of any shape is produced on display file immediately, simply by moving the head of the Tracer over the original outline. Fast PAPER and INK colour change is provided. The software also includes an infinitely variable scaling routine.

### ● Special Constructions

Circles, lines, angles and rectangles can be rapidly sampled and applied, based on any two Tracer input points. So windows and wheels, bar charts and frames, and so on, can be added to outlines within seconds.

### ● Colour Fill and Texture

Fast colour fill, or a choice of colour hatching can be added within outlined areas on the display.

### ● Text and Symbol Positioning

Text, or user-defined symbols, can be positioned as desired, under the control of the tracing head.

### ● Display, Print, SAVE and Re-trace

Besides colour display, drawings may be printed, and SAVED on cassette (or video recorder). And with the re-trace routine amazing animated presentations can be made.

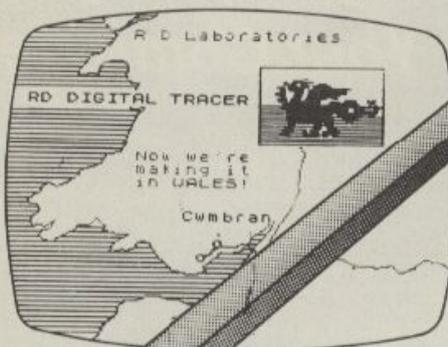
### BBC Micro Tracer

This Tracer version operates with the BBC Micro Model B, or ADC converted Model A computers. It is suitable for all colour modes including Teletext, and a "colour palette", which can be modified whilst the program is running, relieves the user of complex GCOL colour specification. Accuracy to 1% is achieved over a full A3 tracing area. Software is provided for both serial and parallel printers. The price of **£69.95** includes P&P and VAT.

### ZX Spectrum Tracer

The ZX Spectrum Tracer (compatible with ZX81) operates with all ZX Spectrum variants and accessories, including Sinclair printer and Microdrive. Original areas up to A4 may be traced with a typical accuracy greater than 2%. The price of **£55.50** includes P&P and VAT.

Unretouched hard copy from ZX printer.



The RD Digital Tracer is supplied with connector/interface, software cassette, and full instructions on use. It is available from Spectrum and other computer shops, or direct from RD Laboratories.

Please \_\_\_\_\_ Tracer(s) for BBC Micro at **£69.95** each, total £ \_\_\_\_\_  
 send me \_\_\_\_\_ Tracer(s) for ZX Spectrum at **£55.50** each, total £ \_\_\_\_\_

Name \_\_\_\_\_

Address \_\_\_\_\_

Cheque, payable to RD Laboratories Ltd, for £ \_\_\_\_\_ enclosed.

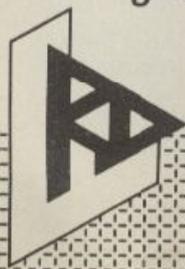
Send to: Dept YC RD Laboratories Ltd 20 Court Road Estate Cwmbran Gwent NP44 3AS. Allow 28 days for delivery.



### Economic Micro Control

RD Laboratories also supply the RD 8100 SYSTEM for automatic measurement, test and control. The modular-based RD 8100 SYSTEM is already widely used in many applications - from scientific experimentation to small-scale energy management systems.

For further product details please send your name, address and postage stamp to RD Laboratories Ltd 20 Court Road Estate Cwmbran Gwent NP44 3AS Tel Cwmbran (06333) 74333 Telex 437240



## Sinclair Quantum Leap 32-bit micro



SINCLAIR'S QL — alias ZX-83 represents a Quantum Leap in the power of home computers according to Sir Clive even if customers used to waiting 28 days and more for Sinclair products are wondering if it really stands for Quite Late.

It certainly seems worth waiting for with 128K RAM, a 32-bit central processor, two built-in Microdrives and all the interfaces — cartridge, RS-232, joystick and RGB — that Sinclair usually leaves out, for just £399. Even the keyboard is almost of typewriter quality and there are both



reset and power on/off buttons.

Also included for the money are four essential software packages for serious micro users. These are Quill — a word processor, Abacus — for planning and financial modelling, Archive — for filing which includes an electronic cheque stub and card index, and Easel — for producing multi-coloured charts.

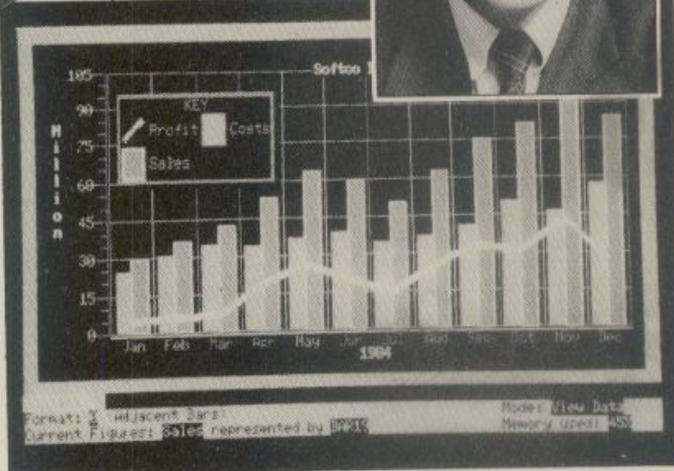
These packages were written by Psion specially for the QL and each one has a Help screen in case you get lost.

The QL is based around 68008 chip although it also has an 8049 processor to handle the keyboard, sound and RS-232.

The Motorola 68008 has a 8-bit data bus which allows it to address up to 1 Megabyte of memory instantaneously — which is just as well now that Sinclair plans a 0.5 Megabyte plug-in RAM cartridge for the QL.

The standard QL has 90K RAM free for programs which can be stored and accessed from the pair of 100K Microdrives built in to the QL. These are not quite the same as the standard Microdrives although

David Potter:  
Psion boss and man  
behind the QL's clever  
suite of software packages.



the plug-in Microdrive cartridges can be re-formatted for use with the QL.

QL Basic, or SuperBasic as Sinclair insists on calling it, is a structured evolution of Sinclair Basic rather than a radically new language. The QL was still waiting for a final version of SuperBasic at its launch.

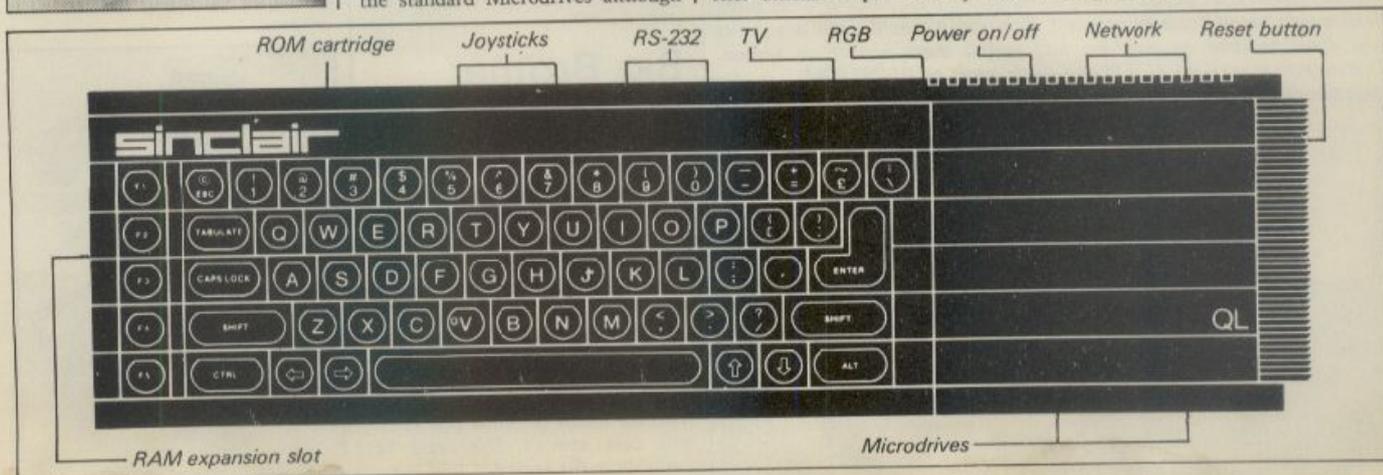
The Elan-style rubber-suspended keyboard is not angled towards the user but plastic legs click uncertainly into the base to provide the angle.

At £400 the QL will give the BBC Micro a hard ride although its lack of IBM compatibility may make businesses think twice before buying one. Sinclair hopes that by sheer

weight of sales the major software houses will have to write packages to suit his QDos — get it — operating system for the QL.

Neither the Spectrum nor the ZX-81 will stop production for some time and Nigel Searle — Sinclair's managing director — is saying nothing about price cuts.

The QL brochure promises "the performance of a mini-computer for the price of a micro" but then Sinclair's advertising used to suggest that the ZX-81 was suitable for running power stations. Teething troubles and delays permitting the QL will set new standards in its price range without any need for exaggeration.



## Say hello to your friendly robot chums Topo and Fred — Prism's articulate Androbots



MEET THE ANDROBOTS — cheerful pint-sized Fred and big brother Topo. "Androbots are designed to be friendly personal robots. They can 'think', talk, move, teach, learn. And grow." — or so it says in the sales brochure.

It modestly describes FRED — the £200 Friendly Robotic Educational Device as "your computer's personal creative genius". Funny — I always thought that was me. Big Brother Topo apparently becomes part of the family. And like any member of a family Topo will develop his own personality."

In reality, although Fred looks like a Cyberman sawn off at the shoulders, he is a type of turtle or buggy which you can remotely control with a TV-style infrared handset. You can either enter commands directly or connect an infrared controller to your micro and put Fred under program control. Fred has an integral pen holder to trace out where he's been and a voice synthesiser with a vocabulary of 45 barely distinguishable words.

Prism, the big computer distributors, are developing versions of Fred for the Spectrum and other home micros. The publicity for Fred and Topo claims that "it won't be long before an Androbot can mix you a drink, fetch your slippers and

then perhaps settle down to a quiet evening's ironing." But although Topo costs an over the top £1,500 it is totally incapable of doing anything of the sort at present. It is little more than a three foot high executive toy, although eventually a robot arm will be available for it.

## Marks out of ten for Oscar



WHAT DO the Pope, Pac-Man look-alikes and Sebastian Coe all have in common? Mark McCormack that's who. His International Management Group organises tours and commercial deals for all sorts of international personalities from Michael Parkinson to His Holiness. Now McCormack is promoting an International Video Games competition with a \$100,000 first prize for the best computer game of the year and a TV Special Oscar-style award ceremony.

Centresoft has halved the price of top Atari games by adopting no-fuss Spectrum-type packaging. Now you can enjoy Zaxxon and five other top selling titles for £15 or less.

## All-singing, all-dancing computer takes hi-fi Amstrad into hi-tech

HIGH-ROLLING hi-fi giant Amstrad is about to get to grips on home computing with a £200 64K micro system including screen and tape recorder.

The company, which helped to put a stereo in every home in the

early 1970s, has built up a £50 million turnover through low prices and aggressive marketing.

Marketing manager Mr Miller is cagey about the specification of the machine, which will be launched in May, but is very confident: "What

we're going to offer will be extremely successful, we have tremendous experience in marketing."

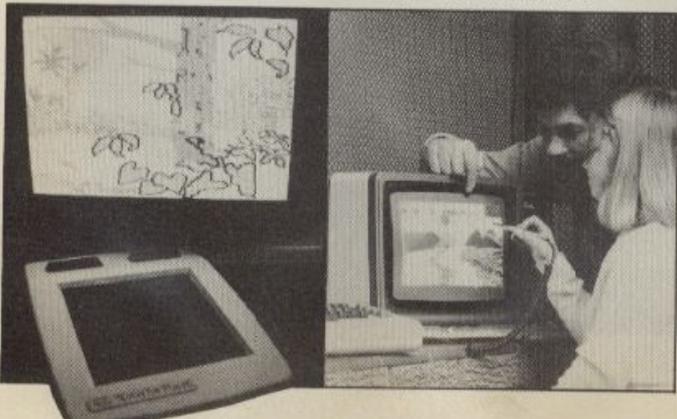
Other sources say the machine will be a Z-80 based micro with 64K RAM, 80-column screen display, proper keyboard and built-in tape recorder. There may be two versions — one including a black and white TV screen for about £200 and the other including a colour monitor for around £280.

## Big Brother remembers

BROTHER'S NEW printer to follow up where the EP-22 left off combines a high-definition 18x24-point dot matrix printer with a typewriter keyboard, RS-232 interface and 4,000 character built-in memory for storing text as you type it on the move.

You can feed the stored text back into your computer when you get home just as easily as you can dump from the micro on to the printer. It will cost around £200 and be available in the Spring.

Budding artists on the Commodore 64 are spoilt for choice. The Computapix Pixstik, right, is a combination of light-pen and excellent software which allows you to paint on screen and make simple three-frame animations. The whole package costs £30 for pen, cassette and manual, which is a fraction of the £90 Audiogenic is charging for its more flexible disc-based Koala Painter, left. This uses a graphics pad which lets you draw pictures on your lap and watch them appear on screen. Computapix is on 0244-313778 and Audiogenic on 01-290 6044.



## TV stands up for itself

IF YOU'VE ever been thrown across the room by an electric shock when you've been reaching behind the television to plug in your computer the new Sony Trinitron KV 1430 may appeal to you. This is a TV specifically designed to be used with micros.

The screen is raised by a few inches so that you can see it over the top of your computer which plugs straight into a socket in the front of the Trinitron. The only snag is the price — £250 for a 14in. television.



## New improved Atmos kills 99 per cent of all known Oric bugs dead

ORIC'S NEW Atmos may look like a flashy portable but under its chunky typewriter keyboard lurks the old Oric 1. Only the ROM has been changed to protect the innocent.

Oric's Peter Harding claims that all those bugs in the old operating system have been ironed out and cassette loading has been much

improved. Old Oric software will still load but you first have to enter a short program from the welcome tape which comes with the Atmos and which simulates the old ROM.

Another special program will suspend the error-checking facility during loading if you suspect that all that is making the program crash is a blip in the header tape or somewhere irrelevant.

At last the other notorious fault of the Oric — the sketchy manual — has been corrected. Atmos buyers will get a full 270-page book together with a quick reference leaflet for beginners.

More than one year after the first deliveries Oric has finally put right most of the teething problems that should have been corrected before the product went on sale. Peter Harding hopes to offer people who bought the original Orics the chance to upgrade to an Atmos for about £50.

The Atmos should give the Electron and CBM-64 a tough run for their money. Although it has poorer resolution and sound than either and lacks the sprites of the Commodore and the BBC Basic of the Acorn, it has more memory available than either and at £170 is significantly cheaper.

At first sight the price is surprising since Oric 1s have been selling for as little as £130 for the 48K model recently. But Peter Harding attributes this to the January sales and attempts to clear stocks of the old model. He says Oric will not be making any more profit on the Atmos with its new keyboard, ROM, and manual than they did on the

Oric 1 — of which 170,000 have been sold around the world this year.

With the new £200 Hitachi 3in. disc drive the Atmos makes an interesting contrast to Sinclair's QL.

*What's the worst job you've ever had? This man has been touring the South of England for the last month dressed up as an astronaut to promote Microdeal's Space Shuttle game by handing out competition forms. Entrants had to put in order the factors they thought were most important in computer games. Now Microdeal is using a Dragon 32 to process the thousands of replies. So far, life-like graphics seems to be the competitors' priority which makes you wonder what they made of a man in a surplus spacesuit from the James Bond film Moonraker, driving around in a Ford Transit with a cardboard space shuttle on top.*



## YOUR COMPUTER TOP 20

Game	Company	Machine
■ Arcadia	Imagine	Vic-20
■ Atic Atac	Ultimate	Spectrum
■ Computer War	Thorn EMI	Atari
■ Cuthbert Goes Walkabout	Microdeal	Dragon
■ Gridrunner	Llamasoft	Vic-20
■ Harrier Attack	Durrell	Oric
■ Hobbit	Melbourne House	BBC
■ Hopper Goes Skiing	PSS	Oric
■ Horace Goes Skiing	Psion	CBM-64
■ Hover Bover	Llamasoft	CBM-64
■ Juniors Revenge	Dragon Data	Dragon 32
■ Lunar Jet Man	Ultimate	Spectrum
■ Manic Miner	Bug Byte	Spectrum
■ Meta-galactic Llamas	Llamasoft	Vic-20
■ Missile Command	Gemini	BBC
■ Motor Mania	Audiogenic	CBM-64
■ Scramble	Quicksilva	ZX-81
■ 3D Ant Attack	Quicksilva	Spectrum
■ Valhalla	Legend	Spectrum
■ Zaxxon	Datasoft	Atari

At last,  
the first joystick  
that puts the firing button  
where it should have been  
in the first place.

Extra responsive  
action

Diamond  
Cut 'Arcade'  
Style Grip

Trigger  
Fire  
Button

# TRIGA COMMAND

IS HERE!

Extra long  
4 ft Cord



Rubber  
Suction  
Cups for  
One Hand Operation

The Top  
American  
Joystick is  
now available in  
the U.K. . . .

To fit your **SPECTRUM**  
ONLY **£19.99** + £1.50 P+P

- Including Interface to plug straight into the Spectrum.
- The first Joystick to give you "Arcade" feel and control.
- "Jet Style" heavy duty, diamond cut grip.
- Fire Trigger placed under your index finger . . . the finger with the fastest reflex action.
- Self centring, 360° action.
- Compatible with most of the latest Software including:

- |  |   |  |   |
|--|---|--|---|
| <input type="checkbox"/> Flight Simulation | <input type="checkbox"/> Arcadia            | <input type="checkbox"/> Penetrator        | <input type="checkbox"/> Spectres           |
| <input type="checkbox"/> Manic Miner       | <input type="checkbox"/> Horace goes Skiing | <input type="checkbox"/> Atik Atak         | <input type="checkbox"/> Jetman             |
| <input type="checkbox"/> Jetpack           | <input type="checkbox"/> Slippery Sid       | <input type="checkbox"/> Brain Damage      | <input type="checkbox"/> Frogger            |
| <input type="checkbox"/> Cookie            | <input type="checkbox"/> SS Enterprise      | <input type="checkbox"/> Last Sunset . . . | <input type="checkbox"/> Blind Alley        |
| <input type="checkbox"/> PSSST             | <input type="checkbox"/> Nite Flite         | <input type="checkbox"/> Mazeman           | <input type="checkbox"/> Galactic Jailbreak |
| <input type="checkbox"/> Timegate          | <input type="checkbox"/> Meteoroids         | <input type="checkbox"/> Galaxians         | <input type="checkbox"/> Transam            |
| <input type="checkbox"/> 3D Tunnel         | <input type="checkbox"/> Gulpman            | <input type="checkbox"/> ETX               | <input type="checkbox"/> Robotics           |
| <input type="checkbox"/> Cosmos            | <input type="checkbox"/> Cosmic Guerilla    | <input type="checkbox"/> Frenzy            | <input type="checkbox"/> Armageddon         |
| <input type="checkbox"/> Cyber Rats        | <input type="checkbox"/> Kong               | <input type="checkbox"/> Astroblaster      | <input type="checkbox"/> Terminator         |
| <input type="checkbox"/> Galaxians         | <input type="checkbox"/> Armageddon         | <input type="checkbox"/> Knot in 3D        | <input type="checkbox"/> Detective          |
| <input type="checkbox"/> Spookyman         | <input type="checkbox"/> Mission Impossible | <input type="checkbox"/> Joust             |   |

NOTE: THIS IS ONLY A SMALL SELECTION OF THE MANY COMPATIBLE GAMES

Also available for Commodore / Atari / BBC / Oric / Dragon.

Item	Amount
Spectrum Triga Command	£19.99
VIC / CBM 64 Triga Command	£12.99
Atari Triga Command	£12.99
BBC Triga Command	£19.99
Oric Triga Command	£19.99
Dragon Triga Command	£14.99
Interface Unit only*	£11.99

\* To use with your own Joysticks with Spectrum

N.B All prices include Interfaces where required P + P £ 1.50

ALLOW 7 DAYS  
TRADE ENQUIRIES WELCOME  
24 HRS CREDIT CARD LINE

Sole UK Distributors

**DATTEL  
ELECTRONICS**

27 HOPE STREET, HANLEY,  
STOKE-ON-TRENT  
TEL: 0782 273815

## LEARN TO PLAY BRIDGE ON YOUR HOME COMPUTER

Enjoy learning to play bridge with Bridgemaster, a complete bridge tutor professionally prepared with world expert Terence Reese. Listen to the commentary as you are coached step by step through the game. While you listen you will learn and play bridge. Bridgemaster contains commentary and computer tapes and a useful reference book — everything you need to learn bridge.

"Bridgemaster really does bring the game alive for the beginner . . ." *Soft.*

"A really professional program . . . 100% value for money." *Home Computing Weekly.*

For the Sinclair ZX Spectrum 16/48K, Commodore 64, BBC B and Electron — **£24.95**

Sinclair ZX81 1K/16K — **£19.95**

# BRIDGE MASTER

Available from Boots and other leading computer stores or direct from Bridgemaster, Freeport, Dept. YC1, PO Box 163, SLOUGH SL2 3YY.

Prices include VAT, post and packing. Remittances payable to Bridgemaster.

## WIDGET SOFTWARE

COLOURFUL FUN EDUCATIONAL GAMES FOR CHILDREN  
WITH SUPERB GRAPHICS, SOUND AND ANIMATION

'Outstanding programs  
for infants' . . . EDUCATIONAL  
COMPUTING

### ADDING & SUBTRACTING

(Age 4-7) 16k Spectrum  
Available soon: BBC, Electron, Commodore 64

### ALPHABET

(Age 2-5) 48k Spectrum

### COUNTING

(Age 3-6) 16k Spectrum

### SHAPE SORTER

(Age 3-6) 16k Spectrum

### PATHFINDER

(Age 4-9) 16k Spectrum  
Available soon: BBC, Electron, Commodore 64

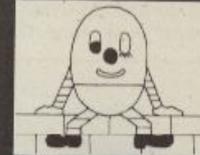
### QUICKTHINKING

(Age 6-12)  
48k Spectrum & Commodore 64

published by **MIRRORSOFT**

### THE HUMPTY DUMPTY MYSTERY.

& WHO KILLED COCK ROBIN?



WIDGET SOFTWARE  
FOR CHILDREN

48k SPECTRUM

### NEW! THE HUMPTY DUMPTY MYSTERY AND WHO KILLED COCK ROBIN? 48k Spectrum

3 colourful programs to encourage logical thinking  
Graded in from early readers to about 10 years

ALSO AVAILABLE FROM



AND WHSMITH

Please send me by return

NAME (block caps)

YC

	SPEC	C-64
Add & Subtract	5.25	
Alphabet	5.25	
Counting	5.25	
Shape Sorter	5.25	
Pathfinder	5.95	
Quickthinking	6.95	
Humpty Dumpty	6.25	
Catalogue		

ADDRESS \_\_\_\_\_

Enclose cheque/PO for \_\_\_\_\_

WIDGET SOFTWARE, 48 DURHAM ROAD, LONDON N2 9DT

# I could do that...

Write a program to work out and print Pascal's Triangle. Each number is derived by adding the two numbers above it, so that the first four lines will be:

```
1
11
121
1331
```

December's *I Could Do That* problem asked for a program to perform a binary search. Most entries adopted the same technique of repeatedly chopping the array to be searched in half until a match is found. The first program to be picked from the hat came from C Bish, 35 Manor Park, Clyst St Mary, Exeter, Devon. It runs on a Spectrum and takes 0.25 seconds to locate an item in a file of 1000.

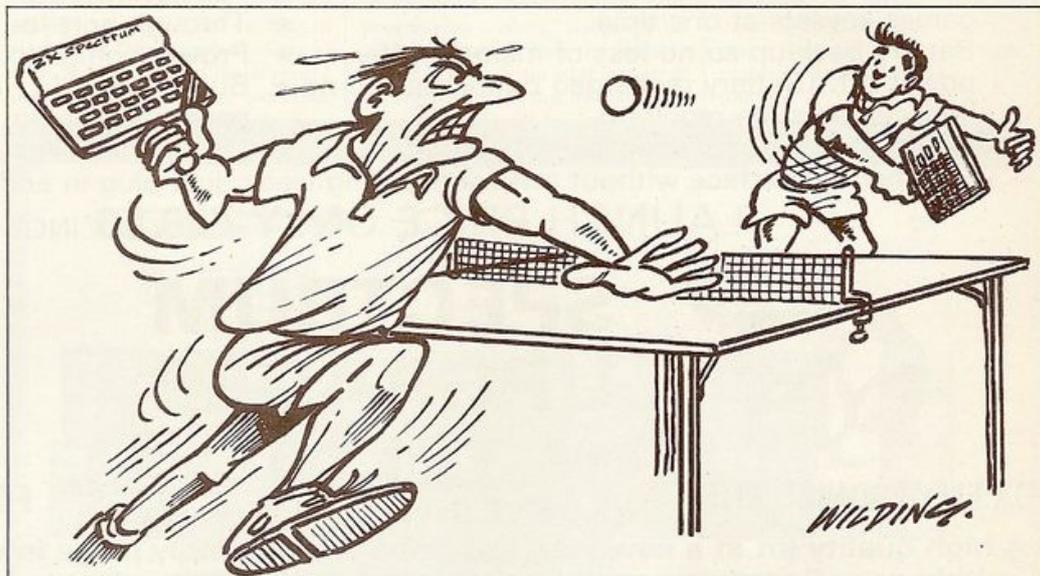
```
10 REM a$ contains 10 data it
ems
30 LET n=10: INPUT "ENTER NAME
TO FIND",t$:GOSUB 1000:IF i=0 T
HEN PRINT t$;" NOT IN FILE":GOTO
30
40 PRINT t$;" IS NUMBER ";i:
GOTO 30
1000 LET h=n: LET l=1: LET o=n+
1:IF a$(n)=t$ THEN LET i=n:RETUR
N
1001 LET i=INT((l+h)/2):IF o=i
THEN LET i=0:RETURN
1002 LET o=i:IF a$(i)=t$ THEN R
ETURN
1003 IF a$(i)<t$ THEN LET l=i+6
OTO 1001
1004 LET h=i:GOTO 1001
```

# BEGINNERS

## First bytes

Starting out in home computing? First Bytes is for you. Just write to

Your Computer with any hardware or software problems, no matter how small or simple.



## The best home micro for games playing

*"Which is the best home computer for games?"*

BEFORE ANSWERING your question directly let us consider what it is that makes one computer more suitable for playing games on than another. Broadly speaking three factors are involved: the computer's graphics and sound facilities, the amount of RAM it offers, and the number of software houses producing software for the machine.

This last factor is by far the most important and is directly related to the number of machines sold. Obviously programmers are more interested in producing software for an established best-seller than for a newly launched machine; and the more programmers there are working on a particular machine the greater the range and quality of its programs.

Time is also important since it takes programmers time to discover how best to exploit a computer. Spectrum programs being released now are markedly superior to those of a year ago.

It is for these reasons that the current range of Spectrum games is, by and large, better than its Oric counterpart. Both machines offer

comparable graphics and indeed the Oric's sound facility is more powerful than the Spectrum's. But the Spectrum has been on the market longer and sells in far greater numbers.

Provided they reach a minimum standard — say 256 by 192 pixel resolution together with eight colours — a micro's graphics capabilities play only a minor part in deciding the quality of its games. Some highly playable games have been written for the Vic-20 despite its relatively humble graphics capability.

Clearly the greater a computer's pixel and colour resolution the greater the potential will be for writing games of arcade quality. But that potential needs programmers to exploit it.

The BBC micro is a case in point. It has the finest graphics of any home computer under £500 and has some excellent games to prove it; Acornsoft's Snapper for example is probably the best home computer version of Pac-Man.

But only few of the recent games have matched the standard of Acornsoft's first batch of programs and the range of games for this micro does not compare with that of its

nearest rival, the CBM-64.

The CBM-64, however, provides nearly four times as much RAM as the BBC for high resolution games. So memory is also a factor here. Many of the more imaginative games require more than 16K. Manic Miner, for example, only runs on the 48K Spectrum and could not be converted for the BBC. It boasts 20 different screen display and takes 1K to store the details for each screen.

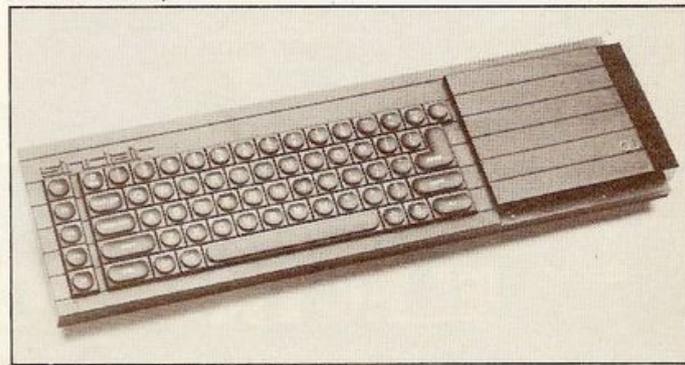
As indicated, the 48K Spectrum is undoubtedly the best machine under £150 for games. Its drawbacks are

that its keyboard is unsatisfactory and will need to buy an interface if you wish to use joysticks.

In a higher price bracket you should consider the Atari range or the Commodore 64. Games for the Atari like Star Raiders, Eastern Front, and the recent Pole Position would probably find a place in an all-time games top ten. Unfortunately, most of these come on cartridges which are substantially more expensive than tape.

After a slow start games are now flooding in for the CBM-64.

*Starting with a clean sheet — what will games programmers be able to achieve on the new Sinclair QL with its fast 32-bit processor and massive memory?*



# PRODUCTS FOR THE VIC-20 + SPECTRUM

## SPECTRUM OWNERS! NOW AVAILABLE

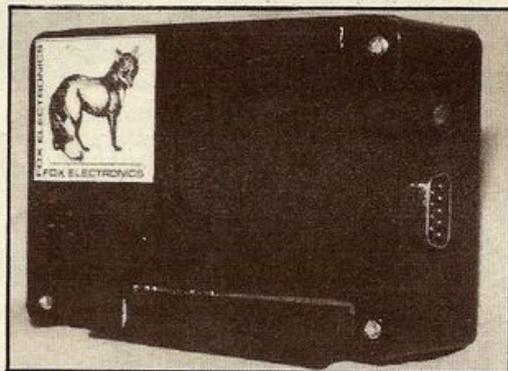
### THE ULTIMATE IN JOYSTICK INTERFACES

THE FOX PROGRAMMABLE INTERFACE —  
AN INTERFACE WITH:

- ★ Complete compatibility with all programs.
- ★ In-built memory to store up to 16 different games keysets at one time.
- ★ Battery back-up so no loss of memory after power off. (Battery recharged during use so no replacements are required).
- ★ One switch only for simplicity of use.
- ★ Full casing.
- ★ Through port for further expansion.
- ★ Proven compatibility with the microdrive
- ★ Built-in pseudo Rom facility with room for personnel tool kit.
- ★ Compatible with all Atari-type joysticks.

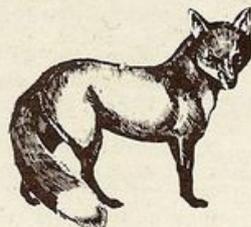
The superior interface without awkward trailing leads, just plug in and start your game.

LAUNCH PRICE ONLY **£28.50** INCL



## SPECTRUM UPGRADES

ONLY **£21.00**



FOX ELECTRONICS LTD.

INCLUSIVE (Issue 2 machines only)

FOX ELECTRONICS LTD.

A high quality kit at a new low, low price which simply plugs into existing socket within your Spectrum, no soldering is required and step by step instructions are supplied. Takes your 16K to 48K in simple steps.

**PROBABLY THE BEST KIT AVAILABLE AT DEFINITELY THE LOWEST PRICE**

## AND FOR THE VIC-20

### Vixen RAM Cartridge

Switchable between 16K or 8K + 3K.

Gives you the option of full 16K RAM or 8K and 3K RAM in one package. When added to a standard VIC-20 gives 16384 bytes of extra memory in memory blocks 1 and 2 or 3092 bytes of extra memory into the 3K memory block AND 8192 bytes of extra memory switchable between memory blocks 1 and 3

- Fully compatible with available motherboards/modules.
- Simply plugs into the rear expansion port of computer.
- No re-addressing of existing BASIC programs needed.



**Only £34.95**



SEND NOW TO

**FOX  
ELECTRONICS**

141 ABBEY ROAD, BASINGSTOKE, HANTS. TEL: 0256 20671

CALLERS  
WELCOME

Please send me:—

- Joystick interface  Name.....  
Spectrum upgrade  Address.....  
Vixen Ram   
Catalogue

I enclose £.....

## Debugging

MOST OF THE PROBLEMS people encounter in keying in magazine listings are of their own making. It is difficult to key in a long listing without making a single mistake and of course a single mistake — such as confusing a O with a 0 or missing out a comma — is usually sufficient to crash the program. Admittedly the listings themselves are sometimes error-ridden but in *Your Computer* these are rare.

However, if you know how to interpret error messages tracking down a problem in a listing can be fairly simple. This in turn reduces to knowing where to look for an error. Perhaps the most common mistake made by beginners is to assume that the program bug must be at the line referred to by the error message.

Take the following line for example:

```
40 FOR N=1 to 20: READ D. B(N)=D: NEXT
```

When the computer executes this line it expects to find 20 Data items which it can read into the variable D. If the Data statement does not contain enough items or holds a letter instead of a number your program will crash at line 40 — despite the fact that the fault lies elsewhere.

The error message may "Insufficient Data" which is clear enough but it is equally likely to be something more obscure like "Integer out of range" or even — on Sinclair machines — "Nonsense in Basic".

Naturally enough the solution here is to check your Data statements. If these are numerous you may be able to trace the fault to a particular Data statement. Type in Print N directly from the keyboard and you will be able to work out

# BEGINNERS

*first bytes*

then find out where in the program it is being set incorrectly.

where in the list of data the program has stopped.

This technique of examining variables is often useful in debugging. Remember that the computer retains its variables even though the program has crashed. "Subscript out of range" means that the variable within brackets in an array is to large or negative. Print out its value and

To debug these errors it not necessary to understand how the program works. When it runs but fails to do what it is intended to, you will need to try and fathom out its logic. The judicious use of the Stop statement is useful here. By inserting Stop statements at various points you can narrow down the problem areas to one or two routines.

## Comparing different Basics

*"Why are some Basics said to be more powerful than others?"*

THE DIFFERENT versions of Basic are often referred to as dialects of the same language. Like natural language dialects their differences are sometimes just a matter of using different words for the same command. Thus Sinclair Basic uses To to handle string splicing while most other versions use the commands Mid\$, Left\$, Right\$. Although To might be rather easier to use than Mid\$ it performs the same function.

However, what makes some Basics more powerful than others is the presence of extra commands and one area that sorts out the weak Basics from the strong is graphics. Commodore Basic, for example, is strikingly lacking in any commands to plot points or lines. Unlike the Spectrum with its Plot, Draw and Circle commands the CBM-64 requires you to Poke your pixels into the screen memory.

BBC Basic is particularly well endowed with graphic commands. These allow such facilities as both relative and absolute plotting, filling areas, and defining separate graphics and text windows.

BBC Basic is well equipped in other departments too and is unquestionably the most powerful version of the language available on a home micro. One reason for its superiority is that its interpreter is twice as big as most other Basic interpreters — it occupies 16K ROM as opposed to 8K.

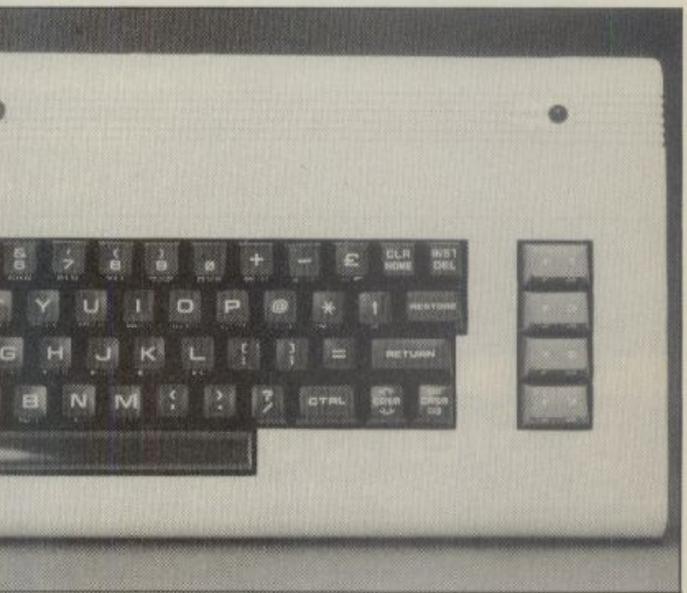
It is worth taking a closer look at BBC Basic since it gives an idea of what the language is capable of. One of its strengths is that it allows you to write structured programs. Put simply structured programming means programming without Gotos.

It is extremely difficult to fathom the control structure of a program which is shot through with Goto statements. By providing the facility for named procedures and commands such as Repeat Until or If Then Else, BBC Basic enables you to write programs whose structure is more readily apparent. Only Lynx Basic offers comparable features.

BBC Basic also boasts a number of programming utilities — Auto, Renummer, Delete, Trace — not generally found in other Basics. These cannot be used within a program but make the task of developing and debugging a program easier.

Perhaps more useful than these utilities is a good editor and this is one area where BBC Basic does not reign supreme. Despite its deficiencies Commodore Basic has the advantage of an excellent full screen editor which lets you move the cursor to a line and edit it on the spot. As such it is preferable to line editors like those on the BBC and Spectrum which require you to pull the line down first.

Speed is another measure of the power of different Basics. Here



*The BBC Electron, below, boasts one of the most powerful Basics around. The Vic-20, above uses Commodore Basic which is relatively feeble.*



again BBC Basic scores highly. It is twice as fast as CBM Basic and three times as fast as Spectrum Basic. This can make the difference between being able to write an adequate game in Basic and being forced to turn to machine code.

If the Basic on your machine now seems a little threadbare in

comparison with BBC Basic take consolation: you can always customise your Basic. By adding the Simons Basic cartridge to the CBM-64 you can extend the resident language by a further 114 commands. On a smaller scale *Your Computer* often prints machine code routines to give extra commands.

# COMMODORE USER

*the monthly magazine for Commodore users*

**ASK FOR IT AT YOUR  
NEWSAGENT FROM  
26 JANUARY**

**85p**



**Stell Software**  
for top quality programs

Make learning fun with these top quality educational games!

**Beats the Invader** - Make an 80% score to earn the title and win the prize of £1000.00.

**Money** - The educational game for 4-10 years.

**Missing Words** - Search for the missing word and win the prize of £1000.00.

**Time** - The educational game for 4-10 years.

**Identikit** - The educational game for 4-10 years.

**Nerves for Children** - Move for Children. A set of 100 cards for the children to play. Suitable for 2-4 players. (BBC B, £9.95)

**Railroader** - The educational game for 4-10 years.

Spectrum programs only **£6.95** BBC/Electron programs only **£7.95**  
Ask for Stell Software at larger branches of Boots, John Menzies, W. H. Smith  
and all good computer shops, where most titles are available.  
In case of difficulties order direct from Stell Software. Dealers should contact their regular distributors.

**No. 1 in Education**

Stell Software 36 Limerfield Ave, Whalley, Lancs, BB6 9R1.

## Don't blame the equipment- it could be the mains

Dirty mains bring noise, transients, spikes and momentary outages.

Result-memory loss, data errors, inconsistencies and very likely circuit damage.

The Galatrek Filter Plug, with its transverse and common mode attenuation capability is designed to protect micro and mini computers, word processors, video and hi-fi equipment from mains borne interference and surges.

Current rating 2 amperes-frequency 50/60Hz. Available from

Galatrek International Ltd. price £31.05 including V.A.T. and P & P.

For applications with higher current consumption, Galatrek have a range of hyperactive tracking voltage suppressors and line conditioners. Ask for details.

Mr. Dealer-fitting the Galatrek Filter Plug could save a lot of service calls and keep your customers happy. Write for trade terms.



**Galatrek International Ltd.**  
Scotland Street, Llanrwst, North Wales LL26 0AL  
Telephone: 0492-640311 Telex: 617114

FPI

If you have anything of interest to tell us about your computer club why not contact us on 01-661 3144.

## Local news

### Manchester

A rapidly-burgeoning BBC user group has recently been formed in South Manchester. Meetings are held regularly every fortnight at 229 Manley Road, Chorlton-cum-Hardy, Manchester M211RB. It is hoped to move to larger premises soon. The club which has already evolved its own program enabling Saving of cassette programs or disc, plans to develop into four sections, one devoted to Basic programming, one to assembler, one section to be hardware-related — peripherals and so on — and one general group pulling all these areas together. Contact Mr D K Davies 061 991-0382.

### Scunthorpe

The Grange Farm ZX Computer Club is no longer Sinclair-dedicated, but keeps its old name to distinguish it from other groups in the area. Meetings are held every Wednesday at 7pm at the Grange Farm Hobby Centre, Scunthorpe, South Humberside. The club which has around 40 members, will soon be commencing a series of talks on topics relating to machine-code programming. Membership is £2 per annum for junior and student members — plus 15p per meeting — £5 per annum for other members, plus 25p per meeting. For further details, get in touch with the club secretary, Colin Hazelton, at 26 Rileston Place, Bottisford, Scunthorpe, South Humberside. Telephone 0724-863466.

### Stratford

If Shakespeare had been into microcomputer hardware, would he have been a printed circuit bard? However this may be, the Stratford Computer Club meets once monthly at the Wesley Hall from 7 to 9pm. Contact Chris Parry, 16 Sackville Close, Stratford-upon-Avon, Warwickshire. Telephone 0789-68080.

# COMPUTER

Paul Bond finds the UK Atomic Energy Authority experimenting with the BBC micro and discovers a following for the ill-starred NewBrain.

PURBECK COMPUTER USERS' Club was deeply immersed in self-analysis when *Your Computer* visited Wareham in Dorset recently. After a big initial success and a primary intake of over 70 members, it was felt that things were tailing off slightly. However, at the annual general meeting, the members could look back to a few successes.

Keith Farmer, the club treasurer, revealed that the income from membership fees and also from a course which the club had run had netted enough money to purchase a Seikosha 250 printer, and still leave a little in the bank.

The course itself — a series of tutorials in Basic programming based on the Dragon 32 micro — was also a success, attracting many people new to computing. The series of lessons were given by club chairman David Delaney. He is well-qualified for this since he is also head of Computer Studies at the local school. Two of his pupils studying A-level computing, Stephen Moore and Nigel Matstead, were also present at the club.

The club was founded some 12 months ago by a small group of people who decided to take advantage of computer shop owner Alan Monahan's offer to support the club with monitors in the early stages. The shop also stocked primarily NewBrains and Dragons which explains the predominance of these kind of machines among members. Due to the educational interest there is also a strong



## PURBECK

representation from the BBC Micro. David Delaney explained that the club was experimenting with communications between computers using the RS-423 interfaces.

Another sort of interfacing was being experimented with by David Mockford of the Atomic Energy Authority. Apparently the UKAEA has *carte blanche* to experiment with micros to see what they can be used for — but jokes about that famous initial ZX-81 advert claiming you could run a nuclear power station with one tend to fall rather flat.

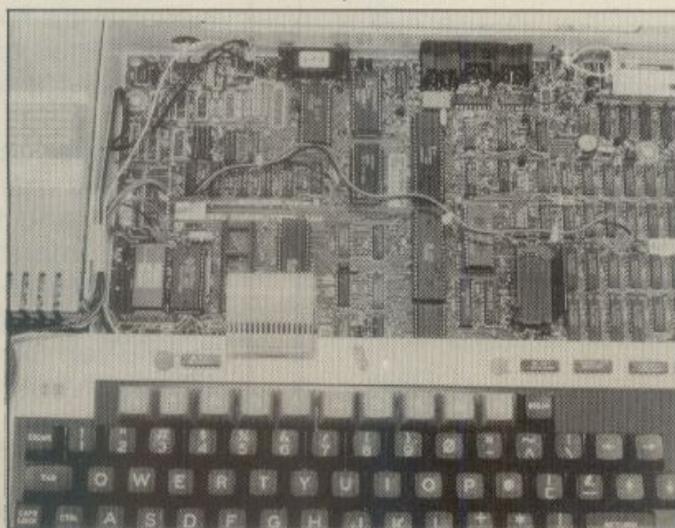
Mr Mockford intends to construct an interface box hooking a BBC Micro into a PDP-11. Apparently the BBC is capable of 10-bit precision, whereas the PDP-11 is

only capable of eight-bit precision. Club treasurer Keith Farmer confessed himself to be a puzzle fanatic, and said that this was what his interest in home computing stemmed from. He owns two micros — a Vic-20 and an Oric. He has had some problems with the Oric as regards loading but has managed to cure most of the difficulties with the purchase of a voltage-stabiliser plug.

A recent victim of the micro-computer market reaper is the NewBrain computer. Alan White, who runs his own engineering company and also participates in the organisation of the local folk club at the Antelope public house, was nevertheless fervent in the defence of the machine. He pointed out that the company had changed hands recently, and maintained that since there was a large standing order for NewBrains for use in the schools of the Federal Republic of Germany, we may yet see a revival of the machine in this country.

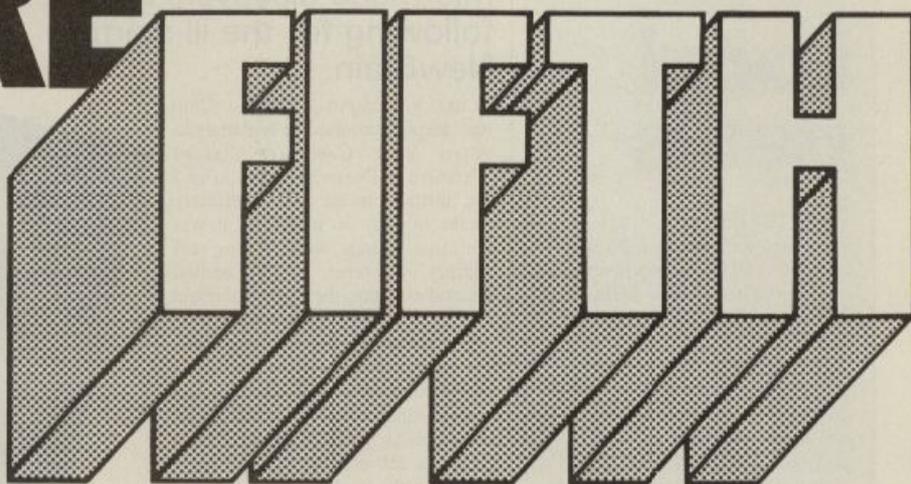
He was amazed at the number of character sets possessed by the micro and had used this to great advantage in his own word-processing applications. By changing the character set from time to time it was possible to reduce some of the strain of staring at the screen, he said. He had developed an accounts program which was of considerable assistance in running his business. "Better than having bits of paper laying around all over the place."

For more details about Purbeck Computer Users' Club, contact Alan Monahan on 09295 51383.



# THE REVOLUTION IS HERE

**A new and  
incredible  
extension  
to basic**



BY RICHARD TAYLOR

**that lets you write fast moving  
Arcade games**

## **\*FIFTH has the following NEW Commands & functions**

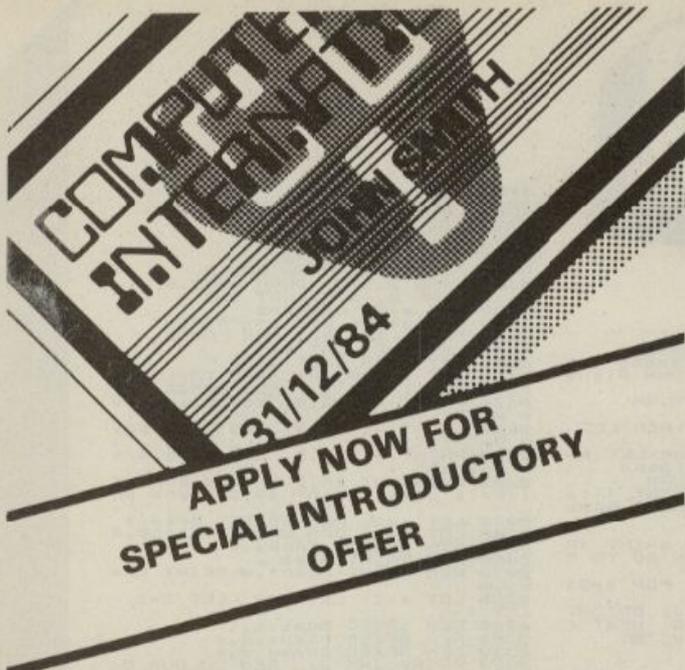
All, Attr, Break Key Disable, Colours, Column, Current, Direction, Disable, Enable, Erase, Fill, Find, Get, Interact, Intparam, Jumps, Large, Let, Limit, Line, LMTPARAM, Mask, More, No, Object, Print, Put, Replace, Remove, Screen, Sound, Speed, Status, Temps, Use, Vector, Velocity.

## **\*Personal Computer News said:**

"Fifth provides an excellent set of commands for programming arcade type games and makes it easy for you to write fast moving games in Basic."

The packages come with an extensive manual, a demonstration program and the fifth interpreter. The commands are entered as words into your program and give you INTERRUPT, driven, fast, high resolution SPRITE graphics without losing the simplicity of Basic.





# COMPUTER CLUB INTERNATIONAL

Reserve **YOUR** Membership today

CCI is a NEW COMPUTER CLUB specifically for you—the home computer enthusiast—whether or not you own a computer.

Members will enjoy a wide range of facilities, including their own magazine, regional meetings, contact with international members, exchange of software and many other benefits, all at very reasonable cost. Make sure of your membership reservation today.

Complete the coupon and send to—

Computer Club International  
**FREEPOST**  
 (NO STAMP REQUIRED)  
 STALYBRIDGE  
 CHESHIRE  
 SK15 1YD

**DO NOT SEND MONEY WITH COUPON**

## MEMBERSHIP RESERVATION

Please include my name on the CCI Membership Reservation List and send me further details without any obligation on my part to join.

SURNAME \_\_\_\_\_

FORENAME/S \_\_\_\_\_

ADDRESS \_\_\_\_\_

TOWN \_\_\_\_\_

COUNTY \_\_\_\_\_

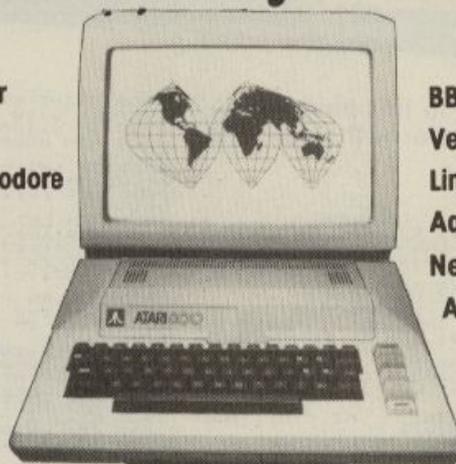
POSTCODE \_\_\_\_\_

COMPUTER OWNED \_\_\_\_\_

YC2

# Computers for Export

Sinclair  
 Oric  
 Commodore  
 Atari  
 Texas  
 Epson  
 Coleco



BBC  
 Vectrex  
 Linx  
 Aquarius  
 New Brain  
 Acorn

Plus Printers, Disc Drives, Memory Expansion, Software

**Quantity discounts available**

No tax charge for equipment shipped abroad

Write for our price list or call our 24hr answer phone

01- 681 8785

**Galaset Ltd, 30 Bayford Road,  
 Littlehampton, West Sussex,  
 England. Telex. 8954018 Acurat G**

## ORIC SOFTWARE

THE SINGLE SOURCE SUPPLY  
 FOR ALL YOUR ORIC SOFTWARE  
 PERIPHERALS AND BOOKS



Catalogue with every purchase  
 or send £1.00 which will be  
 deducted from your first order.

SOME OF THE TITLES WE HAVE AVAILABLE:

Airline	48K	7.95	Operation Gremlin	48K	6.95
Blorythms	16/48K	5.95	Oric Trek	48K	9.98
Breakout + 30 maze	48K	7.50	Oriscope	48K	17.95
Candy Floss + Hangman	48K	7.50	Reverse	48K	6.50
Chess	16/48K	9.95	Synthesizer	48K	7.95
Cube Crazy	48K	7.95	Word Processor	48K	17.95
Dallas	48K	7.95	Xenon-1	48K	8.50
Digger	48K	6.95	Zodiac Adventure	48K	9.95
Dinky Kong	48K	6.95	Zorgons Revenge	48K	8.50
Fantasy Quest	48K	6.50			
Flight	48K	7.95			
Forth	48K	17.95			
Franklins Tomb	48K	9.95			
Grail	48K	6.95			
Harrier Attack	16/48K	6.95			
Hobbit	48K	14.95			
Invaders	16/48K	7.50			
Jogger	48K	6.95			
Marla	48K	6.95			
Multigames	16/48K	7.95			

### BOOKS

The Oric-1 and how to get the most from it 5.95  
 The Oric-1 Companion 6.95  
 An Introduction to Programming the Oric 1.95

### Postage

Books 50p for 1 - 25p per book thereafter  
 Cassettes 50p for 1 to 7 free if 8 or over

**Oric Software, 118 Worcester Road,  
 Malvern, Worcs. WR14 1SS.  
 Tele Malvern (06845) 62467**

# Star★ chart

## Tomb of Dracula

48K Spectrum:

Adventure:

K-Tel:

£6.95:

★★★

The flip-side of the record company's first bid to break into micro software. A text adventure in which you collect silver stakes to arm yourself against the vampire. They can be traded for glimpses of a map leading to gold. The flip-side is called "It's Only Rock 'n' Roll But I like it." It is only written in Basic, and I did not like it.

## Space Station Zebra

48K Spectrum:

Shoot-'em-up:

Beyond:

£6.95:

★★★

Coriolis sickness is the least of your problems on this space wheel. The screen display is an impressive view from the hub of the outer rim of the station. You have to spin the station and sparingly use your laser against alien intruders. I found myself going round in circles on this one.

## De-Fusion

48K Spectrum

Adventure:

Lyndenhurst Ltd:

£5.50:

★★★

A dotty scenario wherein Happy Larry rushes around a background of squares or paths, defusing bombs and collecting flags, avoiding skulls and crossbones, while a pair of Doc-Marten's attempt to crush him. Almost as good as the Blockman program we published in January 1984.

## Royal Birkdale

48K Spectrum

Simulation:

Ocean:

£6.90:

★★★

A lovely opening graphic introduces a program which apparently duplicated the Royal Birkdale Championship Golf Course to a tee. You have to estimate the angle of drive and select strength of hit and allow for wind direction. You do not have to tip the caddy, either.

# SOFTWARE

# Shortlist

## Fighter Pilot

■ 48K Spectrum:

■ £7.95:

■ Digital

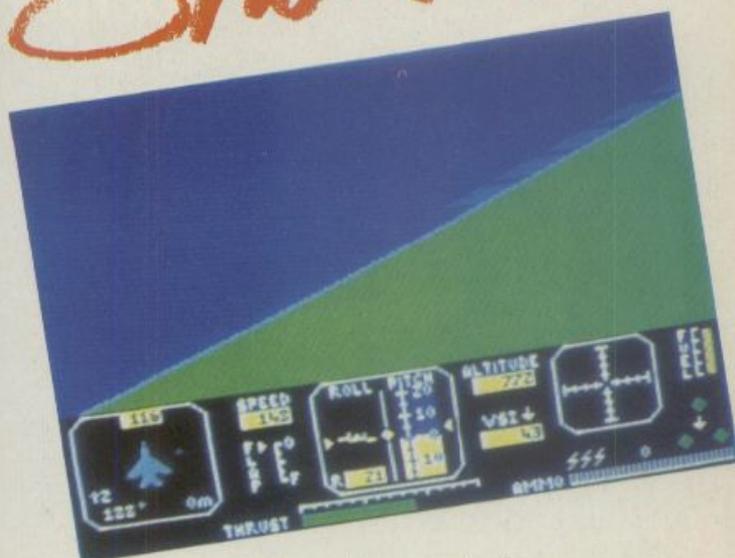
Integration:

★★★★

THERE ARE OLD pilots and there are bold pilots, but there are no old bold pilots — unless they are flying a Spectrum flight simulator of course. Digital Integration's Fighter Pilot is very good indeed. Not only is there a comprehensive representation of the instrument panel of the McDonnell Douglas F-15 Eagle air superiority fighter, but also a good impression of the view from the cockpit. The green line of the horizon and the blue of the sky lurch and spin so convincingly that it is worth getting in a supply of brown paper bags before sitting down to play this one.

There is a Kempston AGF joystick option for this program, which probably renders it more enjoyable than pushing buttons. Not only do you get standard aircraft joystick controls but rudder controls, thrust and flaps can all be used to add subtlety of aerial manoeuvre. Cockpit view can be replaced by a map showing where you are. There are five options within the program: landing practice, flying training, blind landing, air-to-air combat practice, and finally air-to-air combat.

In the final option, you defend four airfields codenamed Base, Tango, Zulu and Delta. After scrambling from Base, you figure out where the enemy is by using your radar and flight computer. Having guessed his target for tonight, you fly an intercept vector. Visual contact occurs inside a mile radius of the hostile, at under 5,000 feet altitude. The enemy aircraft



kicks off the engagement by manoeuvring to get a good attack position. Damage to your own aircraft is shown by a colour change of the aircraft symbol on your radar.

Instrumentation is represented in depth. The radar compass on the far left of the panel is used in combat mode to locate the enemy shown as a flashing dot moving around the aircraft symbol on the instrument. To find his altitude you have to select the flight computer. This is also used for landing guidance as well as combat. Other instruments on the simulator are the artificial horizon, airspeed indicator, altimeter, vertical speed indicator — VSI, this gives your rate of climb or descent — thrust indicator and

instrument landing system.

The high degree of accuracy is only to be expected, since program author D K Marshall spent four years at Boscombe Down flying and evaluating aircraft from all over the world, and moved on to the Royal Aircraft Establishment at Farnborough to become a professional flight simulator programmer. Fighter Pilot certainly compares favourably with Micromart's Strike Attack, written by an RAF Phantom navigator, inasmuch as the latter does not have a view from the cockpit, just instrumentation. The two are complementary, however, in so far as one is dealing with air-to-air combat and the other with ground attack.

## Atic Atac

■ 48K Spectrum:

■ £5.50:

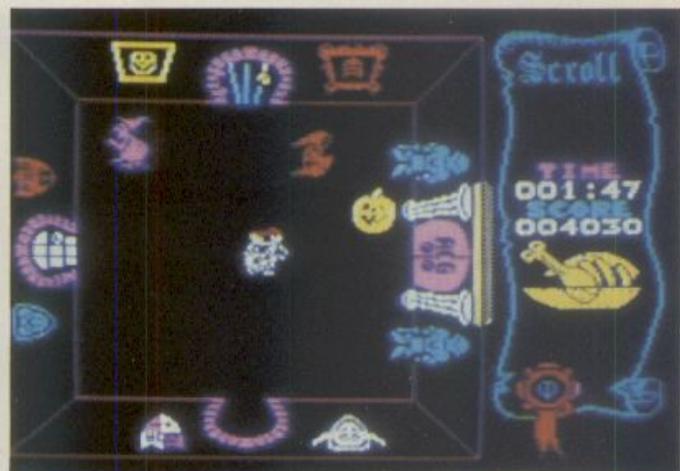
■ Ultimate Play the Game:

★★★★

IF YOU HAVE heard Michael Jackson's Thriller album, and seen the video, you might like to play the game: Atic Atac. It is one of the spookiest, most action-packed, shoot-'em-uppiest programs yet to be seen on a Spectrum.

You are cast as the hero of the piece, and can choose roles. Your choice, knight, wizard or serf, determines which set of secret passages are open to you, the appearance of your computerised alter-ego, and weapons for zapping beasties with. Once this is done, and you have decided whether to use a joystick or the keyboard, you are beamed-down into the front room of a grand and spooky old house.

At this stage the best thing to do is



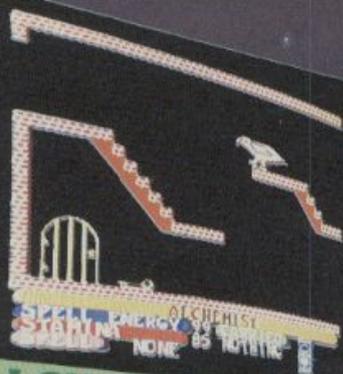
to explore the house, finding your way around and memorising escape routes. But beware: the doors that guard the entrances to the rooms that you travel through, are liable to slam shut, without warning, leaving you

trapped. When this happens, time marches on, your food supply situation, as indicated by the gradually devoured chicken on the right of the screen, diminishes, and

(continued on page 61)

# THE TENSION MOUNTS, THE ADRENALIN FLOWS. THE ADVENTURE BEGINS...

FOR YOUR ZX SPECTRUM



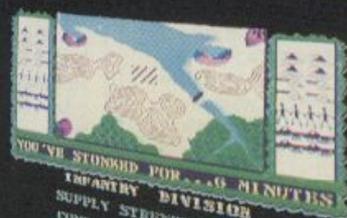
**ALCHEMIST** Can you discover the secret of the 'Spell of Destruction' and defeat the Evil Warlock. Even with your amazing powers of transformation the outcome is still uncertain.



**ZIP ZAP** Encounter hordes of aliens as your runaway droid enters the various domains of ever increasing intelligent attackers. Heart stopping tension and supersmooth animation.



**ZZOOM** You are flying the fastest most deadly machine yet devised by man. If your resolve begins to weaken, remember, the fate of an entire race depends upon the outcome of your mission..... will you succeed?



**STONKERS** You are poised on the very brink of battle. As Commanding General every decision is yours. Will your strategy enable you to capture your objectives? Will victory be yours.

**...the name  
of the game**

Imagine Software Limited,  
5 Sir Thomas Street, Liverpool, Merseyside L1 6BW.  
Dealer Enquiries Contact: Colin Stokes on 051-236 8100 (20 lines).

# Star★ chart

## Space Raiders

Dragon 32:

Shoot 'em-up:

Microdeal:

£8.00:

★★★

There is absolutely no need for software houses to feel ashamed about foisting old games like Space Invaders on the public under a different *nom-de-guerre*. I mean, nobody's going to buy it without playing it first, are they?

## Glaxxons

Dragon 32:

Shoot 'em-up

Microdeal:

£8.00:

★★★

More nostalgia from Microdeal. It is funny how if you say Galaxians fast you get Glaxxons. The same is almost true of the actual game. Given the limitations of the Dragon, this is a good hi-res shoot-'em-up. Traditionalists will love it.

## Jet Pac

Vic-20 (+8K expansion)

Shoot 'em-up

Ultimate Play The Game

£5.50:

★★★

A difficult-to-play implementation of the game originally designed for the Spectrum. The idea is to assemble your rocket module in three stages and then fuel it with pods which magically appear on platforms. You do this with "the very latest Hydrovac Jet Pac". You defend yourself from marauding aliens with a laser phaser and extra points can be earned by picking up any valuables you might come across.

## Space Joust

Vic-20 (unexpanded)

Shoot 'em-up

Software Projects

£5.95:

★★★

Wave after wave of enemy spacecraft which look like bouncing eggs must be destroyed. They have no weapons and neither do you. The only way to destroy them is to hit them from above due to a flaw in their design. The problem is that the same weakness is present in your ship so make sure that the aliens don't sneak above you.

(continued from page 59)

worst of all, the haunting begins.

All manner of foul creatures appear to haunt you, they look like they have escaped from the chamber of horrors. By zapping them with your trusty weapon, you send them packing, back to the other side from whence they came, but more to the point, you score.

Atic Atac combines elements of adventure with those of arcade games in a very original way. You need the red key to pass through a red door and must eat food to stop yourself from passing away prematurely due to hunger. The layout of the house is consistent, and so as you play the game more and more, you begin to find your way around. A number of real terrors, such as Frankenstein's Monster, Dracula and the Devil all appear and can give you quite a hard time.

The ultimate aim in Atic Atac is to

# SOFTWARE

## Shortlist

find the key to the front door, and to escape to freedom, presumably this happens only when you have explored every room in the building, which is not easy, but becomes progressively more likely the longer you practise. When the third reincarnation of yourself on screen finally bites the dust, your final score is displayed along with an indication of the percentage of the house which you actually visited. All in all, Atic Atac is one of the most impressive games I have yet seen on the Spectrum, but do not play it after midnight.

## Ugh!

■ Dragon 32

■ £6.95

■ Softek International

★★★

THE ICE AGE COMETH and your intrepid caveman Ugh needs an adequate supply of victuals to see him through the long winter months. What better than to stock up with pterodactyl eggs. However Pteryx, the eggs' dad, is not impressed and attempts to squash Ugh by swooping down and bombarding him with rocks. They are relatively easy to avoid but when Rex the tyrannosaurus arrives on the scene things can get decidedly nasty. Ugh's only defence is a spear. Since he can only carry one spear at a time he must return to his cave if he wants another.

There are three screens with progressively more difficult paths for Ugh to follow and 16 skill levels are built into the game. Control is by joystick or keys. Graphics and animation are good and this essentially simple game is mildly addictive. One further good point is that you do not have to listen to the Death March every time Ugh gets killed.



YOUR SCORE IS 3  
YOU ARE IN GREAT TROUBLE IF YOU ARE REALLY INTERESTED IN ATTRACTING A NEW MATE AND RETAINING THEM FOR ANY LENGTH OF TIME. IF YOU ALREADY HAVE A PARTNER DON'T BE SURPRISED IF YOU SEE THEM DISAPPEARING OVER THE HORIZON. YOU REALLY ARE A SOCIALLY INCOMPETENT, BOORISH PERSON WHO WOULD BE DIFFICULT TO LIVE WITH IN YOUR PRESENT STATE OF IGNORANCE. SEEK HELP IMMEDIATELY OR BECOME A HERMIT.

## The Dating Game

■ BBC and Electron

■ £12.60

■ Acornsoft

★★★★★

IF YOU FEEL your love life is somewhat lacklustre Acornsoft's The Dating Game could be the remedy. Designed by social psychologist Dr Glenn Wilson it provides four programs to assess your capacities and preferences as a lover. Each sets a number of multiple choice questions and then delivers a diagnosis.

The first test requires at least two people to participate and gives an assessment of their compatibility. If more than two people join in it will pair off the couples it thinks are best suited to each other. There is an option for saving the data.

The three other programs test respectively love styles, preferred relationships, and dating skills. Love Style, for example, assesses you on three scales, "fanciful versus practical", "serious versus playful" and "cool versus practical". Dating Skills examines your ability to find a mate by asking such questions as "what do you expect from a party?",

It does not really matter how seriously you take the tests. They have the same appeal as horoscopes and personality assessments given in

magazines. Dr Glenn Wilson makes various claims about the tests along the lines of "research by social psychologists has identified three major dimensions of loving . . .". But these you can take with a hefty pinch of salt while still enjoying the programs.

The Dating Game makes a refreshing change from the standard arcade-style fare.

## Urban Upstart

■ 48K Spectrum:

■ £6.50:

■ Richard Shepherd Software:

★★★

FROM THE FRIDGE full of lager to the juvenile delinquents' detention cell, Scarthorpe is the town where no-one goes and that even fewer people get away from. It makes Skelmersdale look like Las Vegas. Kids here think the UK Subs are a middle-of-the-road band, and that Joy Division were too flippant.

This is an adventure game, of course, since this is Richard Shepherd's speciality and is a bit more lively than some of its predecessors with good use of simple graphics. So if you are the sort of person who would like to give Elrond a punch on the nose, and if you think Gardalf needs a haircut, this is the game for you. The goal is to escape from Scarthorpe by night. Since this is the sort of town where



you get mugged coming out of the dole office, it is no easy number just trying to bring the milk in, let alone walk down the street.

My first mistake in playing this game was to drink the can of lager in the icebox. I ended up in hospital. I stole a white coat, but ended up in the police station. As you can see, Scarthorpe really is a dead-end town.

The program accepts a wide range of commands and is reasonably user-friendly. It is a pleasant, or rather, unpleasant change from the Dungeons and Dragons world of games like the Hobbit. A computer game with a social conscience! Play it and see.

# ATARI GAMES



Blue Max approaches his target



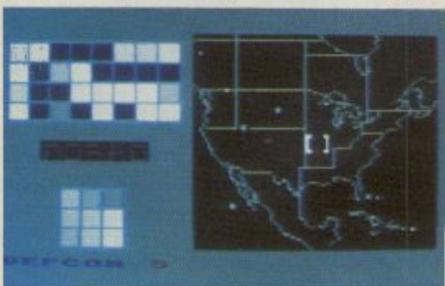
bombs away, direct hit



bridge destroyed, next target please.



Below: Computer War, the War Games game.



Below: Tennis, pricier than the real thing.



You don't have to be an Atari fanatic to admit that it has some of the best-looking games, but with prices up to £25 Meirion Jones asks are they worth the money?

EVEN THE SNAPPIEST games around — even for the Atari — are a bit like Hollywood B movies from the 1950's when car chases, Ronald Reagan and the Cold War were all still bright young things.

However exciting the action is, however good the graphics, the ideas behind the games are pretty shallow — races, chases, heroic fighter-pilots taking on enemy air forces and alien battle fleets single-handed, man rescues heroine from the arms of a villain and so on.

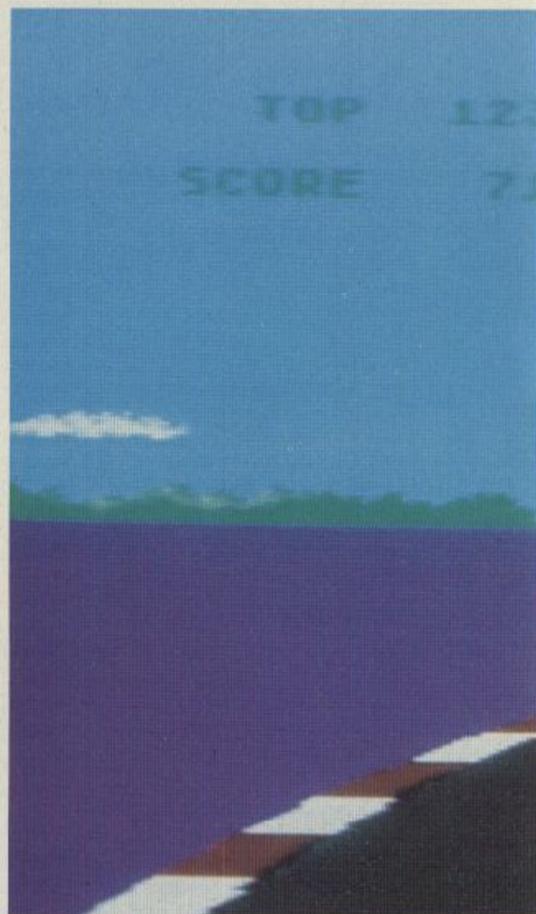
If you wanted to sum up the whole mood in one you would come up with a game with a name like "Zap the red weirdos from Mars". Unfortunately it's already been done with a cartridge for the Atari video game machine called "Communist Mutants from Outer Space". But you cannot palm off that sort of rubbish on Atari home computers users. Instead they can buy Lone Raider which describes itself as "the first UK produced all action game from Atari".

It is not a particularly bad game — there are three frames of action starting with a simple one-dimensional dodge the Daleks which takes a couple of minutes to master and ending with a Frogger variant which is quite fun at first but soon palls. If you had paid £5 or £6 for it — the going rate for a good Spectrum program you would not be too disappointed. Although there must be 30 better programs than this for the Sinclair in that price range.

The trouble is that Atari expect people to pay £15 for the Lone Raider cassette — the sort of money that buys you outstanding programs like Scrabble on the Spectrum. If this is the best that Atari can find in Britain the 400 and 800 cannot have encouraged many owners to become games programmers.

Commodore can point to their British written International Soccer for the 64 — still the most outstanding games program available on a home computer — as evidence of the strength of software support for their machines in Britain. All the best games for the Atari including Tennis, Pole Position and Blue Max come from the other side of the Atlantic.

Pole Position is most impressive for its faithfulness to the arcade original as you can see from the big colour screen shot which dominates this spread. You could never in a thousand years produce displays of this quality on most other home computers. You are alone on the grid at the start and you have to complete your first lap in a fast time if you want to qualify for the next race.



You accelerate smoothly up to 105 mph, pull the joystick back to go into higher gear and start weaving your way through the other cars on the track touching speeds of 195 mph at times. If you hit another car you crash where you are but after the flames have gone out you start again from where you were remembering of course to change down the gears to get maximum acceleration from rest.

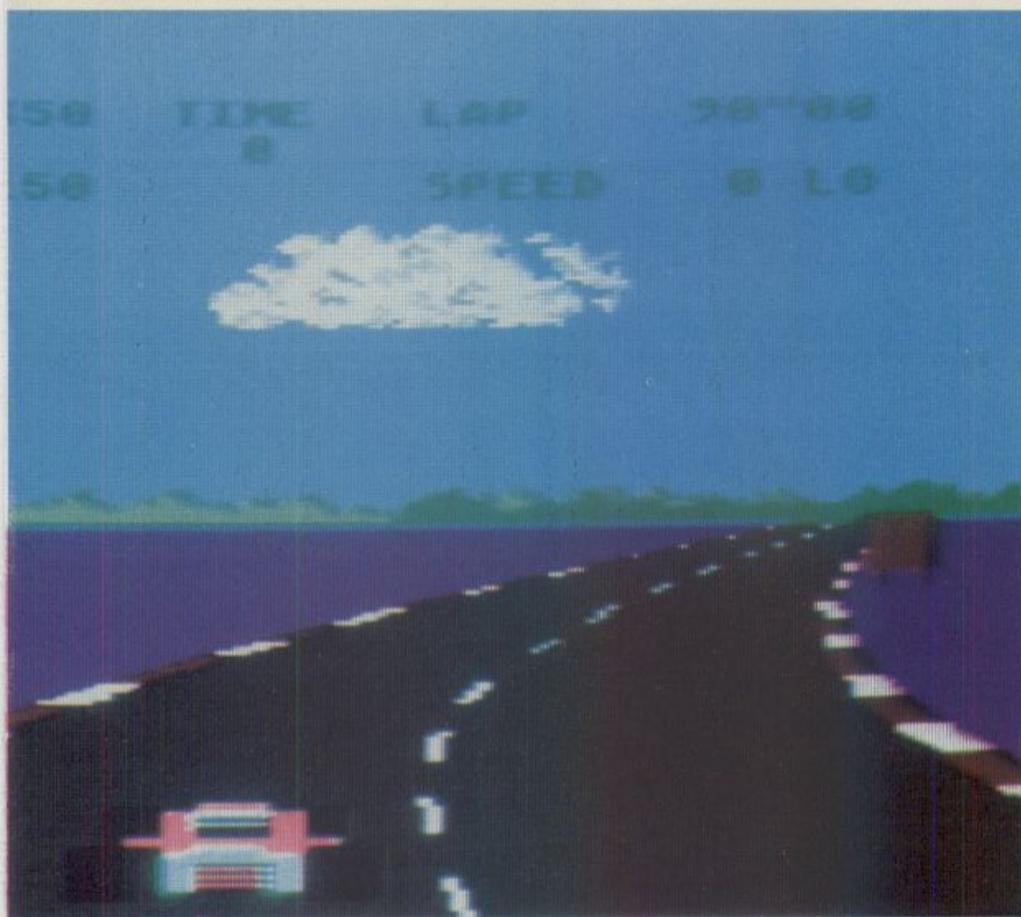
With a little practice you learn to get through most of the corners at very near full speed with a touch of the brakes — the fire button — or by sliding through sideways with a good tyre squeal. There is only one corner where you might need to change down or deliberately slow down by cutting across the grass to get round.

You slow up very quickly if you go off the track — instantaneously if you hit a trackside hoarding. With skill you should be able to get round fast enough to qualify.

The screen tells you which of the eight positions on the grid you have earned. In number eight you will find seven cars ahead of you on the starting grid but even if you get pole position you will find yourself overtaking cars which logically cannot be in front of you. You can choose how many laps you want to race before you qualify.

Pole Position makes all other car racing games look second rate.

I found Blue Max even more appealing even though it is a shoot-'em-up supposedly based on the First World War, but full of strange inconsistencies. You have a steadily scrolling almost plan view of the battlefield which you fly over in your biplane bombing the strafing ground targets and shooting down enemy aircraft.



You might have thought that the Blue Max would be flying for the Germans — but not a bit of it. According to the leaflet which comes with the game he is flying for the RAF — which is strange because at the date at which the game is supposed to be set there was no RAF, only the Royal Flying Corps. But none of this detracts from the appeal of trying to hit as many bridges and block houses as possible.

Hitting enemy planes is more difficult. If you get to the same height as your target the bottom of the screen goes blue and you open fire with a real chance of shooting the enemy down. Anti-aircraft fire can disable your guns and bombs, cause fuel leaks and affect your manoeuvrability. This last is particularly import when you come in to land at the next airstrip.

Even the more thoughtful strategy games like Eastern Front are a little worrying. Eastern Front has been available on cassette from specialist shops for some time but has only

recently become easily available since Atari released it on cartridge with some improvements to the original.

You play the part of Nazi Germany. The scene opens on the eve of Operation Barbarossa, the invasion of the Soviet Union in World War II, which was to leave 20 million Russians dead. The game itself is absorbing and intense. You push your forces forward, tank regiments bursting through the Russian lines and infantry units mopping up survivors behind.

You program all your units individually with up to eight moves then push the start button and watch their progress against the reds. After a couple of hours of play at the Advanced level, which was the only level you could play at with the old cassette-based Eastern Front, you will probably have taken Leningrad and perhaps Stalingrad and be on the fringes of Moscow, but Russian reinforcements will eventually force you back.

If you want to learn how to play the game there are now two easier levels together with a super difficult Expert level which requires you to tell each unit whether you want it to march, fight or stand its ground as well as where you want it to go.

If you just think of it as a game Eastern Front is the best wargame simulation available on a home computer, but perhaps a Russian might see it differently.

Computer War — based on the film War Games attempts to be more ideologically sound. You are defending America from attack by cruise missiles — well the guidance systems have not always worked very well in tests — and you see them coming in on a big map of the country as white dots.

You move a cursor over the dot and move in to a straight forward shoot-'em-up. Echoing the advertising for the film the computer asks is this a game or is this for real. I must admit that when I feel a sudden uncontrollable urge to save the country from nuclear attack I reach for Missile Command.

Dig-Dug is a good implementation of the arcade game. You mine your way around the screen looking for vegetables pursued by the usual motley collection of dragons, monsters and ghosts. But at least the method of disposing of your enemies shows a little more imagination than the usual "Press red fire button".

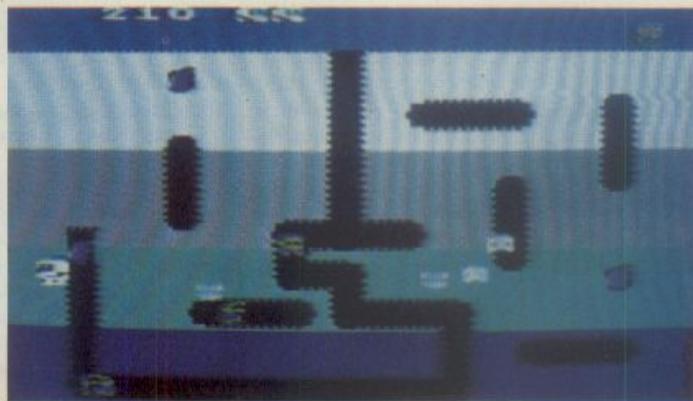
Tennis will appeal to armchair John McEnroes because for the price — £25 — anyone genuinely interested in the game could buy a racket and half a dozen tennis balls and still have enough left over to go and watch the first day of Wimbledon. You can choose doubles or singles with or without the computer taking part.

It is quite easy to get your player to the ball and make a shot by pressing the fire button but difficult to direct it. You have to get to the ball early and then pull the joystick towards the part of the court where you want the ball to go.

Games for the Atari are so expensive that they have to be more than just good fun for a few days. The most hopeful sign for the future is that Zaxxon — the ultimate space shoot-'em-up loosely based on the low level space chase across the surface of the planet in Star Wars is coming down in price to £15.

That makes Lone Raider look particularly overpriced — especially when you remember that Zaxxon was voted Game of the year in America in 1983. ■

Dig-Dug's way of dealing with dragons is to undermine a rock and then sidestep.



# ORIC SOFTWARE

PING, ZAP, SHOOT and Explode — the quasi-onomatopoeia of Oric Basic is well-known. No secret either is the clamorous sound of the AY-3-8912 sound chip which has three channels capable of producing a broad range of noises. Anyone with the temerity to play a shoot-'em-up game on the Oric had better be prepared for the robust sound effects.

With Tansoft's Defence Force, however, you do get an option; it is possible to play a silent game. It is a little unnerving, though, when the action stops to perform a non-existent sound attack. Silent games on the Oric are just not the same. You do not have quite the same "feel" to the game.

Defence Force is good solid traditional fare — once upon a time I might have said something about blasting off into the unknown to meet strange beautiful exotic beings and disintegrate them, but, alas, they are only too familiar and one's first instinct is to greet them like old friends. It is of course a fallacious response, for their reply is invariably to leave you spinning in a low orbit with your solar panels blown away, before the second wave arrives and reduces you to a name carved on the shields of honour at Starfleet Academy.

A Defender-style game, it is your job to keep the pathetic remnants of the human race, who are sitting dazed at the bottom of the screen like extras from *The Day After*, from being kidnapped by grisly off-world marauders. There are 16 different varieties of these galactic grotesques, and your spacecraft is designed to fire in the direction it is pointing in, in order to do away with them. The vulturae are birdlike creatures who do the kidnapping. If they get to the top of the screen they mutate into assassins — should all the humans be captured the game transfers to the astral plane and the entire enemy turns into wraiths.

A star map on the top right-hand side of the screen gives you a long range plan view of hostiles in the area. The game has all the little

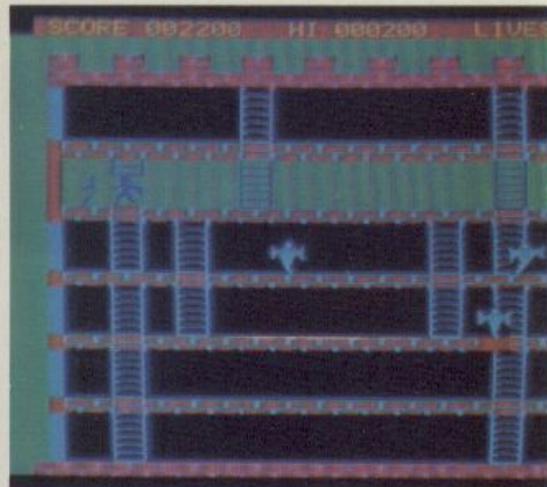
touches which give a presentation sophistication: a hall of fame, a beginner's option as well as the aforementioned silent option. More grimly, there is even a suicide option — press zero if things are going badly.

One of the things that made me feel suicidal during this review was getting things to load on the Oric, although once I got hold of a tape-recorder that would work with it, problems were few. Most software houses realise the problems presented by the Oric's fast rate of output, and include fast and slow versions on their tapes. Inputting data at the slow rate means waiting about eight times longer than loading at the normal rate. This can be tedious where some of the longer and more complex programs are concerned — and of course, this is just where it is most essential.

Oric Galaxians by Gordon Russell, produced by Softek finds us still lost in space. As connoisseurs will appreciate, Galaxians, being an early descendant of Space Invaders means that your ship is anchored at the bottom of the screen blasting away at descending aliens not unlike the vulturae of the preceding program. Clear one attack wave and another appears swooping more and more frequently. As your prowess improves, so does theirs. You score more the closer the alien gets to you — as long as you destroy it. There is an extra life every 10,000 points to a maximum of five lives.

Again, good standard stuff, well-suited to the Oric's sound and graphic capabilities. I found this game strangely hypnotic.

Dinky Kong — crazy name, crazy game! This Severn Software offering drags us back from space. Your lovely girlfriend has gone off with an ape, not entirely of her own volition it would seem, or at any rate she has had second thoughts. The course of true love never runs smoothly, but it is particularly rough round here since the outrageous orang-utang is rolling barrels and fireballs at you. You are trying to climb up ladders from platform to platform to rescue her.



Above: *Dracula's Revenge* from Softek.  
Left: *Loki* from *Joe the Lion*. Above right: *Oricmunch* from Tansoft. Far right: *Ultima Zone* from Tansoft.

## Paul Bond, with cotton wool firmly planted in his ears, learns the secret of immortality.

Yes, it's Donkey Kong, a pale shadow of its former self. What is missing from this one — sadly in view of the capabilities of the AY-3-8912 — is music. There are nine different screens but the Atari implementation of this arcade favourite is much stronger.

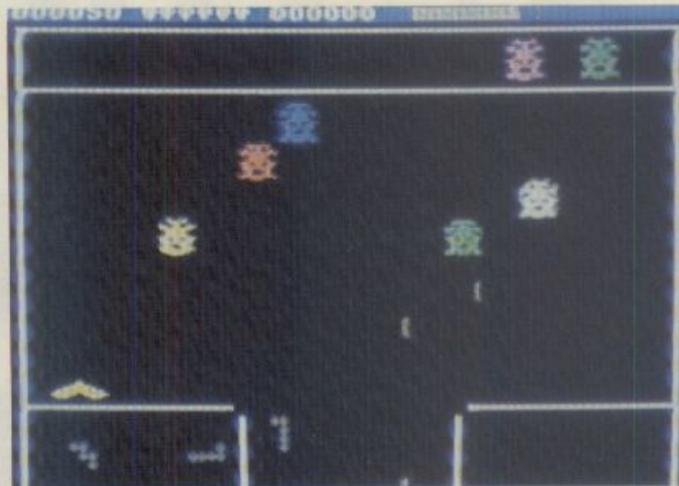
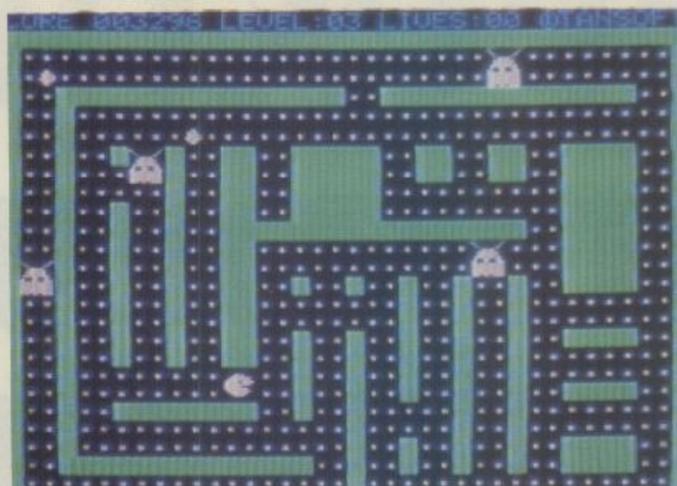
As it turns out, a Kong by any other name can also be a Dracula. *Dracula's Revenge*, from Softek by Steven Chapman is a good example of giving an old game structure that vital spark of originality.

You, as Fearless Freddy the Friar, receive a papal edict telling you to clear up Transylvania. Instead of telling him it is a load of bull, and that you do not want to be a friar who as had his chips, you gamely jump out of the frying pan into the fire.

The screen shows a side-view of one of Count Dracula's unholy hang-outs. It is a castle with several floors and ladders connecting a *la* Kong. It is full of ghosts and werewolves and, at the more difficult levels of the game, vampires, and they are not doing much to increase local property values. What makes this game so tricky is you can only dispose of certain ghouls with certain tools — and at the right time of day. They are all powerful at night except for the werewolves who can be dispatched with a silver bullet regardless of Transylvanian local time.

The time of day is indicated by the colour surrounding the framework of the castle. The creatures of the night cannot face daylight, so as long as the sun is up, all you have to do is run to one end of the floor and open a window. The ghosts are exorcised by the influx of yellow or green daylight — vampires are harder and can only be stopped by yellow light.

Do not rely on mere daylight where werewolves are concerned, or you will find out what a tin of Pal feels like. Creepy music plays throughout this game and every so often the legend appears on the screen: 'Castle 07 sanctified' — or however many you have cleaned up. To move around the screen you



use the cursor keys — quaintly referred to as “curser keys” in the documentation — and use the space bar to fire the bullets.

Still in a gothic vein, you are outside a tall gloomy building. There is a door to the north. There are trees all around. A closed door with a brass door knocker and a bell push. All the classic symptoms of an adventure game and, yes, it is Oric House of Death from Tansoft. Unfortunately it is a text adventure game, no graphics as in the Hobbit, and it did not really fire my imagination in the early stages. But I only got as far as the Developing Room.

Is it a Pac-Man? No, it is an Oricmunch and the object of the game is to move your Oricmuncher round various different mazes eating all the power pills in your path. Familiar? I often wonder if whoever it was thought up the original game ever said to himself “Thar’s gold in them thar pills!”

For every game you have to key in the number of the level you wish to start at. Level 1 is easy and 9 is difficult. The number increases every time you clear a maze and Tansoft maintains that there is no limit to the number you can reach. Apparently 28 is respectable.

Compared to similar games I have played — for example on the BBC Micro, there is Acornsoft’s Snapper — this seemed a trifle gluey. There appear to be nine different screens and the action accelerates as you progress from level to level. Perhaps I am just not enough of a maze freak to keep up the concentration. Another thing which speeds up the game is eating a Bugmonster, which you can do in the usual way after you have engulfed a flashing dot, or booster pill. If two Bugmonsters get eaten, the remainder of the delinquent protoplasmic blobs seemed to get pretty stirred up about it.

Also stirred up about something are the Ultra, an evil race of mutant aliens, who challenged me to do a battle to the death in outer space in this startlingly unoriginal scenario from Personal Software Services. The aliens travel horizontally instead of vertically, but you still have to shoot them.

There are 16 different screens, and a nice touch insofar as you can select the level of sound: press 1 for no sound effects, press 2 for quiet sound effects, press 3 for a surprise visit from the Noise Abatement Society. Another stylish embellishment is having two sets of control keys to select. A competent enough use

of the Oric’s facilities, I still can not feel I would write home to Tau Ceti about this one.

Hopefully more than 11 light years away is one of the roughest places in space — the Ultima Zone, immortalised in a zappy trilogy from Tansoft. The three sections of this computerised shock corridor are Battlezone, the Trap and Orbit Runner. In Battlezone, you are presented with a screen, the bottom of which is divided into three sections. You do battle with the Walkons *a la* Space Invaders.

As you destroy the Walkons they disintegrate into fireballs, releasing the ebulliently destructive bouncing brunes, which are caged in three sections at the based of the screen. You have to destroy all the brunes which are pretty nifty, before moving on to the second part of the game — The Trap. Here you use your laser base to pump power into a presumably disabled Henk class battle cruiser.

It shoots sideways as you shoot up into it. With this rather *ad hoc* Heath Robinson method you have to take out three bouncers before you get to the final tricky stage, Orbit Runner. This is a kind of Frogger where you have to pilot your Sheamus-2 missile through four streams of orbiting bombs to destroy the Walkon spy satellite. Each satellite is worth 75 points. If you manage to get them all a bonus like is awarded. This is probably the best of the bunch from Tansoft, and a thoroughly enjoyable and satisfying sequence of games.

Quark 3D Invaders from Quark Data is a truly ingenious enhancement of the Space Invader theme: your laser base moves about on a slightly slanted 4 by 8 grid at the bottom of the screen. You have to be on the right line to hit the similarly slanted legion of space invaders who are creeping down towards you dropping bombs in their accustomed boorish and unsociable manner. Every so often a mystery object looking suspiciously like a flying saucer zooms across the screen and you can augment your score considerably by destabilising its atomic structure with a well placed blast of light amplified by stimulated emission of radiation. Yes, that is what laser stands for — never spell it with a ‘z’.

The copy of Acheron’s Rage from Softek that I looked at had a rather strange bug: I was rendered immortal. Regardless of how many ergs I took from passing metagalactic malcontents, I never lost a life. Why Acheron is taking his revenge or who he is is never

made clear. Apparently you have blundered into a sector that the warships of the Gor are particularly hot on. In this Asteroids based game, you revolve slowly and can move about the screen taking advantage of a centrally placed grid to shield you from enemy fire. It might be a good game, but like most invulnerable beings I became rather blasé about the whole show.

Finally, I had a look at a pre-production copy of Loki from Joe the Lion. Loki is a Scandinavian god, and you should never look a gift Norse in the mouth. Loki was the trickster among the Asgard bunch and did jolly witty things like throwing mistletoe at Balder, which is like chucking Kryptonite at Superman. Needless to say he was not very popular with the other gods. All this is if the truth be told, totally irrelevant to the actual game which is an out-and-out shoot-em-up.

During the first waves you whizz across a red-gold desert shooting at nameless things coming towards you: later on you end up in space, looping and bunting in an impressive three-dimensional starfield, still shooting at said nameless things. The whole thing is a little like trying to drive down the M1 in the wrong lane at 130 miles per hour.

Game	Company	Price
Defence Force	Tansoft	£7.95
Oricmunch	Tansoft	£7.95
Ultima Zone	Tansoft	£8.50
House of Death	Tansoft	£9.99
Oric Galaxians	Softek	£6.95
Dracula’s Revenge	Softek	£6.95
Acheron’s Rage	Softek	£6.95
Dinky Kong	Severn	£6.95
The Ultra	PSS	£6.95
Quark 3D	Quark Data	£7.50
Loki	Joe the Lion	£6.45

#### Tansoft

Units 1 & 2, Techno Park, Newmarket Road, Cambs.

#### Softek

329 Croxtead Road, London, SE24.

#### Severn Software

5 School Crescent, Lydney, Glos.

#### PSS

452 Stoney Stanton Road, Coventry, CV6 5DG.

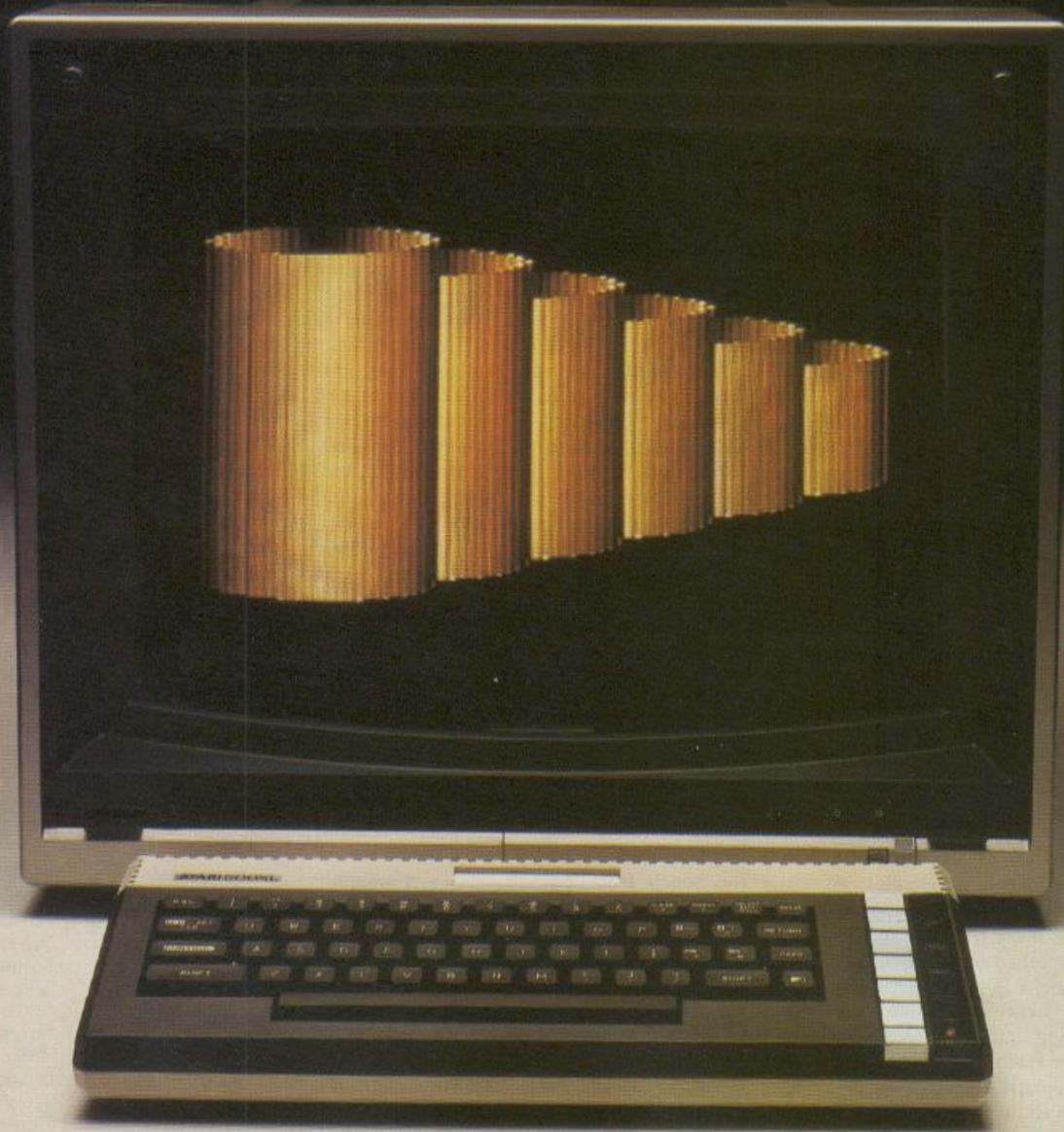
#### Quark Data

3-5 Wood Street, Swindon, Wilts.

#### Joe the Lion

213-215 Market Street Hyde, Cheshire.

# As your expe so can your



600XL Home Computer.

Whatever you want your home computer to do, the ATARI 600XL™ can do it.

**ATARI 600XL product specifications.**

Colour capabilities: 16 colours and 16 intensities. 256 shades.

Memory: 16K RAM expandable to 64K with memory expansion module. 24K ROM operating system including ATARI BASIC programming language.

Sound: 4 independent sound synthesisers. Each with a 3½ octave range.

Display: 11 graphic modes. 5 text modes. Up to 320 x 192 resolution. Maximum text display 24 lines by 40 columns.

Special ATARI integrated circuits:

GTIA for graphics display. POKEY for sound and controller ports. ANTIC for screen control and I/O.

CPU: 6502C microprocessor. 0.56 microsecond cycle. 1.8 Mhz.

Extended graphics functions: High resolution graphics. Multi-coloured character set. Software screen switching. Multiple redefined character sets. Player missile (sprite) graphics. Fine screen scrolling. Changeable colour registers. Smooth character movement. Simple colour animation facilities.

Programming features: Built in ATARI

BASIC programming language plus 8 other languages. HELP key will provide additional information and menu screens. Syntax checking on entry.

Input/Output: External processor bus for expansion with memory and peripherals. 2 controller ports. Serial I/O connector. Monitor output.

Software: Over 1000 items of software available including self teaching programs with unique voice over. Education. Home management. Programming aids. Atari user written programs (APX). And Atari's famous entertainment software.

# Experience grows Atari 600XL.



1. Program Recorder.



2. 64K Memory Module.



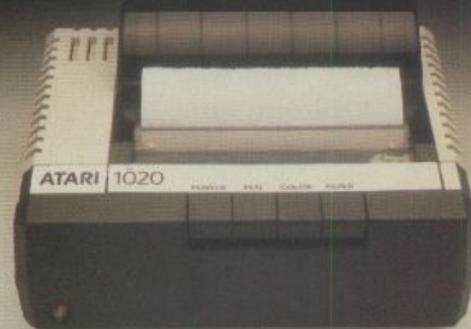
3. Touch Tablet.



4. Trak Ball™ Controller.



5. Super Joysticks.



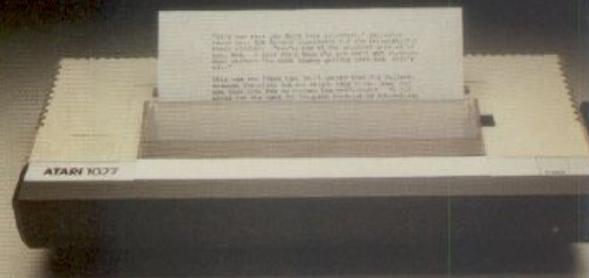
6. Colour Printer.



7. Disk Drive.



8. 80 Column Dot Matrix Printer.



9. Letter Quality Printer.

These peripherals will be available soon:  
1. **ATARI 1010™ Program Recorder** for low cost storage and retrieval capability. Data transmission 600 baud. Storage capability 100K bytes on a 60 minute cassette. Track configuration 4 track, 2 channels (digital and audio). Auto record/playback/pause control.

2. **ATARI 64K Memory Module** gives the 600XL a massive 64K RAM.

3. **ATARI Touch Tablet** enables you to paint pictures and draw diagrams, with the touch of a stylus.

4. **ATARI Trak Ball™ Controller** enables

cursor movement in any direction; adds to the pleasure of Atari games.

5. **ATARI Super Joysticks**. Gives you a greater competitive edge over your games.

6. **ATARI 1020™ Colour Printer** plotter. Four colour graphic print capability. 40 column. 10 characters per second. 5, 10 and 20 characters per inch.

7. **ATARI 1050™ Dual Density Disk Drive**. 5 1/4 inch disks holding 127K randomly accessible bytes provides both expansion and flexibility for your 600XL system with DOS III.

8. **ATARI 1025™ 80 Column Dot Matrix Printer** prints 5, 10 or 16.5 characters per inch. 40 characters per second. Ideal for program listings, financial reports, etc.

9. **ATARI 1027™ Letter Quality Printer** for word processing letters in professional type.

If you'd like to know more about the ATARI 600XL, write to Atari International (UK) Inc., P.O. Box 407, Blackhorse Road, London SE8 5JH and we'll send you all the details.

**The new Atari XL home computer system.**



# COLECO

# ADAM



Rock-steady display and stunning graphics from Buck Rogers for the Adam.

THE COLECO ADAM is a word processor which can be used to run business programs and also the wide range of Coleco games cartridges. The Adam is currently sold in the States at \$700 but the final UK price may be as much as £700.

The Adam will initially appear in March as an upgrade to the Coleco games machine. A stand alone version is expected to appear in August/September.

There are three separate hardware modules — A keyboard, a memory unit and a printer. The printer unit houses the power supply which drives the whole system.

The keyboard has a very nice feel to it with sensible positioning of keys which automatically repeat when held down. The meaning of the black 'smart/function' keys is provided on screen in word processor mode, other key legends also refer to word processing functions.

One of the games paddles may be placed in a carrier to the right of the keyboard and can be used as a numeric keypad. The logic of this will be appreciated when entering Basic programs, there is much less need for non typists to use the shift key and therefore less likelihood of typing the wrong meaning on the normal dual function numeric keys.

The memory unit houses the tape cartridge drive, the memory, processors and expansion ports.

The tape drive units are inexpensive digital drives that use Coleco formatted digital cassettes. Each cassette is capable of holding 500K of formatted data.

There is only one drive supplied although the capacity exists for two. The use of cassettes removes the problem of the special storage requirements for the Microdrive cartridges but is likely to lead to users inserting ordinary cassettes which obviously are not only unformatted, but of inadequate quality, and then complaining that they do not work.

The memory consists of 80K RAM — 16K video RAM and 64K general. On switching on the normal mode is word processing which is housed in ROM. Under these conditions, the user has the main memory as a working store and uses the cassette drives for mass storage of text.

The Adam does not have a resident Basic interpreter; that is loaded from tape which leaves a little over 220 blocks free of tape storage. PRINT FRE(X) shows the amount of RAM available as 26K which indicates that perhaps the ROM is masking a large slice of RAM. Masked memory is usually only available to data storage.

There is expected to be a 64K expansion board providing a total of 144K memory. How much will actually be usable to Basic depends to a large extent on the provision of a suitable bank memory switching mechanism.



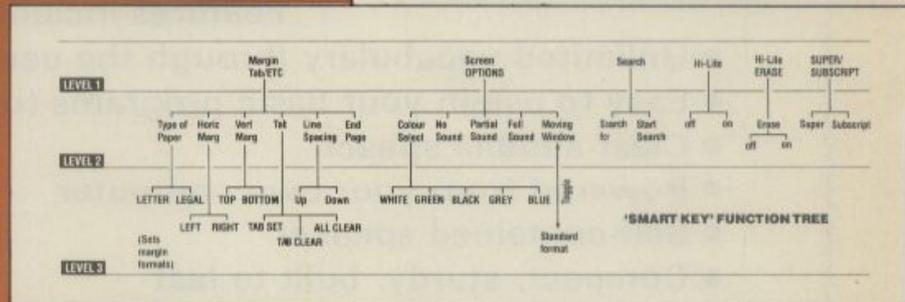
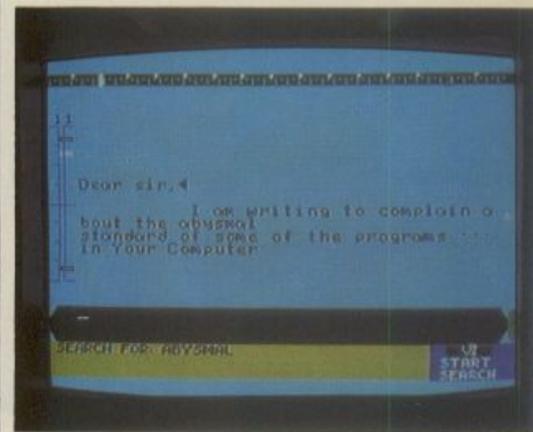
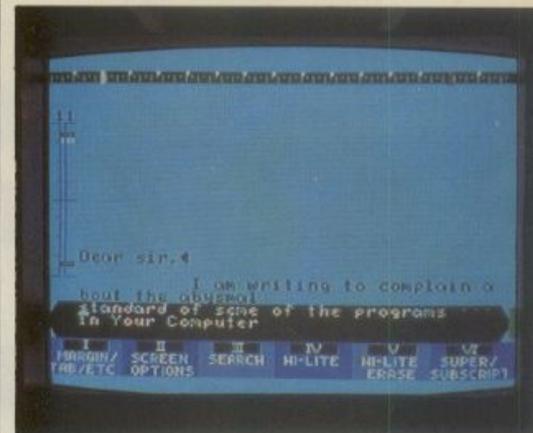
The main unit has three expansion board slots under the top cover and a cartridge port at the top right of the main unit. An edge connector is provided at the side of the system bus as are connectors for two paddle controllers. At the rear are TV and video connections and finally the Adamnet connector which allows communication between each unit.

The bi-directional daisywheel printer uses standard Diablo cartridge ribbons and wheels. Like other prints of this type, the quality is paid for in terms of speed and noise. It is very high quality print at a rather noisy 120 char/min.

A tractor feed is planned to enable fan-fold

Over-priced toy or bargain system?  
Kathleen Peel ways up the Adam  
from Coleco, the people who  
brought you the Cabbage Patch Kids.

Word processing: Adam's serious side



this would present no problems, but until a Centronics or RS-232 interface is produced there will be difficulties.

The Adam requires a television to complete the system. This can be any domestic television as the resolution requirements are no more than the normal teletext transmissions.

The restriction of the screen display to 40 characters is no great loss. Working with 80 characters/line for any length of time requires the use of a good professional colour monitor which would increase the initial cost significantly. The display provides a paper cursor at the top of the screen which shows

exactly where the character will appear on the page and that is all that is needed.

The display was extremely stable with no dot crawl. Generally the games machines seem to have developed very much better displays than computers.

The Adam has the capability of running cartridge and tape based software, I would have preferred the Basic to be in cartridge and not tape. It might have been felt that this would be too similar to Atari, but it would provide instant access to Basic.

There are two switches, one either side of the cartridge port which would have enabled the user to conveniently initialise word processing and Basic.

The Adam is foremost a word processor, and is in wp mode on switch-on. This function is menu driven and very convenient for the occasional user.

There is a reasonably comprehensive set of functions available including block search with multiple deletes and changes. A window is provided to enable the user to continually view the sector that is currently being typed in simulated 80 column mode. The page cursor

(continued on page 71)

paper to be used, especially useful for the sticky address labels.

One point which should also be remembered is that daisywheel printers besides producing wonderful text are not suitable for producing the usual range of business type graphics charts. Normally

**NEW**  
available ex-stock  
NOW!

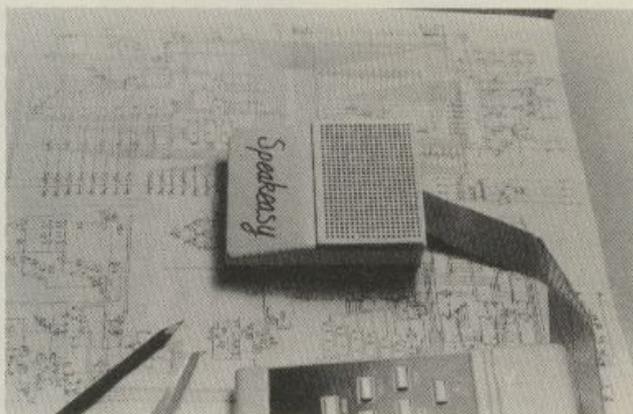
# NOW YOUR MICRO CAN TALK BACK WITH SPEAKEASY £29.95

**NEW**  
available ex-stock  
NOW!

inc. VAT and P&P

AVAILABLE NOW FOR:

BBC  
CBM 64  
VIC 20  
DRAGON 32  
MEMOTECH 500  
MEMOTECH 512  
ORIC-1  
SHARP MZ-700



AVAILABLE SHORTLY:

FOR  
MOST  
OTHER  
POPULAR  
MICRO'S

Features include:

- Unlimited vocabulary through the use of allophones
- Easy to use in your basic programs (or machine code programs!)
- Clear audible speech
- Powered from your own computer
- Self-contained speaker
- Compact, sturdy, built to last
- 12 month guarantee
- If you change your micro — you just change the lead

Available from your local Spectrum (UK) Dealer or direct from:

**JAMAR**  
17 Station Road, Mirfield, West Yorkshire WF14 8LN  
Tel: 0924 495923

Please rush me:

ITEM	QTY.	PRICE	TOTAL
SPEAKEASY (S)		£29.95	
CONNECTING LEAD (STATE WHICH MICRO)		£4.50	
TOTAL PAYABLE		£	

ALL PRICES INCLUDE VAT & P&P



(continued from page 69)

at the top of the screen is adequate but it is always wise to provide extra facilities.

The format of the print can be altered in terms of tabs, line spacing and characters per line and the finished document saved on the digital cassette drive.

The ink and paper screen colours can be altered to suit the user which is a very useful facility and the Adam will also automatically fold text in word processor mode. If the current word exceeds the 40 character line, the whole word is written on the next line.

### Basic lacks structure

I would expect an enhanced version of the Basic at some stage as this implementation lacks good structure. But considering the market that the machine is aimed at, it is a more than adequate implementation.

The speed of the Adam at least three times faster than the Spectrum, that puts it on a par with all but the BBC's of the computing world.

The error messages are fairly comprehensive and with a good editor, enabled corrections to be made to erroneous data quite quickly. Each line is checked on entry for syntax which is unfortunately countered by the fact that the

interpreter is space sensitive.

In text mode, there appeared to be 31 characters/line which indicates that Basic uses a 9 byte wide character and with 40 characters/line in wp, a 7 byte wide character. The maximum resolution of the display is 280 by 192, the Adam also supports 32 sprites and has a capability of displaying 16 colours.

I could find no sound facilities in the Basic command set, yet there is a very good sound capability as demonstrated in the games cartridges.

The Coleco Adam can run the Coleco range of games software. These are very high quality arcade type games with extremely good graphics.

There were three manuals available — Getting started, Programming with Basic and Typing with Adam. They were produced about the time of the Chicago Fair launch and in the case of the Basic documentation, did not represent the true performance of the Adam.

As the Adam is now available in the States, proper documentation should now be ready. By the time it comes to the UK there will be no problem.

Future expansion is for a 64K add-on memory card and a Modem capability. The Adam uses a Z-80 processor and it is planned to run C/PM software.

#### Tape drive comparison

	Coleco Adam	Sinclair Microdrive
Save	58	12
Erase/Delete	11	13
Load	5	5
Catalogue	18	10
Capacity	500K	90K

The format of the Sinclair Microdrive commands is significantly more complicated than those of the Adam. The timings are average times taken on a small number of test files, the only significant difference is in the time taken to save a file and in the capacity of the storage media. ■

### CONCLUSIONS

■ The philosophy of the Adam may well be correct, the small business user does not need Basic, just a tool which replaces a typewriter and runs business software plugged in or loaded from tape.

■ The success, or lack of it, will depend almost entirely on the business software. Given a sufficiently wide range of off-the-shelf packages then the Adam will satisfy a market requirement, but the packages must cater for the idiosyncrasies of the UK market.

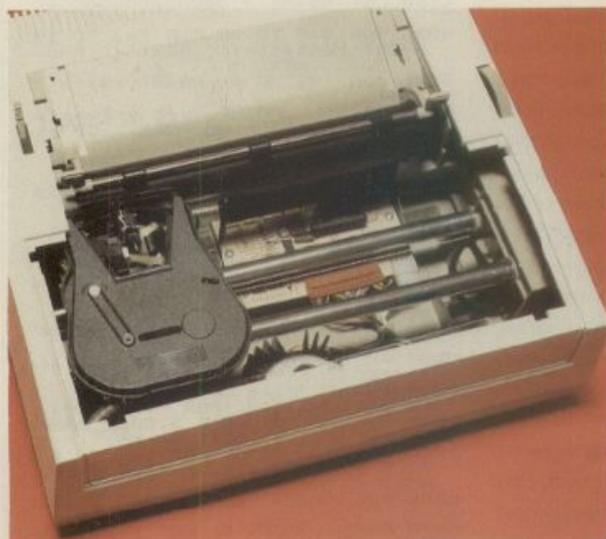
■ The initial impetus of the Adam has been lost by the late launch date and will probably be overshadowed in the UK by Sinclair's next ZX and later on by the baby IBM and a new Commodore business machine.

■ At that point, the pricing policy will be of much greater significance than at present, probably about £700 after the addition of 15 percent VAT and 6 percent import duty.

■ I think that it would be unwise to rely on a single cartridge drive, it would be prudent to have a backup. The use of a daisywheel printer does restrict the type of graphical output available which I would have thought is not unimportant in a business machine, but then a premium is normally paid for quality print.

■ The rock steady display and on screen function key labelling is very good. I am a bit concerned about writing to tape which contains my only copy of Basic but then the average user is unlikely to Poke around and cause problems.

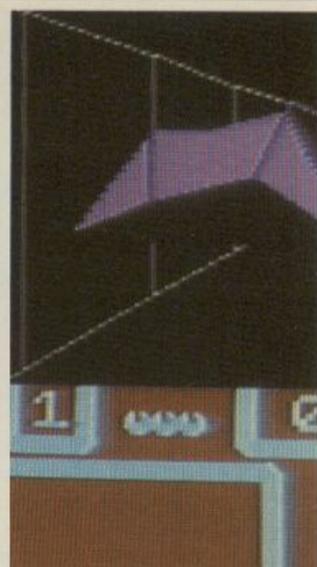
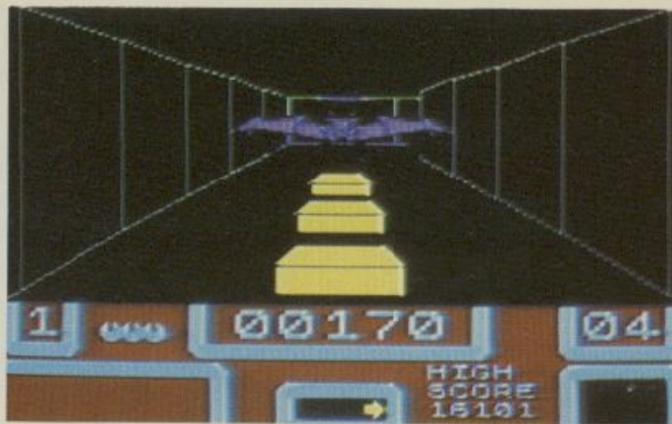
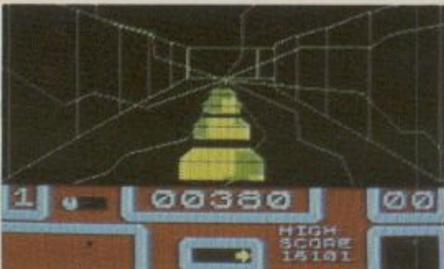
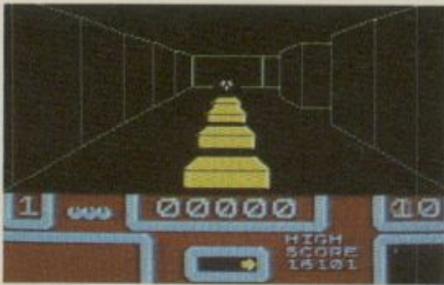
■ The Adam represents extremely good value in the small business market which is word processor orientated.



Hi Cathy  
FATAL SYSTEM ERROR

Maybe Coleco's Smart Basic isn't so smart. Opening up the ROM reveals a secret message from one of the Lazer Micro Systems programmers to Cathy — whoever she is.

Coleco SmartBASIC V1.0 (c) 1983, Lazer MicroSystems Inc



# SPECTRUM

YOU ARE IN THE depths of Transylvania entombed in the tower of Count Dracula's Castle. The floors are laden with gold just waiting to be collected. The only drawback is that each floor of the tower also has a collection of vampire bats.

As you clear each floor of gold vampire bats appear on that floor. Your only means of survival is quick thinking and garlic. Every

time you eat garlic you are immune from bat attack for 20 seconds. The bats do not run away from you but just get a nasty surprise when they try and eat you; indeed, such a surprise that the bat is put out of action for 20 seconds.

Your other means of avoiding the bats is using the lift. The lift will transport you between the floors of the tower at your will.

With four bats in the maze at their most vicious you stand little chance. Or are you skilful enough to survive?

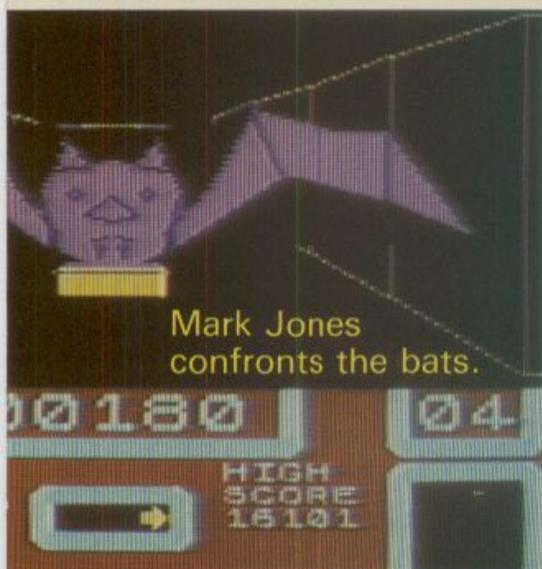
The controls for the game are:

- 5 = move left.
- 6 = move right.
- 7 = move forward.
- 8 = move backwards.
- Capshift 5 = rotate left.

```

Program 1.
1 DATA "183c7eff3c3c3c3c"
2 DATA "3c3c3c3c3c3c3c18"
3 DATA "10307fffff7f3010"
4 DATA "000cfefffffe0c08"
5 DATA "002410ffffbd1800"
6 DATA "0018bcffff182400"
7 DATA "1c185c3e3e5c181c"
8 DATA "3a183a7c7c3a1838"
9 DATA "2466e7e7ffff7e3c"
10 DATA "3c7effff07e7e6624"
11 DATA "3c7effff07ff7e3c"
12 DATA "3c7effff07ff7e3c"
13 DATA "0018245abd5a5a"
14 DATA "00003c3c3c3c0000"
15 DATA "ff81a1a1a1b901ff"
16 DATA "7e7e7e7e7e7e7e7e"
17 DATA "00ffffff00000000"
18 DATA "00f0f0fcfe7e7e7e"
19 DATA "000f1f3f7f7f7f7e"
20 DATA "7e7e7e7e7e7e7e7e"
21 DATA "7e7f7f7f3f1f0f00"
22 CLEAR 30999
23 DIM s$(8,32)
24 LET s$(1)="P P P
25 LET s$(2)="P P III P
P P P
30 LET s$(3)="U00T U000000
000000T U0000T"
40 LET s$(4)="000000000R BLOC
KED HIGH 3000R"
50 LET s$(5)="YOU ARE INP 300
00R SCORE P P"
60 LET s$(6)="THE LIFT P PCA
BDP P P"
70 LET s$(7)="WHICH P U00
00T P P"
80 LET s$(8)="FLOOR? 1-4P
P P"
999 DIM b$(64,16)
1010 LET b$(1)="50000000000000R
1020 LET b$(2)="P0NNNNNPNPNNNN P
1030 LET b$(3)="PN500NPNP000RNP
1040 LET b$(4)="PNPNNPNPNPNNPNP
1050 LET b$(5)="PNPNS0TNNN0RNPNP
1060 LET b$(6)="PNPNPNNPNPNNPNP
1070 LET b$(7)="PNNNNN0000NU000P
1080 LET b$(8)="P0000NNPNPNNNNNP
1090 LET b$(9)="PNNNNPNPN000RNP
1100 LET b$(10)="PN500NP PNNNNPN
1110 LET b$(11)="PNPNNNNNN0RNNN
1120 LET b$(12)="PNPNPNU0RNNPNPN
1130 LET b$(13)="PNNNNNNPU0NPNP
1140 LET b$(14)="PN00NPNPNNPNPN
1150 LET b$(15)="P NNNNNNNPNNNN
1160 LET b$(16)="U0000000000000
T"
2010 LET b$(17)="500000000000000
R"
2020 LET b$(18)="P0NNNNNPNPNNNN
P"
2030 LET b$(19)="PN000RNP00000N
P"
2040 LET b$(20)="PNNNNPNPNNNNNNN
P"
2050 LET b$(21)="PN0RNU00RNS000N
P"
2060 LET b$(22)="PNPNPNNNNPNPNNN
P"
2070 LET b$(23)="P0NNNNPNPNNNN00
P"
2080 LET b$(24)="PNPNPNPNU00NPNN
P"
2090 LET b$(25)="PN0TNPNNPNNU00N
P"
2100 LET b$(26)="PNPNPNPNP00NNN
P"
2110 LET b$(27)="P0NU0NPNN NNNPN
P"
2120 LET b$(28)="PNNNNNNN000RNP
P"
2130 LET b$(29)="PNPNS00NNNNPNPN
P"
2140 LET b$(30)="PNPNPNNN000PNNN
P"
2150 LET b$(31)="P MNNPNPNNNNNP
T"
2160 LET b$(32)="U000000000000000
T"
3010 LET b$(33)="500000000000000
P"
3020 LET b$(34)="P0NNN0000RNNNN
P"
3030 LET b$(35)="PN0RNNNNNNPNPNP
P"
3040 LET b$(36)="PNNPNNS00NPNPNP
P"
3050 LET b$(37)="P0NNNPNPNNPNNNN
P"
3060 LET b$(38)="PNNPNPNPNP0000
P"
3070 LET b$(39)="PNSTNPNPNNNNNNN
P"
3080 LET b$(40)="PNPNMNU0NP0RN
P"
3090 LET b$(41)="PNPNS0NNNNPNPNP
P"
3100 LET b$(42)="PNPNPNPPNU0NNN
P"
3110 LET b$(43)="PNP PNS0PNNNNPN
P"
3120 LET b$(44)="PNNNPNTU0000TN
P"
3130 LET b$(45)="PNPNPNNNNNNNNN
P"
3140 LET b$(46)="PNPNPNPNP0000N
P"
3150 LET b$(47)="P NNPNNNNPNNNN
P"
3160 LET b$(48)="U000000000000000
T"
4010 LET b$(49)="500000000000000
P"
4020 LET b$(50)="P0NNNNPNPNNNNN
P"
4030 LET b$(51)="PN000NPNP0000N
P"
4040 LET b$(52)="PNNNNNNPNPNNNNN
P"
4050 LET b$(53)="P0000NPNP0R0N0
P"
4060 LET b$(54)="PNNNNPNPNNPNPNN
P"
4070 LET b$(55)="PNSRN0TNPNPNPNP
P"
4080 LET b$(56)="PNUTNNNNPN NPNP
P"
4090 LET b$(57)="PMNN00RNNN0RNNN
P"
4100 LET b$(58)="PNPNNNU0N0RU000
P"
4110 LET b$(59)="PNNNPNPNNPNPNNN
P"
4120 LET b$(60)="PNPNNPNPNPN50N
P"
4130 LET b$(61)="PNP00NNPNPNNPNP
P"
4140 LET b$(62)="PNPNNPNPNPNPN0
P"
4150 LET b$(63)="P NNPNPNNNNNNN
P"
4160 LET b$(64)="U000000000000000
T"
5000 FOR g=0 TO 3: FOR f=1 TO 16
: PRINT b$(g+16+f): NEXT f: PAUS
E 0: CLS: NEXT g
5001 FOR f=1 TO 8: PRINT s$(f):
NEXT f
5002 PRINT: PRINT "udg graphics
being created": RESTORE: LET s
s=0: FOR f=1 TO 21
5003 READ a$
5004 LET s=1 TO 16 STEP 2
5005 LET a=CODE a$(s): LET b=COD
E a$(s+1)
5010 IF a>96 THEN LET a=a-39
5015 IF b>96 THEN LET b=b-39
5020 LET a=a-48: LET b=b-48
5030 POKE USR "a"4ss,a+16+b
5040 LET ss=ss+1
5050 NEXT s: NEXT f
5055 CLS
5060 PRINT "ABCDEFGHJKLMNPQRST
U"
5098 PRINT AT 21,0:"Press any ke
y to continue\ PAUSE 0: CLS
5099 PRINT "Data being stored"
5100 LET s=31000: FOR f=1 TO 64:
FOR g=1 TO 16: POKE s,CODE b$(f
,g): LET s=s+1: NEXT g: NEXT f
5200 FOR g=1 TO 8: FOR f=1 TO 32
: POKE s,CODE s$(g,f): LET s=s+1
: NEXT f: NEXT g
5250 FOR f=USR "a" TO USR "a"+21
+a-1
5260 POKE s,PEEK f: LET s=s+1: N
EXT f
5300 PRINT "Data stored"
5310 PRINT AT 21,0:"Press any ke
y to save data": PAUSE 0: CLS
5400 SAVE "mz/cf/udg"CODE 31000,
1448
Note: enter the letters between
quotation marks in graphics
mode except where they form
words, eg., "YOU ARE IN" in
line 50

```



# DRACMAN

Capshift 8 = rotate right.  
 Capshift 6 = turn around.  
 0 = View maze while 0 is being pressed you cannot move. The bats can.

You also have a radar at the bottom of the screen to tell you where the bats are.

Your screen during the game has a 3D view down the passage you are facing, filled with gold, garlic and if you are unlucky a bat flapping towards you.

You have three lives. Each time you are killed there is spectacular machine code sound. The program is the same for 16K and 48K machines and automatically detects what type of machine you have using slightly different

techniques for generating the display. Thus, the 48K display is smoother than the 16K display.

Now to the arduous business of typing in the program. There are six Basic programs which generate the code. After you have typed in each Basic program Save it before you Run it.

The first program generates the data for the four mazes, lower screen display and user defined graphics. This program is fairly straightforward. Once you have Run it Save the code using line 5400.

The second program is a little routine that  
*(continued on page 75)*

## Program 2.

```

1 DATA "1845fdcb57c606af0e80c
5cd8271380910f9c10dca8f7118f1c50
600cd827138030418f8f1b8280df5c5c
de522c104f1b820",6761
2 DATA "f518ddcde52218d8c5cda
a2247047e0710fd1fc1c92ab05cfdcb4
786eb210040018813cdb871af1213210
058012003fdcb47",13623
3 DATA "c6cdb871af1213eb22b05
cc97ea7200b35230b78a720f5b020f2c
9e57cd640fdcb47462802d61867eb732
3722322b05cebe1",20460
4 DATA "13c5011000edb00611052
b1b7ea728f9e52ab05c70e123c11318b
f",24024
5 CLEAR 28999
8 LET c=0
  
```

```

9 LET f=29000
10 FOR h=1 TO 4
20 READ a$
30 FOR s=1 TO LEN a$ STEP 2
40 LET a=CODE a$(s): LET b=COD
E a$(s+1)
50 LET c=c+b+a
60 IF a>96 THEN LET a=a-39
70 IF b>96 THEN LET b=b-39
80 LET a=a-48
90 LET b=b-48
100 POKE f,a*16+b
110 LET f=f+1
120 NEXT s
130 READ tot
140 IF tot<>c THEN PRINT "Error
at line ";h: STOP
150 NEXT h
  
```

## Program 3.

```

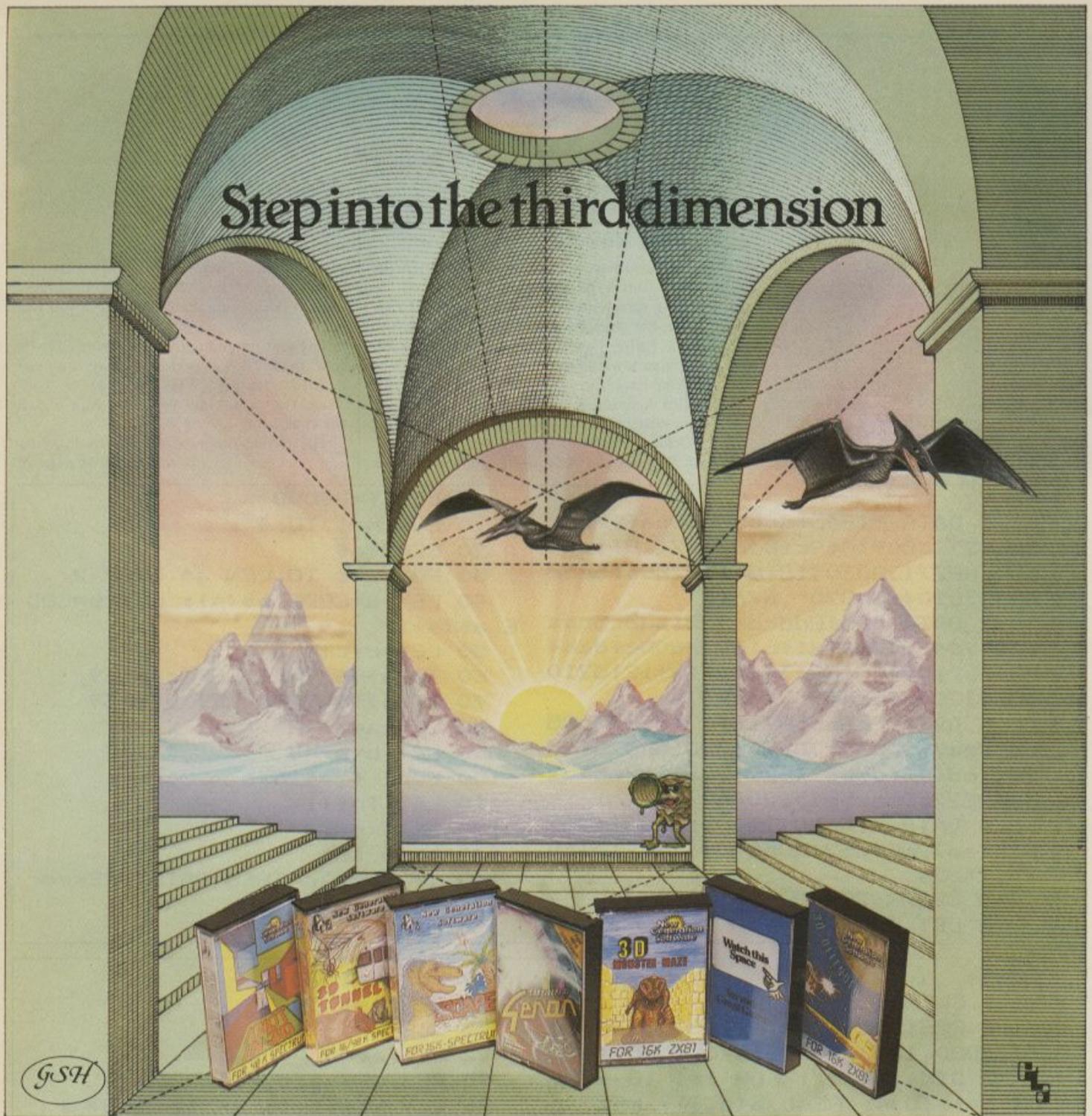
1 CLEAR 28999
2 RESTORE : DATA 1000,1060,10
70,1080,1040,1060,1070,1080
3 DIM a(4,2): FOR f=1 TO 2: F
OR g=1 TO 4: READ a(g,f): NEXT g
: NEXT f
4 DATA 8,48,73,87,101,109,115
,120,123
5 DIM b(9): FOR h=1 TO 9: REA
D b(h): NEXT h
6 LET tt=1
10 LET r=29200
11 LET ss=26537
12 LET s=29272
13 POKE 23729,INT (s/256): POK
E 23728,INT (256*(s/256-PEEK 237
29))
14 LET rr=r-ss
20 BORDER 0: PAPER 0: INK 0: C
D 7000
LS
  
```

```

80 FOR t=1 TO 4
90 FOR k=1 TO 9
91 CLS
92 LET at=0
95 RESTORE a(t,tt)
96 LET tt=tt+1: IF tt=3 THEN L
ET tt=1
97 LET v=119/(127-b(k))
100 READ x
105 IF x=253 THEN GO SUB 8000:
GO TO 200
109 READ y
110 IF x=255 THEN GO TO 150
111 IF k>5 THEN GO SUB 8100
120 DRAW INK at;x/v,y/v: GO TO
100
150 READ a: PLOT INK at;127-y/v
,128-a/v: GO TO 100
200 NEXT k: NEXT t: INK 7: GO T
  
```

*(Program 3 continued on page 75)*

# Step into the third dimension



Take a giant step closer to reality with New Generation Software. The 3D Graphics of New Generation programs bring the screen alive and makes other games look as flat as snakes and ladders.

Spectrum owners will find that seeing is believing when they open the door on 'THE CORRIDORS OF GENON', the latest creation from New Generation. You will be saving the Universe from the evil that now controls all things. But beware – the sound of footsteps approaching could be Bogul!

Hurtle into a void leaving a trail for your unseen pursuers in 'KNOT IN 3D'. Weave your way through up to five trails but be careful, you could get knotted! Or travel through the depths of a moving tunnel full of bats, rats, spiders and toads in '3D TUNNEL', with a special surprise in the 48K version.

Stamina is the vital ingredient of 'ESCAPE', as you'll be venturing into the maze pursued by walking and flying dinosaurs.

ZX81 owners must be prepared for the

shock of coming face to face with the T. Rex that leaps out from '3D MONSTER MAZE'. '3D DEFENDER' takes you out of this world and plunges you into space in a fast moving game to defend your home planet against alien spacecraft in a blitz of explosions, plasma blasts and photon beams.

All these exciting 3D games have been designed by Malcolm Evans, the 3D expert. They'll have you leaping out of your seat because you don't just play New Generation games, you live them.

Corridors of Genon for 48K Spectrum £5.95  
*'It is a superb program, and a well conceived plot. Brilliant!'* Home Computing Weekly  
 Knot in 3D for 48K Spectrum £5.95  
*'Addictive, playable game'* C & V Games  
 3D Tunnel for 16K/48K Spectrum £5.95  
*'A masterpiece of programming'* C & V G

Escape for 16K Spectrum £4.95  
*'One of the best and most original games we have seen for the Spectrum'* Sinclair User  
 3D Monster Maze for 16K ZX81 £4.95  
*'Brilliant, Brilliant, Brilliant...'* Popular Computing Weekly  
 3D Defender for 16K ZX81 £4.95  
*'Another 3D Winner'* Sinclair User

**New Generation Software**

FREEPOST Bath BA2 4TD Tel 0225-316924  
 Mail order by return

Available from  
 W H Smith, Boots,  
 Menzies, Spectrum  
 Group and all leading  
 computer stores.

(program 3 continued from page 73)

```
999 REM bat wing up
1000 DATA 255,105,30,25,35,16,0,
24,7,12,-26,13,-15,255,105,30,24
,11,31,9,32,-24,255,80,18,0,22,2
55,49,9,9,21
1010 DATA 255,0,5,-16,-3,3,11,7,
-10,255,16,8,-4,-8,2,-8,3,-11,7,
-4,255,8,39,8,0,255,0,17,-7,-6,7
,-2,255,7,32,6,2,255,7,32,7,0,25
5,4,32,1,-5,1,5,255,12,16,2,-2,2
,2,-2,2,-2,-2
1020 DATA 253
1030 REM wing down
1040 DATA 255,119,27,24,20,20,-3
,35,5,1,-7,8,-4,12,-4,3,-11,6,-7
,-42,8,-40,5,-26,-3,255,99,26,7,
13,255,50,30,7,20
1050 DATA 255,0,5,-16,-3,3,11,7,
-10,255,16,8,-4,-8,2,-8,3,-11,7,
-4,255,8,39,8,0,255,0,17,-7,-6,7
,-2,255,7,32,6,2,255,7,32,7,0,25
5,4,32,1,-5,1,5,255,12,16,2,-2,2
,2,-2,2,-2,-2,253
1059 REM gold
1060 DATA 255,0,76,-24,0,0,12,24
,0,255,24,64,8,8,16,0,253
1069 REM garlic
1070 DATA 255,0,69,-5,10,5,18,-9
,-16,9,-12,-14,8,0,7,14,13,-15,-
8,-3,-5,3,-5,15,-10,253
1079 REM lift
1080 DATA 255,127-64,128-96,56,0
,0,32,-56,0,0,-32,255,127-70,9,0
,-16,9,0,0,-1,-10,0,0,17,255,127
-84,9,0,-17,0,1,0,17,255,127-90,
9,0,-17,0,1,0,17,255,127-90,8,10
,0,0,-1,-10,0,255,127-90,17,8,0,
0,-1,-8,0
1090 DATA 255,127-105,8,11,0,0,-
```

```
1,-11,0,5,0,0,-16,1,0,0,16,253
6000 LET yy=h-rr
6030 POKE f+1,INT (yy/256): POKE
f,INT (256*(yy/256-PEEK (f+1)))
6040 RETURN
7000 FOR f=29200 TO 29271 STEP 2
7001 PRINT #0;"Press any key to
continue": PAUSE 0
7002 CLS
7003 LET vv=16384
7010 LET h=PEEK f+256*PEEK (f+1)
7015 GO SUB 6000
7020 LET l=PEEK h+256*PEEK (h+1)
7025 IF PEEK h=0 AND vv=16384 TH
EN LET vv=22528: LET h=h+1: GO T
O 7020
7030 IF PEEK h=0 THEN NEXT f: GO
TO 9999
7040 LET b=PEEK (h+2): LET h=h+3
7050 FOR e=1 TO b
7060 POKE l+vv,PEEK h
7070 LET l=l+1: LET h=h+1
7080 NEXT e: GO TO 7020
8000 POKE r+1,PEEK 23729: POKE r
,PEEK 23728
8001 GO SUB 8100
8004 POKE 23695,at
8005 LET r=r+2
8010 IF k>5 THEN RANDOMIZE USR 2
9000: RETURN
8020 RANDOMIZE USR 29002
8030 RETURN
8100 IF t=1 THEN LET at=3
8110 IF t=2 THEN LET at=6
8120 IF t=3 THEN LET at=7
8130 IF t=4 AND k<5 THEN LET at=
58
8140 IF t=4 AND k>=5 THEN LET at
=2
8150 RETURN
9999 SAVE "data"CODE 29200,3460
```

(continued from page 73)

generates machine code for use in the third program. Type this in and Save it. Now try to Run it. Once you have corrected all mistakes and Run successfully you will have a machine-code routine stored at 29000. Every time you Run program 3 you will need this machine code at 29000.

Type in this program and Save it. This routine produces half images of graphics used in the main program. When Run the program will first blank the screen and then generate the bats, gold, garlic and lifts in half images in nine different sizes.

It is important that you go through all the graphics before you Save them. Now Save the code using line 9999.

The next stage is to type Rand USR 0 and then load up with the code from programs 1

(continued on next page)

#### Program 4

```
5 CLEAR 29999
10 DATA "3e0332415b21120022e15
b210067227b5c21000022355b06040e0
13e20111d5b21255b7112231310fa3ec
832de5b3ab55cd63f32d45bc61832d55
b3ec332225dcdad7b21d85b112d5b010
400edb021597b22235d3e19ed47ed5e3
e15328d5ccd237bcd32"
11 DATA 13091
20 DATA "7ccd617c3e04328d5c328
f5c3e1e320d5b320f5b32115b32135b1
600cd977b3e01320a5b3dcd47b0e00c
d2a79cd75acdffa79cd487ccd7f7c2a3
d5b46c5cd467dc110f901fe7fed781f3
8e43e3eed56ed47af2a0b5bed5b355be
d52d0ed530b5bc9cdaa"
21 DATA 14620
30 DATA "224c473ad45b84d64067c
9d5e5ed437d5ccd6f75043e010f10fd4
6b07779cd1c76e1d1c90f0f0fe603473
ad55b80673a8f5c77c9d5e5d9e5d92a7
d5c789438041601180316ff2f4779953
```

```
B041e0118031eff2f4fb8300669d5a5f
f1807b1c86841d51600"
31 DATA 13412
40 DATA "60781f853803bc3807944
fd9c1c518044fd5d9c12a7d5c7884477
93c853d4fcd0376d97910ddd1d9e1d9e
1d1c90afeffcb8e503c5f5cbbf16005f1
94ef11730043eff914f59c10a03e1e5c
54b5f1946d1e1afc9682600292911a45
b19065ccd8976cd0376"
41 DATA 13706
50 DATA "424bcd897617d8cd2c761
8f4c5fdcb47863ad45bcde3763ad55bf
dcb47c6cde376c1c91e00574e234679a
7c823d5eb09eb4623c57e12231310fac
17be61f4f3e20914f3ee0a3b15fe52b7
efdc4746c5200806081fcb1110fb79c
1121310eae1d118c3fd"
51 DATA 14109
60 DATA "cb47be0601ed5bdf5b2ae
15b197ed5e5fe20286ffe9f382ffdc4
77e20070ef4c5cdf76c1e1d1fdcb477
(program 4 continued on next page)
```

(program 4 continued from previous page)

```

ec0e5c5d5cdc177d1c105280efdc47f
e210000afed52ebe118c7e1c9fe9e281
cfdcb477e2832fe9c200521cd671819f
e9d200521bb671810fe"
61 DATA 14703
70 DATA "9e200521df67180721a96
7fdcb47def5783d8716005f195e2356e
bcdcc76f1fe9e289e3e09b82899fdcb4
77e2805052890180104e1d1c33077ed5
bdf5b7b1f2ae15be5f53006d5111001
9d12bafbac52813cd0078c1f1e13006d
511efff19d123cd0c7b"
71 DATA 13741
80 DATA "c9cd0c78c1f1e13006d51
1efff19d123cd0078c93ed032d05b3ed
932d25b180a3ee232d05b3eeb32d25b0
e00c5417efe9f30053ad25b18033ad05
b4fe5d5cdaf76d1e119c1050c78fe002
0e0c9f0ff1000fff01001000f0ff010
0fffff01001000f0"
81 DATA 14094
90 DATA "ff0100fff0ff0ff10003e0
2cd01162ad65b06103e16d7afd7afd71
620c5cd817806107e23cd8d78d710f8c
d8178c110ecc906083e04328f5c7ad71
0fcc94fd6903828fe0f38043e04181de
60ccb3f1f1f380b1f38043e06180e3e0
2180a1f3e0338021803"
91 DATA 13592
100 DATA "a9d698328f5c79c92ae15
b177efe9fd2027bfdcb47decdb47a22e
15bfe9d20070e0acd2a79181afe9c201
10e32cd2a793e0132005b3e1532015b1
805fe9ecae3795e3d0107977afed52f
dcb475628043e9e18023e2077fdcb479
6c9d5cb12380bcb1b3b"
101 DATA 14140
110 DATA "033cd1c9c603d1c9cb1b3
802d1c9c602d1c9e53ec8b92803cd857
f2a355b06000922355bcd4179e1c9e5d
5ed5bcd5b01f0d8cdf079cd72790118f
ccd079cd7279019cfcfd079cd72790
1f6fcd079cd727945cd7279d1e1c9e

```

```

5d5ebc5cb24cb14cb14"
111 DATA 14351
120 DATA "3eaf94477d8717174fcd
a22c1e51108000421783d1910fdd1060
8c5d511000006084a7e17380acb13cb1
2cb13cb121809cb13cb1237cb13cb121
0e823444de1722373d511f0019d1722
37311ff0019eb6069c13e05b82007e52
120f819ebe110b9d1e1"
121 DATA 13037
130 DATA "1313c93e20ed5277fdcb4
7d6cdcd7bc9af093c38fc3ded4247c9c
d0c7b3e98ed5bdf5bcd10792ae15b772
13978ed5bdf5bafcd10798787874f060
009e511000001feefed781f3809e1cd5
978fdcb47dec91f1f3804142106001f3
8041c2100001f38041c"
131 DATA 13986
140 DATA "21020001fef7ed78e6102
0041421040001feefed78c1094e23466
960cb1a3804cb1b3011eb1f3005cdcb7
8180bed5bdf5bafcd47decdb47acd237
7cd8e7afdcb7b7efdc47e6c4bd7ac92
1ae5aaf0604772310fca2ad5f5ebcd1
079fe032807cb4f2802"
141 DATA 14487
150 DATA "3eff3c21ae5a856f3e067
7c9fdcb475ec8fcdcb479ed9e5080:001
01100403ad45cbde07a0100021100583
ad55bcde07afdcb47a608e1d9c9fdcb7
b7e2009af12130b78b120f8c9fdcb476
62007571e00cde67ac9672e00edbc93
e0e1101002110271808"
151 DATA 13854
160 DATA "3e1211000021c800f5cdb
50321c65a0608f1772310fccc93e02cd0
1163e16d73e10d7afd71106601c000c
d3c20d53e01cd0116d1210001228a5c2
1c05022865c0140002a8d5c228f5ccd3
c20c9fff3e5d5c5f50601210055cd827
bd9777b060023cd827b"
161 DATA 13137
170 DATA "23cd827b23cd827b23cd8
27bf1cd1e1f3c795e2356afbad01d200
615ccfd7e1a3f2722b732337c9e5d56a2
600111b10c362793a0a5b47110110cd7

```

```

279c911005e2100620:0004edb0c9218
05a0604111600c5060a772310fc19c11
0f5c93e18c8b9797af32"
171 DATA 13225
180 DATA "085ccdb+023a085cd6313
8f2fe0430eef50604cd47c10fb21011
522005bf1453c230a5bdcda27b3ade5ba
7d60a380332de5bf1212d5b5f1600192
23f5b21255b19223d5bc65e32d75b32e
25b32125b32145b320e5b32105b3e12c
db97bc9219b5a3e0406"
181 DATA 13561
190 DATA "04111c00c50604772310f
c19c110f5c90604219b50af5e511fc0
00608cd3c7ce111200019c1100ec93e0
2cd01163e16d73e15d73e14d72a0b5b0
1f0d81e30cd2a19d5e5c3301a3ae15bf
dcb47f6cdac7cfdcb47b62a3d5b46210
d5b11035bc51aa72008"
191 DATA 13681
200 DATA "7eed5cdac7cd1e123231
313c110ecc92105bf77afed6f1473e1
e90477ecb3c1d1fcb1fcd84ffcd477
6200ecdaa2211400019474ce5d5c30c7
605cdee7c040dcdee7c0ccdee7c0ccde
e7c0d04cdee7cc9c5cd97cc1c921085
dc53a0a5b3d8787803d"
201 DATA 14861
5000 LET c=0: LET f=30000
5010 FOR h=1 TO 20: READ a#
5020 FOR s=1 TO LEN a# STEP 2
5030 LET a=CODE a#(s): LET b=COD
E a#(s+1)
5040 LET c=c+b+a
5050 IF a>96 THEN LET a=a-39
5060 IF b>96 THEN LET b=b-39
5070 LET a=a-48
5080 LET b=b-48
5090 POKE f,a#16+b
5100 LET f=f+1
5110 NEXT s
5111 PRINT h
5120 READ tot: IF tot<>c THEN PR
INT "Error at line "h*10: STOP
5125 LET c=0
5130 NEXT h

```

(continued from previous page)

```

and 3. To do this
Clear 25087
Code 1 - LOAD ""CODE25088
Code 2 - LOAD ""CODE 26537
It is important to include these numbers.
Finally, Save Code 25088, 4911.
Type in program 4 which produces about
4/5 of the main machine code program. Save

```

```

the Basic. Run the program and type
NEW
This deletes the Basic but preserves the code
now stored at 30000.
Type in program 5. Save it and then Run it.
Finally
Save Code 3000, 2568
Now type Rand USR 0. This does a

```

complete New. Now type in the Rem statement. If it is not the right length the Basic program will tell you.

If the task of typing in this program is too much for you, copies are available by sending £2.30 and a self stamped addressed envelope or a jiffy bag to: Mark C Jones, 17 Park Walk, London SW10 0AJ.

Program 5.

```

10 DATA "5f1600197e4f783d875fd
5210d5b195e2356ed53cd5bd12b71211
55b193ef77237721025b193e01773e1
52377cb3b211d5b19ad5b05b7ef983
804fe9c3801123e2077c1c905dd21ec5
b788721035b5f1600197a7c0210d5b1
9d522025d5e23561a5b"
11 DATA 13194
20 DATA "d1fe983805fe9cda287fe
52115b1922045d211d5b7bcb3f056f2
2065d7ee1fe943804fe983801770e001
10100cdd77d111000cdd77d11ffffcdd
77d110ffcd07779fe02444d3f300c2
a045d5e2356069197efe9fd44f47deb2
a025d7323722a065d77"
21 DATA 13804
30 DATA "3e94d52a045d5e2356cd1
079e177c9e5afd7700197efe9f380ad

```

```

d3500dd3500dd35000:e1dd23dd23dd2
3c9c5dd21ea5b2a3755e235623cb6c2
80321000022375b3ade5bbdd53044693
ae15bcda37e505f7dcd3a37e93c8b67e4
f7892c8b67e814f06a"
31 DATA 14045
40 DATA "c5dd7e00dd23dd2385cda
37e93c8b67e4f7892c8b67e81c191380
428051806add3400dd3400dd2310d7f1e
60347808006004fdd21ec5bddd090e020
604dd7e00b92814dd23dd23dd23fe802
005dd21ec5b0410e90d18e4dd2bddd560
Odd2bddd5e00e1e5197e"
41 DATA 13969
50 DATA "fe9f3806dd23dd2318d42
a045d732372e119c9060087cb1087cb1
087cb1087cb101f1f1f1c9d0c547af9
0c1c9cdc57f01f401cd667f3a415b3d3
2415b2854f53e10328f5c3e16d73e11d
7f1c605d73e20d73e04328f5c2a3d5b4
6cdf47c10fb06052140"
51 DATA 13601

```

```

60 DATA "9c2b7cb520fb10f6c9afa
0c0d5e511015bafed52cb3deb2a3d5b7
ebb380ce1e5110a00194e23463e94020
600e1d1c9c1c1c3e0753a015ba7cabd7
e04c5016400cd667fcb3b21d5b197ef
e9d20070e0acd2a791813fe9e200f0e3
2cd2a793e0132005b3e"
61 DATA 14093
70 DATA "1532015b0ec8cd2a79c1c
df47cc93a485ce6380f0f0ff6081608c
57aeel057d3fe78b10b20fcb10b78b12
0e9c9c52a3f5b7e3d772035110c00e51
97ed1122a3d5b7fe0428043c77180c3
ade5b2807d0a380332de5b2ad65b545
d01000409010001ed0"
71 DATA 13651
80 DATA "0604cd47c10fbc1c92ad
45be521405822d45b214a5b110a00060
4c5e50608c5e54e234623cd03764e234
6cd2c76e119c110ecel12323c110e2e12
2d45b7fdcb47dec9"
81 DATA 8933

```

```

5000 LET c=0: LET f=32000
5010 FOR h=1 TO 8: READ a#
5020 FOR s=1 TO LEN a# STEP 2
5030 LET a=CODE a#(s): LET b=COD
E a#(s+1)
5040 LET c=c+b+a
5050 IF a>96 THEN LET a=a-39
5060 IF b>96 THEN LET b=b-39
5070 LET a=a-48
5080 LET b=b-48
5090 POKE f,a#16+b
5100 LET f=f+1
5110 NEXT s
5111 PRINT h
5120 READ tot: IF tot<>c THEN PR
INT "Error at line "h*10: STOP
5125 LET c=0
5130 NEXT h
5131 NEXT h
5132 NEXT h
5133 NEXT h
5134 NEXT h
5135 NEXT h
5136 NEXT h
5137 NEXT h
5138 NEXT h
5139 NEXT h
5140 NEXT h
5141 NEXT h
5142 NEXT h
5143 NEXT h
5144 NEXT h
5145 NEXT h
5146 NEXT h
5147 NEXT h
5148 NEXT h
5149 NEXT h
5150 NEXT h
5151 NEXT h
5152 NEXT h
5153 NEXT h
5154 NEXT h
5155 NEXT h
5156 NEXT h
5157 NEXT h
5158 NEXT h
5159 NEXT h
5160 NEXT h
5161 NEXT h
5162 NEXT h
5163 NEXT h
5164 NEXT h
5165 NEXT h
5166 NEXT h
5167 NEXT h
5168 NEXT h
5169 NEXT h
5170 NEXT h
5171 NEXT h
5172 NEXT h
5173 NEXT h
5174 NEXT h
5175 NEXT h
5176 NEXT h
5177 NEXT h
5178 NEXT h
5179 NEXT h
5180 NEXT h
5181 NEXT h
5182 NEXT h
5183 NEXT h
5184 NEXT h
5185 NEXT h
5186 NEXT h
5187 NEXT h
5188 NEXT h
5189 NEXT h
5190 NEXT h
5191 NEXT h
5192 NEXT h
5193 NEXT h
5194 NEXT h
5195 NEXT h
5196 NEXT h
5197 NEXT h
5198 NEXT h
5199 NEXT h
5200 SAVE "draccod"CODE 30000,2
768

```

Program 6.

```

1 REM *****
*****
*****
3 IF PEEK 23757>87 THEN PRINT
"rem statement too long": STOP
4 IF PEEK 23757<87 THEN PRINT
"rem statement too short": STOP
5 GO TO 100
10 DATA 0,48,175,255,7,52,172,
255,47,78,158,255,71,93,148,255,
87,103,143,255,99,110,138,255,10
8,116,135,255,114,120,133,255,11
9,123,131,255,122,125,130,255,12
4,127,128,6134
11 DATA 0,1,4,5,4,6,0,2,255,0,
5,4,5,4,6,0,6,255,128,1,132,5,13
2,6,128,2,255,128,5,132,5,132,6,

```

```

128,6,255,0,1,128,1,128,2,0,2,0,
1,255,2666
12 DATA 128,115,139,130,138,15
5,147,164,147,175,128,115,172,13
6,210,136,220,144,255,152,128,11
5,206,106,226,83,240,83,255,64,1
28,115,169,94,170,78,194,66,200,
48,128,115,152,80,140,64,144,57,
128,48,128,115,108,78,74,67,64,5
6,44,48,128,115,86,97,56,106,40,
98,0,123,128,115,90,129,88,144,5
8,153,56,175,9697
13 DATA 30,151,225,238,30,169,
225,238,30,162,225,238,30,122,22
5,238,2576
14 DATA 1,0,0,16,0,0,255,255,0
,240,255,0,128,128,128,1406
15 READ a
20 IF a>255 THEN GO TO 30
25 POKE f,a: LET d=d+a: LET f=

```

```

f+1
26 GO TO 15
30 IF d<>a THEN PRINT "Error 1
n data": STOP
40 PRINT "data ok": RETURN
50 LET f=23760: LET d=0: RESTO
11: GO TO 15
60 LET d=0: LET f=23370: RESTO
12: GO TO 15
70 LET d=0: LET f=23816: RESTO
13: GO TO 15
80 LET d=0: LET f=23530: RESTO
14: GO TO 15
90 LET f=23460: LET d=0: RESTO
15: GO TO 15
100 GO SUB 90
110 GO SUB 80
120 GO SUB 70
130 GO SUB 60
140 GO SUB 50

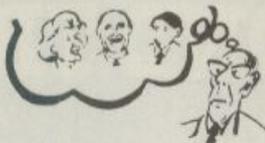
```

```

145 POKE 23516,11: POKE 23517,1
6
150 POKE 23519,1: POKE 23520,0
155 POKE 23512,117: POKE 23513,
119: POKE 23514,112: POKE 23515,
116
160 PRINT "all ok"
175 REM
180 REM Now delete lines 3-170
185 REM
190 REM Now add this line
195 REM
200 REM 10 BORDER 2: CLEAR 2406
205 LOAD ""CODE : LOAD ""CODE
210 REM Now SAVE "Dracnan" LINE
1
220 REM
230 REM Now SAVE "prbuf"CODE 23
296,255

```

## DENIS THROUGH THE DRINKING GLASS



Why did Denis Thatcher visit the Pope wearing a truss and a parachute and carrying a lawn mower? What use is the cherry blossom? Who is that strange tramp in the woods?

Only you can discover, but first you must deal with Ken Livingstone, Norman Tebbit and lots of other characters in this zany political adventure.

Written in humorous verse. 100% machine code — using the Quill from Gilsoft.

Losing is often funnier than succeeding — don't play it, play with it. — 48K Spectrum £5.50 incl. p&tp.

## ARCHIMEDES' MAGIC SCREW

Fresh from inventing the camel-driven date stoner, Archimedes is up to his neck in hot water again. Help him make new discoveries — help him discover the secret of the universe — help him find the soap.

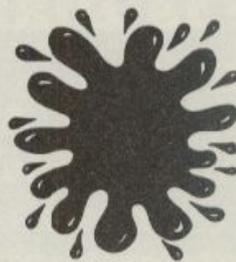
Probably the most difficult logic problem you will ever have to tackle.

## WAIT FOR THE DENNIS SEQUAL! THE TEBBIT

Applications software specialities  
Dept. YC, 8 St. Paul's Road  
Peterborough PE1 3DW

# ISL 48K SPECTRUM ISL

## SPLAT!



48K SPECTRUM CHALLENGE  
FROM INCENTIVE SOFTWARE LTD

## SPLAT! ARCADE

ONE OF THE MOST ORIGINAL AND COMPELLING ARCADE GAMES EVER PRODUCED! STARRING ZIPPY!!

"SPLAT! is one of the most addictive games I have ever played on the 48K SPECTRUM. It is certainly the most original!"

Computer & Video Games

NOW AVAILABLE FROM WH SMITH AND BOOTS.

N001 £5.50

## MOUNTAINS OF KET ADVENTURE

A MONSTER OF AN ADVENTURE PROGRAM! COMBAT, INTER-ACTIVE BEINGS, MONETARY SYSTEM, MAGIC, EDGAR, SAVE/LOAD FACILITY PLUS MANY OTHER FEATURES.

As well as being a fast ingenious compelling adventure in itself the Mountains of Ket is the first of a 3 part series that builds into a mammoth adventurers challenge.

Incentive: It could be adventageous if you achieve 100%!!

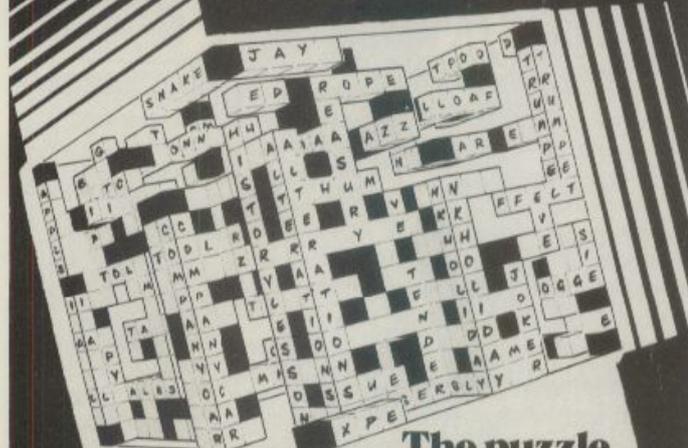
N002 £5.50



48K SPECTRUM ADVENTURE  
FROM INCENTIVE SOFTWARE LTD

NEW

## The ultimate Crossword



## The puzzle that needs a computer

Alien present the ultimate in word puzzles — 30 integrated crosswords which form a cube.

All locations of this 3 dimensional puzzle are contained in the computer programme and you can complete any cube you wish using the display on your TV, and computer keyboard. Understanding all the relationships between the

crosswords is not possible without the computer but as you proceed you will discover new routes to help achieve the solution.

Features: Solution store, Instant Display, Anagram Function, Character Location in memory.

This is a tough puzzle with a degree of difficulty — it's the ultimate but it's not impossible. Full instructions are included with the programme.

**£1000 PRIZE**  
to sender of first correct taped solution run on our computer on 1st June 1984

Please mail me  copies of the Alien Ultimate Crossword puzzle programme at £14.95 per copy inc. P. & R. for the  BBC Model B  Commodore 64  Spectrum 48K enclose £ \_\_\_\_\_ or my Access/Visa Card No. is \_\_\_\_\_

Name \_\_\_\_\_

Address \_\_\_\_\_

Postcode \_\_\_\_\_



**The New Dimension**  
The Alien, Arcade House, Church St  
Baccham Leics. NN7 5AF.

Please allow 28 days for delivery

## 1984

A GAME OF GOVERNMENT MANAGEMENT



48K SPECTRUM CHALLENGE  
FROM INCENTIVE SOFTWARE LTD

NEW

## 1984

THE GAME OF ECONOMIC SURVIVAL

THE BRITISH ECONOMY WITH YOU AT THE CONTROLS! WHAT SORT OF CHANCELLOR WOULD YOU MAKE WITH SEVERAL BILLION POUNDS TO SPEND & FIVE YEARS TO THE NEXT GENERAL ELECTION? GRAPHIC DISPLAYS, HISTOGRAMS & AN ANNUAL PERFORMANCE RATING ARE ALL INCLUDED TO SHOW HOW YOU ARE DOING. HOW MANY YEARS WILL YOU LAST?

FREE INSIDE: Pocket Guide to Running Britain™!

N003 £5.50

All programs run in the 48K ZX SPECTRUM and are available from all good computer shops. In case of difficulty please order direct using the coupon below.

Please send me (tick box(es) required)

SPLAT  MOUNTAINS OF KET  1984

All at £5.50 each (inclusive of VAT and 1st class postage)  
I enclose cheque/P.O. for £ \_\_\_\_\_ or debit my Access Account No.



Name \_\_\_\_\_

Address \_\_\_\_\_



INCENTIVE SOFTWARE LTD., 54 London Street,  
Reading RG1 4SQ. Tel: Reading (0734) 591678

# THE DAN DIAMOND TRILOGY

*My name is Diamond, Dan Diamond,* and this is my story. A story of beautiful mermaids, bored robots and dank, dark dungeons. A story that started one muggy day in New York, and like the Big Apple, it's rotten to the core.

The Dan Diamond Trilogy is three separate adventure games. Each game may be played on its own, but clues may be found in the earlier adventures which may help later on. Each game comes with a lavishly illustrated 20-page case file, and hints (both helpful and misleading) which have been hidden in the illustrations.

**Part I. Franklin's Tomb,** in which our hero receives a mysterious plea for help which leads him to a hidden tomb and the mystery of the stargate.

**Part II. Lost in Space,** in which our hero finds himself stranded on a derelict spacecraft, doomed to travel endlessly through space, or find a way out.

**Part III. Fishy Business,** in which our hero lands on a watery planet, discovers the source of the plea for help and saves the day.

All three programs cost £9.95 each and are available for the DRAGON 32, BBC MODEL B and 48k ORIC-1 microcomputers. (note: Fishy Business for the BBC and ORIC will be available February 1984).

Cheques or postal orders payable to:

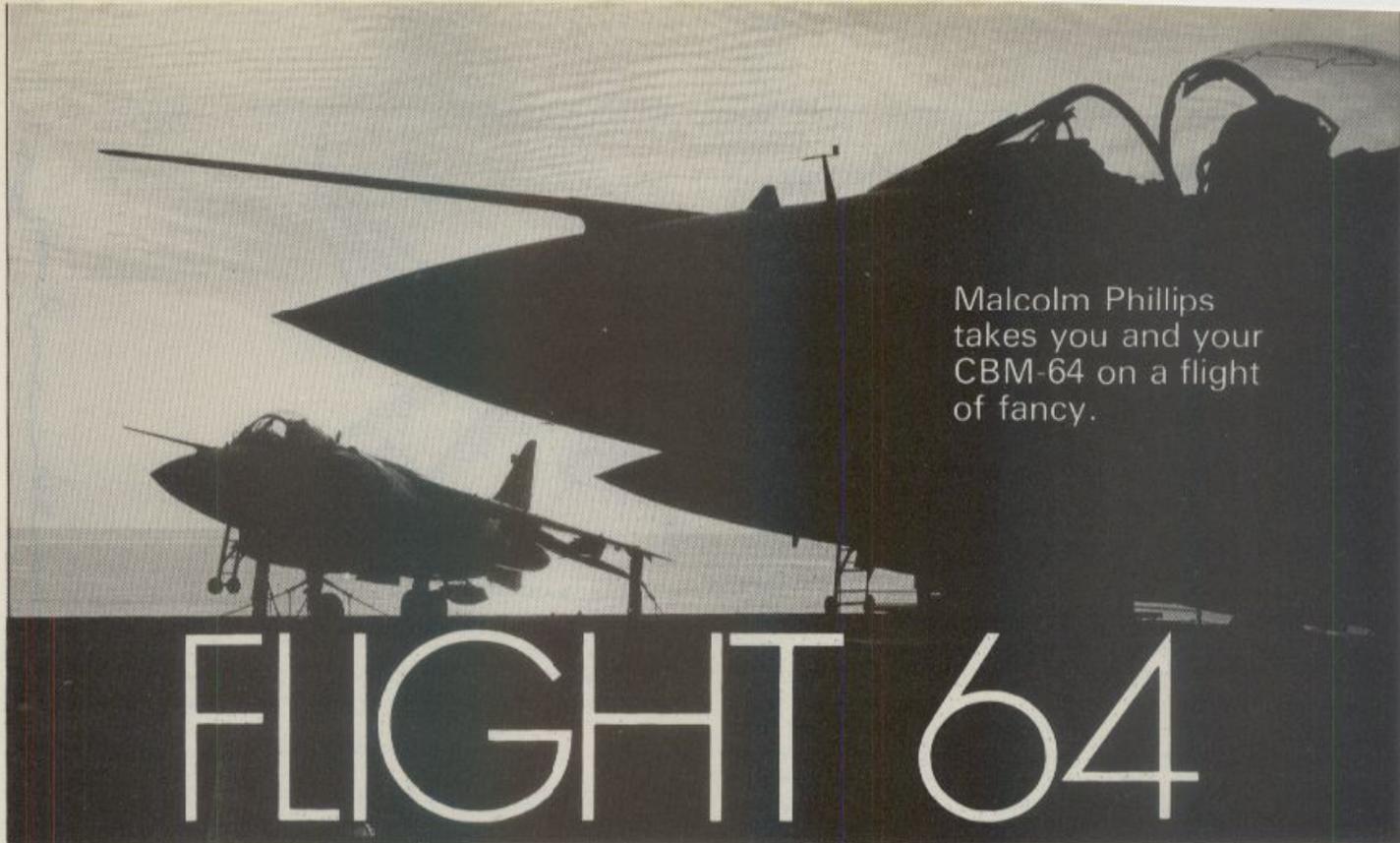
# Salamander

## SOFTWARE

17 Norfolk Road, Brighton, East Sussex, BN1 3AA.

Look out for Dan Diamond's next Adventure Series "Franklin in Wonderland" Available Spring 1984

*"It must be the most consistently enjoyable adventure game I've ever played"*  
- Computer Choice (Program of the Month) -



Malcolm Phillips takes you and your CBM-64 on a flight of fancy.

# FLIGHT 64

IMAGINE THAT you are in a harrier and you are about to start your landing on an island. Your vertical take off and landing system is disabled so you must land the aircraft in the conventional way.

Your Commodore 64 shows the instrument panel and the view through the flight deck windscreen. To land the aircraft you must use your keyboard to control the flight.

You must line the black cross at the centre of the flightdeck with the centre of the runway. To do this you may have to make a turn to the left or to the right. If the heading shown on your compass is say -789 metres then you will crashland 789 metres from the runway. To correct this press the key A. You will see the compass reading reduce towards zero. A white crosswire will move towards the centre of the windscreen. This is the coarse crosswire. A black crosswire is the fine course setting. When your course is correct the compass will show zero and the two crosswires line up with the black cross on the flightdeck.

While you are doing this there are a number of other controls to keep in mind. You should reduce the engine thrust as soon as possible to preserve your fuel for the landing. You do this

with key S — Slow. If you slow down too much the aircraft will stall. A red stall alarm will announce this condition. You can speed up again with key F — fast.

You can also speed up by diving. Key X causes the plane to dive, this causes the airspeed to increase and the horizon shown in your windscreen to become higher as you dive towards the sea. When you dive or climb the rate at which you move vertically is shown on the VSI — Vertical Speed Indicator. This indicator is particularly useful near touchdown. The distance to the control tower is shown in the top left corner.

When you get to within 20,000 metres you will see the fields and trees as you approach the airport. When you get within 10,000 metres you will see the runway. When you get to within 5,000 metres you will see the control tower. After 2,000 metres concentrate on getting your aircraft down on the runway.

If you do not get on the runway you will overfly the airport and crash. You must not forget to lower your undercarriage before touchdown. You can only lower your undercarriage if your altitude is less than 1,000 feet.

You should aim to land with your airspeed

at about 250 kph. When you are within limits your flightdeck displayed values are green. If you get below 1,000ft. and you are more than 100 metres off course then watch out for mountains.

The following notes will enable you to draw at machine code speed a border around the screen, lines of machine code characters or blocks of machine code characters to fill in large areas at least 10 times faster than with Basic. Poke the following characters and use the appropriate Sys command given in the listing to activate the routine.

- Background colour: Poke 820, Colour1
- Foreground colour: Poke 821, Colour2
- Border colour: Poke 2, Colour3
- Border character: Poke 827, Character
- SYS 38000 to draw the border, or wherever you send the data.
- Line/Block routines
- Character: Poke 719, Character
- Length of line N: Poke 731, N Characters
- X displacement: Poke 733, X From home position
- Y displacement: Poke 734, Y From home position
- Character colour: Poke 735, Colour1
- Block Depth D: Poke 736, D Lines in block
- SYS 38400 Draw line
- SYS 38600 Draw block

```

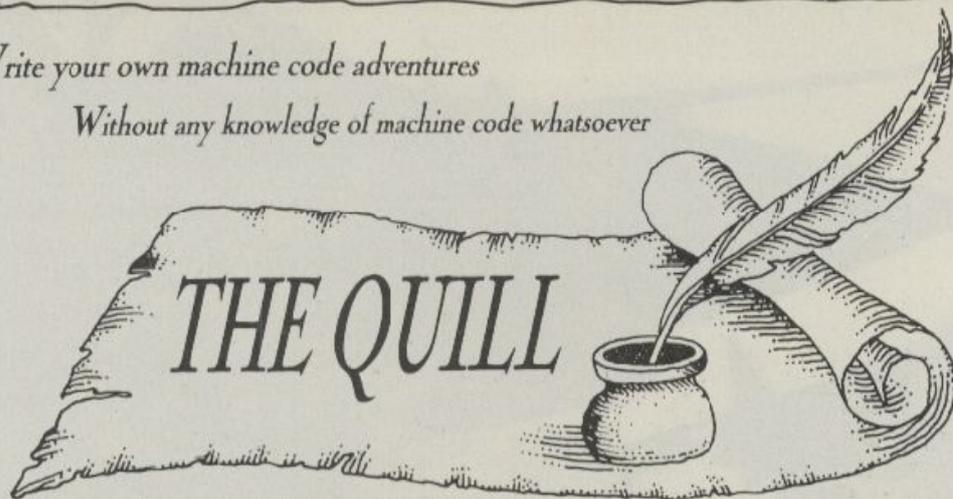
0 REM FOR * READ CTRL + KEY 3
300 POKE719,95 :POKE720,127:POKE721,102 REM TOP CHR BOT CHR LEFT CHR
310 POKE722,105:POKE723,40:POKE724,0:REM RIGHT CHR TOP LINE ADDRESS
320 POKE731,12:POKE732,13:POKE733,1:REM LENOHT BACKGROUND FORGROUND
322 POKE732,10:POKE733,0:POKE734,1:REM HEIGHT X DISP Y DISP
324 POKE2,2:POKE827,94:POKE820,5:POKE821,1:REM BORDER COLOUR/CHFR/FOND/BGND
330 FOR I=0TO1:READ POKEI+38000,A:NEXT I
335 PRINT"##### FLIGHT BR72 " PRINT" HAPCLI CONTROL CALLING"
340 FOR I=0TO175:READ POKEI+38000,A:NEXT I
350 FOR I=0TO127:READ POKEI+38200,A:NEXT I
360 FOR I=0TO127:READ POKEI+38400,A:NEXT I
365 FOR I=0TO175:READ POKEI+38600,A:NEXT I:SYS38000
370 FOR I=2TO13:POKE733,20-I:POKE734,I:POKE820,5:POKE821,5:POKE731,I+1:SYS38400
375 NEXT SYS38400:POKE719,127:POKE731,38:SYS38400:POKE719,104
380 FOR I=14TO23:POKE733,24-I:POKE734,I:POKE820,6:POKE821,3:POKE731,I+1:SYS38400:NEXT SYS38400:GOTO3000
400 DATA173,52,3,24,109,54,3,141,251,0,141,12,3,173,53,3
401 DATA109,55,3,141,252,0,141,55,3,96,255,175,240,0,255,255
410 DATA162,0,173,52,3,141,32,208,173,53,3,141,33,208,173,59
411 DATA3,157,192,7,157,6,4,173,2,0,157,192,219,157,0,216
412 DATA232,224,40,208,233,162,0,169,0,141,53,3,169,24,141,58
413 DATA3,169,40,141,52,3,169,233,141,54,3,141,56,3,141,251
414 DATA0,141,253,0,169,3,141,55,3,141,252,0,169,215,141,57
415 DATA3,141,254,0,169,1,173,59,3,145,251,173,2,0,145,253
416 DATA173,52,3,24,109,54,3,141,251,0,141,54,3,173,53,3
417 DATA109,55,3,141,252,0,141,55,3,173,52,3,24,109,56,3
418 DATA141,253,0,141,56,3,173,53,3,109,57,3,141,254,0,141
419 DATA57,3,160,0,173,59,3,145,251,173,2,0,145,253,160,1
420 DATA173,59,3,145,251,173,2,0,145,253,206,58,3,208,177,96
430 DATA169,0,141,59,3,174,59,3,189,1,206,74,157,199,2,254
431 DATA199,2,189,199,2,234,201,115,46,5,169,15,133,2,96,42
432 DATA157,1,208,32,232,255,74,74,74,174,59,3,157,199,2,189
433 DATA0,208,74,125,198,2,157,198,2,201,124,48,11,13,2,0
434 DATA141,214,2,141,16,208,169,0,157,198,2,42,157,0,208,230
435 DATA59,3,238,59,3,165,2,16,133,2,173,31,208,208,12,173

```

(listing continued on page 81)

Write your own machine code adventures

Without any knowledge of machine code whatsoever



*THE QUILL* is a major new utility written in machine code which allows even the novice programmer to produce high-speed machine code adventures of superior quality to many available at the moment without any knowledge of machine code whatsoever.

Using a menu selection system you may create well over 200 locations, describe them and connect routes between them. You may then fill them with objects and problems of your choice. Having tested your adventure you may alter and experiment with any section with the greatest of ease. A part formed adventure may be saved to tape for later completion. When you have done so *THE QUILL* will allow you to produce a copy of your adventure which will run independently of the main *QUILL* editor, so that you may give copies away to your friends.

*THE QUILL* is provided with a detailed tutorial manual which covers every aspect of its use in writing adventures. It is impossible to describe all the features of this amazing program in such a small space so we have produced a demonstration cassette which gives further information and an example of its use.

This demo-cassette is available at £2.00, and *THE QUILL* itself at £14.95.

FOR THE 48K SPECTRUM AT £14.95

Our Software is now available from many computer shops nationwide, or direct from us by post or telephone.

SAE for full details of our range.

NOW AVAILABLE AT W. H. SMITHS

Dealer enquires welcome.

**GILSOFT**

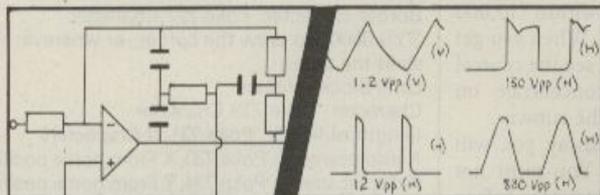
30 Hawthorn Road  
Barry  
South Glamorgan  
CF6 8LE  
☎(0446) 736369

CREDIT CARD ORDER LINE  
MANNED 24 HOURS  
IS 0222 41361 EXTN 430



**S**pectre

ENFIELD HOUSE  
SWARDESTON  
NORWICH  
NORFOLK



**ELECTRONICS**

£ 9.95

**DIGITAL CIRCUIT DESIGNER.** Electronics allows you to draw your circuit diagram on screen using standard symbols for logic gates, transistors, resistors, capacitors, diacs, triacs, diodes, etc., etc... Symbols can be rotated, wiring interconnected or crossed over as required. Once complete the computer will 'power up' your circuit - high voltage levels turn red, low levels turn green. Circuits can be de-activated, modified and re-activated until they function as required, all without touching a soldering iron! Part completed circuits may be saved for future work and displays can be sent to the printer. All components are fully interactive i.e. they can change the state of sections previously activated in the sequence - even oscillators can be seen oscillating. Warning is given of short-circuits. (57 defined graphics are employed)

**LINNET**



£ 14.95

**LINEAR NETWORK ANALYSER.** Characteristics of complete networks, including sub-circuits, are entered. The computer performs either time or frequency domain analyses, presenting the output data in any of a choice of forms, both graphical and written. The program detects the presence of a printer and, if connected, can produce detailed graphical displays by printing lengthways along the paper. Happily deals with highly complex networks - the instruction book provides numerous examples using transistors, I.C.s, bandpass filters, op amps, etc., etc... An invaluable tool for both professional and amateur designers.

**48 K SPECTRUM**

## HEARING IS BELIEVING Tele Sound SPECTRUM BEEP BOOSTER

**TELESOUND** is ready built and tested so that you can get the full sound of your Spectrum through any unmodified television set, black and white or colour. The unit is easy to fit in minutes without any previous experience as full fitting instructions are provided.

**TELESOUND** has been designed using the very latest ultra miniature components so it's size is an incredible 2x1.3x1cm. and fits neatly inside the Spectrum. Three easy push-on connections are made to the Spectrum. The connections are clearly shown in a diagram that comes with full fitting instructions.

### TELESOUND FEATURES

- SOUND AND VISION TOGETHER FOR ADDED REALISM
- BEEP VOLUME CONTROLLABLE FROM A WHISPER TO A ROAR.
- KEYBOARD CLICK CLEARLY HEARD TO ASSIST PROGRAM ENTRY.
- PROGRAMS CAN BE HEARD WHEN BEING LOADED - NO SOLDERING OR CASE CUTTING REQUIRED.
- ADDITIONAL AMPLIFIER NOT NECESSARY - SEPARATE POWER SUPPLY NOT REQUIRED.
- USES NO MEMORY SO WORKS WITH ALL PROGRAMS - COMPATIBLE WITH ALL OTHER ADD-ONS INCLUDING MICRODRIVE

**TELESOUND** comes complete with easy to follow fitting instructions and costs £9.95 inclusive of post, packing etc. Please state your computer when ordering.

## COMPUSOUND

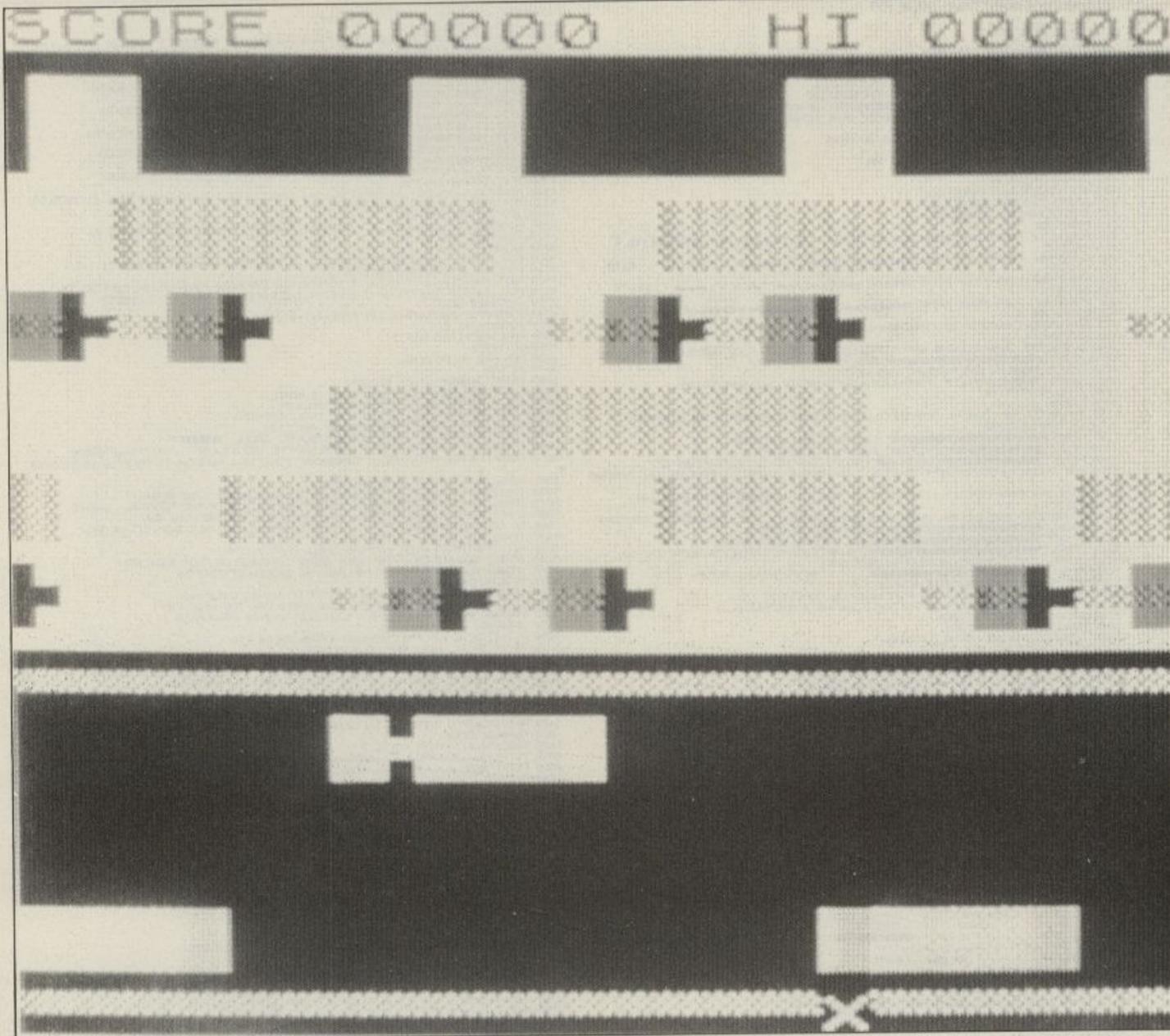


Overseas and Trade Enquiries  
Welcome



DEPT: 32 - 33 LANGLEY CLOSE, REDDITCH, WORCESTERSHIRE.  
B98 0ET. TELEPHONE: (0527) 21429 (21439 Answerphone)





# FROGGIE

R Braunton gives you a leaping game for a leap year.

FROGGIE IS A VERSION of the well known arcade game for the 16K ZX-81 with these features:

- Fast machine code action;
- Moving cars, lorries and racing cars;
- Moving logs and turtles;
- Alligators and diving turtles;
- Flies and alligators in the homes;
- Snake on the bank;

## ZX-81

- Baby frog to rescue;
- Time bar;
- Extra frog at 8000 points;
- Hold key.

The machine code itself is stored in a Rem 6208 bytes long. This is obtained by entering the first line:

```
1 REM 153 characters
```

Then edit the line and change it to line 2,

then edit this and change it to line 3. Carry on this procedure until you have lines 1 to 39. Then add:

```
40 REM 6 characters
```

and then enter the following commands:

```
POKE 16510,0
```

```
POKE 16511,65
```

```
POKE 16512,24
```

This will result in all the Rems becoming one large Rem of 6208 characters. Now type in the hexadecimal loader, program 1. Run it and type in the machine code but missing out the first column as this is the address at which



# GET YOUR HANDS ON ONE...



## The Spectravision Quickshot deluxe joystick (BBC compatible)

Now, Microstyle offer you the chance to use a joystick where joysticks have never been used before! Operating directly through the existing user-ports on your BBC model B microcomputer and available for use with all Acornsoft and most other keyboard controlled games even Planetoids — these joysticks include a machine-code 'driver program' on tape, which converts keyboard commands to remote control operation for maximum enjoyment.

**only £19.95** inc VAT

*for mail order please add 75p P&P*

**The Aylesbury Computer Centre**  
52 Friar's Sq., Aylesbury.  
Telephone: Aylesbury (0296) 5124

**The Bath Computer Centre**  
29 Belvedere, Lansdown Road, Bath.  
Telephone: Bath (0225) 334659

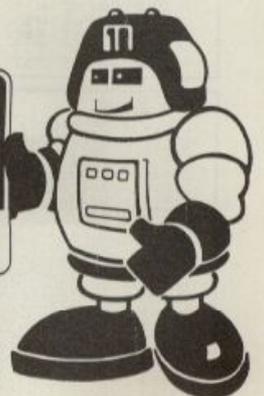
**The Daventry Computer Centre**  
67 High St., Daventry.  
Telephone: Daventry (03272) 78058

**The Newbury Computer Centre**  
47 Cheap Street, Newbury.  
Telephone: Newbury (0335) 41929

# MicroStyle

THE HOME COMPUTER PEOPLE

Please Note: While Microstyle will endeavour to maintain sufficient stocks of items currently or previously advertised we regret that all items are offered for sale subject to availability from manufacturers.



# ...BEFORE THEY DO!



# FREEWAY FROG

Freeway Frog is a game for the BBC Micro model B, based on the arcade game Frogger. The program has been tested and works with both the 0.1 and the 1.2 Operating Systems. It also works on a Model A, fitted with 32K

RAM. The program demonstrates how machine code can be used to generate multi-colour graphics quickly and easily. Before I go into how the program works, I will give a brief description of how to play the game.

Freeway Frog is a game for one player where you must lead your family of frogs safely across the multi-lane motorway dodging the traffic. You must also cross a treacherous and fast-moving river with many currents to catch

## Listing 1.

```

10 REM
20 REM      Frogger
30 REM
40 REM      1st of three parts
50 REM
60 REM      by J.R.Wilson
70 REM
80 DATA 1,B7A3A3
90 DATA 1,F5F0B0E0A0E0F0A0A0F0B0A0A0A0F0B0A0A0A0F0B
0A0A0A0F0B0A0B0A0F0B0
100 DATA 1,B52020A0BDA12020B6A0A2B4A0B6A0A2B4A0B6A0A
2B420B0F0BAA0EAA6
110 DATA 1,B5A0A0A0B5A0A0A0A9F0BBA1A0A9F0BBB5A0A9F0B
BB5A0A9F0BBA0EA
120 DATA 17,B520A0A0A0B5
130 DATA 14,A2ACA6A0A0A2ACA6
140 MODE7
150 VDU 132,157
160 PRINT
170 FOR Y=1 TO 6
180 READ B
190 READ A#
200 FOR J=0 TO 1
210 H=J*17 +Y
220 PRINT TAB(0,H);
230 IF J=0 THEN VDU 132,157,147 ELSE VDU 130,157,149

```

```

240 PRINT SPC(B+1);
250 FOR I =1 TO LENA# STEP 2
260 A=EVAL("&" +MID$(A#,I,2))
270 VDU A
280 NEXT I
290 NEXT J
300 NEXT Y
310 PRINT TAB(0,7);CHR#132;CHR#157
320 PRINTTAB(0,24);CHR#130;CHR#157;
330 PRINT TAB(0,17);CHR#130;CHR#157
340 VDU 31,12,9,129,141,98,121
350 VDU 32,134,74,46,82,46
360 VDU 87,105,108,115,111,110
370 VDU 31,12,10,129,141,98,121
380 VDU 32,134,74,46,82,46
390 VDU 87,105,108,115,111,110
400 SOUND&10,17,3,255
410 FOR I=1 TO 4
420 FOR J=50 TO 255
430 SOUND &11,0,J,1
440 NEXT
450 NEXT
460 SOUND&10,0,0,0
470 VDU 28,10,16,30,11
480 PAGE=&1100
490 CHAIN "Frogger 1"
500 END

```

## Listing 2.

```

10REM
20REM Frogger part 2
30REM
40REM by J.R.Wilson
50REM
60REM October 10th 1983
70REM
80REM on BBC Model B
90REM
100:
110:
150:
160:
170IF FREE&1100 THEN PRINT"MODE should be 1100"IE
ND
180REM Initialise sound envelopes
190ENVLOPE1,1,1,0,0,20,0,0,127,-2,-3,-5,126,80
200ENVLOPE2,2,-1,-1,-1,255,255,255,126,0,0,-1,126,80
O
210ENVLOPE3,2,0,0,0,0,126,-1,-3,-5,126,80
220REM Setup user defined characters
230REM Blank
240VDU23,234,255,255,255,255,255,255,255,255,255
250REM Frog moving up
260VDU23,225,90,145,189,60,24,36,66,36
270REM Frog moving down
280VDU23,226,36,66,36,24,60,189,145,90
290REM Frog moving to right
300VDU23,227,1,66,172,26,26,172,66,1
310REM Frog moving to left
320VDU23,228,128,66,53,88,53,66,128
330REM Frog sitting in hole
340VDU23,237,4,10,10,31,63,47,112,63
350VDU23,230,32,80,80,248,252,244,14,252
360VDU23,231,1,66,172,26,26,172,66,1
370VDU23,232,218,230,220,248,244,236,142,7
380REM Dead frog
390VDU23,234,137,74,16,0,1,192,0,0
400VDU23,235,74,145,16,0,0,0,0,0
410REM Snake moving to right
420VDU23,236,0,0,0,0,198,36,24,0
430VDU23,237,0,0,0,0,17,8,184,96,0
440REM Snake moving to left
450VDU23,238,0,0,44,224,16,9,6,0
460VDU23,239,0,0,0,0,195,36,24,0
470REM Crocodile sitting in hole
480VDU23,240,0,0,0,0,0,48,75
490VDU23,241,0,0,0,0,28,120,224,224
500VDU23,242,75,255,254,252,255,255,255,0
510VDU23,243,128,128,0,0,85,255,255,0
520REM Fly
530VDU23,244,40,16,16,84,214,214,214,16
540REM hedge
550VDU23,245,255,187,255,238,255,119,255,221
560PROCL
570PROCL(7,5,CHR#132+CHR#157+CHR#134+"F R D G G E R
+CHR#156)
580PROCL(8,9,CHR#129+"B"+CHR#130+"J.R.Wilson")
590PROCL(3,13,"Please wait a few seconds..")
600REM Setup machine code in pages 5900 and 5900 hex
610FOR I=0 TO 3 STEP 2
620PX=5900
630OPT I
640:
650:      Move graphics
660:
670:move LDAR0
680STABF \ object counter
690L2 LD#BF
700LD VY,X
710CF#0
720BNE L1
730L4 LD#BF
740INCBF
750CF#30
760BNE L2
770BTS

```

```

780L1 LDA T,
790TAY
800LD A,LB,Y
810STAB#72
820LD A,VB,Y
830STAB#73
840LD A,LE,Y
850STAB#74
860LD A,SP,Y
870STAB#75
880LD A,VF,X
890STAB#77
900LD A,XP,X
910STAB#76
920BFS poke
930CLC
940LD A,#76
950AND#75
960STAB#76
970CF#79
980BNE L3
990L12 LDAR0
1000TAB#74
1010MFP L11
1020L3 CMP#80
1030BNE L12
1040CF#78
1050BNE L12
1060CF#80
1070BNE L11
1080LD#78
1090LD#76
1100L11 BTA XP,X
1110BFS poke
1120MFP L4
1130:
1140:
1150:
1160poke TXA
1170PHA
1180LD#77
1190LD A,LE,X
1200STAB#73
1210LD A,HSB,X
1220STAB#1
1230LD#76
1240CF#80
1250BNE P1
1260D#88
1270P2 CLC
1280D#89
1290DC#76
1300STAB#0
1310D#81
1320DC#80
1330STAB#1
1340XER
1350BNE P2
1360P3 LD#80
1370ST#82
1380ST#83
1390ST#84
1400ST#85
1410P2 LD#84
1420DA(1,72),Y
1430LD#85
1440DR(580),Y
1450STAB(580),Y
1460INCB#4
1470INCB#5
1480D#82
1490INCB#2
1500CF#87
1510BNE P3
1520D#89
1530STAB#2
1540INCB#3

```

```

1550CLC
1560D#83
1570AND#76
1580CF#80
1590BNE P4
1600LD#77
1610LD A,LSB,Y
1620STAB#0
1630LD A,HSB,Y
1640STAB#1
1650D#80
1660CF#74
1670P4 LD#83
1680CF#74
1690BEG P5
1700MFP F3
1710P5 PLA
1720TAX
1730BTS
1740:
1750:
1760:
1770poke LDA LSB,Y
1780LD A,HSB,Y
1800STAB#1
1810TX#72
1820CF#80
1830BEG P9
1840LD#89
1850D10 CLC
1860D#870
1870AND#72
1880TAB#70
1890LD#71
1900AND#0
1910ST#74
1920BNE
1930BNE D10
1940D9 LD#80
1950TX#74
1960D11 LDA(70),Y
1970STAB#3
1980CF#80
1990BNE D13
2000AND#70
2010CF#80
2020BEG D12
2030AND#128
2040CF#128
2050BNE D12
2060INC#74
2070D12 LD#873
2080AND#85
2090CF#80
2100BNE D13
2110AND#64
2120CF#84
2130BEG D13
2140INC#74
2150D13 INY
2160CF#82
2170BNE D11
2180BTS
2190:
2200LD#PX+1
2210HSB=HSB+32
2220HSB=HSB+32
2230LD#HB+13
2240LD#LB+13
2250SPLE+13
2260YF#SP+13
2270YF#XP+30
2280YF#YF+30
2290NEXT
2300REM
2310FOR I=0 TO 31
2320LBT1=(83000+I*640)/MOD256
2330MSB71=(83000+I*640)/DIV256
2340NEXT
2350REM Data for special graphics
characters
2360REM i.e. The sprite data
2370REM LDG
2380DATA E2E20000000E2E2
2390DATA C0C00000000000
2400DATA C0C40000000000
2410DATA C0C0C000000000
2420DATA C0C00000C400C40
2430DATA C0C00000B0C0B0
2440DATA C0C0C400000000
2450DATA C0C0C0C0000000
2460DATA C0C400C400000000
2470DATA C0C0C0C0000000
2480DATA C400C400000000
2490DATA C0C0C0C0000000
2500DATA C0C0C0C0000000
2510DATA C0C0C1C1C1C1C1C1
2520DATA D3C3C3C1C1C3C3D3
2530REM D#80
2540DATA F3F3F3F3F3F3F3F3
2550DATA F3F3F3F3C0C0F3F3
2560DATA F3F3F3C0C0C0F3F3
2570DATA F3F3C0C0C0F3F3F3
2580DATA F3E2C0C40C0C0000
2590DATA F3C0C40C0C01B1B1
2600DATA F3C0C0C40C0F3F3
2610DATA F3C40C0C0C0F3F3
2620DATA F3F3C0C0C0E2E2E2
2630DATA F3F3F3C40C0C0000
2640DATA F3A0303030F3F3F3
2650DATA F380303030F3F3F3
2660DATA F3030303803030
2670DATA F3030303803030
2680DATA F3030303803030
2690REM LDRY (
2700DATA 0013A3A3A3A31500
2710DATA F3F3F3F3F3F3A3F
2720DATA 2A2A2A2A2A2A2A2A
2730DATA F2F2F2F2E2E2F2F
2740DATA F0F0F1E0F0F0F3F
2750DATA F0F0F0F0F0E2E2F
2760DATA F0F0F2F0F2F0F3F
2770DATA F0F0F0F1E1E0F3F
2780DATA F0F0F0F0F0F3F
2790DATA F315F1F1F1F1F3F
2800REM P#87 CAR 3
2810DATA 0103030302030303
2820DATA 30303030302033E
2830DATA 0303010303010303
2840DATA 1603020202020316
2850DATA 2903030103030329
2860DATA 3030303030303020
2870REM BTE 1
2880DATA 0000000300000000
2890DATA 0000000121000000
2900DATA 0001030F01590000
2910DATA 00F0000000000000
2920DATA 0002829280000000
2930DATA 0000000300000000
2940REM TRACTOR
2950DATA 000003E000000000
2960DATA 0001013E00010100
2970DATA 0003030300030303
2980DATA 0505100505100505
2990DATA 1616201616301616
3000DATA 00F0000000000000
3010DATA 2525252525252525
3020DATA 068200802006820
3030REM VNS 1
3040DATA 3C3B38383838383C
3050DATA 3C30303030303C
3060DATA 3C30303030303C

```

```

3070DATA 3C3C3C3C3C3C3C3C
3080DATA 3C2828282828283C
3090DATA 2B3C141414143C2B
3100REM CAR 1
3110DATA 1133333333333311
3120DATA 3332222222223333
3130DATA 3332333333332333
3140DATA 3300333333330033
3150DATA 3313333333331333
3160DATA 2233111111113322
3170REM NORMAL TURTLE 1
3180DATA E3E3E3E3E3E3E3E3
3190DATA F30C0C0C0C0C0F3
3200DATA F30C0C0C0C0C0F3
3210DATA D8D3D3D3D3D3D8
3220REM NORMAL TURTLE 1
3230DATA E7E3E3E3E3E3E7
3240DATA F1C0C0C0C0C0F1
3250DATA F30C0C0C0C0C0F3
3260DATA D8D3D3D3D3D3D8
3270REM DIVNS TURTLE 1
3280DATA E3E3E3E3E3E3E3E3
3290DATA 303C3C3C3C3C30
3300DATA 703C3C3C3C3C70
3310DATA 9A1A303333301A9A
3320REM Read in sprite data
3330CX=6000
3340REM read data for log
3350LB=CX+7#B-CX/256
3360LB1=CX+8#B-CX/256
3370LB#6=CX+8#B#6-CX/256
3380PROCL(15,48)
3390REM read data for crocodile
3400LB#2=CX+8#B#2-CX/256

```

John Wilson, his BBC micro and a frog provide hints on road safety.

Table 1.

Bit number	7	6	5	4	3	2	1	0
Left pixel	B3		B2		B1		B0	
Right pixel		B3		B2		B1		B0



Program 1. Description.

Lines	Use
80 to 130	Data for title
140	Select teletext mode
150 to 390	Display title using teletext graphics
400 to 450	The frog sounds its presence
480	Reset page to a higher value ready for the next part
490	Load and run the next part

your family unawares. Move your frogs across one at a time avoiding the ever-increasing traffic and river populated by many crocodile and turtles.

Avoid the holes occupied by the hungry crocodiles. If you do not you will be invited to dinner! You collect points for getting a frog safely to its hole and bonus points for getting

the whole family home. You can collect more points by jumping on any flies that appear, but make sure you are not caught by the snake. As the game progresses, more traffic takes to the road and more crocodiles populate the river.

Your family has one final enemy — the dreaded French Chef who will cut your legs off if you take too long. Therefore, keep an eye

on your time. Once you reach the fourth phase, you are awarded a bonus frog to keep your family company. To move your frog, use the following controls: Z — Left; X — Right; — Up; / — Down. Or, alternatively, you may define your own keys.

To fit this program into the limited memory (continued on page 91)

```

3410PROC(15,48)
3420RER read data for lorry
3430L(77)=CL(1877)=CL/256
3440PROC(10,0)
3450RER read in data for the fast car
3460L(78)=CL(1878)=CL/256
3470PROC(16,0)
3480RER read in data for motorcycle
3490L(79)=CL(1879)=CL/256
3500PROC(8,0)
3510RER read in data for tractor
3520L(80)=CL(1880)=CL/256
3530PROC(18,0)
3540RER read in data for van
3550L(81)=CL(1881)=CL/256
3560PROC(16,0)
3570RER read in data for car
3580L(82)=CL(1882)=CL/256
3590PROC(16,0)
3600RER read in data for turtle moving right
3610L(83)=CL(1883)=CL/256
3620R(4)
3630PROC(14,48)
3640R(1) TO 2
3650R(13) TO 31
3660R(1)=70
3670C(4)=11(1884)
3680R(1)
3690R(1)
3700RER read in data for turtle moving left
3710L(84)=CL(1884)=CL/256
3720R(4)
3730PROC(14,48)
3740R(1) TO 2
3750R(13) TO 31
3760R(1)=70
3770C(4)=11(1885)
3780R(1)
3790R(1)
3800RER read in data for diving turtle
3810L(85)=CL(1885)=CL/256
3820R(4)
3830PROC(14,48)
3840R(1) TO 2
3850R(13) TO 31
3860R(1)=70
3870C(4)=11(1886)
3880R(1)
3890R(1)
3900RER read in data for size and speed of each type
of sprite
3910R(1) TO 12
3920R(1) TO 8
3930L(1)=18(1887)
3940R(1)
3950R(1) TO 8
3960R(1) TO 8
3970R(1) TO 8
3980R(1) TO 8
3990R(1) TO 8
4000R(1) TO 8
4010R(1) TO 8
4020R(1) TO 8
4030R(1) TO 8
4040R(1) TO 8
4050R(1) TO 8
4060R(1) TO 8
4070R(1) TO 8
4080R(1) TO 8
4090R(1) TO 8
4100R(1) TO 8
4110R(1) TO 8
4120R(1) TO 8
4130R(1) TO 8
4140R(1) TO 8
4150R(1) TO 8
4160R(1) TO 8
4170R(1) TO 8
4180R(1) TO 8
4190R(1) TO 8
4200R(1) TO 8
4210R(1) TO 8
4220R(1) TO 8
4230R(1) TO 8
4240R(1) TO 8
4250R(1) TO 8
4260R(1) TO 8
4270R(1) TO 8
4280R(1) TO 8
4290R(1) TO 8
4300R(1) TO 8
4310R(1) TO 8
4320R(1) TO 8
4330R(1) TO 8
4340R(1) TO 8
4350R(1) TO 8
4360R(1) TO 8
4370R(1) TO 8
4380R(1) TO 8
4390R(1) TO 8
4400R(1) TO 8
4410R(1) TO 8
4420R(1) TO 8
4430R(1) TO 8
4440R(1) TO 8
4450R(1) TO 8
4460R(1) TO 8
4470R(1) TO 8
4480R(1) TO 8
4490R(1) TO 8
4500R(1) TO 8
4510R(1) TO 8
4520R(1) TO 8
4530R(1) TO 8
4540R(1) TO 8
4550R(1) TO 8
4560R(1) TO 8
4570R(1) TO 8
4580R(1) TO 8
4590R(1) TO 8
4600R(1) TO 8
4610R(1) TO 8
4620R(1) TO 8
4630R(1) TO 8
4640R(1) TO 8
4650R(1) TO 8
4660R(1) TO 8
4670R(1) TO 8
4680R(1) TO 8
4690R(1) TO 8
4700R(1) TO 8
4710R(1) TO 8
4720R(1) TO 8
4730R(1) TO 8
4740R(1) TO 8
4750R(1) TO 8
4760R(1) TO 8
4770R(1) TO 8
4780R(1) TO 8
4790R(1) TO 8
4800R(1) TO 8
4810R(1) TO 8
4820R(1) TO 8
4830R(1) TO 8
4840R(1) TO 8
4850R(1) TO 8
4860R(1) TO 8
4870R(1) TO 8
4880R(1) TO 8
4890R(1) TO 8
4900R(1) TO 8
4910R(1) TO 8
4920R(1) TO 8
4930R(1) TO 8
4940R(1) TO 8
4950R(1) TO 8
4960R(1) TO 8
4970R(1) TO 8
4980R(1) TO 8
4990R(1) TO 8
5000R(1) TO 8
5010R(1) TO 8
5020R(1) TO 8
5030R(1) TO 8
5040R(1) TO 8
5050R(1) TO 8
5060R(1) TO 8
5070R(1) TO 8
5080R(1) TO 8
5090R(1) TO 8
5100R(1) TO 8
5110R(1) TO 8
5120R(1) TO 8
5130R(1) TO 8
5140R(1) TO 8
5150R(1) TO 8
5160R(1) TO 8
5170R(1) TO 8
5180R(1) TO 8
5190R(1) TO 8
5200R(1) TO 8
5210R(1) TO 8
5220R(1) TO 8
5230R(1) TO 8
5240R(1) TO 8
5250R(1) TO 8
5260R(1) TO 8
5270R(1) TO 8
5280R(1) TO 8
5290R(1) TO 8
5300R(1) TO 8
5310R(1) TO 8
5320R(1) TO 8
5330R(1) TO 8
5340R(1) TO 8
5350R(1) TO 8
5360R(1) TO 8
5370R(1) TO 8
5380R(1) TO 8
5390R(1) TO 8
5400R(1) TO 8
5410R(1) TO 8
5420R(1) TO 8
5430R(1) TO 8
5440R(1) TO 8
5450R(1) TO 8
5460R(1) TO 8
5470R(1) TO 8
5480R(1) TO 8
5490R(1) TO 8
5500R(1) TO 8
5510R(1) TO 8
5520R(1) TO 8
5530R(1) TO 8
5540R(1) TO 8
5550R(1) TO 8
5560R(1) TO 8
5570R(1) TO 8
5580R(1) TO 8
5590R(1) TO 8
5600R(1) TO 8
5610R(1) TO 8
5620R(1) TO 8
5630R(1) TO 8
5640R(1) TO 8
5650R(1) TO 8
5660R(1) TO 8
5670R(1) TO 8
5680R(1) TO 8
5690R(1) TO 8
5700R(1) TO 8
5710R(1) TO 8
5720R(1) TO 8
5730R(1) TO 8
5740R(1) TO 8
5750R(1) TO 8
5760R(1) TO 8
5770R(1) TO 8
5780R(1) TO 8
5790R(1) TO 8
5800R(1) TO 8
5810R(1) TO 8
5820R(1) TO 8
5830R(1) TO 8
5840R(1) TO 8
5850R(1) TO 8
5860R(1) TO 8
5870R(1) TO 8
5880R(1) TO 8
5890R(1) TO 8
5900R(1) TO 8
5910R(1) TO 8
5920R(1) TO 8
5930R(1) TO 8
5940R(1) TO 8
5950R(1) TO 8
5960R(1) TO 8
5970R(1) TO 8
5980R(1) TO 8
5990R(1) TO 8
6000R(1) TO 8
6010R(1) TO 8
6020R(1) TO 8
6030R(1) TO 8
6040R(1) TO 8
6050R(1) TO 8
6060R(1) TO 8
6070R(1) TO 8
6080R(1) TO 8
6090R(1) TO 8
6100R(1) TO 8
6110R(1) TO 8
6120R(1) TO 8
6130R(1) TO 8
6140R(1) TO 8
6150R(1) TO 8
6160R(1) TO 8
6170R(1) TO 8
6180R(1) TO 8
6190R(1) TO 8
6200R(1) TO 8
6210R(1) TO 8
6220R(1) TO 8
6230R(1) TO 8
6240R(1) TO 8
6250R(1) TO 8
6260R(1) TO 8
6270R(1) TO 8
6280R(1) TO 8
6290R(1) TO 8
6300R(1) TO 8
6310R(1) TO 8
6320R(1) TO 8
6330R(1) TO 8
6340R(1) TO 8
6350R(1) TO 8
6360R(1) TO 8
6370R(1) TO 8
6380R(1) TO 8
6390R(1) TO 8
6400R(1) TO 8
6410R(1) TO 8
6420R(1) TO 8
6430R(1) TO 8
6440R(1) TO 8
6450R(1) TO 8
6460R(1) TO 8
6470R(1) TO 8
6480R(1) TO 8
6490R(1) TO 8
6500R(1) TO 8
6510R(1) TO 8
6520R(1) TO 8
6530R(1) TO 8
6540R(1) TO 8
6550R(1) TO 8
6560R(1) TO 8
6570R(1) TO 8
6580R(1) TO 8
6590R(1) TO 8
6600R(1) TO 8
6610R(1) TO 8
6620R(1) TO 8
6630R(1) TO 8
6640R(1) TO 8
6650R(1) TO 8
6660R(1) TO 8
6670R(1) TO 8
6680R(1) TO 8
6690R(1) TO 8
6700R(1) TO 8
6710R(1) TO 8
6720R(1) TO 8
6730R(1) TO 8
6740R(1) TO 8
6750R(1) TO 8
6760R(1) TO 8
6770R(1) TO 8
6780R(1) TO 8
6790R(1) TO 8
6800R(1) TO 8
6810R(1) TO 8
6820R(1) TO 8
6830R(1) TO 8
6840R(1) TO 8
6850R(1) TO 8
6860R(1) TO 8
6870R(1) TO 8
6880R(1) TO 8
6890R(1) TO 8
6900R(1) TO 8
6910R(1) TO 8
6920R(1) TO 8
6930R(1) TO 8
6940R(1) TO 8
6950R(1) TO 8
6960R(1) TO 8
6970R(1) TO 8
6980R(1) TO 8
6990R(1) TO 8
7000R(1) TO 8
7010R(1) TO 8
7020R(1) TO 8
7030R(1) TO 8
7040R(1) TO 8
7050R(1) TO 8
7060R(1) TO 8
7070R(1) TO 8
7080R(1) TO 8
7090R(1) TO 8
7100R(1) TO 8
7110R(1) TO 8
7120R(1) TO 8
7130R(1) TO 8
7140R(1) TO 8
7150R(1) TO 8
7160R(1) TO 8
7170R(1) TO 8
7180R(1) TO 8
7190R(1) TO 8
7200R(1) TO 8
7210R(1) TO 8
7220R(1) TO 8
7230R(1) TO 8
7240R(1) TO 8
7250R(1) TO 8
7260R(1) TO 8
7270R(1) TO 8
7280R(1) TO 8
7290R(1) TO 8
7300R(1) TO 8
7310R(1) TO 8
7320R(1) TO 8
7330R(1) TO 8
7340R(1) TO 8
7350R(1) TO 8
7360R(1) TO 8
7370R(1) TO 8
7380R(1) TO 8
7390R(1) TO 8
7400R(1) TO 8
7410R(1) TO 8
7420R(1) TO 8
7430R(1) TO 8
7440R(1) TO 8
7450R(1) TO 8
7460R(1) TO 8
7470R(1) TO 8
7480R(1) TO 8
7490R(1) TO 8
7500R(1) TO 8
7510R(1) TO 8
7520R(1) TO 8
7530R(1) TO 8
7540R(1) TO 8
7550R(1) TO 8
7560R(1) TO 8
7570R(1) TO 8
7580R(1) TO 8
7590R(1) TO 8
7600R(1) TO 8
7610R(1) TO 8
7620R(1) TO 8
7630R(1) TO 8
7640R(1) TO 8
7650R(1) TO 8
7660R(1) TO 8
7670R(1) TO 8
7680R(1) TO 8
7690R(1) TO 8
7700R(1) TO 8
7710R(1) TO 8
7720R(1) TO 8
7730R(1) TO 8
7740R(1) TO 8
7750R(1) TO 8
7760R(1) TO 8
7770R(1) TO 8
7780R(1) TO 8
7790R(1) TO 8
7800R(1) TO 8
7810R(1) TO 8
7820R(1) TO 8
7830R(1) TO 8
7840R(1) TO 8
7850R(1) TO 8
7860R(1) TO 8
7870R(1) TO 8
7880R(1) TO 8
7890R(1) TO 8
7900R(1) TO 8
7910R(1) TO 8
7920R(1) TO 8
7930R(1) TO 8
7940R(1) TO 8
7950R(1) TO 8
7960R(1) TO 8
7970R(1) TO 8
7980R(1) TO 8
7990R(1) TO 8
8000R(1) TO 8
8010R(1) TO 8
8020R(1) TO 8
8030R(1) TO 8
8040R(1) TO 8
8050R(1) TO 8
8060R(1) TO 8
8070R(1) TO 8
8080R(1) TO 8
8090R(1) TO 8
8100R(1) TO 8
8110R(1) TO 8
8120R(1) TO 8
8130R(1) TO 8
8140R(1) TO 8
8150R(1) TO 8
8160R(1) TO 8
8170R(1) TO 8
8180R(1) TO 8
8190R(1) TO 8
8200R(1) TO 8
8210R(1) TO 8
8220R(1) TO 8
8230R(1) TO 8
8240R(1) TO 8
8250R(1) TO 8
8260R(1) TO 8
8270R(1) TO 8
8280R(1) TO 8
8290R(1) TO 8
8300R(1) TO 8
8310R(1) TO 8
8320R(1) TO 8
8330R(1) TO 8
8340R(1) TO 8
8350R(1) TO 8
8360R(1) TO 8
8370R(1) TO 8
8380R(1) TO 8
8390R(1) TO 8
8400R(1) TO 8
8410R(1) TO 8
8420R(1) TO 8
8430R(1) TO 8
8440R(1) TO 8
8450R(1) TO 8
8460R(1) TO 8
8470R(1) TO 8
8480R(1) TO 8
8490R(1) TO 8
8500R(1) TO 8
8510R(1) TO 8
8520R(1) TO 8
8530R(1) TO 8
8540R(1) TO 8
8550R(1) TO 8
8560R(1) TO 8
8570R(1) TO 8
8580R(1) TO 8
8590R(1) TO 8
8600R(1) TO 8
8610R(1) TO 8
8620R(1) TO 8
8630R(1) TO 8
8640R(1) TO 8
8650R(1) TO 8
8660R(1) TO 8
8670R(1) TO 8
8680R(1) TO 8
8690R(1) TO 8
8700R(1) TO 8
8710R(1) TO 8
8720R(1) TO 8
8730R(1) TO 8
8740R(1) TO 8
8750R(1) TO 8
8760R(1) TO 8
8770R(1) TO 8
8780R(1) TO 8
8790R(1) TO 8
8800R(1) TO 8
8810R(1) TO 8
8820R(1) TO 8
8830R(1) TO 8
8840R(1) TO 8
8850R(1) TO 8
8860R(1) TO 8
8870R(1) TO 8
8880R(1) TO 8
8890R(1) TO 8
8900R(1) TO 8
8910R(1) TO 8
8920R(1) TO 8
8930R(1) TO 8
8940R(1) TO 8
8950R(1) TO 8
8960R(1) TO 8
8970R(1) TO 8
8980R(1) TO 8
8990R(1) TO 8
9000R(1) TO 8
9010R(1) TO 8
9020R(1) TO 8
9030R(1) TO 8
9040R(1) TO 8
9050R(1) TO 8
9060R(1) TO 8
9070R(1) TO 8
9080R(1) TO 8
9090R(1) TO 8
9100R(1) TO 8
9110R(1) TO 8
9120R(1) TO 8
9130R(1) TO 8
9140R(1) TO 8
9150R(1) TO 8
9160R(1) TO 8
9170R(1) TO 8
9180R(1) TO 8
9190R(1) TO 8
9200R(1) TO 8
9210R(1) TO 8
9220R(1) TO 8
9230R(1) TO 8
9240R(1) TO 8
9250R(1) TO 8
9260R(1) TO 8
9270R(1) TO 8
9280R(1) TO 8
9290R(1) TO 8
9300R(1) TO 8
9310R(1) TO 8
9320R(1) TO 8
9330R(1) TO 8
9340R(1) TO 8
9350R(1) TO 8
9360R(1) TO 8
9370R(1) TO 8
9380R(1) TO 8
9390R(1) TO 8
9400R(1) TO 8
9410R(1) TO 8
9420R(1) TO 8
9430R(1) TO 8
9440R(1) TO 8
9450R(1) TO 8
9460R(1) TO 8
9470R(1) TO 8
9480R(1) TO 8
9490R(1) TO 8
9500R(1) TO 8
9510R(1) TO 8
9520R(1) TO 8
9530R(1) TO 8
9540R(1) TO 8
9550R(1) TO 8
9560R(1) TO 8
9570R(1) TO 8
9580R(1) TO 8
9590R(1) TO 8
9600R(1) TO 8
9610R(1) TO 8
9620R(1) TO 8
9630R(1) TO 8
9640R(1) TO 8
9650R(1) TO 8
9660R(1) TO 8
9670R(1) TO 8
9680R(1) TO 8
9690R(1) TO 8
9700R(1) TO 8
9710R(1) TO 8
9720R(1) TO 8
9730R(1) TO 8
9740R(1) TO 8
9750R(1) TO 8
9760R(1) TO 8
9770R(1) TO 8
9780R(1) TO 8
9790R(1) TO 8
9800R(1) TO 8
9810R(1) TO 8
9820R(1) TO 8
9830R(1) TO 8
9840R(1) TO 8
9850R(1) TO 8
9860R(1) TO 8
9870R(1) TO 8
9880R(1) TO 8
9890R(1) TO 8
9900R(1) TO 8
9910R(1) TO 8
9920R(1) TO 8
9930R(1) TO 8
9940R(1) TO 8
9950R(1) TO 8
9960R(1) TO 8
9970R(1) TO 8
9980R(1) TO 8
9990R(1) TO 8

```

Every computer needs  
**CHATTERBOX II**  
"Listen creep, I am the leader...."

For ZX81  
SPECTRUM  
BBC  
TRS 80  
APPLE  
NASCOM  
VIC/PET/64  
(Please state)



TAKE US TO  
YOUR LEADER

SPEECH  
SYNTHESIS

By  
WILLIAM  
STUART  
SYSTEMS

**NEW!**  
EXCLUSIVE! **PITCH  
CONTROL**

£49  
COMPLETE  
OR £39 (DIY KIT)

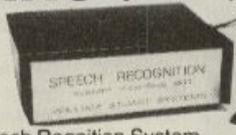
## CHATTERBOX II™ can say anything!

Genuine phoneme synthesis - not just recorded speech - hence unlimited vocabulary. Programmable pitch for more natural intonation (exclusive to Wm Stuart Systems) - solid tone cabinet for quality sound - integral beep/music amplifier. **PLUS** expansion socket for BIG EARS voice recognition system. Full instructions technical notes and software supplied with this outstanding educational unit.  
DEALER ENQUIRIES WELCOME

As seen on BBC TV "Computer Programme"

## \*BIG EARS\*

**SPEECH  
INPUT  
FOR ANY  
COMPUTER**



STOP!  
GO!  
LEFT!  
RIGHT!

Hugely successful Speech Recognition System, complete with microphone, software and full instructions.

**BUILT TESTED & GUARANTEED**  
PLEASE STATE COMPUTER: UK101,  
SPECTRUM, ATOM, NASCOM2, Vic 20, Micron,  
ZX80/81, PET, TRS80, MZ80K, APPLE II, BBC MICRO

**ONLY £49**

## ZX81/SPECTRUM

**MUSIC SYNTHESISER (Stereo)  
+16 LINE CONTROL PORT**

Play 3-part music, sound effects, drums etc. Full control of attack, decay and frequency. Input/Output lines provide control and monitor facility for Home Security, Robot Control, Model Railway etc. etc. Works with or without 16K RAM.

Full instructions/software included.  
Add keyboard to make a live performance polyphonic synthesiser!  
Note: up to 3 units can be used simultaneously; giving 9 music channels & 48 I/O lines

**AMAZING VALUE  
AT ONLY  
£19.50 (KIT)  
£25.50 (BUILT)**

**NEW!**

**VIBRATO  
CONTROL**

S  
O  
F  
T  
W  
A  
R  
E

### THE COMPOSER

Synthesiser Music Programme. Enter & play 3 part harmony. Includes demonstrations. (Spectrum/ZX81) recommended £7

### TALKING HANGMAN

For Chatterbox! The classic game claims its victims with a dry vocal accompaniment (Spectrum) £6

### ZX ARP/DRUMSEQ

Fascinating synthesiser demonstrations. Generates automatic sequences and plays from keyboard. Some weird effects (Spectrum) £6

### CHROMACODE??????

Can you defuse the bomb by cracking the secret combination before time runs out? With Chatterbox voice output (Spectrum) £6

## COLOUR MODULATOR

RGB in, PAL/UHF out (not for ZX)

**KIT £16**

**BUILT £22**

Please add VAT at 15% to prices.  
Barclay/Access orders accepted by telephone

All enquiries  
S.A.E. please

**WILLIAM  
STUART  
SYSTEMS Ltd**

Quarley Down House  
Cholderton  
Nr. Salisbury  
Wiltshire. SP4 ODZ  
Tel: 098 064 235



# QUICKSILVA ARE THE GAME LORDS...

## SPECTRUM PROGRAMS

ANT ATTACK\* 6.95

Sandy White

GAMES DESIGNER\* 14.95

John Hollis

BUGABOO\* 6.95

Indescomp

TRAXX\* 6.95

Jeff Minter/Salamander

GRIDRUNNER\* 6.95

Jeff Minter/Salamander

SMUGGLERS COVE\* 6.95

John Keneally

VELNOR'S LAIR\* 6.95

Derek Brewster

3D STRATEGY\* 6.95

Freddy Vachha

XADOM\* 6.95

Mike Moscoff

AQUAPLANE\* 7.95

John Hollis

## ZX-81 PROGRAMS

QS DEFENDA 3.95

Nick Lambert

QS ASTEROIDS 3.95

John Hollis

QS INVADERS 3.95

Dave Edwards

QS SCRAMBLE 3.95

Dave Edwards

## COMMODORE 64

PURPLE TURTLES\* 7.95

Mark & Richard Moore

AQUAPLANE\* 7.95

John Hollis & Steve Hickman

RING OF POWER\* 6.95

Mc Clemont & Fred Preston

QUINTIC WARRIOR\* 7.95

T.P. Watts

ULTISYNTH\*‡ 14.95

Nalin Sharma

## BBC PROGRAMS

THE GENERATORS\* 6.95

Dave Mendes

MINED OUT\* 6.95

Ian Andrew & Ian Rowlings

BEEB ART\*‡ 14.95

Dave Mendes

PROTECTOR 7.95

Andy Green

WIZARD 6.95

A.R. Buckley

MUSIC PROCESSOR 14.95

Andy Williams

## VIC20 PROGRAMS

TORNADO 5.95

CHARTEC

SKYHAWK 7.95

CHARTEC

TRADER‡ 14.95

PIXEL POWER 7.95

PIXEL

## ATARI PROGRAM

MAGIC WINDOW 8.95

M. Walker

## DRAGON PROGRAM

MINED OUT 5.95

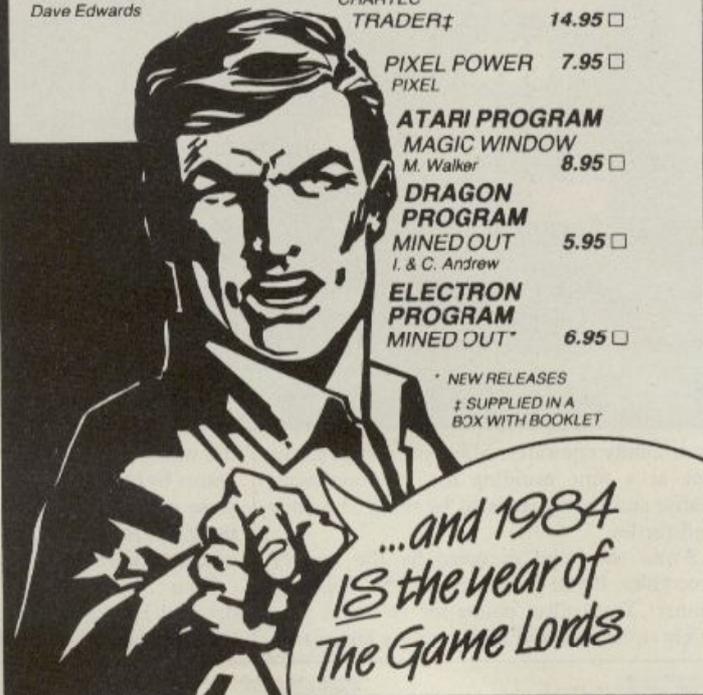
I. & C. Andrew

## ELECTRON PROGRAM

MINED OUT\* 6.95

\* NEW RELEASES

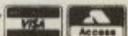
‡ SUPPLIED IN A BOX WITH BOOKLET



# QUICKSILVA

All games marketed exclusively by Quicksilva Limited.  
Please send me the games I have ticked.

I enclose cheque/P.O. for  
Send to Quicksilva Mail Order,  
P.O. Box 6,  
Wimborne, Dorset BA21 7PY.  
Telephone: (0202) 891744

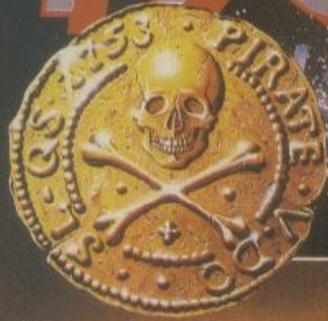


Boots, W. H. Smiths, J. Menzies,  
Microdealer, HMV, Hamleys,  
John Lewis, Computers for All  
and all reputable specialist  
computer stores.

Name \_\_\_\_\_  
Address \_\_\_\_\_

WARNING: These programs are sold according to QUICKSILVA Ltd's terms of trade and conditions of sale. Copies of which are available on request.

1984



QUICKSILVA

...THE YEAR OF THE GAME LORDS.

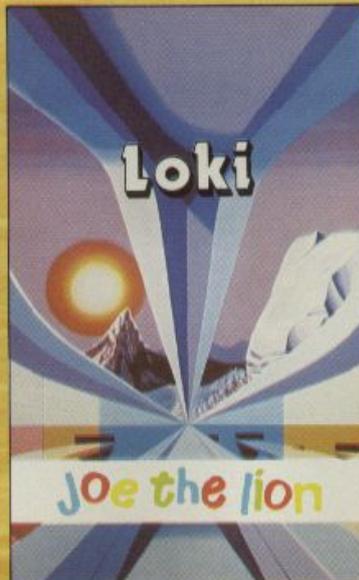
THERE IS ONLY ONE KING  
OF THE SOFTWARE JUNGLE!

# Joe the lion

Joe the lion  
Rules O.K.



Dimbo £5.45  
Any Spectrum



Loki £6.45  
48 K Oric



Challenger £7.45  
BBC B

Distributors please contact Laurence Holt Tel :-061-366-7431. Available from good software outlets.

(continued from page 87)

required some special program design and splitting the whole game into three separate programs. The first program is a short title page, which loads the remaining programs higher up in memory. The second program assembles the machine code, and prints the graphics characters and creates the instructions.

Although the game uses machine code, it should be possible to modify the program, or even convert it to another computer with a little work. To help anyone attempting this

conversion, I give a brief description of what the main parts of each program do.

Anyone who has attempted to directly access the screen memory in the high resolution graphics modes would have encountered a problem. In mode 2, each byte of screen memory holds the colours for two adjacent pixels, and is stored in a rather strange way. The logical colour numbers are split up into binary and stored in separate bits — see table

For example, a red pixel next to a green pixel would be stored as follows:

Logical colour red = 1 = 0001 in binary.

Logical colour green = 2 = 0010 in binary.  
memory byte = 0 0 0 1 0

0 0 1 0  
= 00000110 = decimal 6

The next problem encountered is the order in which the bytes are stored. Eight consecutive bytes of screen memory store the colour information for 16 pixels in a block two wide and eight deep. The next eight consecutive bytes of screen memory is a similar block of pixels adjacent to the previous block.

To make the graphics quicker and to get round the above problems, the simple machine code program is used. All this program does is to Poke consecutive bytes of screen memory, in order to make up a character. Another machine code program uses the Poke subroutine to delete, move and re-print all the graphics for the logs, cars, etc. This program is virtually instantaneous, allowing for high speed arcade-type action. Another machine code program tests for whether the frog has been hit by a car, or fallen into the water.

This program works by testing each pixel next to the frog and counting the pixels that have logical colours less than eight, excluding black. As all the dangerous obstacles of the program are made up from colours in the range 1 to 7, it is easy to tell whether the frog has strayed onto something it should not have. Also, all the safe obstacles, such as the logs, swimming turtles and the crocodiles back, are defined using colours in the range 8 to 15.

The machine code is assembled into pages &900 and &A00, which are normally unused by the computer for most of the time. All the

(continued on next page)

### Program 2. Description.

Lines	Use
170	Stop the program, if page is not set
190 to 210	Define sound envelopes
240 to 550	Define user characters
560 to 590	Display title
610 to 1120	Assemble machine code to move graphics
1160 to 1730	Assemble machine code to 'Poke' graphics
1770 to 2180	Assemble machine code to 'Peek' at frogs position
2200 to 2280	Set up all 'labels' required by assembler
2310 to 2340	Find the position of each line of screen memory for the machine code
2370 to 2520	Data for log graphics
2540 to 2680	Data for crocodile graphics
2700 to 2790	Data for lorry graphics
2810 to 2860	Data for 'sports car' graphics
2880 to 2930	Data for 'motorbike' graphics
2950 to 3020	Data for tractor graphics
3040 to 3090	Data for van graphics

3110 to 3160	Data for car graphics
3180 to 3210	Data for turtle moving right graphics
3230 to 3260	Data for turtle moving left graphics
3280 to 3310	Data for diving turtle graphics
3320 to 3890	Read in and decode graphics data
3910 to 3940	Read in data about graphics
3960 to 3990	Data about graphics length, speed and direction
4010 to 4020	Set flash rates of colours 8 to 15
4040 to 4060	Ask if instructions are required
4070 to 4080	Display instructions, if required
4140	Load and run the last program
4190 to 4270	Read in, decode and store a line of graphics data
4310 to 4340	Print in double height writing
4380 to 4420	Press the space bar to continue
4460 to 4960	Print instructions
5000 to 5200	Display title page
5220 to 5270	Set up text window

### Listing 3.

```

10REM Frogger part 3
20REM
30REM
40REM by J.R. Wilson
50REM
60IF PAGE=0 THEN PRINT "PAGE must be at 8100"
70GOTO 1500
80REM SOUND 020 2370
90X=1:Y=0
100GOTO 1100
1100CALL 1500
1200CALL 1500
1300CALL 1500
1400CALL 1500
1500CALL 1500
1600CALL 1500
1700CALL 1500
1800CALL 1500
1900CALL 1500
2000CALL 1500
2100CALL 1500
2200CALL 1500
2300CALL 1500
2400CALL 1500
2500CALL 1500
2600CALL 1500
2700CALL 1500
2800CALL 1500
2900CALL 1500
3000CALL 1500
3100CALL 1500
3200CALL 1500
3300CALL 1500
3400CALL 1500
3500CALL 1500
3600CALL 1500
3700CALL 1500
3800CALL 1500
3900CALL 1500
4000CALL 1500
4100CALL 1500
4200CALL 1500
4300CALL 1500
4400CALL 1500
4500CALL 1500
4600CALL 1500
4700CALL 1500
4800CALL 1500
4900CALL 1500
5000CALL 1500
5100CALL 1500
5200CALL 1500
5300CALL 1500
5400CALL 1500
5500CALL 1500
5600CALL 1500
5700CALL 1500
5800CALL 1500
5900CALL 1500
6000CALL 1500
6100CALL 1500
6200CALL 1500
6300CALL 1500
6400CALL 1500
6500CALL 1500
6600CALL 1500
6700CALL 1500
6800CALL 1500
6900CALL 1500
7000CALL 1500
7100CALL 1500
7200CALL 1500
7300CALL 1500
7400CALL 1500
7500CALL 1500
7600CALL 1500
7700CALL 1500
7800CALL 1500
7900CALL 1500
8000CALL 1500
8100CALL 1500
8200CALL 1500
8300CALL 1500
8400CALL 1500
8500CALL 1500
8600CALL 1500
8700CALL 1500
8800CALL 1500
8900CALL 1500
9000CALL 1500
9100CALL 1500
9200CALL 1500
9300CALL 1500
9400CALL 1500
9500CALL 1500
9600CALL 1500
9700CALL 1500
9800CALL 1500
9900CALL 1500

```

(continued from previous page)

data required by the machine code is then stored into memory from page &D00 to page &1100. The program finally loads the last and

final part of the game, after printing the instructions.

The listings are long and will take plenty of time and energy to type in. If you feel you do

not have either the stamina or patience for such an epic, I will supply the game on cassette. Send £3 to John Wilson, 336 High Road, Benfleet, Essex SS7 5HP.

**Program 3. Description.**

Lines	Use	730 to 770	Put holes in hedge	1920	hole
60	Make sure Page has been set correctly	780 to 790	Print river	1930	Are all the holes full?
70	Reset variables for keys	800 to 810	Print grass	1970 to 2090	Reset position of frog
80	Trap any errors	820	Print hedge at bottom of screen	2150	Your frog has died
90	Turn off the auto-repeat on keys	830 to 850	Print writing	2160 to 2170	Continue to play, if there are any more frogs left alive
100 to 120	Display title	860 to 870	Reset timer	2180	Display your final score
130 to 170	Choose whether sound is required	880 to 910	Print any frogs left alive	2190	Update high score, if necessary
180 to 210	Choose whether to change the controls	920	Update score	2200 to 2250	Print high score
200	Clear variables ready for the next game	930 to 950	Reset positions of objects	2260 to 2290	Play another game, if required
230 to 240	Set up variables for speed and direction of drift on river	1030	Read the number of objects on this screen	2300 to 2350	Print in double height writing
250 to 270	Set up variables required to use machine code	1040 to 1160	Read in data for object positions	2360	Collect bonus points for eating the fly
280	Select 16 colour graphics mode	1170 to 1190	Reset position of frog	2370	Print the snake
290	Make cursor invisible	1210 to 1250	Print phase number	2380	Trap escape key (If the Shift is not pressed.)
300	Set up main variables for the game	1260 to 1310	Redefine colours to display screen	2390 to 2410	Reset repeat rate on keys
320	Update timer and move objects	1330	Gain a bonus frog	2420 to 2540	Print error message
330 to 400	Move your frog	1350 to 1410	Sound the beginning of the phase	2420 to 2540	Data for phase 0
410	Test for whether frog has got home	1420 to 1460	Delete phase number	2550 to 2670	Data for phase 1
420 to 500	Update fly	1470 to 1500	Reset flags to show that the holes are empty	2680 to 2800	Data for phase 2
510 to 600	Update crocodile in hole	1520	Delete a frog	2810 to 2930	Data for phase 3
610 to 650	Move snake	1530 to 1580	Set up variables for fly, crocodile and snake	2940 to 3060	Data for phase 4
660	Print screen	1590	Start clock	3070 to 3190	Data for phase 5
670 to 690	Make colours disappear	1610 to 1640	Time delay	3200 to 3350	Gain bonus points for completing a screen
710 to 720	Print hedge at top of screen	1650	Update score	3370 to 3400	Move traffic
		1660	Plot frog	3410	Go on to the next phase
		1670 to 1680	Update timer	3430 to 3460	Define control keys
		1690 to 1710	Your family has been caught by the Chef	3470 to 3500	Define left key
		1720 to 1910	Your frog has safely reached a	3510 to 3550	Define right key
				3560 to 3600	Define up key
				3610 to 3650	Define down key
				3660 to 3680	Press the Space Bar to start

# THE FABULOUS CASSETTE

# 50

FROM **Cascade**

**VALUE that's out of this world**

## 50 GAMES ON ONE CASSETTE

DRAGON A/B Spectrum APPLE ATARI ORIC-1 ZX81 VIC-20

**ONLY**  
**£9.95**  
(INC. P&P and VAT)

It is impossible to tell you everything about the 50 games on CASSETTE 50 but they include many types such as maze, arcade, missile, tactical and logic games, to suit most tastes in computer game playing. CASSETTE 50 will appeal to people of all ages and the games will provide many hours of entertainment for all the family at a fraction of the cost of other computer games.

**EXPRESS DELIVERY - ORDER NOW**

Name \_\_\_\_\_

Address \_\_\_\_\_

Post Code \_\_\_\_\_

Country \_\_\_\_\_

**Dealers & Stockists enquiries welcome.**

Please send me by return of post, Cassette 50 at £9.95 per tape. I enclose a cheque/postal order for

£ \_\_\_\_\_ made payable to Cascade Games Ltd.

Please debit my  No. \_\_\_\_\_

SPECTRUM  ORIC-1  ZX 81  VIC 20

BBC A/B  DRAGON  ATARI  APPLE

Cascade Games Ltd., Suite 4, 1-3 Haywra Crescent, Harrogate, North Yorkshire, HG1 5BG, England. Telephone: (0423) 504526.

YC 2/84

# You've read the game... now play the book...

## MY SECRET FILE

Program by Phil Nathans

Based on the best-selling Puffin book by John Astrop

A personal database for your darkest thoughts.

Do you have secrets you wouldn't even confide to your closest friend? Let alone your family?

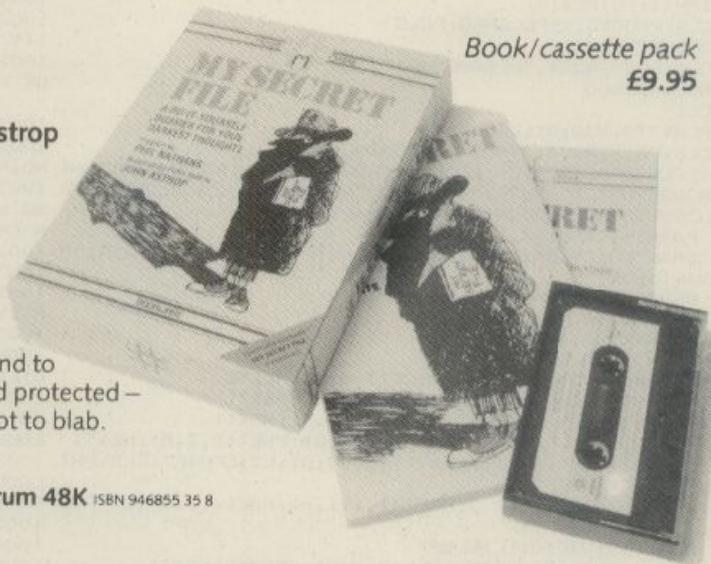
Do you have secrets about your friends and family you wouldn't confide to anyone but yourself?

At last, you're no longer alone. **My Secret File** turns your personal computer into a personal confidante. And to keep your confidences confidential, it's even password protected – because these days, you can't even trust your micro not to blab.

Trust no-one: file your friends before they file you.

Available for the: **Commodore 64** ISBN 946855 30 7 **Spectrum 48K** ISBN 946855 35 8  
**BBC Micro B** ISBN 946855 40 4

Book/cassette pack  
£9.95



Book/cassette pack  
£9.95

## THE UNORTHODOX ENGINEERS: THE PEN AND THE DARK

Adventure game program by Keith Campbell  
Based on the story by Colin Kapp

Colin Kapp created the classic SF stories about the Unorthodox Engineers – and now you can try to solve the mystery of the indestructible pillar of darkness and the riddle of contra-energy in this mind-bending text adventure game.

Reading Colin's story in this pack should help you. But once you and your micro are locked into the problem, not even Colin could get you out.

By special arrangement with an unspecified alien culture, Mosaic will let you have the story along with the program – so at least you're in with a chance.

Please read the story carefully . . . because we'd like to release our Spring SF bookware blockbuster (Harry Harrison's *Stainless Steel Rat* on micro for the first time!) before you carelessly unleash contra-energy across the universe. Thank you.

Available for the: **Spectrum 48K** ISBN 946855 15 3 **BBC Micro B** ISBN 946855 20 X

Available from good bookshops and computer stores.

Published by Mosaic Publishing Ltd

Marketed by John Wiley & Sons Limited, Baffins Lane, Chichester, Sussex PO19 1UD

BOOKWARE

# DRAGON INTERCEPTOR

Stop the aliens stealing resources from your city in V Parkin's smooth action game.

```

1 CLEAR200,27979
6 GOSUB10000
7 DIMH(4):DIMN(4)
10 CLS:PMODE3,1:PCLEARB:FCLS
20 GOSUB20100
22 CLS:PRINT@234,"PLEASE WAIT"
25 GOSUB21000
30 CLS
90 PLAY"T9;V30;01;L1EL2F"
95 CLS:PRINT@233,"THEY'RE COMING"
100 PCLS:DRAW"S16;C6;BMO,180;R2U2R2D2R2U1R2D1R4U6R2D6R
2U2R2D2R2U5R2D5R2U2R2D3R2U2R2U2R2U4R2D4R2D2R2D4U3R2D
3R2U2R2U3U2R2D3R2D2R4U2R2D2R2U4R2D2R2"
101 PAINT(1,18E),7,6
110 DRAW"SB;C7;BM166,0;R20D1L20NU1R8D2R4NU2L4R17U2R10D
1LBG4L14H2E1"
111 DRAW"SO;C7;BM166,1;R20"
112 PAINT(218,4),7,7
113 PAINT(186,4),7,7
114 PAINT(186,8),7,7
115 FORI=180T0216 STEP2:PSET(I,6,6):NEXTI
116 FORI=182T0212 STEP2:PSET(I,8,6):NEXTI
117 FORI=184T0214 STEP2:PSET(I,10,6):NEXTI
118 FORI=166T0206 STEP2:PSET(I,0,8):PSET(I,2,8):NEXTI
119 FORI=1T0950:NEXTI:PLAY"T9;V30;01;L2;EFF#F":CLS:PRI
NT@237,"NEARER"
200 FORI=0T0254 STEP 2:PSET(I,191,6):PSET(I,189,6):PSE
T(I,187,6):NEXT I
201 PLAY"T9;V30;01;L1EL2F"
202 CLS:PRINT@235,"RED ALERT":FORI=1T0750:NEXTI
203 PLAY"T9;V5;01;L4EP16FP16F#P16FP16V10EP16FP16F#P16F
P16V15EP16FP16F#P16FP16V20EP16FP16F#P16FP16V25EP16FP16
F#P16FP16V30EP16FP16F#P16F"
210 PCOPY 1 TO 5:PCOPY 2 TO 6:PCOPY 3 TO 7:PCOPY 4 TO
8
300 FORI=32250T032320:POKE I,0:NEXT I
310 POKE32250,0:POKE32251,0
320 POKE32258,5
330 POKE32228,0:POKE32229,4:POKE32230,96:POKE32231,106
340 POKE32220,0:POKE32221,4:POKE32222,96:POKE32223,106
350 POKE32248,&H7D:POKE32249,&H1E
360 DEFUSRO=&H6E1B
370 A=USRO(&H6E1B)
380 POKE32220,27:POKE32221,31:POKE32222,14:POKE32223,3
0
390 POKE32232,27:POKE32233,31:POKE32234,14:POKE32235,3
0
400 POKE32248,&H7C:POKE32249,&H8B
410 A=USRO(&H6E1B)
420 POKE32236,27:POKE32237,31:POKE32238,14:POKE32239,3
0
430 POKE32244,27:POKE32245,31:POKE32246,14:POKE32247,3
0
440 POKE32252,0:POKE32253,0
450 POKE32232,0:POKE32233,4:POKE32234,96:POKE32235,106
460 POKE32240,0:POKE32241,4:POKE32242,96:POKE32243,106
470 POKE32308,1:POKE32309,31
475 PCOPY 5 TO 1:PCOPY 6 TO 2:PCOPY 7 TO 3:PCOPY 8 TO
4:SCREEN 1,1
480 TIMER=RND(255)
490 DEFUSRO=&H733C
500 A=USRO(&H733C)
510 FORI=1T01000:NEXTI
520 SC=PEEK(32291)+PEEK(32292)*10+PEEK(32293)*100+PEEK
(32294)*1000+PEEK(32295)*10000
540 GOSUB20000
550 CLS:PRINT@11,"YOUR SCORE=";SC
560 PRINT:PRINT"HIGH SCORES="
570 FORI=1T04:PRINTTAB(0)H(I);TAB(8)N(I):NEXTI
9997 PRINT@457,"PRESS SPACEBAR"
9998 IF INKEY#<>" THEN9998
9999 GOSUB20100:GOTO300
10000 CLS:PRINT@203,"INTERCEPTOR":PRINT@299,"BY V PARK
IN"
10010 FOR I=1 TO 1000:NEXT
10020 CLS:PRINT" ALIEN INVADERS ARE STEALING","YOUR C
ITY'S VALUABLE RESOURCES."
10021 PRINT"YOU HAVE AT YOUR DISPOSAL FIVE","INTERCEPT
OR FIGHTERS (5 LIVES)","TO PROTECT THE CITY BY BLOWING
"
10022 PRINT"UP THE ALIEN SHUTTLES."
10023 PRINT" YOU WILL GAIN 10 POINTS FOR","EACH DESCE
NDING CRAFT DESTROYED"
10024 PRINT"BUT ONLY 5 POINTS IF YOU DESTROYAN ASCENDI
NG CRAFT.YOU WILL","LOSE 5 POINTS EACH TIME THE","ALIE
N CRAFT BEAMS RESOURCES TO THE HOVERING CARGO SHIP."
10025 PRINT@457,"PRESS SPACEBAR"
10030 IF INKEY#<>" THEN10030
10031 CLS:PRINT" THE CARGO SHIP IS OUT OF RANGE OF YOU
R INTERCEPTORS."
10032 PRINT" OCCASIONALLY A FORMATION OF","FLYING NEU
TRON BOMBS WILL APPEAR(WHICH KILL PEOPLE,BUT LEAVE","B
UILDINGS ETC. UNHARMED.)"
10033 PRINT" IF YOU CAN SHOOT THEM DOWN","YOU WILL GA
IN 50 POINTS EACH.","IF YOU FAIL, EACH ONE LANDING D
EDUCTS 50 POINTS FROM YOUR","SCORE.";
10034 PRINT" IF YOU COLLIDE WITH A","NEUTRON BOMB YOU
LOSE A LIFE, BUT THE BOMB MIGHT NOT ALWAYS","BE DEST
ROYED."
10035 PRINT@457,"PRESS SPACEBAR"
10040 IF INKEY#<>" THEN10040
10041 CLS:PRINT" BEWARE OF TINY SPACEMINES","LEFT ABO
UT THE SCREEN OR YOU MAY LOSE AN INTERCEPTOR."
10042 PRINT:PRINT:PRINT:PRINT" GOOD LUCK WITH Y
OUR MISSION"
10043 PRINT@457,"PRESS SPACEBAR"
10050 IF INKEY#<>" THEN 10050
10060 RETURN
20000 FORI=1T04
20010 IF SC>H(I)THEN HI=I:GOTO20040
20020 NEXT I
20030 RETURN
20040 FOR I=4 TO HI STEP-1
20050 H(I)=H(I-1):N(I)=N(I-1)
20060 NEXT I
20070 H(HI)=SC:N(HI)=N#
20080 RETURN
20100 CLS:PRINT"PLEASE ENTER YOUR NAME"
20110 INPUT N#
20120 FOR I=1T01000:NEXTI
20130 RETURN
21000 FORI=&H6D4C TO &H76A5
21010 READ A:POKE I,A:NEXT
21011 DATA189,109,120,16,142,124,236,252,125,224,195,6
,0,31,1,246,125,220,166,133,167,160,92,241,125,221,38
,246,189
21012 DATA109,164,38,230,57,189,109,120,16,142,125,80,
126,109,83,182,125,223,198,32,61,195,0,32,253,125,226,
182
21013 DATA125,222,198,32,61,253,125,224,57,182,125,231
,198,32,61,195,0,32,253,125,226,182,125,230,198,32,61,
253
21014 DATA125,224,57,252,125,224,195,0,32,253,125,224,
16,179,125,226,57,189,109,142,16,190,125,248,252,125,2
24,195
21015 DATA6,0,31,1,246,125,228,166,133,39,3,189,112,16
4,170,160,167,133,92,241,125,229,33,239,189,109,164,38
,223
21016 DATA57,189,114,173,18,252,125,234,253,125,242,18
2,1,91,129,22,37,5,129,42,34,22,57,182,125,234,129,18,
37
21017 DATA13,128,3,183,125,234,182,125,235,128,3,183,1
25,235,57,182,125,234,129,133,34,248,139,3,183,125,234
,182

```



INTERCEPTOR IS A zap-pow arcade type game with smooth movement and good colour. All the action of the game is controlled by the machine-code routine. You need one joystick in the right-hand port.

The scenario and playing instructions and

scoring information are displayed at the beginning of the game. You have five interceptor fighters — one at a time — to protect the city by shooting and destroying the alien shuttles. These shuttles go up and down on the right hand-side of the screen, taking

resources from the city to the cargo ship.

Scoring is simple: 10 points for each descending alien destroyed, five points for each ascending alien destroyed, and each time an alien returns to the cargo ship and beams

(continued on page 99)

21018 DATA125,235,139,3,183,125,235,57,189,109,142,16,190,125,248,252,125,224,195,6,0,31,1,246,125,228,166,133,167	,7,48
21019 DATA160,92,241,125,229,38,246,189,109,164,38,230,57,189,109,120,16,190,125,248,252,125,224,195,6,0,31,1	21036 DATA1,166,128,167,164,49,168,32,90,38,246,49,169,255,32,49,62,16,188,126,42,36,217,57,246,125,250,192,10
21020 DATA246,125,220,166,160,164,133,167,133,92,241,125,221,38,244,189,109,164,38,228,57,182,125,252,39,9,1,22,125	21037 DATA37,9,141,10,198,1,142,126,36,32,6,246,125,250,142,126,35,166,132,52,4,171,224,128,10,45,13,167,128
21021 DATA252,189,113,42,126,110,175,182,125,253,38,24,252,125,238,253,125,246,139,1,203,1,253,125,238,193,1,44,37	21038 DATA140,126,39,39,14,166,132,198,1,32,235,166,132,52,4,171,224,167,132,57,182,126,34,38,9,139,0,183,126,34
21022 DATA42,124,125,253,189,113,37,57,252,125,238,253,125,246,128,1,192,1,253,125,238,129,12,34,18,122,125,253,252	21039 DATA189,111,123,57,122,126,34,57,206,126,4,38,14,17,131,126,31,39,31,51,67,109,196,38,2,32,242,18,18,18
21023 DATA125,250,124,125,251,198,5,247,125,250,189,113,34,57,182,125,234,187,1,19,132,15,129,8,38,3,126,111	21040 DATA18,51,65,172,196,39,4,51,66,32,228,51,95,111,192,127,125,254,111,133,57,126,114,148,17,131,124,236,38
21024 DATA86,57,198,180,247,255,215,215,140,198,1,189,186,160,247,255,214,57,246,125,254,38,29,246,255,0,193,126,39	21041 DATA18,125,126,1,38,46,124,126,1,125,126,2,39,38,122,126,2,32,33,125,126,3,38,28,52,4,52,2,52,16,52
21025 DATA5,193,254,39,1,57,189,114,247,18,18,252,125,226,195,5,192,253,125,255,189,110,191,246,125,254,190,125	21042 DATA32,52,64,198,10,189,112,49,53,64,53,32,53,16,53,2,53,4,124,126,3,57,246,125,250,190,126,38,38,22,190
21026 DATA255,111,133,92,247,125,254,189,111,20,246,125,254,193,31,36,9,193,0,39,4,134,15,167,133,57,127,125,254	21043 DATA126,36,38,17,182,126,35,52,4,160,224,43,4,183,126,35,57,127,126,35,57,206,126,35,166,196,52,4,160
21027 DATA57,166,133,38,1,57,241,125,236,37,45,241,125,237,34,40,182,125,238,198,32,61,195,6,0,16,179,125,255	21044 DATA224,43,3,167,196,57,166,196,139,10,52,4,160,224,167,192,17,131,126,39,39,4,198,1,32,225,57,189,112,225
21028 DATA34,25,195,1,192,16,179,125,255,37,16,124,126,3,198,10,247,125,250,189,112,49,134,0,126,111,229,189,115	21045 DATA134,10,183,125,252,182,125,251,38,58,182,125,239,198,32,61,195,6,32,31,1,16,142,0,10,246,125,236,203
21029 DATA247,18,18,18,18,18,126,112,121,206,126,4,199,0,225,196,39,9,51,67,17,131,126,31,35,244,57,182,125,236	21046 DATA1,134,40,167,133,48,136,64,49,63,16,140,0,0,38,243,182,125,252,129,1,38,15,127,125,252,134,0,48,137
21030 DATA128,1,167,192,182,125,238,198,32,61,195,7,0,237,196,57,206,126,4,198,0,225,196,38,9,51,67,17,131,126	21047 DATA253,128,16,142,0,10,32,221,57,182,125,238,198,32,61,195,5,225,31,1,246,125,236,134,32,167,133,48,136
21031 DATA31,35,242,57,230,192,174,196,134,0,167,133,40,231,194,189,111,172,230,196,39,223,134,80,167,133,51,67	21048 DATA224,134,128,167,133,48,136,224,192,1,134,2,167,133,48,136,224,134,8,167,133,182,125,252,129,1,38,27,127
21032 DATA17,131,126,31,35,211,57,166,133,38,1,57,241,125,232,37,59,241,125,233,34,54,182,125,234,198,32,61,195	21049 DATA125,252,127,125,251,134,0,167,133,48,136,32,167,133,48,136,32,203,1,167,133,48,136,32,167,133,57,252
21033 DATA6,0,191,125,224,16,179,125,224,34,36,195,1,64,16,179,125,224,37,27,126,114,159,125,126,2,39,3,122,126	21050 DATA125,236,253,125,228,252,125,238,253,125,230,252,125,244,253,125,220,252,125,246,253,125,222,204,124,136,253
21034 DATA2,134,0,167,196,246,125,254,183,125,254,190,125,255,167,133,57,189,111,249,230,196,126,111,225,198,0	21051 DATA125,248,57,252,125,232,253,125,228,252,125,234,253,125,230,252,125,240,253,125,220,252,125,242,253,125,222
21035 DATA247,125,250,189,112,49,57,254,126,44,16,190,126,40,142,124,36,166,192,161,132,39,4,48,8,32,248,198	21052 DATA204,125,30,253,125,248,57,79,142,126,4,230,132,167,128,16,174,129,167,165,140,126,34,37,242,57,134,0
	21053 DATA183,125,232,183,125,232,134,4,183,125,233,18

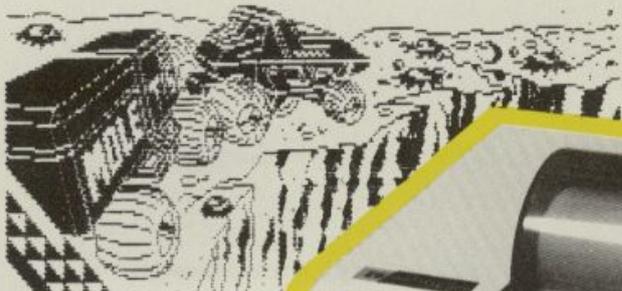
(listing continued on page 99)

```

0: "PLEASE WAIT" PRINT AT 0,0:1
LOAD
PRINT
NT AT 1,0:
AT 1,0:
13,0:

```

# LOW COST



```

EP .1,5: PAPER
1: OLS PRINT
T 9,7: "PSSST IS
0: "PLEASE WAIT"
OAD ""SCREEN"
PRINT AT 13,0: LOAD
NT AT 13,0: LOAD ""CO
AT 13,0: LOAD ""CODE
13,0: LOAD ""CODE
424

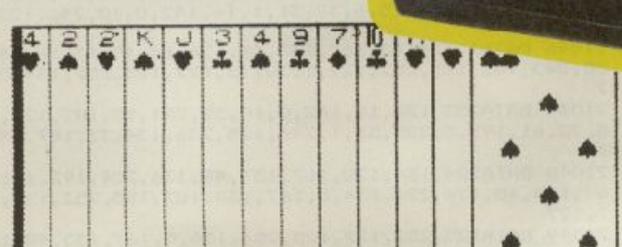
```



```

1 CLEAR 24299: BF
P .1,2: BEEP .1,3:
EP .1,5: PAPER 0:
1: OLS PRINT BRIN
T 9,7: "PSSST IS LO
0: "PLEASE WAIT": PA

```



Please send me ..... printers at £61.95 for Spectrum or ZX 81 only.  
 Please send me ..... printers at £101.95 for:  Commodore 20/64,  Atari,  
 Dragon,  BBC,  Standard RS232, and ..... boxes of paper at £12 per  
 box of 10 rolls. TOTAL £ ..... Cheque/PO enclosed or debit my  
 Access/Barclay card account No. ....  
 Name & Address .....

```

GO SUB 3500
3051 LET r=9: GO SUB 3500
3052 PRINT AT 10,17: "3 6 8"

```

# PRINTERS

The ALPHACOM range of thermal printers are compact, lightweight and quiet in operation. No maintenance is required for the life of the machine (i.e. no ribbons to change). Uses inexpensive 40 column thermal paper, each roll 25 metres in length.



**£99.95**  
Add £2  
p & p.

## Alphacom 42

For COMMODORE 20/64, ATARI (all models), BBC CENTRONICS, DRAGON and RS232.

A high-speed, 2 lines per second, 40 column thermal printer, which has full 320 x n dot graphic capability. To the printer, simply plug in the interface module which is applicable to your computer. Each module supplied includes the appropriate self-test programme. Other interface modules are available separately.



**£59.95**  
Add £2  
p & p.

## Alphacom 32

For SINCLAIR SPECTRUM and ZX 81.

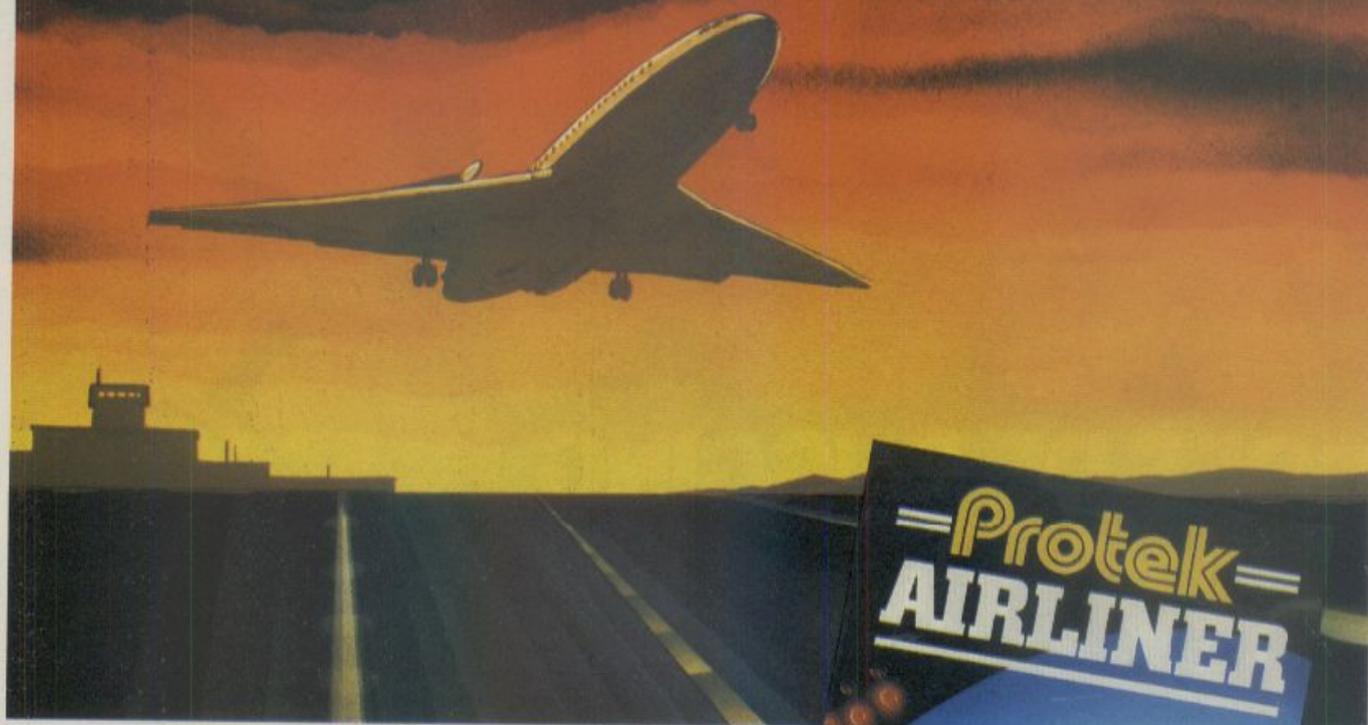
Fully interfaced to the Spectrum and ZX81, this printer operates at 2 lines per second, with full 256 x n dot graphic capability, 32 column line width. It uses the standard Sinclair print commands (COPY, LLIST, LPRINT).

Available direct or from W H Smith, Laskeys, Greens, John Menzies and Spectrum Group.

**DEAN ELECTRONICS LIMITED**

Glendale Park Fernbank Road Ascot Berkshire  
 Telephone 0344 885661 Telex 849242

# HIGH FLYING EXCITEMENT FROM PROTEK.



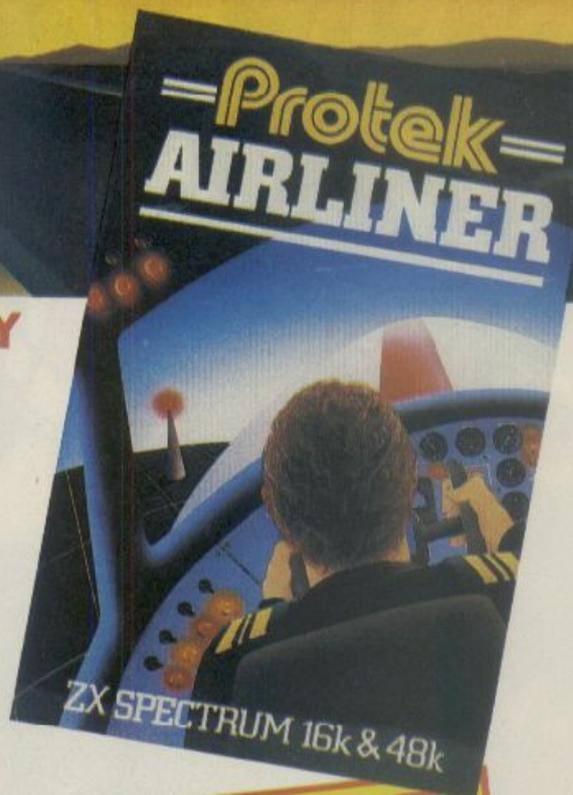
## HAVE YOU THE SKILL TO FLY AND LAND AN AIRLINER?

From take off to touch down you're in control. Flight control is totally in your hands. Keeping your aircraft in full flight will be as complex as controlling the real thing.

You'll be able to take off, manoeuvre, navigate, and land the aircraft using realistic aircraft controls. You'll chart your present position on a map or view the runway as you land without losing sight of vital instruments.

In fact, you'll hardly be able to tell the difference thanks to 'Airliners' range of features.

Have you got what it takes to be a high flyer?



See the complete range of action packed computer games from Prottek at your local computer store.

**£5.95**  
Available for the BBC  
and Commodore 64 soon.

# Protek

Protek Computing Ltd, 1A Young Square,  
Brucefield Industrial Park, Livingston, West Lothian. 0506 415353.



# LOTHLORIEN



# MICRO MOUSE

## GOES DE-BUGGING



**ACTIONMASTER**  
ONE OF A SERIES OF  
GREAT ARCADE GAMES

Any SPECTRUM — £5.95 KEMPSTON Joy Stick Compatible.  
Look out for COMMODORE '64!

Lothlorien 'ACTIONMASTER,' 'WARMASTER' and 'ADVENTUREMASTER' games are available from John Menzies, Lightning dealers and leading software outlets. For a complete list send for our free colour Catalogue.

M.C. Lothlorien, 56a Park Lane, Poynton, Cheshire SK12 1AF. Telephone: 0625 876649

(continued from page 95)

up resources you lose five points. If your interceptor is hit by an alien bullet you lose a life. Occasionally waves of neutron bombs will appear in formation. You score 50 points for each one you destroy, and lose 50 for each one which lands on the city. If you collide with a neutron bomb you lose a life but the bombs may not always be destroyed. Beware of tiny space mines accidentally left about the screen.

A personalised high score list is kept of the top four scores and on-screen scoring is an additional feature.

Top left is score and top centre is lives left.

A primitive but effective colour mixing system is used at lines 115 to 118 to gain extra colours on the high resolution screen. This is achieved by alternating lines of different colours. A better system would use a cross-hatch pattern but this needs to be Poked into screen memory as the plot function of the Dragon is not accurate enough to set individual pixels in PMode 3.

All the Basic does is to set up the graphics, display instructions, and keep and display the table of high scores.

The main program is entirely in machine code. The machine code was originally written

using the Tandy Edtasm Plus Assembler but was converted to decimal code and placed in data statements, from which the machine code is now Poked in from Basic. This is to avoid having special machine code loaders. If anyone has this assembler he can type it in from the assembler listing to the addresses shown and Saved separately, and the subroutine starting at 21000 to end, and line 25 can be omitted.

If the machine code has been Saved separately as above, line 25 could be used to load the machine-code routine with

CLOADM 'NAME'

The machine code routine is not relocatable.

(listing continued from page 95)

```

3,125,233,134,96,183,125,234,183,125,234,134,106,183,1
25,235,183
21054 DATA125,235,127,126,1,246,125,254,190,125,255,11
1,133,127,125,254,189,110,27,57,134,27,183,125,236,183
,125
21055 DATA236,134,31,183,125,237,183,125,237,134,14,18
3,125,238,183,125,238,134,30,183,125,239,183,125,239,1
27,126
21056 DATA3,189,110,27,57,189,109,120,252,125,226,131,
0,128,253,125,226,16,142,6,32,252,125,224,195,6,0,31,1
,246
21057 DATA125,220,166,160,167,133,92,241,125,221,38,24
6,189,109,164,38,230,57,252,125,230,253,125,222,189,11
4,237
21058 DATA57,109,164,39,6,254,125,248,126,112,167,57,1
25,126,1,38,6,124,126,1,126,111,217,126,111,225,173,15
9,160
21059 DATA10,252,125,232,253,125,240,182,126,47,39,4,1
22,126,47,57,134,2,183,126,47,182,1,90,129,22,37,5,129
21060 DATA42,34,15,57,182,125,232,129,4,39,20,122,125,
232,122,125,233,57,182,125,232,129,18,36,6,124,125,232
,124
21061 DATA125,233,57,252,125,228,253,125,220,189,110,6
1,57,246,125,233,247,125,254,57,182,126,48,39,4,122,12
6,48
21062 DATA57,182,125,252,38,250,134,5,183,126,48,16,14
2,24,95,142,24,96,198,0,166,133,183,126,49,92,193,32,3
9,6
21063 DATA166,133,167,165,32,245,182,126,49,167,165,48
,136,32,49,168,32,16,140,29,31,37,221,57,125,126,2,38,
1
21064 DATA57,189,109,219,189,113,212,189,110,61,189,11
0,27,204,124,236,253,125,248,189,109,178,189,110,207,1
89,112
21065 DATA103,189,110,97,189,113,181,189,110,61,189,11
0,27,204,125,80,253,125,248,189,109,178,204,126,35,253
,126,44
21066 DATA204,6,8,253,126,40,204,6,0,253,126,42,189,11
2,2,204,126,2,253,126,44,204,6,14,253,126,40,253,126,4
2
21067 DATA189,112,2,125,125,252,38,82,125,126,1,39,33,
134,5,183,126,46,189,113,212,189,114,138,189,114,95,19
8,1
21068 DATA189,110,193,189,114,138,122,126,46,38,240,18
9,113,243,189,114,6,125,126,3,39,39,134,5,183,126,46,1
89,113
21069 DATA181,189,114,138,189,114,95,198,100,189,110,1
93,189,114,138,122,126,46,38,240,189,114,56,182,1,18,1
29
21070 DATA2,16,34,1,181,18,189,114,254,22,255,69,52,11
8,206,126,54,225,192,38,89,16,174,193,16,191,125,224,1
88,125
21071 DATA224,39,38,49,168,32,16,191,125,224,188,125,224,39,14,49
21072 DATA168,32,16,191,125,224,188,125,224,16,38,0,41
,51,93,134,5,183,126,50,198,10,247,125,250,189,112,49,
122
21073 DATA126,50,38,243,127,125,254,127,125,255,127,12
6,0,31,50,189,117,119,53,118,109,225,57,51,66,17,131,1
26,63
21074 DATA37,155,53,118,57,16,142,126,54,230,160,174,1
61,39,18,79,167,133,48,136,32,167,133,48,136,32,167,13
3,48
21075 DATA136,32,167,133,16,140,126,62,37,226,16,142,1
26,54,230,160,174,164,16,39,1,14,23,0,254,18,140,24,0,
37
21076 DATA15,134,10,189,118,149,95,142,0,0,175,164,231
,162,32,75,175,164,125,126,51,39,5,122,126,51,32,12,13
4
21077 DATA1,183,126,51,90,193,0,38,2,198,31,231,162,16
6,133,39,2,141,70,134,10,167,133,48,136,32,166,133,39,
2
21078 DATA141,57,134,240,167,133,48,136,32,166,133,39,
2,141,44,134,240,167,133,48,136,32,166,133,39,2,141,31
,134
21079 DATA10,167,133,49,35,16,140,126,63,37,141,125,12
6,50,39,13,198,5,247,125,250,189,112,225,122,126,50,38
,238
21080 DATA57,241,125,232,37,57,241,125,233,34,52,182,1
25,234,198,32,61,195,6,0,191,125,224,16,179,125,224,34
,34
21081 DATA195,1,64,16,179,125,224,37,25,125,126,1,38,1
3,134,1,183,126,1,125,126,2,39,3,122,126,2,141,46,109
21082 DATA225,22,255,167,166,133,129,15,38,34,134,5,18
3,126,50,198,10,247,125,250,189,112,49,122,126,50,38,2
43,127
21083 DATA125,254,127,125,255,127,126,0,141,6,109,225,
22,255,127,57,230,160,174,160,111,164,111,162,111,162,
111
21084 DATA133,48,136,32,111,133,48,136,32,111,133,48,1
36,32,126,118,133,125,126,52,39,4,48,136,32,57,48,136,
224
21085 DATA57,49,63,22,255,80,134,31,183,126,54,142,11,
32,191,126,55,134,26,183,126,57,142,13,32,191,126,58,1
34
21086 DATA31,183,126,60,142,15,32,191,126,61,127,125,2
52,189,109,219,189,113,212,189,110,61,189,110,27,204,1
24,236
21087 DATA253,125,248,189,109,178,189,110,207,189,112,
103,189,116,100,204,126,35,253,126,44,204,6,8,253,126,
40,204
21088 DATA6,0,253,126,42,189,112,2,204,126,2,253,126,4
4,204,6,14,253,126,40,253,126,42,189,112,2,189,114,254
,125
21089 DATA126,1,39,39,134,5,183,126,46,189,113,212,189
,114,138,189,114,95,198,1,189,110,193,189,114,138,122,
126
21090 DATA46,38,240,189,113,243,189,114,6,125,126,2,38
,1,57,16,142,126,55,16,140,126,63,44,56,109,160,38,7,1
09
21091 DATA161,38,3,32,240,57,142,1,244,48,31,140,0,0,3
8,249,141,3,22,255,104,122,126,53,34,13,125,126,52,39
21092 DATA9,127,126,52,134,25,183,126,53,57,134,1,183,
126,52,134,31,183,126,53,57,127,1,18,126,115,60,111,13
3
21093 DATA52,118,198,200,215,140,198,1,189,186,160,53,
118,57,183,126,50,52,118,198,0,215,140,198,8,189,186,1
60,53,118,57
22000 FOR I=32080 TO 32199:POKE I,0:NEXT
30000 PCLS
30010 DRAW"SB;CB;BMO,0;R4D3NR3U3F5L7U3L2U3"
30020 PAINT(3,3),7,8
30030 PAINT(12,5),8,8
30040 POKE32220,0:POKE32221,4:POKE32222,0:POKE32223,10
30050 DEF USRO=&H6D4C
30060 A=USRO(&H6D4C)
30070 PCLS:DRAW"54;CB;BMO,8;R1E1R1E1R1E1R2E1R2NU1R1NU1
R2F1R2F1R1F1R1R1L161L161L161L261NF1L5NG1H1L2H1L1H1L1
H1"
30080 PAINT(12,8),6,8
30090 POKE32220,0:POKE32221,4:POKE32222,0:POKE32223,14
30100 DEFUSRO=&H6D6E
30110 A=USRO(&H6D6E)
30120 FORI=31780TO31859
30130 READ A:POKE I,A
30140 NEXT
30141 DATA0,255,195,195,195,195,195,255
30142 DATA1,48,48,48,48,48,48,48
30143 DATA2,255,3,3,255,192,192,255
30144 DATA3,255,3,3,255,3,3,255
30145 DATA4,195,195,195,255,3,3,3
30146 DATA5,255,192,192,255,3,3,255
30147 DATA6,192,192,192,255,195,195,255
30148 DATA7,255,3,3,3,3,3,3
30149 DATA8,255,195,195,255,195,195,255
30150 DATA9,255,195,195,255,3,3,3
30160 RETURN

```

Program 2.

```

0 REM FOR "M" READ CTRL + KEY 3
10 GOT030000
100 POKE36877,245
110 B=INT(PN/256)
120 POKE0,PN-B*256:POKE1,B
130 SYS6445
140 IFA=11THENPN=PN-1:GOTO155
150 PN=PN+1
155 B=INT(PN/256)
156 POKE0,PN-B*256:POKE1,B
160 SYS6625
170 IFPEEK(2)<>255THEN320
180 GOSUB1800
190 IFLF#=""THEN20000
200 LF#←LEFT$(LF#,LEN(LF#)-2):POKE36878,8
210 PN=4545
230 PRINT"SCORE LIFE"
240 PRINT"PS"
250 PRINT"SC"
260 PRINT"LF#"
290 IFSG=1THENGOSUB2000
300 IFSG=2THENGOSUB3000
310 GOSUB4000
320 B=INT(PN/256)
330 POKE0,PN-B*256:POKE1,B:POKE2,10
340 IFA=11THENSYS6593:RETURN
350 SYS6609:RETURN
400 POKEP1,32
410 P1=P1+22
420 IFP1>4293THEN490
430 IFD1=1THEN450
440 IFPEEK(P1+1)=32ANDRND(1)>0.8THENP1=P1+1:GOTO460
450 IFPEEK(P1-1)=32ANDRND(1)>0.8THENP1=P1-1
460 POKEP1,109
470 POKEP1+CO,C1-8
480 RETURN
490 IFPEEK(P1+1)<>32THENP1=P1-1
500 B=INT(P1/256)
510 POKE0,P1-B*256:POKE1,B:POKE2,C1
520 SYS6497
530 S1=2
540 RETURN
600 B=INT(P1/256)
610 POKE0,P1-B*256:POKE1,B
620 SYS6561
630 P1=P1+22
640 IFP1>4425THEN720
650 IFD1=1THEN670
660 IFPEEK(P1+2)=32ANDRND(1)>0.8THENP1=P1+1:GOTO680
670 IFPEEK(P1-1)=32ANDRND(1)>0.8THENP1=P1-1
680 B=INT(P1/256)
690 POKE0,P1-B*256:POKE1,B:POKE2,C1
700 SYS6497
710 RETURN
720 IFPEEK(P1+2)<>32THENP1=P1-1
730 B=INT(P1/256)
740 POKE0,P1-B*256:POKE1,B:POKE2,C1
750 SYS6429
760 S1=3
770 RETURN
800 B=INT(P1/256)
810 POKE0,P1-B*256:POKE1,B
820 SYS6445
830 P1=P1+44
840 IFP1>4557THEN920
850 IFD1=1THEN870
860 IFPEEK(P1+3)=32ANDRND(1)>0.8THENP1=P1+1:GOTO880
870 IFPEEK(P1-1)=32ANDRND(1)>0.8THENP1=P1-1
880 B=INT(P1/256)
890 POKE0,P1-B*256:POKE1,B:POKE2,C1
900 SYS6429
910 RETURN
920 PS=PS+1:SC=SC+10:CS=CS+1
930 PRINT"PS:PRINT"SC"
940 C1=9
950 IFRND(1)>0.7THENC1=11
960 IFRND(1)>0.7THENC1=15
970 P1=4216
980 IFRND(1)>0.5THENP1=4217
990 D1=0
1000 IFRND(1)>0.5THEND1=1
1010 S1=1
1020 RETURN
1100 POKEP2,32
1110 P2=P2+22
1120 IFP2>4293THEN1190
1130 IFD2=1THEN1150
1140 IFPEEK(P2+1)=32ANDRND(1)>0.8THENP2=P2+1:
GOTO1160
1150 IFPEEK(P2-1)=32ANDRND(1)>0.8THENP2=P2-1
1160 POKEP2,109

```

(continued on opposite page)

COMPETE IN a short, cross-country style race — a little like the arcade game Turbo. You start off on a road leading to a city. By overtaking four cars the driving scene changes to the countryside on the outskirts of the city and a mountain range appears in the distance. By overtaking another four cars you will arrive back at the start line ready for another lap.

The program comes in two parts; program 1 must always be loaded and run before loading program 2 — the actual game. It is advisable to save both parts before running.

To help you with the Data statements the program goes through them in three separate sections and performs a check after each.

The following notes will help you type in some of the lines. The brackets should not be typed: they show you in what form the characters should be typed in, e.g., the line: PRINT "(CSR HOME)(SHIFT VUA)(3 SPACES)(COMMODORE NSR)" means type the Cursor Home key, then type the characters VUA with Shift held down, then type three spaces, and finally type the characters NSR with the Commodore key held down. Note: spaces must be typed without shift unless (SHIFT SPACE) is written.

```

2000 POKE 646,9
2010 PRINT "(CSR HOME)(2 CSR DOWNS)
(SHIFT VUV)(2 SPACES)(SHIFT SSTU)
(SPACE)(SHIFT SST)(SPACE)(SHIFT
UV)(SPACE)(SHIFT SSTUU)";
2020 PRINT "(SHIFT WWWWWWSSWWWSS
WWWWWSSWWW)";
2030 PRINT "(SHIFT WWWWWWSSWWWSS
WWWWWSSWWW)";
3010 PRINT "(CSR HOME)(2 CSR DOWNS)
(19 SPACES)(SHIFT XYZ)";
3020 PRINT "(15 SPACES)(SHIFT +)
(COMMODORE -)(SHIFT ↑)
(COMMODORE *) (SHIFT SPACE)
(COMMODORE K)";
3030 PRINT "(13 SPACES)(COMMODORE
IT@G+ME)(SHIFT E)(COMMODORE N)";
4000 PRINT "(CSR HOME)(CSR RED)(5 CSR
DOWNS)(8 CSR RIGHTS) (SHIFT
FC)(2SPACES)(SHIFT *P)";
4010 PRINT "(8 CSR RIGHTS)(SHIFT GD)(2
SPACES) (SHIFT AQ)";
4020 PRINT "(8 CSR RIGHTS)(SHIFT HE)
(2SPACES)(SHIFT BR)";
4030 PRINT "(7 CSR RIGHTS)(SHIFT IC)
(4 SPACES)(SHIFT *M)";
4040 PRINT "(7CSR RIGHTS)(SHIFT JD)
(4 SPACES)(SHIFT AN)";
4050 PRINT "(6 CSR RIGHTS)(SHIFT FKE)
(4 SPACES)(SHIFT BOP)";
4060 PRINT "(6 CSR RIGHTS)(SHIFT GC)
(6 SPACES)(SHIFT *Q)";
4070 PRINT "(6 CSR RIGHTS)(SHIFT HD)
(6 SPACES)(SHIFT AR)";
4080 PRINT "(5 CSR RIGHTS)(SHIFT ILE)
(6 SPACES)(SHIFT BLM)";
4090 PRINT "(5 CSR RIGHTS)(SHIFT JC)
(8 SPACES) (SHIFT *N)";
4100 PRINT "(4 CSR RIGHTS)(SHIFT FKD)
(8 SPACES)(SHIFT AOP)";
4110 PRINT "(4 CSR RIGHTS)(SHIFT GLE)

```

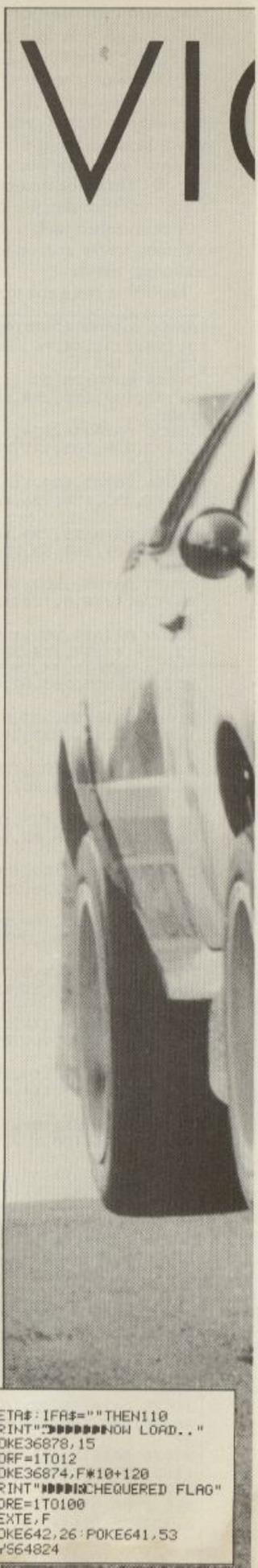
(continued on page 104)

Program 1.

```

10 POKE36879,8
20 PRINT"CHEQUERED FLAG"
30 PRINT"BY NEIL KIRK ***"
40 PRINT"PROGRAM BEFORE PLAYING"
50 PRINT"+++ CHEQUERED FLAG +++"
60 PRINT"IT A KEY!"
70 PRINT"IT A KEY!"
80 PRINT"IT A KEY!"
90 PRINT"IT A KEY!"
100 POKE198,0
110 GETA$:IFA#=""THEN110
120 PRINT"NOW LOAD.."
130 POKE36878,15
140 FORF=1TO12
150 POKE36874,F*10+120
160 PRINT"CHEQUERED FLAG"
170 FORF=1TO100
180 NEXTF
190 POKE642,26:POKE641,53
200 SYS64824

```



# C RALLY 20

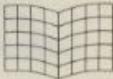
For Vic-20 owners with 16K and the urge to live life in the fast lane. Neil Kirk hands you the wheel.



(continued from opposite page)

```
1170 POKEP2+CO,C2-8
1180 RETURN
1190 IFPEEK(P2+1)<>32THENP2=P2-1
1200 B=INT(P2/256)
1210 POKE0,P2-B*256:POKE1,B:POKE2,C2
1220 SYS6497
1230 S2=2
1240 RETURN
1300 B=INT(P2/256)
1310 POKE0,P2-B*256:POKE1,B
1320 SYS6561
1330 P2=P2+22
1340 IFP2>4425THEN1420
1350 IFD2=1THEN1370
1360 IFPEEK(P2+2)=32ANDRND(1)>0.8THENP2=P2+1:GOTO1380
1370 IFPEEK(P2-1)=32ANDRND(1)>0.8THENP2=P2-1
1380 B=INT(P2/256)
1390 POKE0,P2-B*256:POKE1,B:POKE2,C2
1400 SYS6497
1410 RETURN
```

(listing continued on page 104)

<b>GILSOFT</b>	<b>COMPUTASOLVE LTD.</b>	<b>KEYSOFT</b>	
			
<b>INTERFACE PUBLICATIONS</b> 	 <b>SUNSHINE</b>	<b>SOFTEACH</b>	<b>Hilderbay</b>
<b>EAST LONDON ROBOTICS</b>		<b>COMPUSOUND</b>	<b>Melbourne</b>
 <b>CDS Micro Systems</b>	<b>Heinemann Educational Books</b> 	 <b>THE GAME LORDS</b>	 <b>CAMBRIDGE COMPUTING</b>
 <b>Elephant Software.</b>	 <b>FOX ELECTRONICS</b>	<b>AGF</b>	<b>FAL-SOFT COMPUTERS</b>

# Look at some of the if you don't visit the

Are you missing out on everything that's right for your ZX machine?  
Do you want to see the latest developments in hardware, software, books, peripherals and gizmos?

Then there's only one venue that's a must for you.  
The 10th ZX MICROFAIR at ALLY PALLY on the 4th February 1984!

**GET YOUR  
ADVANCE TICKETS  
NOW!**

## **10th ZX Microfair. Ally Pally February 4th.**

**Saturday 4th February 10am-6pm  
ALEXANDRA PAVILION, ALEXANDRA PARK, WOOD GREEN, LONDON N22**

**Advance Tickets from: Mike Johnston, 71 Park Lane, Tottenham, London N17 0HG.  
Prices: Adults £1 Kids (under 14) 50p. Parties of 10 or more at 10% discount!  
Please make cheques payable to ZX MICROFAIR and enclose S.A.E.**

**Prices at the door: Adults £1.25, Kids 60p**

**Exhibitors — phone Mike Johnston on 01-801 9172 for details!**

PICTURESQUE  
PICTURESQUE  
PICTURESQUE

**JRS SOFTWARE**

**IVYSOFT**

**HILTON  
COMPUTER  
SERVICES**

**CALPAC**

**CS**

**HISOFT**

**sinclair**

**Crystal**

**House**

**CRL**

**Computers of  
Wigmore St**

**Transform Ltd.**

**C.C.S.**

**BUFFER  
MICRO SHOP**

**BASICARE  
MICRO  
SYSTEM**

**Print'n'plotter  
Products**

**LOTHLORIEN**  
*the mind stretcher*

**PHIPPS  
ASSOCIATES**

**MICROSPHERE**

**HAVEN  
HARDWARE**

**SPECTADRAW**

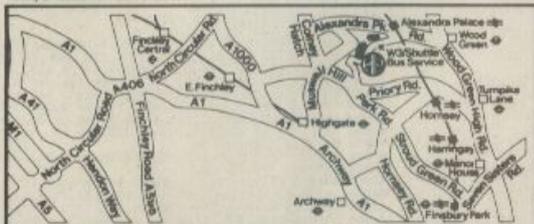
**ANIROG**

# things you'll miss next ZX Microfair.

There's hundreds of exhibitions, lots of bargains, and usual friendly atmosphere with a Bring-and-Buy Sale, User Groups, Refreshment areas, and bars!

All in all a good day out... and a good chance to see everything concerned with Sinclair Machines!

**By Road**  
Follow signs from the A1 (Link with M1 and North Circular). Plenty of parking space available!  
Variety of routes from Central London.



**By London Transport**  
Underground: Victoria Line from Victoria (also Oxford Circus, Kings Cross, St Pancras) to Highbury and Islington — change (cross platform) to BR Suburban Service to Alexandra Palace — free shuttle bus or 5 minute walk from there!

Alternative: Piccadilly Line (from Heathrow etc) to Finsbury Park or Wood Green — Link with W3 bus service to the fair.



**By British Rail**  
From London (Kings Cross or Moorgate) — about every 10 minutes to Alexandra Palace station — free shuttle bus or short walk from there!  
From any part of the U.K. enquire from Kings Cross Travel Centre, London N1 9AP (phone 01-278 2477) about special day trips to the ZX MICROFAIR!



**10<sup>th</sup>**  
**ZX MICROFAIR**  
**ALEXANDRA PALACE**  
**FEBRUARY 4th 1984**



(continued from page 101)

```

(8 SPACES)(SHIFT BLQ)
4120 PRINT "(4 CSR R GHTS)(SHIFT HC)
(10 SPACES)(SHIFT "R")
4130 PRINT "(3 CSR R GHTS)(SHIFT ILD)
(10 SPACES)(SHIFT ALM)
4140 PRINT "(3 CSR R GHTS)(SHIFT JLE)
(10 SPACES)(SHIFT BLN)
4150 PRINT "(2 CSR R GHTS)(SHIFT FKC)
(12 SPACES)(SHIFT "OP")
4160 PRINT "(2 CSR R GHTS)(SHIFT GLD)
(12 SPACES)(SHIFT ALG)
4170 PRINT "(2 CSR R GHTS)(SHIFT HLE)
(12 SPACES)(SHIFT BLR)";

```

(listing continued from page 101)

```

1420 IFPEEK(P2+3)=32ANDNDND(1)>0.8THENP2=P2+1 GOT01580
1430 B=INT(P2/256)
1440 POKE0,P2-B*256:POKE1,B:POKE2,C2
1450 SYS6429
1460 S2=3
1470 RETURN
1500 B=INT(P2/256)
1510 POKE0,P2-B*256:POKE1,B
1520 SYS6445
1530 P2=P2+44
1540 IFP2=40377THENJ20
1550 IFD2=1THENI570
1560 IFPEEK(P2+3)=32ANDNDND(1)>0.8THENP2=P2+1 GOT01580
1570 IFPEEK(P2+1)=32ANDNDND(1)>0.8THENP2=P2-1
1580 B=INT(P2/256)
1590 POKE0,P2-B*256:POKE1,B:POKE2,C2
1600 SYS6429
1610 RETURN
1620 P5=P5+1 SC=SC+10:CS=CS+1
1630 POKE0,P5-B*256:POKE1,B
1640 SYS6444
1650 [FRND(1)>0.7THENC2=1]
1660 [FRND(1)>0.7THENC2=15]
1670 P2=4216
1680 [FRND(1)>0.5THENP2=4217]
1690 S2=8
1700 [FRND(1)>0.5THENC2=1]
1710 S2=1
1720 RETURN
1800 B=INT(PN/256)
1810 POKE0,PN-B*256:POKE1,B
1820 SYS6444
1830 POKE36874,0:POKE36877,180:POKE36878,15
1840 POKEPN+23,141:POKEPN+23+CD,2
1850 FORP=1 TO400:HEXTF
1860 POKEPN,142:POKEPN+CD,10
1870 POKEPN+1,143:POKEPN+1+CD,10
1880 POKEPN+2,144:POKEPN+2+CD,10
1890 POKEPN+22,145:POKEPN+22+CD,10
1900 POKEPN+23,146:POKEPN+23+CD,10
1910 POKEPN+24,147:POKEPN+24+CD,10
1920 POKEPN+44,140:POKEPN+44+CD,10
1930 POKEPN+45,149:POKEPN+45+CD,10
1940 POKEPN+46,150:POKEPN+46+CD,10
1950 POKE36877,220
1960 FORL=1 TO507STEP-1:POKE36878,L
1970 FORM=1 TO1000:HEXTF,L
1980 POKE36877,150:POKE36878,0
1990 FL=1 GOT015000
2000 POKE46,9
2010 PRINT"*****";
2020 PRINT"00000000000000000000";
2030 PRINT"00000000000000000000";
2040 RETURN
3000 POKE46,9
3010 PRINT"*****";
3020 PRINT"*****";
3030 PRINT"*****";
3040 RETURN
4000 PRINT"*****";
4010 PRINT"*****";
4020 PRINT"*****";
4030 PRINT"*****";
4040 PRINT"*****";
4050 PRINT"*****";
4060 PRINT"*****";
4070 PRINT"*****";
4080 PRINT"*****";
4090 PRINT"*****";
4100 PRINT"*****";
4110 PRINT"*****";
4120 PRINT"*****";
4130 PRINT"*****";
4140 PRINT"*****";
4150 PRINT"*****";
4160 PRINT"*****";
4170 PRINT"*****";
4180 RETURN
6000 A=PEEK(197)
6010 IFP=110R=12THENG05B100:GOT06050
6020 POKE36877,150:B=INT(PN/256)
6030 POKE0,PN-B*256:POKE1,B:POKE2,10
6040 SYS6429
6050 GNS1G05SUB400:600,600
6060 IFN0THENNNH=1:G0T6080
6070 GNS2G05SUB100:1300,1500
6080 B=INT(PN/256)
6090 POKE0,PN-B*256:POKE1,B
6092 SYS6625
6090 IFPEEK(2)<0.255THEN6300
6100 G05UB1000
6110 IFL#="" THENI2000
6120 IFL#="EFT9(LF#):LE(LF#):2":POKE36878,B
6130 PH=4545
6150 PRINT"*****SCORERS SCORE LIFE"
6160 PRINT"*****";
6170 PRINT"*****";
6180 PRINT"*****";
6190 PRINT"*****";
6210 IFS0=1THENG05SUB200
6220 IFS0=2THENG05SUB300
6230 G05UB4000
6300 IFC5CORH=H6000
6310 SQ=SQ+1:CS=0
6320 IFS0=2THENG05SUB300:G0T60800
6330 CR=CR+2:SC=SC+100
6340 G0T014000
10000 POKE36878,0:POKE190,0
10010 PRINT"*****";
10020 PRINT"*****";
10030 PRINT"*****";
10040 PRINT"*****";
10050 PRINT"*****";
10060 PRINT"*****";
10070 PRINT"*****";
10080 PRINT"*****";
10090 PRINT"*****";
10100 PRINT"*****";
10110 PRINT"*****";
10120 SC=0:FL=0
10130 PS=0
10140 CR=4
10150 CS=0
10160 P1#=""

```

```

10170 P2#=""
10180 FORF=1 TO7
10190 "ORGO"TOC
10200 "RINT"R",MID$(P1#,F,1):LEFT$(P2#,C):"*****
"HEQUERED FLAG"
10210 GETR:IFR#="" THENI0240
10220 HEXTF,0
10230 G0T01010
10240 IFR#="" THENI5000
10250 IFR#="" THENI2000
10260 POKE36879,27
10270 POKE36879,192
10280 POKE50,0
10290 PRINT"*****EVEI":CHR$(9)
10300 END
12000 POKE36879,42
12010 PRINT"*****HEQUERED FLAG"
12020 G0T01010
12030 PRINT"THIS IS A DRIVING GAME"
12040 PRINT"WHERE YOU MUST SCORE"
12050 PRINT"AS MANY POINTS AS"
12060 PRINT"POSSIBLE BY OVERTAKING"
12070 PRINT"MOVES. EACH CAR SCORES"
12080 PRINT"100 POINTS."
12090 GETR:IFR#="" THENI2000
12110 PRINT"MOV PASSING A CERTAIN"
12120 PRINT"NUMBER OF CARS (4) THE"
12130 PRINT"DRIVING SCENE CHANGES"
12140 PRINT"TO THE SECOND SCENE"
12150 PRINT"YOU WILL ARRIVE BACK"
12160 PRINT"AT THE START LINE."
12170 PRINT"YOU RECEIVE 100 BONUS"
12180 PRINT"POINTS AND GET YOUR"
12190 PRINT"MOVES BACK."
12200 PRINT"*****THEI A KEV!K"
12210 GETR:IFR#="" THENI2210
12220 PRINT"THE GAME NOW BECOMES"
12240 PRINT"MORE DIFFICULT AS YOU"
12250 PRINT"MOVE TO THE MORE CARS"
12260 PRINT"TO MOVE INTO THE NEXT"
12270 PRINT"SCENE, 2 EXTRA CARS"
12275 PRINT"WERE EXTENDED FLAV"
12280 PRINT"THE GAME ENDS WHEN"
12290 PRINT"YOU HAVE CROSSED THREE"
12300 PRINT"TIMES AND LOST ALL OF"
12310 PRINT"YOUR LIVES."
12315 PRINT"*****THEI A KEV!K"
12316 GETR:IFR#="" THENI2316
12317 PRINT
12320 PRINT"THE TOP OF THE SCREEN"
12330 PRINT"SHOWS"
12340 PRINT"MOVES YOU HAVE PASSED"
12350 PRINT"YOUR PRESENT SCORE"
12370 PRINT"YOUR REMAINING LIVES"
12380 PRINT"*****CONTROLS"
12390 PRINT"Y" LEFT
12400 PRINT"N" RIGHT
12410 PRINT"*****THEI A KEV!K"
12420 GETR:IFR#="" THENI2420
12430 G0T010000
14000 PRINT" ( 44 SPACES )"
14010 POKE36877,0:POKE36874,0:POKE36878,15
14020 FORF=1 TO10
14030 PRINT"*****EXTENDED PLAY"
14040 POKE36878,240
14050 FORI=1 TO50:HEXTF
14060 PRINT"*****"
14070 POKE36878,0
14080 FORI=1 TO50:HEXTF
14090 FL=0
15000 PH=4545
15010 S1="S2"
15020 P1=216:IFRND(1)>0.7THENC1=4217
15030 P2=4217:IFRND(1)>0.7THENC2=4217
15040 D1=0:IFRND(1)>0.7THEND1=1
15050 D2=0:IFRND(1)>0.7THEND2=1
15060 C1=9:IFRND(1)>0.7THENC1=11
15070 IFRND(1)>0.7THENC1=15
15080 C2=9:IFRND(1)>0.7THENC2=11
15090 IFRND(1)>0.7THENC2=15
15090 N=6
15100 IFF1=1THENPOKE36874,210:RETURN
15110 S0="LF#""
15120 POKE36879,91
15130 POKE36878,15
15140 PRINT"*****HEQUERED FLAG"
15150 PRINT"*****";
15160 PRINT"*****PREPARE TO START"
15170 G05UB4000
15180 PRINT"*****";
15190 FORF=1 TO8:PRINT"*****";HEXTF
15200 POKE0,193:POKE1,17:POKE2,10:SYS6429
15210 POKE38161,10:G05UB16000
15220 POKE38161,9
15230 POKE38162,11:G05UB16000
15240 POKE38162,9
15250 POKE38163,15:G05UB16000
15260 POKE38163,9
15270 POKE38164,13
15280 POKE38167,245
15290 FORF=1 TO350:HEXTF
15300 PRINT"*****SCORERS SCORE LIFE"
15310 PRINT"*****";
15320 PRINT"*****";
15330 PRINT"*****";
15360 G05UB2000
15370 G05UB4000
15380 POKE36877,150:POKE36874,210:POKE36878,0
15390 G0T010000
16000 POKE36875,230
16010 FORF=1 TO200:HEXTF
16020 POKE36875,0
16030 FORF=1 TO350:HEXTF
16040 RETURN
20000 POKE36877,0:POKE36874,0:PRINT"*****";
20010 PRINT"*****";
20020 PRINT"*****";
20030 FORF=1 TO10
20040 PRINT"*****";
20050 FORL=15 TO20STEP-1
20060 POKE36878,L
20070 POKE36874,L*2+10
20080 POKE36875,L*2+10
20090 POKE36878,L*2+10
20100 HEXTF,L
20110 POKE36878,15
20120 PRINT"*****";
20130 PRINT"*****";
20140 POKE36874,220
20150 POKE36875,220
20160 POKE36878,220
20170 FORF=1 TO700:HEXTF
20180 POKE36874,0
20190 POKE36874,0
20200 POKE36875,0
20210 POKE36878,0
20220 IFC5CORH=H5=SC
20230 G0T010000
30000 POKE36875,25
30010 PRINT"*****HEQUERED FLAG"
30020 PRINT"*****";
30030 PRINT"*****SETTING UP CHARACTERS"
30040 PRINT"*****PLEASE WAIT...";
30050 FORF=5120 TO5631
30060 POKEF,PEEK(F+27640)
30070 HEXTF
30080 FL=0
30090 FORF=5632 TO50591
30100 READ

```

```

30110 POKEF,A:PH=PH+1
30120 HEXTF
30130 IFR#="" THENPRINT"DATA ERROR, LINES...";
"40000-40440" GOT031000
30140 PH=0
30150 FORF=5992 TO6327
30160 READ
30170 POKEF,A:PH=PH+1
30180 HEXTF
30190 IFR#="" THENPRINT"DATA ERROR, LINES...";
"40450-40960" GOT031000
30200 PH=0
30210 FORF=6328 TO6703
30220 READ
30230 POKEF,A:PH=PH+1
30240 HEXTF
30250 IFR#="" THENPRINT"DATA ERROR, LINES...";
"40970-41220" GOT031000
30260 PH=0
30270 CD=32792
30280 POKE36878,0
30290 POKE36895,205
30300 POKE50,120
30310 PRINTCHR$(8)
30320 G0T010000
31000 POKE36879,27
31010 PRINT"*****EVEI":CHR$(9)
31020 END
40000 DATR255,255,255,127,127,127,63,63
40010 DATR63,31,31,31,15,15,15,15
40020 DATR7,3,3,3,3,1,1,1
40030 DATR255,255,255,254,254,254,252,252
40040 DATR252,249,249,249,240,240,246,246,224
40050 DATR224,224,192,192,192,120,120,120
40060 DATR0,0,0,0,1,1,1,1
40070 DATR3,7,7,7,15,15,31,31
40080 DATR1,63,63,127,127,127,255,255
40090 DATR15,31,31,31,7,7,7,7
40100 DATR15,31,31,31,63,63,127,127
40110 DATR127,127,255,255,255,255,255,255
40120 DATR255,255,255,255,255,255,255,255
40130 DATR128,128,138,138,152,152,224,224,224
40140 DATR240,240,246,246,252,252,252,254
40150 DATR254,254,255,255,255,255,255,255
40160 DATR0,0,0,138,138,120,120
40170 DATR192,224,224,224,240,240,240,240
40180 DATR248,252,252,254,254,254,255,255
40190 DATR170,187,187,187,170,170,187,187
40200 DATR128,128,128,128,138,138,138,138
40210 DATR42,38,38,38,38,38,38,38
40220 DATR0,0,0,170,170,170,170,170
40230 DATR170,170,170,170,170,170,170,170
40240 DATR0,0,0,10,10,42,42
40250 DATR0,0,170,170,130,170,171,170
40260 DATR0,0,128,168,168,250,254,191
40270 DATR0,0,0,2,10,42,42
40280 DATR0,0,19,170,169,165,149
40290 DATR0,0,170,170,187,86,90
40300 DATR8,2,10,170,170,171,171,255
40310 DATR170,171,175,191,254,250,250,234
40320 DATR170,174,175,175,171,171,171,171
40330 DATR191,175,171,234,250,250,254,254
40340 DATR0,0,2,10,42,42,171
40350 DATR0,18,170,171,179,191,255,255
40360 DATR174,190,254,254,250,250,234,234
40370 DATR149,85,90,170,170,175,191,255
40380 DATR106,171,175,191,255,254,254,250
40390 DATR255,255,255,234,170,169,169,165
40400 DATR234,178,189,189,149,85,85,85
40410 DATR170,106,90,90,86,86,85,85
40420 DATR255,255,191,191,191,175,175,111
40430 DATR255,195,165,153,153,165,195,129
40440 DATR255,255,235,235,235,235,255,255
40450 DATR219,255,219,254,219,255,219
40460 DATR2,62,62,62,62,2,10,5
40470 DATR128,188,188,188,188,188,168,168
40480 DATR40,34,24,250,207,243,240
40490 DATR0,0,136,143,170,243,207,15
40500 DATR0,62,63,49,63,63,63,0
40510 DATR40,40,170,170,170,170,170,170
40520 DATR0,252,252,12,252,252,0
40530 DATR0,2,2,10,10,40,40,40
40540 DATR170,170,170,0,0,40,40,170
40550 DATR128,128,160,150,40,40,40,40
40560 DATR252,252,254,194,195,252,252,252
40570 DATR170,170,170,170,255,255,60,0
40580 DATR63,63,131,131,195,63,63,63
40590 DATR48,60,63,51,60,63,15,0
40600 DATR0,48,170,170,170,170,170,170
40610 DATR0,0,192,240,60,204,252,252
40620 DATR0,2,2,10,10,40,232,240
40630 DATR170,170,170,0,0,40,40,170
40640 DATR60,148,128,160,160,40,56,60
40650 DATR252,252,206,154,243,252,60,12
40660 DATR170,170,170,170,255,255,60,0
40670 DATR255,131,179,255,63,15,0
40680 DATR0,0,3,15,60,51,63,63
40690 DATR40,40,170,170,170,170,170,170
40700 DATR12,68,252,204,60,252,240,192
40710 DATR0,50,2,10,10,40,40,60
40720 DATR170,170,170,0,0,40,40,170
40730 DATR8,128,128,160,160,40,43,47
40740 DATR252,240,194,206,255,252,240,152
40750 DATR170,170,170,170,255,255,60,0
40760 DATR63,63,179,131,287,63,60,48
40770 DATR2,60,24,30,12,10,17
40780 DATR3,0,0,0,0,48,12
40790 DATR8,192,128,128,128,128,32,47
40800 DATR8,3,12,48,32,32,108,128
40810 DATR0,2,2,0,0,3,12
40820 DATR42,42,170,170,170,170,236,34
40830 DATR60,168,128,128,152,40,15,0
40840 DATR0,0,0,0,0,0,0,0
40850 DATR128,128,128,128,192,0,0
40860 DATR128,192,48,12,0,0,0
40870 DATR160,0,165,0,133,87,24,165,1,185,132,133
40880 DATR88,138,145,0,165,2,145,87,232,200,138,145
40890 DATR8,145,0,232,24,152,185,200,169,138,145,0,165
40900 DATR145,0,230,145,200,165,0,24,152,105,200
40910 DATR2,145,87,232,200,138,145,0,165,2,145,87
40920 DATR232,200,138,145,0,165,2,145,87,232,24,152
40930 DATR105,20,169,138,145,0,165,2,145,87,232,200
40940 DATR138,145,0,165,2,145,87,232,200,138,145,0
40950 DATR145,2,145,87,96
40960 DATR72,138,72,152,72,162,114,32,104,24,104,160
40970 DATR104,170,104,96
40980 DATR72,138,72,152,72,162,32,160,0,138,145,0
40990 DATR200,145,0,200,145,0,24,152,105,20,169,138
41000 DATR145,0,230,145,200,165,0,24,152,105,200
41010 DATR160,138,145,0,200,145,0,200,145,0,184,160
41020 DATR104,170,104,96
41030 DATR72,138,72,152,72,162,160,160,0,132,17,17
41040 DATR72,24,165,1,185,132,133,68,138,145,0,165
41050 DATR145,0,232,200,138,145,0,165,2,145,87
41060 DATR32,24,152,105,21,168,138,145,0,185,2,145,87
41070 DATR72,232,200,138,145,0,165,2,145,87,104,160
41080 DATR160,170,104,96
41090 DATR72,138,72,152,72,162,32,160,0,138,145,0
41100 DATR72,138,72,152,72,162,32,160,0,138,145,0
41110 DATR145,0,104,168,104,170,104,96
41120 DATR72,138,72,152,72,162,132,32,104,24,104,160
41130 DATR104,170,104,96
41140 DATR72,138,72,152,72,162,129,32,104,24,104,160
41150 DATR104,170,104,96
41160 DATR72,138,72,152,72,162,255,160,0,132,17,17
41170 DATR0,201,32,240,14,201,114,240,10,201,123,240
41180 DATR0,201,132,240,2,134,2,200,177,0,201,32
41190 DATR240,14,201,15,240,10,201,124,240,5,201,400
41200 DATR240,2,134,2,250,177,0,201,32,240,14,201
41210 DATR146,240,10,201,125,240,6,201,134,240,2,134
41220 DATR2,104,168,104,170,104,96

```

# AGF

# PROGRAMMABLE JOYSTICK INTERFACE

for  
**Spectrum**  
or **ZX81**

MICRODRIVE  
COMPATIBLE



#### ABOUT OUR INTERFACE

The AGF Programmable Joystick Interface is a unique design offering the use of any Atari-compatible joystick with absolutely all software, whether it is cassette or ROM cartridge, with the Sinclair Spectrum or ZX81.

The hardware programmable interface requires no additional software and accurately replicates the keys of the computer in a manner which is responsive to absolutely ALL key reading methods, both BASIC and Machine Code.

The interface does not interfere with key operation and can therefore be used simultaneously with the keyboard.

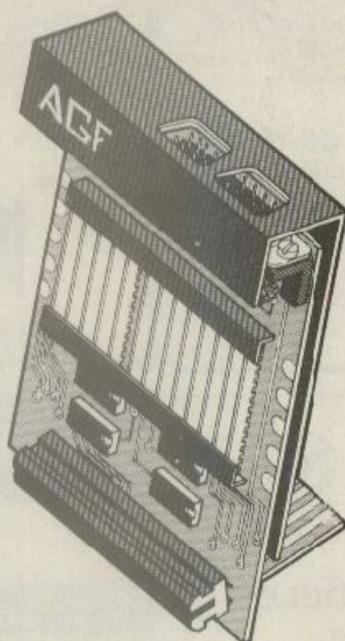
There is no need to remove the interface once fitted as the rear extension connector will accommodate further expansion, i.e. printers or RAM packs etc. This important feature avoids excessive wear to the expansion port.

The key replication principle pioneered by AGF means that your own programs can use eight directional joystick movement by utilising simple key reading BASIC.

Two joystick sockets are provided which share the same keys, for use with the majority of two player games. Several interfaces may be used on the same computer for multiple joystick applications.

The interface is programmed by a two digit code, which is looked up on a programming chart supplied, for each direction and firing button. The two numbers are then selected on a pair of leads which are clipped onto appropriately numbered strips on the interface.

Once configured this can be marked on a Quick Reference Programming Card for storing with the game. As the programming is *not* power dependent the interface retains the last configuration made and can be immediately used when next switched on.



#### KEY FEATURES

- \* Programmable design gives TOTAL software support.
- \* Accepts Atari, Competition Pro, Wico, Starfighter, Quick Shot, Le Stick etc.
- \* Rear extension connector for all other add-ons.
- \* Free demo program and instructions.

#### PACKAGE CONTENTS SUPPLIED

- Programmable Interface Module as illustrated, complete with clip-on programming leads.
- Self adhesive programming chart detailing how to define which key is simulated by UP, DOWN, LEFT, RIGHT, and FIRE. This can be fixed on to the case of your computer or if preferred the protective backing can be left on. The chart is made of a very durable reverse printed plastic and is extremely easy to read.
- One pack of ten Quick Reference Programming Cards for at-a-glance setting to your games requirements. The card allows you to mark the configuration in an easy to read fashion with space to record the software title and company name.
- Video Graffiti demonstration program which is written totally in BASIC to illustrate how all eight directions and fire can be read. This is also a useful high resolution drawing program.
- 12 months guarantee and full written instructions.

## JOYSTICKS

#### CONTROLLERS

FOR USE WITH OUR INTERFACE  
Module or VIC 20, Commodore 64,  
Atari VCS, Atari 400, Atari 800

If you require extra Joysticks for our  
original interface module mark order  
'OLD' Joysticks

ONLY £7.54 inc VAT + P&P

FROM: MR/MRS/MISS			
ADDRESS			
SEND C.W.O. (NO STAMP NEEDED) TO: A.G.F. HARDWARE, DEPT.YC,			
FREEPOST, BOGNOR REGIS, WEST SUSSEX, PO22 9BR			
QTY	ITEM	ITEM PRICE	TOTAL
	PROGRAMMABLE INTERFACE	33.95	
	JOYSTICK(S)	7.54	
	PACK(S) QUICK REFERENCE CARDS	1.00	
ONE	VIDEO GRAFFITI	FREE	
ZX81 <input type="checkbox"/> ZX SPECTRUM <input type="checkbox"/>		Please tick	
DEALER ENQUIRIES WELCOME		EXPORT PRICES ON APPLICATION	
		FINAL TOTAL	

...O.K. on all issue Spectrums...

# Blast off to ADVENTURE



Create and solve ADVENTURE programs on your Spectrum, Commodore 64, Dragon, Oric or BBC Micro.

## CREATING ADVENTURES ON YOUR ZX SPECTRUM -

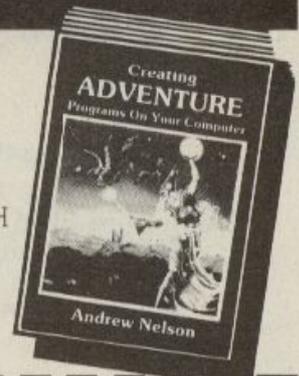
Peter Shaw and James Mortleman. Create and solve Adventure programs on the Spectrum with this exciting new book which includes five complete major programs, plus chapter after chapter of hints and tips to help you write your own programs. Chapter

headings include Creating Locations; Picking Things Up; Monsters; Adding Graphics; and Adding to the Vocabulary. Just £4.95 and you're up and away.

## CREATING ADVENTURE PROGRAMS ON YOUR COMPUTER -

Andrew Nelson. If your computer uses a version of Microsoft BASIC, then this book is for you. It contains three complete Adventure programs, along with extensive documentation to help you create and solve Adventures. Suitable for use with the Commodore 64, Dragon, Oric, BBC Micro, Sirius, IBM PC and

Apple, you'll find this book an easy-to-understand primer on Adventure creation. The full-length programs include WEREWOLVES AND WANDERER and THE AFTERMATH OF THE ASIMOVIAN DISASTER. This book is just £4.95



Interface Publications, 9-11 Kensington High Street, London W8 5NP.

Please send me the following books. I enclose £.....

- Creating ADVENTURES on your ZX Spectrum Shaw/Mortleman — 4.95  
 Creating ADVENTURE programs on your Computer Andrew Nelson — £4.95

Name: .....

Address: .....



Computer and book trade supplied by The Computer Bookshop, 30 Lincoln Road, Olton, Birmingham B27 6PA (021 707 7544, telex 334361)

NEW

The complete speech synthesis system

For use with Dragon 32 computer

## SPEECH SYNTHESIS MODULE for the Dragon 32 Computer

- Fully cased module plugs into cartridge port
- Unlimited vocabulary; based on dedicated speech processor utilising allophones
- Approx 200 words, and all numbers, pre-defined, for access by entering word or number required
- Complete control using 5 new BASIC commands
- Speech can easily be incorporated into existing BASIC programs
- Up to 40 words spoken from one command; speech can occur simultaneously with graphics
- £37.95 inclusive

Also available: SOUND EXTENSION MODULE for use with the Dragon computer — provides facility to play chords and harmonies — easy to use via BASIC — built-in sound effects — music and graphics can occur together without loss of speed — two I/O ports — User Manual — ONLY £34.95 inc.



ACCESS/Cheque/P.O. to:

## J.C.B. (MICROSYSTEMS)

29 Southbourne Road - Bournemouth - BH6 5AE

Tel: (0202) 423973

Write or phone for further details

# COMPUTER LINK

### DIL PLUGS (Headers) IDC

Pins	.....	90p
14	.....	£1.00
16	.....	£1.40
24	.....	£1.40
40	.....	£2.15

### IDC SHROUDED HEADERS WITH EJECTING LOCKING ARMS

Straight	Right	Angle
10-way	85p	90p
14-way	£1.00	£1.20
18-way	£1.25	£1.45
28-way	£1.40	£1.60
28-way	£1.70	£1.95
34-way	£2.00	£2.30
40-way	£2.15	£2.45
50-way	£2.30	£2.65
60-way	£2.45	£2.85

### IDC AMPHENOL PLUGS

24-way	.....	£5.00
38-way	.....	£5.20

### REBBIAN CABLE

	Grey Rainbow	
9-way	13p	24p
10-way	15p	28p
14-way	18p	32p
15-way	20p	35p
16-way	22p	40p
20-way	30p	50p
24-way	36p	60p
25-way	40p	65p
28-way	45p	70p
34-way	60p	80p
37-way	65p	85p
40-way	70p	90p
50-way	95p	£1.25
60-way	£1.10	£1.40
64-way	£1.15	£1.50

### IDC JUMPERS 36" SINGLE ENDED

Ways	2 Row	Card	Edge	PCB
10	£1.35	£1.85	£1.45	
14	£1.70			
16	£1.90	£2.45	£1.75	
20	£2.20	£2.95	£1.95	
28	£2.95	£3.85	£2.95	
34	£3.40	£4.35	£3.35	
40	£4.50	£5.85	£4.20	
50	£5.25	£6.85	£5.20	
60	£6.25	£8.25	£6.20	

### IDC SOCKET CONNECTORS

2 Row	.....	80p
14-way	.....	90p
16-way	.....	£1.00
20-way	.....	£1.20
26-way	.....	£1.45
34-way	.....	£1.60
40-way	.....	£1.85
50-way	.....	£2.00
60-way	.....	£2.25

### IDC CONNECTORS

	Male	Female
9-way	£2.70	£3.20
15-way	£3.20	£3.70
25-way	£3.90	£4.45
37-way	£5.90	£6.90

### EDGE CONNECTORS

23-way (ZX-81)	£1.85
28-way (Spectrum)	£2.10

### D CONNECTORS

(Solder Bucket)

	Male	Female
9-way	75p	£1.00
15-way	95p	£1.50
25-way	£1.50	£1.90
37-way	£2.40	£3.25

HOODS 95p

### DIL PLUG HEADERS

Jumper Leads Ribbon Cable

Single ended lead:

Length	14 pin	16 pin	24 pin	40 pin
24"	£1.35	£1.55	£2.30	£3.25

Double ended leads:

6"	£1.80	£2.00	£2.9	£3.25
12"	£1.90	£2.10	£3.10	£4.85
24"	£2.00	£2.25	£3.40	£5.30
36"	£2.25	£2.45	£3.65	£5.85

### COMPUTER LEADS

BBC Computer to Printer 2 metre lead £12.75  
 BBC or ORIC 7-pin DIN plug to 2 x 3.5mm Jack to 1 x 3.5mm Jack 1 metre lead £2.25  
 5-pin Domino plug ..... 50p  
 6-pin DIN plug ..... 50p  
 7-pin DIN plug ..... 50p

### ANY COMBINATION OF LEAD MADE TO ORDER

### CARD EDGE CONNECTORS IDC

Female	.....	£1.20
10-way	.....	£1.60
16-way	.....	£1.80
20-way	.....	£2.40
26-way	.....	£2.60
34-way	.....	£3.10
40-way	.....	£3.40
50-way	.....	£3.85
60-way	.....	£4.80

### IDC P.C.B. PLUGS

10-way	.....	85p
16-way	.....	£1.20
20-way	.....	£1.35
26-way	.....	£1.60
34-way	.....	£1.95
40-way	.....	£2.00
50-way	.....	£2.25
60-way	.....	£2.60

### IDC 25 WAY D CONN

Jumper Lead Ribbon Cable Assembly

18" long Single End Male	.....	£4.65
18" long Single End Female	.....	£5.10
36" long Double End Male	.....	£9.75
36" long Double End F/F	.....	£10.00
36" long Double End M/F	.....	£9.85

### ASSORTMENTS

Z80A CPU	.....	£2.95
Z80A CTC	.....	£2.55
Z80A DART	.....	£5.45
Z80A P10	.....	£2.70
ZN424E	.....	£1.25
ZN425E	.....	£3.40
ZN426E	.....	£2.95
ZN427E	.....	£5.95

### LIGHT PEN

Light Pen for ZX80/81. SPECTRUM enables you to produce high resolution drawings on your own TV screen. ONLY £14.75

NO HIDDEN EXTRAS - ALL PRICES FULLY INCLUSIVE - FREE P&P - C.W.O. COMPUTER LINK, Dept. Y.C.2, 8 Randworth Avenue, Hoddeston, Herts EN11 9NR Tel: 0952 466832/462371



# DRAW ROUTINE

Become a computer artist with Spencer Collyer's simple graphics program.

ZXDRAW IS A SET OF three graphics utilities for the ZX-81, allowing the user to draw straight lines, circles, and triangles. All three can Plot or Unplot the shapes onto the screen, and both circles and triangles may be filled or unfilled.

To enter ZXDRAW, create the first three Rem statements with lengths:

```
REM1 365 bytes
REM2 453 bytes
REM3 185 bytes
```

The enter the hexloader for Froggie — page 82 in this issue — and input the three machine-code blocks set out in tables 1, 2 and 3, with the starting addresses as shown.

Thirdly, enter the Sin-table creation program, table 2, and Run it.

Now delete all but the first three Rems, and then enter the Basic test program. Save the whole to tape before running as one error could cause a crash. Now Run the test program. If all is well a series of circles will be drawn across the centre of the screen, and then a row of small triangles will be drawn above them. Pressing any key will clear the screen and a series of unfilled triangles will be drawn, each one inside the last. Note that in some cases parts of the shapes are off-screen.

The routine requires five parameters to be Poked into memory before it is called. These

are, to draw a line from (a,b) to (c,d):  
 POKE 16514,a  
 POKE 16515,b  
 POKE 16516,c  
 POKE 16517,d  
 POKE 16417,PLOT(=1)/Unplot(=0) flag.  
 Thus, POKE 16417,1  
 will plot lines to the screen, while  
 POKE 16417,0  
 will unplot them.

Note that only 16514 and 16515 have their contents altered by this routine. Thus, if you wish to use one point as the end point for several lines, Poke 16417 with the plot/unplot flag, and then Poke 16516,16517 with the x and y co-ordinates of the point. Then you simply have to alter 16514,16515 each time. Note also that the routine must be called with  
 LET variable = USR 16527

as  
 RAND USR 16527  
 for some unexplained reason produces an error code 4. Type

RUN 10  
 to illustrate how the changing of just 16514,16515, instead of all five locations, still produces the same result. This should half-fill the screen with black in a triangle.

Now swap lines 20,30 with 50,60, and a very strange effect is produced, which illustrates that on exit from the routine, 16514, 16515 do not necessarily equal 16516,16517, otherwise a straight line from (0,0) to 63,0) would be drawn.

Now type RUN 90  
 to illustrate the patterns produced by alternatively plotting and unplotting a moving

line. Alternatively, add a step of 2 to line 90, change line 100 to

```
POKE 16417,1
```

and Run to see the interference pattern produced simply by plotting lines.

Further interesting results can be obtained by  
 RUN 170

Other ideas will doubtless come to mind, and you only have to type them in to see what they will do, remembering that within certain constraints, off-screen drawing is possible. These limits are actually from c.-100 to c.100 for both x and y.

Now on to the circle routine. This routine draws the best possible circle, or ellipse, given the limitations of the ZX-81 display. The routine requires six parameters to be Poked into memory. These are, with their respective addresses:

- 16444 Radius of circle, or width of ellipse
- 16445 Radius of circle, or height of ellipse
- 16446 x-co-ordinate of centre
- 16447 y-co-ordinate of centre.
- 16448 filled (=1)/Unfilled (=0) flag
- 16417 Plot (=1)/Unplot (=0) flag

Note that if a circle is wanted, both 16444 and 16445 should hold the value of the radius, which can range from 1 to c.100. However, for ellipses they may both hold different values in the given range. A value of 0 in either will give very weird results indeed.

It should also be noted that none of these values are altered during execution. The routine is called with:

```
LET variable = USR 17065.
```

Circles, especially unfilled ones, seem to work best when superimposed. For instance, try  
 RUN 290

which produces a shell-like pattern. Adding a step of 2 to line 320 can make it seem as though you are looking down a tunnel.

(continued on next page)

Table 1.

16527	-	3A8240473A8440A7	=	744
16535	-	9B3286403A834047	=	724
16543	-	3A8540A798328740	=	8223
16551	-	CB7F200CFE002004	=	664
16559	-	3E0018063E011802	=	181
16567	-	3EFF3289403A8640	=	6624
16575	-	CB7F200CFE002004	=	664
16583	-	3E0018063E011802	=	181
16591	-	3EFF3289403A8640	=	6619
16599	-	3E003288403A8640	=	671
16607	-	FE7F3803E0FF3C32	=	1043
16615	-	6C403A8740FE7F38	=	696
16623	-	03E0FF3032804047	=	682
16631	-	3A8C404F78418638	=	766
16639	-	12328C4078328040	=	647
16647	-	3E003288403A8640	=	673
16655	-	3288403A8C404FCB	=	767
16663	-	3F328E400C41C53A	=	661
16671	-	2140FE002004FEA0	=	609
16679	-	18023E98CD7941C1	=	627
16687	-	3A8D404F3A88C4081	=	735
16695	-	328E404F3A88C4081	=	684
16703	-	798A381DA79A328E	=	606
16711	-	403A88404F3A8240	=	653
16719	-	813282403A89404F	=	711
16727	-	3A83403132834013	=	651
16735	-	163A8A404F3A8240	=	613
16743	-	813282403A89404F	=	713
16751	-	3A83403132834013	=	643
16759	-	A5093238403A8240	=	768
16767	-	4F3A8340473E3FB9	=	713
16775	-	D83E2890D8473FB9	=	713
16783	-	CB2330023E04CB29	=	603
16791	-	3002CB07F5D0C941	=	676
16799	-	7ECB07FE103007CB	=	664
16807	-	0F3002E8F47119E	=	692
16815	-	0C3A304093FAB4C1	=	632
16823	-	F12FA01802F180FE	=	1145
16831	-	083302E8F2A0E40	=	667
16839	-	77C93E1790D8795E	=	1116
16847	-	1F4FC505AFCB10CB	=	1101
16855	-	10CB1068672929C1	=	717
16863	-	484709C14709ED48	=	737
16871	-	0C400923220E40C9	=	433

Table 2.

17055	-	21F541065AC5E5E5	=	1094
17073	-	3A3C405E2600E5D1	=	768
17091	-	471910FD3A3E4084	=	661
17099	-	3282403A3D40115A	=	534
17107	-	00E1196E2600E5D1	=	636
17115	-	471910FD3A3E4084	=	682
17113	-	328340CD9443E123	=	925
17121	-	C110CA0055AC5E5E5	=	1162
17129	-	3A3C405E2600E5D1	=	766
17137	-	471910FD3A3E4084	=	681
17145	-	3282403A3D40115A	=	669
17153	-	5A00A7ED528E2600	=	724
17151	-	ESD1471910FD3A3F	=	624
17159	-	4094328340CD9443	=	677
17177	-	E123C110C821F541	=	1012
17135	-	065AC5E5E53A3C40	=	933
17133	-	6E2600E5D1471910	=	698
17231	-	FD3A3E4094328240	=	629
17209	-	3A3D40115A00E119	=	540
17217	-	6E2600E5D1471910	=	698
17225	-	FD3A3F4094328340	=	631
17233	-	CD3443E123C110CA	=	1091
17241	-	065AC5E5E53A3C40	=	933
17249	-	6E2600E5D1471910	=	698
17257	-	FD3A3E4094328240	=	629
17255	-	3A3D40E1115A0007F	=	682
17273	-	ED528E2600E5D147	=	976
17281	-	1910FD3A3F408432	=	661
17289	-	8340CD9443E123C1	=	1063
17297	-	10C8C9ED4882403A	=	681
17305	-	4040FE001200A2A3E	=	629
17313	-	40228440CD8F40C9	=	907
17321	-	3A21440FE0120043E	=	506
17329	-	9B18023EA0CD7941	=	794
17337	-	C9 = 201	=	

Table 3.

17344	-	0603C52A3E402244	=	476
17352	-	402282402A404022	=	496
17360	-	4640223440CD8F40	=	776
17368	-	3A4F40FE0023763A	=	671
17376	-	8C40473A8E403248	=	661
17384	-	402A8C402249402A	=	523
17392	-	8840224B402A8A40	=	617
17400	-	224C402A3C402284	=	507
17408	-	40C52A4440228240	=	663
17416	-	CD8F40C13A4A404F	=	680
17424	-	3A4840813248404F	=	688
17432	-	3A494057798A381D	=	674
17440	-	A79A3248403A4540	=	704
17448	-	4F3A444081324440	=	680
17456	-	3A4C40F3A454081	=	597
17464	-	32454028163A4D40	=	426
17472	-	4F3A444081324440	=	680
17480	-	3A4440F3A454081	=	599
17488	-	32454028163A4D40	=	639
17496	-	224C402A3C402284	=	436
17504	-	40223E02A3C40222	=	424
17512	-	46402220402A4240	=	468
17520	-	223C40C105C2C243	=	811
17528	-	C9 = 201	=	

(continued from previous page)

Type RUN 380  
to see the advantages and disadvantages of the filled circle routine. It can be seen that, although the filled circle is drawn faster than the series of concentrically placed unfilled circles, and also has the central point filled in, it is less effective at producing a complete fill. Note that changing the For-Next loop in line 420, to FOR K = 0 TO 12 will simply result in the weird results already noted for a radius value of 0, and the central point will still not be filled in, in all likelihood.

Finally, on to the triangle routine. This will draw filled or unfilled triangles as well as possible, using the vertices Poked into memory. Assuming a triangle with vertices (a,b), (p,q), (x,y) the necessary Pokes are:

16444,a  
16445,b  
16446,p  
16447,q  
16448,x  
16449,y  
16463, Filled (=1)/Unfilled (=0) flag  
16417, Plot (=1)/Unplot (=0) flag.

The routine is then called with  
LET variable = USR 17344  
A point to note about the filled triangle routine is that it, in fact, draws the triangle three times, once from each vertex. This is to ensure a complete fill of the triangle, but it sometimes means that, although a triangle appears to be complete, in fact the routine has not finished drawing. To see what would result if the routine drew lines from only one vertex, type RUN 510  
And now for a warning, or two, actually.

First, the plot routine used by these routines, while being much faster than the Sinclair one, will bomb-out if you attempt to plot over writing, or one of the grey character. This is not recommended anyway, as you lose some of the information so carefully placed on the screen. Secondly, if you use Print after using the routines, do not use it on its own, but use Print At. This is because the plot routine resets the system variable DF\_CC, while leaving S\_POSN alone. Thus the computer might think that it is at (0,0), while in fact it could well be at (16,16). The end result of then using a bare Print statement is to overwrite one of the Newline characters. Result: the computer crashes. However, using, say,  
PRINT AT 0,0;  
even with nothing following the semi-colon, allows the computer to set its house in order.

Test program.

```

4:REM
5:GOTO 9500
10:POKE 16417,1
20:POKE 16510,63
30:POKE 16517,43
40:FOR K=0 TO 63
50:POKE 16514,K-K
60:POKE 16519,0
70:LET L=USR 16527
80:NEXT K
90:FOR K=0 TO 63
100:POKE 16417,0+(K/2)
110:POKE 16514,63-K
120:POKE 16519,43
130:POKE 16517,0
140:POKE 16510,0
150:LET L=USR 16527
160:NEXT K
  
```

```

165:STOP
170:FOR K=0 TO 44 STEP 2
180:POKE 16417,1
190:POKE 16514,63
200:POKE 16516,20
210:POKE 16516,0
220:POKE 16517,K
230:LET L=USR 16527
240:POKE 16514,0
250:POKE 16516,21
260:POKE 16516,63
270:POKE 16517,K
280:NEXT L=USR 16527
290:STOP
300:POKE 16417,1
310:POKE 16448,32
320:FOR K=1 TO 20
330:POKE 16444,K
340:POKE 16448,K
350:POKE 16448,K
360:LET L=USR 17065
370:NEXT K
380:STOP
390:POKE 16417,1
400:POKE 16448,0
  
```

```

410:POKE 16447,22
420:FOR K=1 TO 12
430:POKE 16444,K
440:POKE 16448,K
450:LET L=USR 17065
460:NEXT K
480:POKE 16448,1
490:POKE 16448,12
500:LET L=USR 17065
510:STOP
520:POKE 16444,0
530:POKE 16448,0
540:POKE 16447,43
550:POKE 16448,63
560:POKE 16449,20
570:POKE 16463,1
580:POKE 16417,1
590:LET L=USR 17344
600:STOP
610:POKE 16417,1
620:POKE 16444,10
630:POKE 16445,10
640:POKE 16447,22
650:POKE 16448,0
660:FOR K=69 TO -6
670:STEP -1
680:POKE 16446,K
  
```

```

690:POKE 16446,K
700:POKE 16447,1
710:POKE 16448,36
720:POKE 16447,34
730:POKE 16449,34
740:POKE 16463,1
750:FOR K=2 TO 63 STEP 4
760:POKE 16444,K
770:POKE 16448,K-2
780:POKE 16448,K+2
790:LET L=USR 17344
800:NEXT K
810:IF INKEY#="" THEN
820:GOTO 9710
830:CLS
840:POKE 16463,0
850:POKE 16444,32
860:FOR K=64 TO 4
870:STEP -4
880:POKE 16445,22+K
890:POKE 16447,22+K
900:POKE 16445,10
910:POKE 16449,22+K
920:POKE 16446,22+K
930:POKE 16448,22+K
940:POKE 16448,22+K
950:LET L=USR 17344
960:NEXT K
970:STOP
  
```

Arcade software for COMMODORE 64  
Action-packed 100% Machine Code



£6.95

Scale the ladders to get your Space Hammer but watch out for the homicidal "Meenies", the slightest touch and you'll be electrocuted. Once the Hammer is in your hands you can start to rid the world of the meenies, chase them up and down the ladders, through the escape door, lure them into the holes dug with your space hammer. When you trap one, rush over and BONK him on the head. But HURRY! If you loiter he will climb out, fill in the hole, and then home in on you, flashing in anger! To add to your problems your oxygen is running out and the meenies move faster the more you kill.

A superb arcade-style game with Hall of Fame. Uses one joystick.

LATES RELEASE — AVAILABLE NOW! CYBERMEN — £6.95

You, our hero, attempt to remove the platinum from the Cosmic space station inhabited by the Cybermen. Programmed to destroy all intruders, their duty is to protect the precious metal. For safe keeping this has been distributed throughout the random maze of corridors of which the space station consists. Not only do the Cybermen home in on you but you will be electrocuted if you touch the maze walls. Your phaser will kill the Cybermen but the corridors are also patrolled by the indestructible overseer who possesses the unearthly power of moving through walls.

All orders despatched by return first class post.  
Callers and Trade enquiries welcome.  
Dept PCW 13, 2 Glensdale Street, Leeds LS9 9JJ  
Telephone (0532) 480987

J. MORRISON (MICROS) LTD.  
Suppliers of quality machine code software since 1978

MICROS Vultures



£6.95

"There in the sky I saw the screaming alien birds. They had come to invade our planet. People ran in wild panic and desperation in some vain hope of escape. But there was no escape. The aliens swooped out of the sky killing anyone in their path. I alone decided to stay and fight, but then the eggs hatched and the true horror began."

A fast-moving Galaxian type arcade game with Hall of Fame and bonus lives. Uses one joystick.

SOFTWARE FOR THE DRAGON  
all machine code

**MAURICE MINOR — NEW**  
Out for a quiet drive in your Morris Minor when you inadvertently wander on to a race track and find yourself in the middle of a Grand Prix. To turn back against the other cars would be suicide. The only thing to do is grit your teeth, grip the wheel, put your foot down and make for the finishing line and safety. If you can avoid the crash barriers and oil slicks, drive fast enough to avoid being run over by Mario and Nelson behind you, then you can think about overtaking the cars in front. Can you make it before your car falls to pieces? Another superb Arcade style game with animated high resolution colour graphics and sound. Requires one joystick.  
A very fast action with accelerator, damage report, timer, six levels of skill and hall of fame.  
SUPPLIED ON CASSETTE ..... £6.95

**EDITOR/ASSEMBLER + DISASSEMBLER - MONITOR**  
Two pass global type. Supports labels of six characters. Directives: ORG, RMB, FCB, FDB, FCC, REM. Hexadecimal Arithmetic. Powerful debug Monitor includes 14 commands plus set break points, selection of useful sub-routines and Disassembler.  
Altogether a powerful program package with information for the serious user or interested beginner. Supplied on cassette.  
PREVIOUSLY SOLD SEPARATELY FOR OVER £40. Now substantial sales let us bring the price down to only ..... £19.95

Cheques/POs payable to  
J. MORRISON (MICROS) LTD.  
(Dept PCW10)  
2 Glensdale Street, Leeds LS9 9JJ  
ALL ORDERS DESPATCHED BY  
RETURN FIRST CLASS POST  
Callers and Trade enquiries welcome  
Tel: (0532) 480987  
AVAILABLE FROM SPECTRUM AND OTHER GOOD SOFTWARE DEALERS

**CRUSADER, NEW**  
A superb arcade-style game with animated high resolution colour graphics and sound. In quest of the Holy Grail you, our intrepid hero, have to overcome seven increasingly difficult stages to reach your goal. Scale the city walls to reach the inner sanctum, swinging across pits, crossing enchanted lakes while avoiding deadly scorpions and devilish dwarfs. None of our testers has yet managed to get past Screen 5. Will YOU be the one to reveal the secret of the final screen?  
SUPPLIED ON CASSETTE ..... £6.95

**DROIDS — (OPTIONAL JOYSTICK)**  
"Stop the Droids removing lead shields to release the bombs which will destroy the world. Very fast game. Excellent Hi-Res colour graphics and sound.  
SUPPLIED ON CASSETTE ..... £6.95

**CHESSE**  
Hi-Res display of board and pieces. 8 selectable levels of skill. CURSOR control, move selection (No numbers/letters to enter). Supports CASTLING and EN PASSANT.  
SUPPLIED ON CASSETTE ..... £7.95

**VULTURES — (uses one joystick)**  
FAST MOVING GALAXIAN TYPE GAME in full colour with Hi-Res graphics and sound. A flock of vultures guard their eggs. As they swoop towards you try to kill them: but watch out! Just when you think you have killed them all, the eggs hatch.  
SUPPLIED ON CASSETTE ..... £6.95

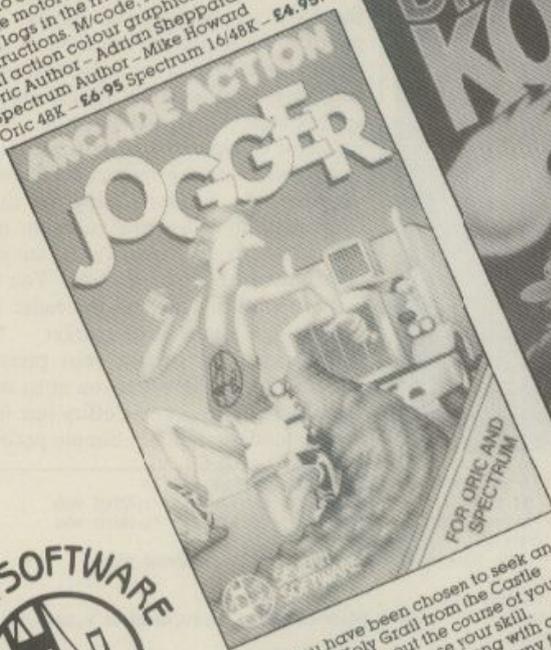
**BONKA**  
ADDICTIVE Arcade style game in full colour. Climb the ladders and dig holes to trap the "Meenies" before they kill you. 4 selectable speeds and choice of 1 to 9 Meenies to start. NO JOYSTICKS NEEDED.  
SUPPLIED ON CASSETTE ..... £7.95

J. MORRISON (MICROS)

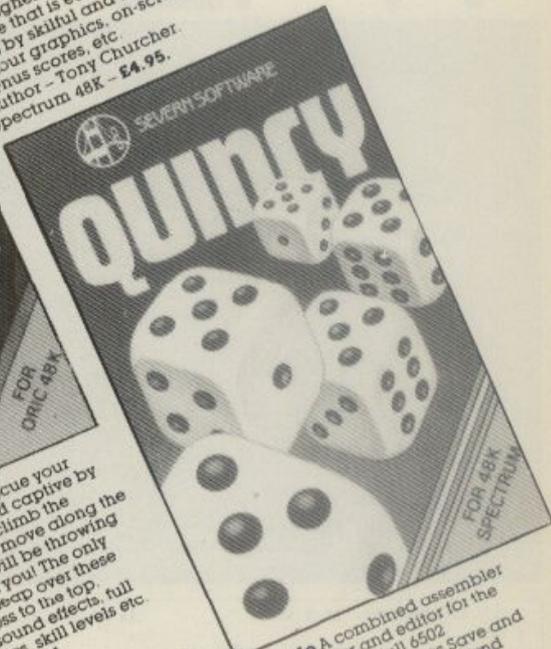
# The REAL Challenge!

## For your ORIC or SPECTRUM

**Jogger** Guide your joggers across a 4-lane motorway and crocodiles infested the gap in the fence. Each time a jogger is safely home the lories and cars have to encounter more crocodiles on the motorway but fewer crocodiles and logs in the river. Full on-screen instructions. M/code, sound effects and full action colour graphics.  
 Oric Author - Adrian Sheppard  
 Spectrum Author - Mike Howard  
 Oric 48K - £6.95 Spectrum 16/48K - £4.95.

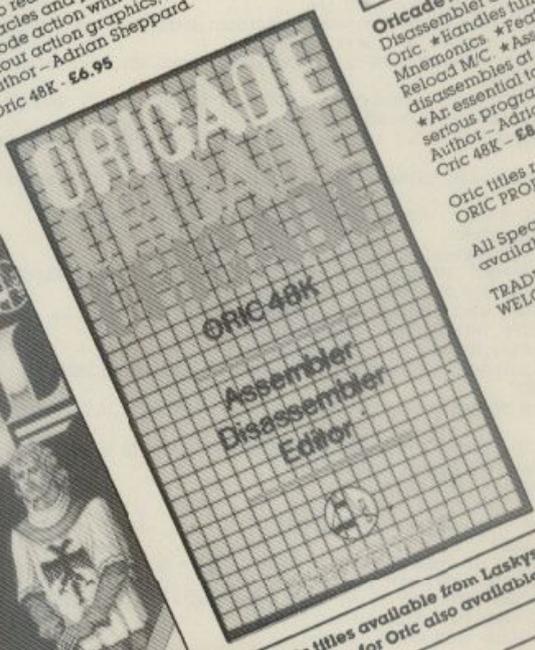


**Quincy** A superb dice game for 2 to 6 players. 3 throws per go to try and score points by obtaining certain combinations. I.e. 3 of a kind, a run, pairs etc. 13 go's to complete a game. The highest score is the winner! It's a game that is easy to learn but can be won by skilful and thoughtful play. Full colour graphics, on-screen instructions, bonus scores, etc.  
 Author - Tony Churcher  
 Spectrum 48K - £4.95.



**Dinky Kong** Attempt to rescue your lovely girlfriend who is held captive by the angry gorilla. As you climb the connecting ladders and move along the gangways, the gorilla will be throwing barrels and fireballs at you! The only way to reach her is to leap over these obstacles and progress to the top. Micocode action with sound effects, full colour action graphics, skill levels etc.  
 Author - Adrian Sheppard  
 Oric 48K - £6.95

**Oricade** A combined assembler, Disassembler and editor for the Oric. \*Handles full 6502 Mnemonics \*Features Save and Reload M/C \*Assembles and disassembles at any address. \*An essential tool for any serious programmer.  
 Author - Adrian Sheppard  
 Oric 48K - £8.50.

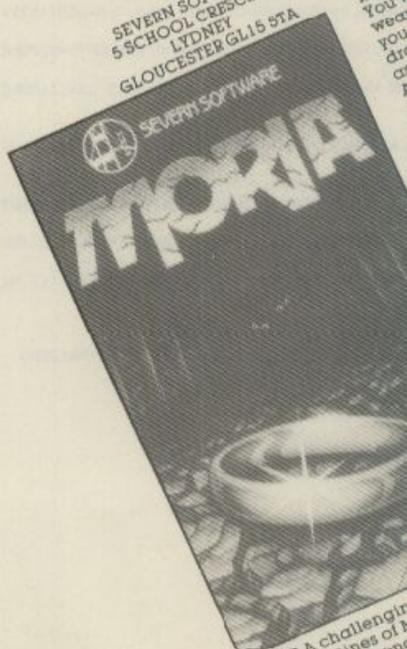


Oric titles recommended by ORIC PRODUCTS INT. LTD.  
 All Spectrum Software is available on Micronet 800.  
 TRADE ENQUIRIES WELCOME



SEVERN SOFTWARE  
 5 SCHOOL CRESCENT  
 LYDNEY  
 GLOUCESTER GL15 5TA

**Grail** You have been chosen to seek and recover the Holy Grail from the Castle Perilous. Throughout the course of your task you will have to use your skill, intelligence and logic (along with a little luck) as you encounter many foes. You will have the opportunity to gather weapons and armour to fight with, but if you are wounded your strength will drain away - many other features such as warp, jewels etc.  
 Author - Adrian Sheppard  
 Oric 48K - £6.95.



**Moria** A challenging adventure game set in the mines of Moria. You'll have to try and survive encounters with the monsters Durins Ring. The Wizard and the Trader may help or hinder you on your journey to freedom - a game that will really test your character and staying power.  
 Oric Author - Adrian Sheppard  
 Spectrum Author - Mike Howard  
 Spectrum 16/48K - £4.95.  
 Oric 48K - £6.95

All Oric titles available from Laskys.  
 Dinky Kong for Oric also available from WH Smith.

Please send me (Tick box)  
**SPECTRUM 16/48K**

- Jogger @ £4.95
- Quincy @ £4.95
- Moria @ £4.95

**ORIC 48K**

- Jogger @ £6.95
- Dinky Kong @ £6.95
- Moria @ £6.95
- Oricade @ £8.50
- Grail @ £6.95

I enclose Cheque/P.O. for £  
 payable to Severn Software

Name \_\_\_\_\_  
 Address \_\_\_\_\_

Severn Software, 5 School Crescent, Lydney, Gloucester GL15 5TA  
 All prices include VAT and P&P  
 Overseas P&P add 50p

YC1

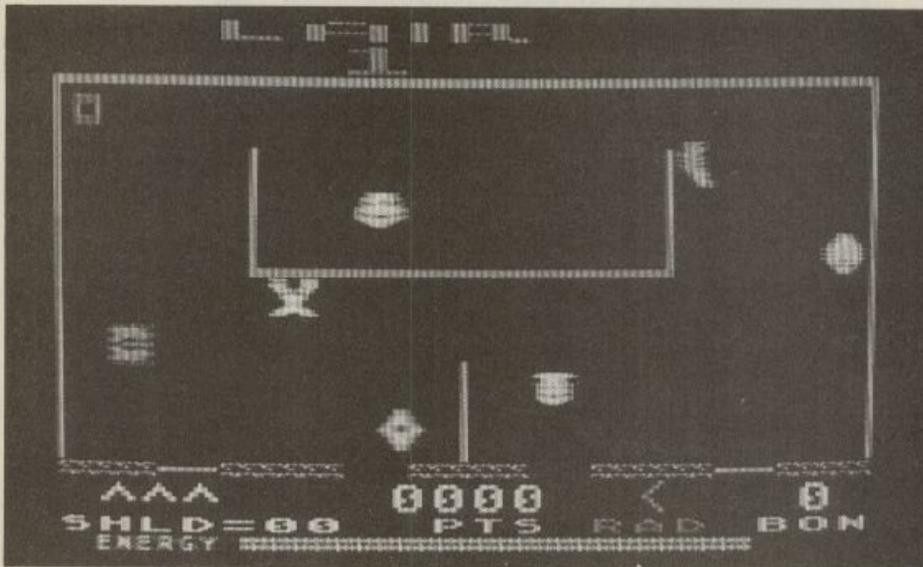
# THE LAIR

D Hitchens invites you and your Atari 400/800 to enter the lair and make a fortune — provided you don't get killed.

YOUR MISSION IS to search the Lair for four pieces of hidden treasure and recover them safely.

Radar is your sole aid to quickly locating the hidden treasure. As soon as you have entered the Lair, an indicator will appear in red to point in the horizontal direction in which the treasure is hidden. Your radar will not tell you its precise location but it will inform you of its approximate horizontal position. When the indicator changes to < your treasure will lie somewhere within a vertical band around this position. On a first-playing of the game, experiment in its use and ignore the monsters.

Picking up the treasure is automatically achieved when you pass over it. You will hear a short musical tone and the radar indicator will change into a home market — \* — into which you must deposit your prize. Before you can do this, however, you must stake your claim by reporting to the office just inside the lair's boundary, top left. Simply position your



```

0 REM ** MONSTERS' LAIR **          ** DAVE HITCHENS (c) 1983 **
1 REM
10 SOUND 0,0,0,0:GOSUB 7000:GOTO 100
20 ENERGY=ENERGY+600-EN:EN=600:A=USR(PMB3+500):SHIELD=9:POKE 656,2:POKE
E 657,9:FOR N=1 TO 30:?"#":NEXT N:RETURN
25 BONUSPTS=BONUSPTS+1-(BONUSPTS=9):POKE 656,1:POKE 657,18:?"CHR$(144+
BONUSPTS)":RETURN
30 FOR N=30 TO 80 STEP 10: SOUND 2,N,10,9:NEXT N:FOR N=80 TO 30 STEP -1
0: SOUND 2,N,10,12:NEXT N: SOUND 2,0,0,0
32 POKE 656,1:POKE 657,13:?" "":CHR$(170):" "":POKE PMB3+230,D2+2:RETR
RN
35 SOUND 2,10,0,15:A=2:FOR N=15 TO 0 STEP -.5: SOUND 2,50,0,N:NEXT N
:RETURN
40 FOR N=15 TO 0 STEP -.25: SOUND 2,100+N/5,12,N:NEXT N:RETURN
100 REM INITIALISING
105 DIM SCORE(4),ENERGY(4),TIME(4)
120 GRAPHICS 5:POKE 539,0:GOSUB 5000:GOSUB 4000:POKE 732,1:POKE 623,24
:POKE 82,0: SOUND 1,0,0,0: SOUND 2,0,0,0
121 IF DIFF THEN D2=3:D3=20:D4=6:D4=PMBASE2+2
122 IF NOT DIFF THEN D2=4:D3=40:D4=5:D4=210
123 POKE PMB3+147,D3:POKE 1562,D4:GOSUB 1900
124 POKE 708,38:POKE 709,198:POKE 710,0:POKE 711,72:GOSUB 3800
125 GOSUB 3000
130 FOR N=1 TO 50:RESTORE 1800+10*RND(0):READ D: SOUND 1,D,10,5: SOUND 2
,D+1,10,5
135 FOR DA=1 TO 10:RND(0)+15:NEXT DA:NEXT N:FOR DA=5 TO 0 STEP -.2:SO
UND 1,D,10,DA: SOUND 2,D,10,DA:NEXT DA
138 POKE 53761,130:POKE 53277,3
140 IF PRIZE<2 THEN COLOR 1:GOSUB 2000
150 IF PRIZE=0 THEN X=3:Y=3:GOSUB 2500
500 REM MAIN LOOP - BASIC
510 IF PEEK(632)<15 THEN EN=EN-1:IF NOT EN THEN GOTO 1500
520 POKE 656,2:POKE 657,9+EN/20:?" "":
530 IF EN<150 AND NOT PEEK(1710) THEN A=USR(PMB3+400):POKE 1664,0
540 IF EN<100 THEN POKE 712,60:POKE 712,0
550 IF PEEK(20)<20 THEN EN=EN-1+(EN=1)
560 IF PEEK(1602)<190 THEN 600
570 POKE 53278,0:IF PRIZE=3 AND PEEK(1600)=162 AND PEEK(1602)=201 THEN
GOTO 1600
580 POKE 77,0:GOTO 500
600 IF PEEK(1602)<25 OR PEEK(1600)<48 OR PEEK(1600)>206 THEN GOTO 1500
610 IF PEEK(53248)=1 AND PEEK(632)=15 AND PEEK(644)=0 AND PRIZE=1 THEN
PRIZE=2:GOSUB 40:COLOR 0:GOSUB 2000
620 IF PEEK(53248)=2 OR PEEK(53248)=3 THEN SHIELD=SHIELD-4:BONUS=0:GOS
UB 35:IF PEEK(53248)=3 THEN 1500
622 IF PEEK(53256)=1 THEN SHIELD=SHIELD-1:BONUS=0:GOSUB 35
625 IF SHIELD<0 THEN POKE 656,1:POKE 657,25:?"0":GOTO 1500
630 POKE 656,1:POKE 657,25:?"CHR$(SHIELD+176)":
640 IF PEEK(53248)=4 THEN PRIZE=1:COLOR 0:PLOT X,Y:GOSUB 30
650 IF PEEK(53256)=8 AND PEEK(632)=15 AND NOT PEEK(644) THEN GOSUB 20
660 IF PEEK(53248)=8 AND (PRIZE=0 OR PRIZE=1) THEN GOTO 1500
670 IF PEEK(53248)=8 AND PRIZE=2 THEN PRIZE=3:GOTO 500
690 POKE 53278,0
700 REM BONUS
710 IF PEEK(632)<=
;OBONUS=BONUS+1: SOUND 2,20*(PRIZE>0),0,15: SOUND 2,0,0,0:IF BONUS=75 TH
EN GOSUB 25:BONUS=0
800 REM RADAR
805 IF PRIZE THEN 900
810 X1=(PEEK(1600)-48)/2:POKE 656,1:POKE 657,13
820 IF X1<X-2 THEN ? " "":CHR$(27):CHR$(30):" "":GOTO 900
830 IF X1>X+2 THEN ? " "":CHR$(27):CHR$(28):" "":GOTO 900
840 ? CHR$(9):" "":CHR$(8):
900 IF NOT PEEK(558) AND NOT PRIZE THEN GOSUB 2500
1000 GOTO 500
1300 RESTORE 1350
1310 FOR N=1 TO 11:READ DA,DB: SOUND 1,DA,10,8: SOUND 2,DA+3,10,8:FOR A=
1 TO DB:NEXT A
1320 FOR A=8 TO 4 STEP -.2:POKE 53763,160+A:POKE 53765,160+A:NEXT A:N
EXT N: SOUND 1,0,0,0: SOUND 2,0,0,0:RETURN
1350 DATA 193,140,193,100,193,15,193,140,162,115,173,20,173,100,193,30
,193,105,204,50,193,150
1400 POKE 53761,0:POKE 53277,0:FOR N=53261 TO 53265:POKE N,0:NEXT N
1410 POKE 656,1:POKE 657,13:?" "":RETURN
1500 COLOR 0:PLOT X,Y:GOSUB 1400:LIVES=LIVES-1:POKE 1710,0:A=USR(1572)
:IF LIVES=0 THEN 8000
1520 GOSUB 1300:EN=600:SHIELD=9:DEAD=1:PRIZE=0:BONUS=0:BONUSPTS=0:POKE
656,1:POKE 657,18:?"CHR$(144)":
1530 POKE 656,2:POKE 657,9:FOR N=1 TO 30:?"#":NEXT N:POKE 656,1:POKE
657,25:?"CHR$(185)":
1540 GOSUB 3000:GOTO 138
1600 GOSUB 1400:POKE 53761,0:A=USR(1572):A=USR(PMB2+200,LAIR):ENERGY=E
NERGY+600-EN
1610 TIME(LAIR)=INT((256*PEEK(19)+PEEK(20))/50):ENERGY(LAIR)=ENERGY
1620 SCORE(LAIR)=1500-(TIME(LAIR)*10)-ENERGY(LAIR)+(BONUSPTS*250)+(SHI
ELD*100)+(LIVES*125)
1630 POKE 656,1:POKE 1710,0:IF SCORE(LAIR)<10 THEN SCORE(LAIR)=INT(100
*RND(0)+10)
1640 FOR N=SCR TO SCR+SCORE(LAIR) STEP 5:POKE 657,12-LEN(STR$(N)):?" N":
SOUND 1,10,12,15: SOUND 1,0,0,0:NEXT N
1645 SCR=SCR+SCORE(LAIR)
1650 A=2*2*2:ENERGY=0:LAIR=LAIR+1:IF LAIR=5 THEN 8000
1660 OFFSET=OFFSET+22:BONUS=0:BONUSPTS=0:POKE 19,0:POKE 20,0:PRIZE=0
1670 GOTO 125
1700 STOP
1800 DATA 230
1801 DATA 173
1802 DATA 114
1803 DATA 85
1804 DATA 57
1805 DATA 42
1806 DATA 50
1807 DATA 68
1808 DATA 76
1809 DATA 102
1810 DATA 136
1811 DATA 153
1900 RESTORE 1920
1910 FOR N=1 TO 8:READ D:POKE PMB1+D,D4:NEXT N:RETURN
1920 DATA 18,60,102,144,186,274,316,358
2000 PLOT 2,2:DRAWTO 2,4:DRAWTO 4,4:DRAWTO 4,2:DRAWTO 2,2:RETURN
2500 REM PLACE PRIZE
2510 COLOR 0:PLOT X,Y
2520 X=INT(RND(0)*79):Y=INT(RND(0)*39):LOCATE X,Y,Z:IF Z THEN 2520
2530 COLOR 3:PLOT X,Y
2540 A=USR(PMB3+300):A=USR(1556):POKE 1664,0:RETURN
3000 POKE PMB3+230,D2:REM LAIR START
3100 FOR N=0 TO 10:POKE PMB3+1300+N,PEEK(PMB2+OFFSET+N):NEXT N

```

explorer over the office, release the joystick and press the controller button.

If your claim is accepted, the office will disappear. Move away at once since you are not immune from monster attack even when reporting at the office. Finally, leaving the lair only by one of the pink doorways and deposit your treasure at the home symbol by positioning your man directly over it. There is no need to press the controller button — your prize will be automatically registered providing you have completed the procedures outlined above.

After a brief interlude, Lair 2 will appear followed, by turn, by Lairs 3 and 4, each containing one piece of treasure. Successful recovery of all four pieces of treasure ends the game by disclosing a scoresheet of your performance.

The eight monsters roam incessantly and unpredictably. When playing the game for the first time, pause before entering the lair in order to become more familiar with their wanderings. Collision with a monster will reduce your shield energy by 10 points unless you are fortunate enough to meet him during his re-energising process. All monsters re-energise frequently but unpredictably — always treat them with respect.

Energy is depleted continuously as you

move around but movement within the lair is far less expensive than movement beneath it — ensure you have sufficient energy to complete your mission. While stationary you consume only a small amount of life support energy so you may leave the lair at any time via a black doorway and come to rest below. Your current energy level is shown on the bar graph at the bottom of the screen. When your energy drops to 30 percent of its starting value, an energy pod will appear within the walls of the lair, top right; if energy becomes dangerously low, the screen will flash red. To replenish your supply, dock with the pulsating pod — be very wary of the Devil! — release the joystick and press the red controller button. Vacate the area as soon as the re-energising process is complete since you are vulnerable while stationary. The process simultaneously repairs damaged shields and restores them to maximum.

You are equipped initially with armour to protect you from inadvertent collisions with the walls and barriers of the lair and its residents. Current shield energy is shown in white beneath the lair. Ten points are lost if you collide with a monster; 40 if you touch a wall or barrier. If your shield energy falls to zero any future collision will be fatal.

If your shields are down it is advisable to

consume energy safely beneath the lair in order to activate the pod — you may pass safely anywhere in this area.

You begin the game with five explorers. Your current explorer will flash yellow while beneath the lair signifying that it is safe to travel anywhere within that zone. On entering the lair he will change to flashing purple to warn of the restricted movements allowed there. You forfeit one life if your main energy falls to zero; you collide with Monsters or barrier while your shields are down; you attempt to enter the lair other than via the black doorways; you attempt to escape from the lair other than via a pink or black doorway. Forfeit all five lives and the game ends.

Bonus points are awarded if you are able to avoid collisions within the lair for an extended period of time. The current value is shown in yellow to the right of the radar indicator. A high value will enhance your score and will be carried over into subsequent lairs unless your explorer dies.

Treasure is positioned randomly at the beginning of each lair and also at regular intervals thereafter until discovered — you cannot afford to dally while searching! A warning bell will sound when the treasure is repositioned together with a pulsating prize symbol above the walls of the lair, top right.

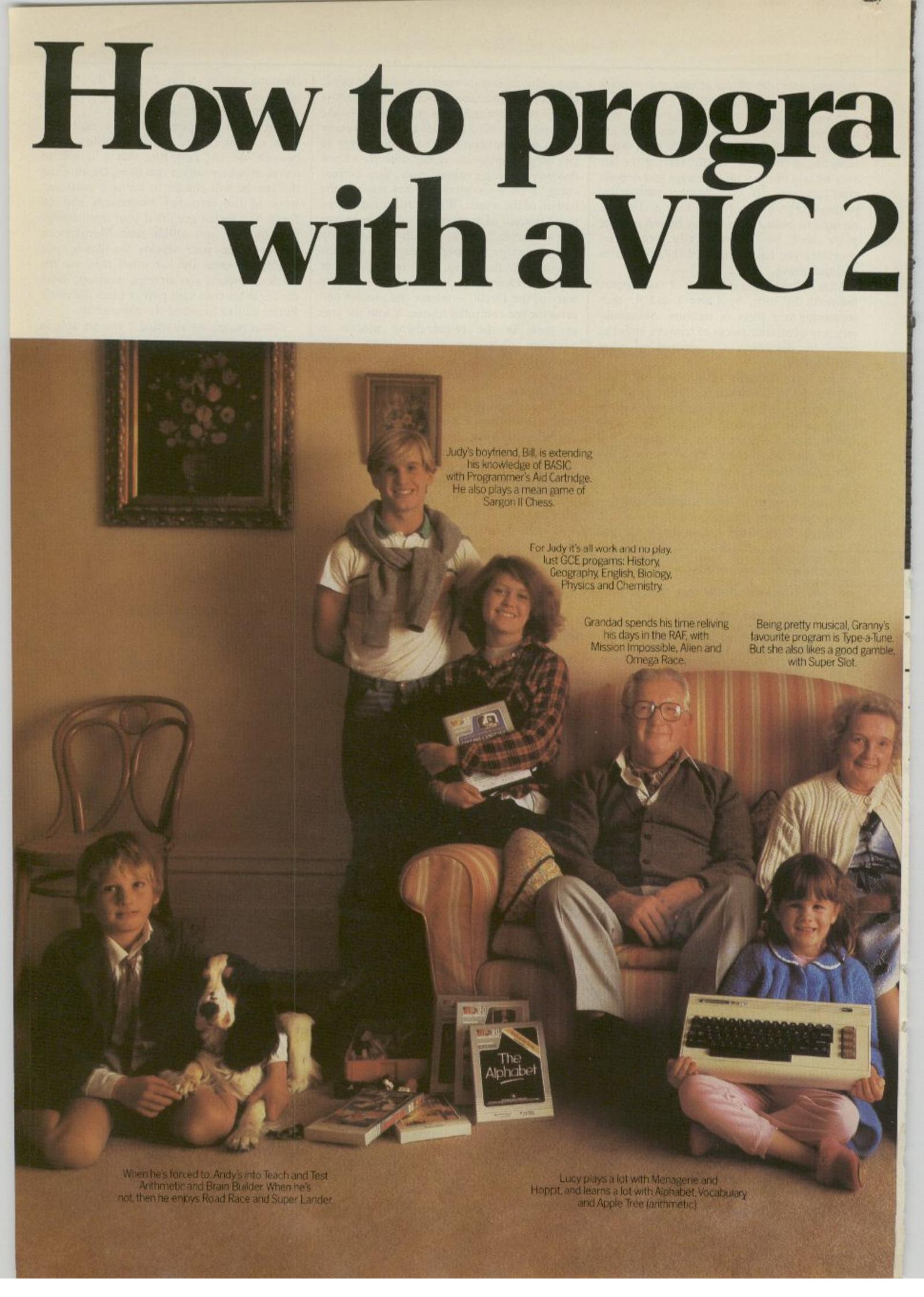
```

3110 FOR N=0 TO 10:POKE PMB3+1556+N,PEEK(PMB2+OFFSET+1+N):NEXT N
3120 RESTORE 3125:FOR N=PMB2+972 TO PMB2+978:READ D:POKE N,D:NEXT N
3125 DATA 1,1,7,1,1,1,6
3130 POKE 1600,XPOS+LIVES*8:POKE 1601,3:POKE 1602,201:POKE 1604,213:PO
KE 1605,1
3140 POKE 656,1:POKE 657,LIVES?" ";
3190 IF DEAD=1 THEN DEAD=0:RETURN
3200 POKE 656,0:POKE 657,0:COLOR 2:ON LAIR GOTO 3500,3510,3520,3530
3500 ? "XXXXXXXXXX XXXXXX XXXXXXXXXXXX";
3505 PLOT 39,39:DRAWTO 39,29:PLOT 19,7:DRAWTO 19,19:DRAWTO 59,19:DRAWTO
0 59,7:RETURN
3510 REM LAIR 2
3515 PLOT 39,0:DRAWTO 39,12:PLOT 0,14:DRAWTO 8,14:PLOT 71,14:DRAWTO 79
,14:PLOT 39,20:DRAWTO 39,25
3517 PLOT 7,32:DRAWTO 16,32:PLOT 63,32:DRAWTO 72,32:RETURN
3520 REM LAIR 3
3523 PLOT 22,36:DRAWTO 57,36
3526 PLOT 46,19:DRAWTO 39,12:POSITION 32,19:POKE 765,2:XIO 18,#6,0,0,"
S:";RETURN
3530 REM LAIR 4
3533 PLOT 16,32:DRAWTO 25,23:PLOT 63,32:DRAWTO 54,23:PLOT 16,32:DRAWTO
22,36:PLOT 63,32:DRAWTO 57,36
3536 PLOT 16,11:DRAWTO 10,4:POSITION 4,11:POKE 765,2:XIO 18,#6,0,0,"S:
"
3537 PLOT 75,11:DRAWTO 69,4:POSITION 63,11:POKE 765,2:XIO 18,#6,0,0,"S
:"
3539 RETURN
3710 RETURN
3900 REM GAME START
3810 LAIR=1:OFFSET=0:ENERGY=0:TIME=0:EN=600:BONUS=0:BONUSPTS=0:SHIELD=
9:LIVES=5:XPOS=51:PRIZE=0:SCR=0
3820 FOR N=0 TO 4:TIME(N)=0:ENERGY(N)=0:SCORE(N)=0:NEXT N
3830 POKE 656,1:POKE 657,1:FOR N=1 TO LIVES:? CHR$(27);CHR$(254);:NEXT
N
3840 POKE 657,6:" 0000 " ;CHR$(144);" SHLD=90 PTS rad bon";
3850 ? " ENERGY ";:FOR N=1 TO 30:" #";:NEXT N
3860 COLOR 2:PLOT 0,39:DRAWTO 0,0:DRAWTO 79,0:DRAWTO 79,39
3870 POKE 705,230:POKE 706,230
3885 POKE 18,0:POKE 19,0:POKE 20,0:A=USR(1572)
3890 POKE 559,62:POKE 1664,0:A=USR(1536):POKE 1710,0
3900 RETURN
3997 REM
3998 REM INSERT DLI'S
3999 REM
4000 DL=PEEK(560)+PEEK(561)*256
4010 RESTORE 4020:FOR N=1 TO 12:READ D,DT:POKE DL+D,DT:NEXT N
4020 DATA 3,202,10,138,15,138,19,138,24,138,29,138,34,138,38,138,45,19
6,48,7,49,6,50,4
4030 IF PEEK(PMB1)=72 THEN RETURN
4032 SOUND 1,108,10,2:SOUND 2,109,10,2
4035 RESTORE 4050
4040 FOR N=0 TO 216:READ D:POKE PMB1+N,D:NEXT N:FOR N=0 TO 171:READ D:
POKE PMB1+256+N,D:NEXT N
4048 REM MONSTER 1 DLI (PHASE 1/2/3)
4050 DATA 72,138,72,216,162,1,189,128,6,56,233,1,201,255,208,3,173,10,
210,141,10,212
4051 DATA 141,0,208,157,128,6,169,40,141,18,208
4052 DATA 169,42,141,0,2,104,170,104,64
4058 REM MONSTER 2
4060 DATA 72,138,72,216,162,2,189,128,6,24,105,1,201,255,208,3,173,10,
210,141,10,212
4061 DATA 141,0,208,157,128,6,169,200,141,18,208
4062 DATA 169,84,141,0,2,104,170,104,64
4068 REM MONSTER 3
4070 DATA 72,138,72,216,162,3,189,128,6,56,233,1,201,255,208,3,173,10,
210,141,10,212
4071 DATA 141,0,208,157,128,6,169,74,141,18,208
4072 DATA 169,126,141,0,2,104,170,104,64
4078 REM MONSTER 4
4080 DATA 72,138,72,216,162,4,189,128,6,24,105,1,201,255,208,3,173,10,
210,141,10,212
4081 DATA 141,0,208,157,128,6,169,218,141,18,208
4082 DATA 169,168,141,0,2,104,170,104,64
4088 REM MONSTER 5
4090 DATA 72,138,72,216,162,5,189,128,6,24,105,1,201,255,208,3,173,10,
210,141,10,212
4091 DATA 141,0,208,157,128,6,169,154,141,18,208
4092 DATA 174,1,2,232,142,1,2,169,0,141,0,2,104,170,104,64
4098 REM MONSTER 6
4100 DATA 72,138,72,216,162,6,189,128,6,56,233,1,201,255,208,3,173,10,
210,141,10,212
4101 DATA 141,0,208,157,128,6,169,248,141,18,208
4102 DATA 169,42,141,0,2,104,170,104,64
4108 REM MONSTER 7
4110 DATA 72,138,72,216,162,7,189,128,6,24,105,1,201,255,208,3,173,10,
210,141,10,212
4111 DATA 141,0,208,157,128,6,169,106,141,18,208
4112 DATA 169,84,141,0,2,104,170,104,64
4118 REM MONSTER 8
4120 DATA 72,138,72,216,162,8,189,128,6,56,233,1,201,255,208,3,173,10,
210,141,10,212
4121 DATA 141,0,208,157,128,6,169,136,141,18,208
4122 DATA 169,126,141,0,2,104,170,104,64
4128 REM TEXT WINDOW DLI
4130 DATA 72,138,72,152,72,162,54,160,10,169,120
4131 DATA 141,10,212,141,22,208,142,23,208,140,24,208,169,26,141,25,20
8
4132 DATA 174,1,2,202,142,1,2,169,0,141,0,2,104,168,104,170,104,64
4201 REM USR CALLS: START/STOP/TIMER & PLAYER 4 OFF
4202 RESTORE 4250
4210 FOR N=1536 TO 1592:READ D:POKE N,D:NEXT N
4250 DATA 104,160,0,166,208,169,6,76,92,228
4251 DATA 104,160,95,162,228,169,6,76,92,228
4252 DATA 104,169,5,160,0,162,6,32,92,228,169,192,141,14,212,96
4254 DATA 104,162,255,169,0,157,0,0,157,0,0,157,0,0,157,0,0,202,208,24
1,96
4260 POKE 1579,PMBASE+3:POKE 1582,PMBASE+7:POKE 1585,PMBASE+7:POKE
1588,PMBASE+7
4290 SOUND 1,80,10,2:SOUND 2,81,10,2
4301 REM VBI DATA
4310 FOR N=PMB3 TO PMB3+236:READ D:POKE N,D:NEXT N
4350 DATA 174,128,6,224,0,208,19,169,0,141,0,2,165,204,141,1,2,169,192
,141,14,212,232,142,128,6
4351 DATA 174,139,6,232,142,139,6
4352 DATA 224,20,208,10,165,204,162,0,142,139,6,108,144,6
4353 DATA 224,15,208,5,165,207,108,144,6

```

(listing continued on page 115)

# How to progra with a VIC 2



Judy's boyfriend, Bill, is extending his knowledge of BASIC with Programmer's Aid Cartridge. He also plays a mean game of Sargon II Chess.

For Judy it's all work and no play. Just GCE programs: History, Geography, English, Biology, Physics and Chemistry.

Grandad spends his time reliving his days in the RAF, with Mission Impossible, Alien and Omega Race.

Being pretty musical, Granny's favourite program is Type-a-Tune. But she also likes a good gamble, with Super Slot.

When he's forced to, Andy's into Teach and Test Arithmetic and Brain Builder. When he's not, then he enjoys Road Race and Super Lander.

Lucy plays a lot with Menagerie and Hopbit, and learns a lot with Alphabet, Vocabulary and Apple Tree (arithmetic).

# m your family 0 computer.

Mum uses Robert Carrier's Menu Planner and feeds her brain with Mastermind and Quizmaster.

Dad escapes into another world with Cosmic Jailbreak but comes quickly down to earth again with Money Manager and Vicwriter.

The VIC 20 can please all of the people all of the time because it has, quite literally, hundreds of software programs.

Programs that are exciting, fun, educational, musical and always entertaining.

There's ROM software (they're the cartridges you simply plug into the back of the computer) for only £9.99, and cassette programs (for use with the cassette unit) starting at under £5.00.

No other home computer offers such a choice.

Or, to put it another way: who in your family would have nothing to do with the VIC 20?

We suspect that the answer is no one.

Please send me Vicssoft, the free colour catalogue of VIC software.

Name \_\_\_\_\_

Address \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Postcode \_\_\_\_\_

The Commodore Information Centre, 675 Ajax Avenue, Slough, Berkshire SL1 4BG. Tel: Slough (0753) 79292.

 **commodore**

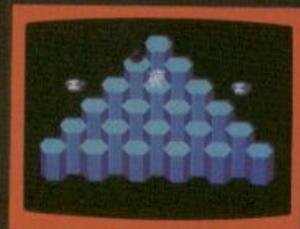
# ANIROG SOFTWARE

COMPUTER GAMES  
OF TOMORROW

AVAILABLE

**NOW!**

**AS SEEN ON  
T.V.!**



HEXPERT



MOON BUGGY



SKRAMBLE



3D TIME TREK

COMMODORE 

**NEW**

**GALAXY**

AVOID CAPTURE BY THE ALIEN MOTHER SHIPS TRACTOR BEAM. THE FIGHTERS DIVE BOMB YOU. 100 SCREENS WITH A TWO PLAYER OPTION. K.B./J.S. £7.95

- KONG K.B./J.S. £7.95  
4 SCREENS WITH BRILLIANT ANIMATED GRAPHICS
- SKRAMBLE J.S. £7.95  
5 SECTORS TO TEST YOUR SKILL
- HEXPERT J.S. £7.95  
TRAIN BERT TO BE HEXPERT ON THIS 3D HEXAGONAL PYRAMID
- MOON BUGGY J.S. £7.95  
MANOEUVRE YOUR PATROL CRAFT OVER GIANT POT HOLES AS YOU DEFEND THE MOON BUGGY FROM ALIEN ATTACK.
- FROG RUN K.B./J.S. £5.95  
A POPULAR ARCADE GAME. FUN FOR THE WHOLE FAMILY.
- 3D TIME TREK K.B./J.S. £5.95  
SPECTACULAR 3D GRAPHICS STAR TREK GAME.
- DUNGEONS K.B. £6.95  
ENTER THE REALMS OF FANTASY IN THIS ROLE PLAYING GAME.
- DARK DUNGEONS K.B. £6.95  
2ND IN THE SERIES OF FOUR. DEFINITELY NOT FOR THE FAINT HEARTED.

NEW APPROVED GAMES FOR  
**THE STACK LIGHT RIFLE**

- INDIAN ATTACK £5.95
- COSMIC COMMANDO £5.95
- VENGEANCE OF ZENO £5.95

24 HR. CREDIT CARD SALES HORLEY (02934) 6083  
PAYMENT BY CHEQUE, P.O., ACCESS/VISA  
8 HIGH STREET HORLEY, SURREY.  
Overseas 50p post & packaging  
**TRADE ENQUIRIES WELCOME**  
29, West Hill, Dartford, Kent. (0322) 92513/8



(listing continued from page 111)

```
4354 DATA 224,10,208,5,165,208,108,144,6
4355 DATA 224,5,208,5,165,207,141,7,212
4360 DATA 174,42,2,224,0,208,77
4370 DATA 173,10,210,201,128,16,7,162,56,160,233,108,151,6,162,24,160,
105,142,149,6,140,150,6,41,7,216,24,105,1
4380 DATA 170,188,164,6,224,5,16,14,173,149,6,145,203,200
4390 DATA 173,150,6,145,203,108,153,6
4400 DATA 173,149,6,145,205,200,173,150,6,145,205,169,3,160,250,162,0,
32,92,228,169,192,141,14,212
4410 DATA 165,20,141,195,2,173,10,210,141,0,210
4420 DATA 174,69,6,240,60,206,65,6,208,35
4430 DATA 173,120,2,41,1,208,3,32,0,0,173,120,2,41,2,208,3,32,0,0
4440 DATA 173,120,2,41,4,208,3,206,64,6,173,120,2,41,8,208,3,238,64,6,
174,64,6
4450 DATA 142,4,208,232,142,5,208,162,3,142,65,6,76,95,228
4460 POKE PMB3+188,PMBASE2+1:POKE PMB3+198,PMBASE2+1:POKE PMB3+197,50
4498 REM AND CORRESPONDING OFFSETS
4500 FOR N=1 TO 8:READ D:POKE 1700+N,D:NEXT N
4510 DATA 9,51,93,135,177,9,51,93
4598 REM USR DATA FOR PLAYER 3
4600 FOR N=PMB3+300 TO PMB3+366:READ D:POKE N,D:NEXT N
4610 DATA 104,162,0,189,214,6,157,16,0,157,16,0,157,16,0,232,224,15,20
8,239
4611 DATA 162,0,169,200,141,6,210,160,0,200,192,250,208,251,233,4,201,
40,208,240,232,224,20,208,233,169,0
4612 DATA 141,6,210,162,0,157,16,0,157,16,0,157,16,0,232,224,15,208,24
2,96
4629 REM PRIZE & ENERGY POD CHARS.
4630 FOR N=1750 TO 1770:READ D:POKE N,D:NEXT N
4635 DATA 28,99,65,99,127,62,62,28,28,8,8,8,8,28,62,224,160,224,224,16
0,224
4698 REM ENERGY POD ON : USR DATA
4700 FOR N=PMB3+400 TO PMB3+455:READ D:POKE N,D:NEXT N
4710 DATA 104,162,0,189,229,6,157,38,0,157,38,0,157,38,0,232,224,6,208
,239
4711 DATA 169,30,141,2,210,169,0,160,175,140,3,210,162,0,232,224,250,2
08,251,136,192,159,208,241
4712 DATA 105,1,201,16,208,233,162,1,142,174,6,96
4798 REM USR DATA: ENERGY POD OFF
4800 FOR N=PMB3+500 TO PMB3+549:READ D:POKE N,D:NEXT N
4810 DATA 104,162,0,169,0,157,38,0,157,38,0,157,38,0,232,224,6,208,242
4811 DATA 162,204,142,3,210,160,250,140,2,210,162,0,232,224,250,208,25
1,136,192,20,208,241,162,0,142,3,210
4812 DATA 142,174,6,96
4850 FOR N=1 TO 4:READ DA,DB,DC:POKE PMB3+DA,PMBASE1+7:POKE PMB3+DB,PM
BASE2+7:POKE PMB3+DC,PMBASE3+7:NEXT N
4860 DATA 308,311,314,354,357,360,408,411,414,507,510,513
4870 REM ENABLE PLYRS CHARS TO PMSETS
4900 RETURN
4998 REM PM SET-UP
5000 PMBASE1=PEEK(106)-16:PMBASE2=PMBASE1-8:PMBASE3=PMBASE2-8:POKE 542
79,PMBASE1
5010 POKE 53774,0:POKE 16,0
5020 PMB1=PMBASE1+256:PMB2=PMBASE2+256:PMB3=PMBASE3+256
5058 REM PAGE 0/6 INDEXED ADDRESSING
5060 POKE 203,0:POKE 204,PMBASE1:POKE 205,0:POKE 206,PMBASE1+1:POKE 20
7,PMBASE2:POKE 208,PMBASE3
5065 POKE 1680,71:POKE 1681,PMBASE3
5066 POKE 1687,99:POKE 1688,PMBASE3
5067 POKE 1689,144:POKE 1690,PMBASE3
5070 POKE PMB2+512+10,255
5090 POKE 53251,190:POKE 53259,1:POKE 53249,80:POKE 53250,112:POKE 532
57,3:POKE 53258,3:POKE 53767,165
5998 REM MONSTER CHARACTER SETS
6000 RESTORE 6050
6005 IF PEEK(PMB1)=72 THEN RETURN
6008 SOUND 1,217,10,2:SOUND 2,218,10,2:POKE 53767,172
6010 FOR N=0 TO 36:POKE PMB1+1024+N,0:NEXT N
6015 FOR N=187 TO 255:POKE PMB1+1024+N,0:NEXT N
6020 FOR N=37 TO 186:READ DT:POKE PMB1+1024+N,DT:NEXT N
6025 FOR N=0 TO 36:POKE PMB2+1024+N,0:NEXT N
6030 FOR N=187 TO 255:POKE PMB2+1024+N,0:NEXT N
6035 FOR N=37 TO 186:READ DT:POKE PMB2+1024+N,DT:NEXT N
6040 FOR N=0 TO 36:POKE PMB3+1024+N,0:NEXT N
6042 FOR N=187 TO 255:POKE PMB3+1024+N,0:NEXT N
6044 FOR N=37 TO 186:READ DT:POKE PMB3+1024+N,DT:NEXT N
6048 REM SET 1
6050 DATA 0,99,34,20,20,42,127,42,62,62,62,62,62,62,20,20,28,0,0,0
6051 DATA 28,12,28,28,56,56,28,60,24,60,24,56,112,96,96,224,192,192,0,
0
6052 DATA 60,60,126,90,90,126,255,255,189,195,255,126,60,24,0,0
6053 DATA 0,24,24,60,36,126,102,255,126,255,126,255,126,126,60,60,24,2
4,0,0
6054 DATA 195,194,195,195,102,102,36,60,60,24,24,24,60,126,102,66,66,6
6,0,0
6055 DATA 85,85,254,254,127,127,230,194,91,91,194,230,127,127,254,254,
85,85,0,0
6056 DATA 126,255,60,60,60,126,219,126,126,90,102,126,60,24,0,0
6057 DATA 0,0,0,0,24,60,126,231,126,60,24,0,0,0,0,0,0
6058 REM SET 2
6060 DATA 65,34,34,20,20,62,127,42,62,62,62,62,62,62,20,20,28,0,0,0
6061 DATA 28,20,28,28,56,56,28,56,28,56,28,28,28,28,56,28,24,24,0,0
6062 DATA 60,60,126,90,90,126,255,255,189,195,255,126,60,24,0,0
6063 DATA 0,24,24,60,60,126,126,255,102,255,102,255,126,126,60,60,24,2
4,0,0
6064 DATA 195,66,195,195,102,102,36,60,60,24,24,60,126,102,66,195,1
95,0,0
6065 DATA 170,170,127,127,254,254,103,67,218,218,67,103,254,254,127,12
7,172,172,0,0
6066 DATA 126,255,60,60,60,255,90,126,126,90,102,126,60,24,0,0
6067 DATA 0,0,0,24,24,60,60,102,231,126,60,60,24,24,0,0,0,0
6068 REM SET 3
6070 DATA 34,34,34,20,20,62,127,42,62,62,62,62,62,62,20,20,28,0,0,0
6071 DATA 28,24,28,28,56,56,28,56,28,56,28,14,14,6,7,3,3,0,0
6072 DATA 60,60,126,122,90,126,255,255,189,195,255,126,60,24,0,0
6073 DATA 0,24,24,60,60,126,126,255,126,255,126,255,102,126,36,60,24,2
4,0,0
6074 DATA 195,67,195,195,102,102,36,60,60,24,24,60,126,102,195,0,0,
0,0
6075 DATA 85,85,254,254,127,127,230,194,91,91,194,230,127,127,254,254,
85,85,0,0
6076 DATA 126,255,60,60,189,126,90,126,126,90,102,126,60,24,0,0
6077 DATA 24,24,24,60,60,60,126,102,231,231,126,126,60,60,24,24,24
6098 REM PLYR 1/2 CHAR. SETS
6100 SOUND 1,152,10,2:SOUND 2,163,10,2
6110 FOR M=PMB3 TO PMB1 STEP 2048:RESTORE 6120:FOR N=M+1280 TO M+1310:
READ D:POKE N,D:NEXT N
6113 FOR N=M+1536 TO M+1566:READ D:POKE N,D:NEXT N
6116 NEXT M
6120 DATA 0,0,0,0,0,0,0,0,0,134,137,137,137,143,137,233,233,0,0,0,0,
0,0,0,0,0,0,0,0
6130 DATA 0,0,0,0,0,0,0,0,0,92,84,84,84,92,84,84,82,0,0,0,0,0,0,0,0,
0,0,0,0,0
6140 POKE 53249,80:POKE 53250,112:POKE 53257,3:POKE 53258,3:REM POS. 0
N SCREEN
6150 FOR N=PMB2 TO PMB2+87:READ D:POKE N,D:NEXT N:REM 705/706 CHAR FOR
"1:2:3:4"
6160 DATA 1,3,1,1,1,1,1,1,3,3,0,0,0,0,0,0,0,0,128,128
6170 DATA 3,4,0,0,1,2,4,4,7,7,0,128,128,128,0,0,0,0,128,128
6180 DATA 7,0,1,2,3,0,0,0,4,3,3,128,128,0,0,0,128,128,128,0,0
6190 DATA 1,3,5,13,13,15,1,1,1,1,0,0,0,0,0,192,0,0,0,0,0
6200 FOR N=PMB2+100 TO PMB2+137:READ D:POKE N,D:NEXT N
6210 DATA 104,169,24,141,1,210,162,0,169,40,160,0
6220 DATA 200,196,250,208,251,141,0,210,169,160,160,0
6230 DATA 200,196,250,208,251,141,0,210,232,224,190,208,227,96
6300 FOR N=PMB2+200 TO PMB2+253:READ D:POKE N,D:NEXT N:REM HAPPY SOUND
6310 DATA 104,104,104,10,10,162,170,142,5,210,162,200,142,4,210
6320 DATA 160,250,136,208,253,202,224,5,208,243,56,233,1,208,238
6330 DATA 162,5,142,4,210,160,250,136,208,253,232,224,250,208,243,162,
0,142,4,210,142,5,210,96
6400 FOR N=PMB2+256 TO PMB2+290:READ D:POKE N,D:NEXT N:REM PLYR 4 MOVE
UP
6410 DATA 172,66,6,206,66,6,206,66,6,200,200,200,185,0,0,136,136,153,0
,0,200,200,200,204,68,6,208,240
6420 DATA 206,68,6,206,68,6,96
6430 FOR N=PMB2+256+50 TO PMB2+256+84:READ D:POKE N,D:NEXT N:REM PLYR
4 DOWN
6440 DATA 172,68,6,238,68,6,238,68,6,136,136,136,185,0,0,200,200,153,0
,0,136,136,136,204,66,6,208,240
6450 DATA 238,66,6,238,66,6,96
6460 FOR N=1 TO 4:READ D:POKE PMB2+D,PMBASE2+3:NEXT N
6470 DATA 270,275,320,325
6800 RETURN
7000 REM TITLE PAGE
7001 REM
7010 GRAPHICS 0:POKE 559,0
7020 POKE 708,136:POKE 709,26:POKE 710,210:POKE 711,72:POKE 712,52
7030 DL=PEEK(560)+256*PEEK(561):RESTORE 7035
7035 FOR N=1 TO 8:READ DA,DB:POKE DL+DA,DB:NEXT N:DATA 0,0,1,48,3,71,6
,6,15,5,26,6,27,6,28,6
7040 POSITION 3,0:"MONSTERS' LAIR":?
7050 ? " USE JOYSTICK 1 TO MANOEUVRE YOUR EXPLORER AROUND EACH
LAIR IN"
7060 ? " SEARCH OF HIDDEN TREASURE — BUT BEWARE THE MONSTERS W
HICH PROWL"
7070 ? " INCESSANTLY AND WHOSE MOVEMENTS CANNOT BE ANTICIP
ATED"
7075 ? :? :?
7080 ? "RADAR WILL ASSIST IN YOUR QUEST BUT THE TREASURE WILL BE REP
OSITIONED AT"
7090 ? "INTERVALS OF TIME - IF YOUR ENERGY BECOMES LOW, HEAD FOR T
HE PULSATING"
7095 ? "ENERGY POD- BUT WATCH THOSE MONSTERS"
7100 ? :? " SCORES ARE BASED ON ENERGY USED AND ON TI
ME TAKEN"
7110 POSITION 21,20:"diff level select":POSITION 1,21:"initialise
start"
7115 POKE 559,34
7120 IF PEEK(53279)=7 THEN 7120
7130 POSITION 21,20: ? "
7140 FOR N=1 TO 20:IF PEEK(53279)=6 THEN POP :GOTO 7200
7150 NEXT N
7160 IF PEEK(53279)=5 THEN DIFF=1-DIFF
7170 POSITION 27,20:IF DIFF THEN ? "novice":
7180 IF NOT DIFF THEN ? "expert":
7190 GOTO 7140
7200 POSITION 1,21:"initialising ";CHR$(145);" min"
7210 FOR N=1 TO 10:POKE 711,72-PEEK(711):I=2*2:NEXT N
7250 RETURN
8000 REM GAME OVER
8010 A=USR(1546):GRAPHICS 0:POKE 708,138:POKE 709,186:POKE 710,20:POKE
711,74:POKE 712,20:POKE 752,1
8020 DL=PEEK(560)+256*PEEK(561)
8030 POKE DL,0:POKE DL+3,71:POKE DL+6,6:FOR N=7 TO 24:POKE DL+N,6:NEXT
N:POKE DL+28,6
8040 POSITION 3,0:"MONSTERS' LAIR":POSITION 3,1:"game concluded"
8042 POSITION 24,1:IF DIFF THEN ? "novice level":GOTO 8050
8045 ? "expert level"
8050 FOR LAIR=1 TO 4:POSITION 4,LAIR:2:"lair ";CHR$(LAIR+144);" ";
SCORE(LAIR):SOUND LAIR-1,LAIR*50,10,5
8052 A=2*2*2*2:NEXT LAIR:A=2*2*2*2*2:FOR N=0 TO 3:SOUND N,0,0,0:NEXT
N
8055 FOR N=1 TO 4:ENERGY=ENERGY+ENERGY(N):TIME=TIME+TIME(N):NEXT N:MIN
S=INT(TIME/60):SECS=TIME-MINS*60
8060 ? :? " energy used ";ENERGY
8070 ? " time taken ";MINS;" ";SECS:CHR$(34)
8100 POSITION 9,11:"OPTION TO PLAY AGAIN":POSITION 9,12:"SELECT F
OR DIFFICULTY"
8110 IF PEEK(53279)=5 THEN 8110
8140 FOR N=1 TO 15:IF PEEK(53279)=3 THEN POP :GOTO 8200
8150 NEXT N
8160 IF PEEK(53279)=5 THEN DIFF=1-DIFF
8170 POSITION 7,13:IF DIFF THEN ? "novice":
8180 IF NOT DIFF THEN ? "expert":
8190 GOTO 8140
8200 GOTO 120
```

# WARLOCK'S MOUNTAIN

A J Edgington's quest takes you into Zeroth's mountain to recover the stolen spellbook and fight assorted nasties.

CLIMB THE MOUNTAIN and recover the stolen spellbook in this game, Warlock's Mountain, for the 48K Oric. Instructions are included in the program but the theme is as follows:

The player's task is to recover a spellbook stolen by the warlock which can be found on the top of five floors. These floors consist of stone passageways and caverns which contain treasure and

which shift about inside the mountain.

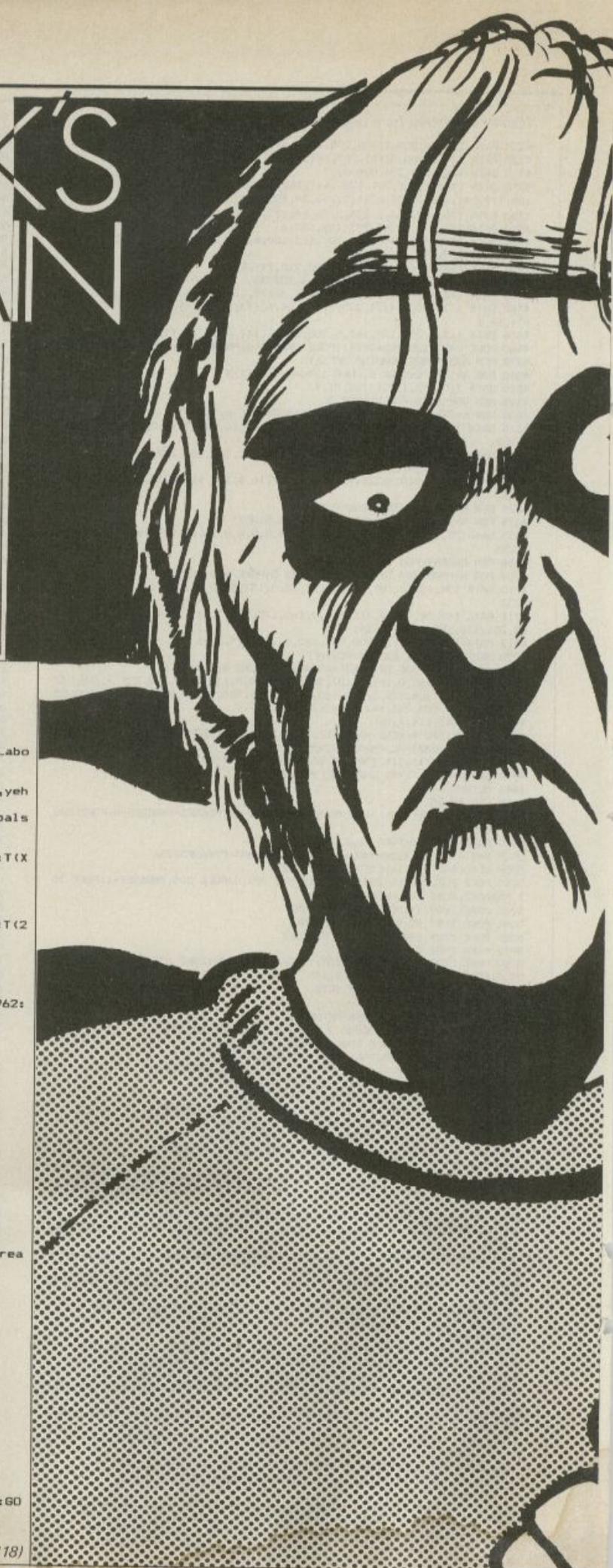
You start in the middle floor, and leave from one of the corners and are able to move floors by falling into traps or using the Enchanted Elevator which appears occasionally. Naturally, you cannot escape until you have found the spellbook in one of the caverns. It is not an easy game to beat.

```

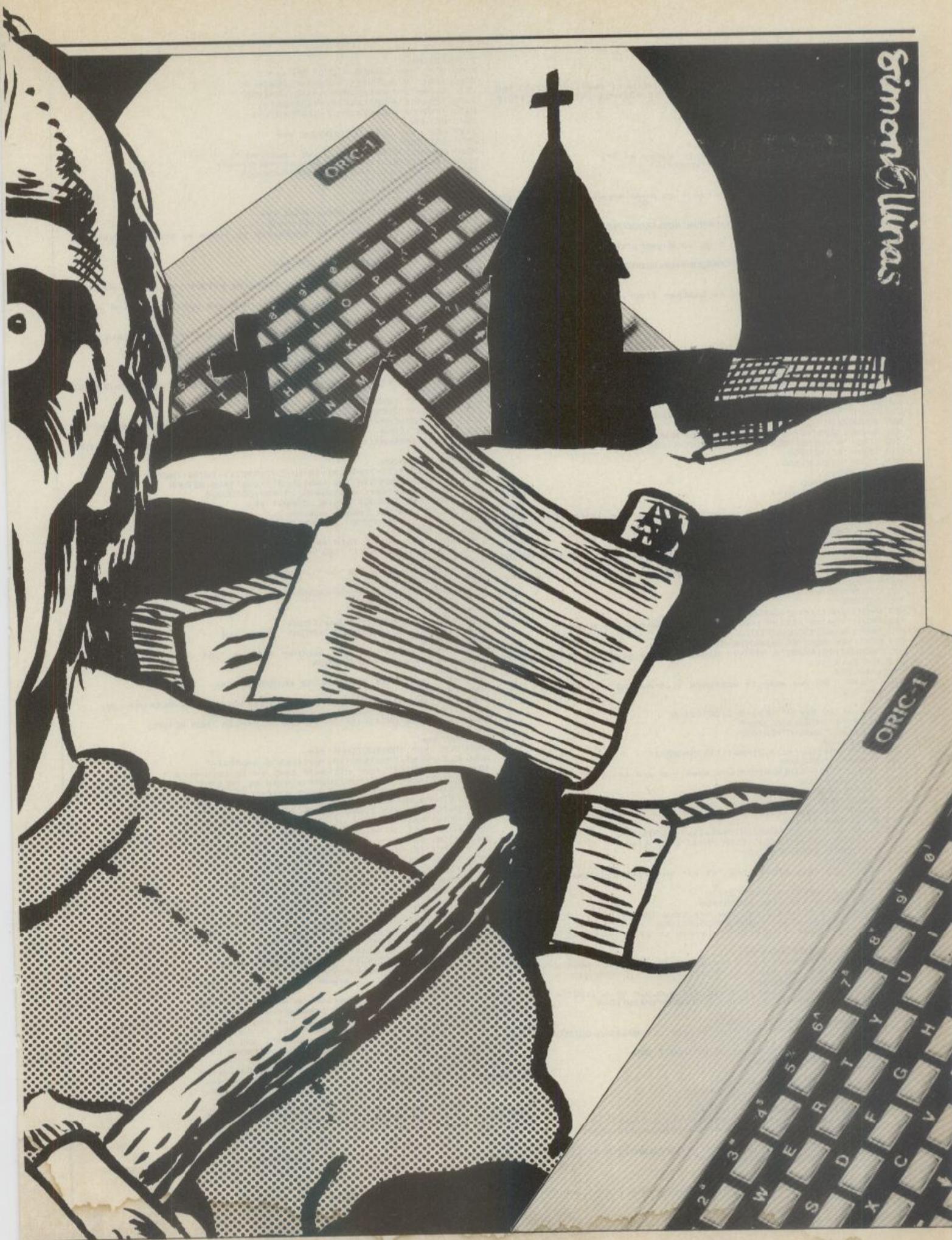
5 R=RND(RND(1)*-65535)
10 CLS:INK6:PAPER4
20 DINT(4,29),TN(9),TP$(9),M$(9)
30 PLOT7,1,CHR$(10)+"The Warlock's Mountain"
40 PLOT7,2,CHR$(10)+"The Warlock's Mountain"
50 DATA255,255,160,255,255
60 DATA Horror,Ambushers,Escape,Hideous Monsters,the WARLOCK's Labo
ratory
70 TR=1000
80 DATA Amberstones,minotaur,Bags of sovereigns,dragon,Crystals,yeh
ti,Diamonds
90 DATA troll,Emeralds,stinging jelly,Gold pieces,yellow mold,Opals
,tiger
100 DATA Rubies,lion,Sapphires,griffon,Pearls,goblin
140 FORX=0T04:READT(X,0):T(X,1)=T(X,0):T(X,2)=160:T(X,3)=T(X,0):T(X
,4)=T(X,0)
150 NEXT
160 FORX=0T04:FORY=0T04:FORI=0T05:T(X,Y+S*I)=T(X,Y):NEXT I,Y,X
170 T(1,6)=244:T(3,6)=244:T(1,8)=244:T(3,8)=244
180 T(2,11)=255:T(2,10)=255:T(3,17)=255:T(4,17)=255:T(2,23)=255:T(2
,24)=255
190 T(0,27)=255:T(1,27)=255
200 FORL=0T04:READLV$(L):NEXT
210 FORL=0T09:READ TP$(L),M$(L):NEXTL
220 EX=INT(RND(1)*8)
230 DIME(7):E(0)=48284:E(1)=48362:E(2)=48396:E(3)=48314:E(4)=48962:
E(5)=49074
240 E(6)=48996:E(7)=49044
250 GOSUB4000:LI=-1:DISPLAY INSTRUCTIONS
290 GOSUB300:GOTO330
300 CLS:FORB=48282T048316
310 FORD=STOB+760STEP40
320 POKED,126:NEXTD:NEXTS
325 RETURN
330 P=48774:LV=0:CT=0:PW=INT(RND(1)*21+10):FIGHT=2800
335 C=0:GOSUB340:GOTO 384
340 ST=0:M=48364:GOSUB2000
350 M=48394:GOSUB2000
360 M=48964:GOSUB2000
370 M=48994:GOSUB2000
375 ST=0:M=P:GOSUB2000
377 ST=9
380 GOSUB2100
383 POKEP,164:RETURN
384 PRINT" Press N,S,W or E to change direction just before you rea
ch a junction"
385 IFPEEK(616)>5THENGOSUB2100
386 I=1
390 PRINT"Which way ( N,S,E or W )":GETD$
395 GOSUB2100
400 GOSUB2200
405 IFC<0THEN700
406 IFC=27THENC=-1
410 PK=PEEK(P+I):V=INT(RND(1)*10)
415 M=P+3*I:P1=P+I:S=0
420 IFP=E(EX)ANDLV=0ANDSB=1THEN1500
430 CT=INT(RND(1)*10)-4:IFCT=-1THENC=1 ELSECT=CT+(CT<0)*CT
440 IFPK<33THENP=P-I:I=0-I:POKEP-I,160:POKEP,164
460 IFPK=126THENGOSUB2000:CT=1:GOTO400
470 WAIT20:D$=KEY$
480 IFFPK=255THENI=0-I:GOTO530
490 IFRND(1)*50>49 THEN GOSUBB00
500 IFRND(1)*200>199THEN550
510 IFLV=2ANDRND(1)*50>=.99THENGOSUB2640:PRINT"Lucky !!":WAIT300:GD
SUB2100
520 IFSB=C>25THEN550
530 POKEP,160:P=P+I:POKEP,164:GOTO400

```

(listing continued on page 118)

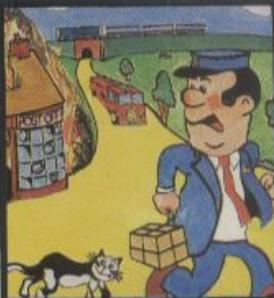


Simon & Lina's



(listing continued from page 116)

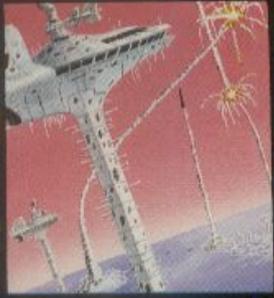
```
550 PRINT " A Trap to catch unwary travellers.":WAIT200:POKEP,160
560 P1%=(P-4B364)/200:P2%=(P-4B364-200*P1%)/P2%:P3%=(P2%-INT(P2%/40))*40:P3
%P2%/5
570 P=4B364+P3%*5+P1%*200:GOTO705
599 REM *** CHANGE FLOOR ***
600 POKEP+1,1B9:GOSUB2100
610 PRINT " The Enchanted Elevator."
620 PRINT "Up a floor, down a floor or carry on ?";
630 GETA$:IFA%="C" THEN GOSUB2100:GOTO2010
635 C=0:CT=0:ST=0
640 IFA%="U" THEN 670
650 IFLV=-2 THEN PRINT "You can't go down anymore.":WAIT300:GOTO
2010
655 GOSUB300
660 LV=LV-1:P=P+3:I:IFLV=0 THEN GOSUB340 ELSE GOSUB375
665 RETURN
670 IFLV=2 THEN PRINT " You can't go up anymore.":WAIT300:GOTO2010
675 GOSUB300
680 LV=LV+1:P=P+3:I:IFLV=0 THEN GOSUB340 ELSE GOSUB375
690 RETURN
700 GOSUB2100:GOTO550
705 PRINT "You dematerialised to another floor.":WAIT300
707 C=0:CT=0:ST=0
710 IFLV=2 THEN LI=-1
711 IFLV=-2 THEN LI=1
715 LV=LV+LI
720 GOSUB300
730 IFLV=0 THEN GOSUB340 ELSE GOSUB375
740 GOSUB2100:GOTO550
799 REM *** WANDERING MONSTER ***
800 S=KEY$:GOSUB2100
810 PRINT "There is a "M$(V)" wandering about ahead.Do you wish to a
pproach it.":
820 PRINT "sneak up on it,withdraw or cast treasure ?";:GETA$
825 GOSUB2100
830 W=INT((ABS(LV)+1)*10*RND(1))+20*RND(1)
840 IFA%="W" THEN IF PEEK(P-1)=160 THEN I=-1:RETURN
850 IFA%="A" THEN 900
853 IFA%="C" THEN 1600
855 GOSUB2800
870 IFW<20 THEN 950
880 W=INT(RND(1)*10)+1
885 PW=PW-W
890 PRINT "You survived,but are wounded ";:IFW<=0 THEN PRINT "fatally"
:GOTO3000
893 IFW<6 THEN PRINT "slightly" ELSE PRINT "badly"
895 WAIT300:GOTO2100
900 IFRND(1)>.6 THEN PRINT "He's friendly;you may pass.":WAIT300:GOTO21
00
910 PRINT "It's one of the Warlock's pets,and he's not in a very
good mood.":
920 GOSUB2800:W=INT(RND(1)*10)
930 GOTO885
950 W=INT(RND(1)*10):GOSUB2100
960 PRINT "You've killed the "M$(V)" and gained his power."
970 PW=PW+W:WAIT300:GOTO2100
999 REM *** MONSTER GUARDING TREASURE ***
1000 GOSUB2100:PRINT "A "M$(V)" appears to be guarding the treasure
in this cavern"
1005 A$=KEY$
1010 PRINT " Do you wish to approach it,sneak up and attack it, or
retreat ?";
1015 S=0
1020 GET A$:IF A$="R" THEN I=0-I:GOTO2100
1030 IFA%="S" THEN S=15 ELSE S=9
1040 IFA%<"A" AND S=0 THEN I=0
1045 GOSUB2100
1050 W=INT((ABS(LV)+1)*10*RND(1))+20*RND(1)
1060 IFA%="A" THEN 1400
1065 IFRND(1)*10<5 THEN PRINT "He's seen you and is pretty angry.":S=7
1070 IFW<5 THEN 1200
1080 IFW<55 THEN 1140
1085 GOSUB FIGHT
1090 PRINT "You have killed the "M$(V)" but it has wounded you ";
1095 W=INT(RND(1)*10)
1100 PW=PW-W:IFW<=0 THEN PRINT "fatally":GOTO3000
1110 IFW<5 THEN PRINT "badly" ELSE PRINT "slightly"
1120 S=0:GOSUB 2500:GOTO2100
1200 GOSUB2800
1210 PRINT "You have killed the "M$(V)" and absorbed some of his mag
ic powers"
1220 PW=PW+INT(RND(1)+10):GOTO1120
1400 A=INT(RND(1)*10):IFA<A THEN 1450
1410 PRINT "He's friendly and you may take the ";
1420 PRINT "treasure of ";:GOSUB2520:RETURN
1450 PRINT "He doesn't look very pleased to see you and, yes.":GO
TO1085
1499 REM *** PLAYER WINS ***
1500 CLS:PRINT "You have found the exit and escaped. Well done !"
1505 PRINT " I bet you can't do it again !!"
1510 K$="captured":GOTO3050
1600 GOSUB2100:PRINT " Cast : a,b,c,d,f,g,o,p,r or s.":GETA$
1610 FORN=0 TO 9:IFA%="LEFT$(TP$(N),1) THEN A$=TP$(N):G=N
1615 NEXTN
1620 IFLEN(A$)=1 THEN PRINT:GOTO855
1630 IFTN(G)<10 THEN PRINT:PRINT "No effect...":WAIT300:GOTO855
1635 PRINT
1640 PRINT "The "M$(V)" has vanished.":WAIT 300
1650 TN(G)=INT(RND(1)*TN(G))
1660 GOTO2100
1999 REM *** DRAW A NEW CAVE ***
2000 IF RND(1)*20>=19 AND ST>0 THEN 600
2005 GOSUB3500
2010 FORN=0 TO 4:POKEM-82+N,T(0,N+CT*5)
2020 POKEM-42+N,T(1,N+CT*5):POKEM-2+N,T(2,N+CT*5)
2030 POKEM+38+N,T(3,N+CT*5):POKEM+78+N,T(4,N+CT*5):NEXTN
2040 PLAY1,0,0,0
2050 FORS=1000 TO 500 STEP -20: SOUND1,S,9:NEXTS:WA*TS:PLAY0,0,0,0
2060 IFACT=1 THEN CT=0:GOSUB TREASURE
2070 C=C+1:RETURN
2099 REM *** CLEAR TOP SIX ROWS ***
2100 PRINTCHR$(30);:FORN=1 TO 6:PRINTCHR$(14):NEXT:PRINTCHR$(30);
2110 PRINT " Level of "LV$(LV+2)
2115 IFS<>0 THEN RETURN
2120 PRINT "Power now is "PW
2130 RETURN
2199 REM *** CHANGE DIRECTION ***
2200 IFD%="N" AND PEEK(P-40)=160 THEN I=-40
2210 IFD%="S" AND PEEK(P+40)=160 THEN I=40
2220 IFD%="E" AND PEEK(P+1)=160 THEN I=1
2230 IFD%="W" AND PEEK(P-1)=160 THEN I=-1
2240 RETURN
2499 REM *** ADD TO TREASURE ***
2500 WAIT300
2510 GOSUB2100:PRINT "You have captured ";
2520 JW=INT(RND(1)*50)+10:TP=INT(RND(1)*10)
2525 IFJW<30 AND LV=2 AND SB=0 THEN 2600
2530 PRINTJW;TP$(TP)
2540 TN(TP)=TN(TP)+JW
2550 WAIT300:GOTO2100
2599 REM *** CAPTURE SPELL-BOOK ***
2600 PRINT "the Warlock's spell-book.":
2610 SB=1:PRINT "it would be advisable to leave as soon as possible
now!"
2620 WAIT800:GOTO2100
2639 REM *** CONFRONT WARLOCK ***
2640 GOSUB2100:TT=0
2650 PRINT "Zeroth the Warlock is standing before you and he wants h
is spellbook";
2660 PRINT " back; you can give it to him and hope to find anothe
r copy";
2670 PRINT " or ...":WAIT900:S=0:GOSUB2100
2680 PRINT "cast all of your treasure at him and hope he vanishes o
r fight him";
2690 PRINT " if you are feeling powerful.":A$=KEY$:WAIT900
2700 PRINT "Choose G,C or F.":GETA$
2705 GOSUB2100
2710 IFA%="G" THEN GOSUB2100:PRINT "He's disappeared !":WAIT400:GOSUB2
100:RETURN
2720 IFA%="C" THEN 2760
2730 IFA%<"F" THEN GOSUB2100:GOTO2700
2740 IFPW<15 THEN PRINT "You don't have a chance !":GOSUB2810:PRINT "He
killed you.":PW=0
2745 IFPW<14 AND RND(1)>.4 THEN PRINT "50-50 !":GOSUB2810:IFRND(1)>.4 THE
N RETURN
2750 POP:GOTO3000
2760 FORN=0 TO 9:TT=TT+TN(N):TN(N)=INT(RND(1)*TN(N)):NEXTN
2770 IFTT>250 THEN PRINT "He vanished !":WAIT400:RETURN
2780 PRINT "No effect whatsoever.":POP:GOTO3000
2799 REM *** CONDUCT MORTAL COMBAT ***
2800 PRINT " mortal combat ensues..."
2810 FOR N=1 TO 40 :POKEP,170:WAIT9:POKEP,164:WAIT8:NEXT N
2820 RETURN
2999 REM *** END OF TRIP ***
3000 WAIT300:CLS:PRINT " You're dead !":WAIT200
3010 K$="lost"
3050 PRINT "Treasure "K$"; :-":PRINT
3055 Y=PEEK(616)
3060 FORN=0 TO 9:IFTN(N)=0 THEN 3080
3070 PRINT TN(N);TP$(N)
3080 NEXTN
3083 IFSB=1 THEN PRINT " I Spellbook"
3085 IFPEEK(616)=Y THEN PRINT:PRINT " Not a lot !"
3087 PRINT:PRINT
3090 INPUT "Would you like another attempt ";:A$
3100 IFLEFT$(A$,1)=-Y THEN RUN
3110 END
3499 REM *** CHECK FOR BLOCKED ENTRANCES ***
3500 P9=P+8*I
3510 P1=PEEK(P9+3):P2=PEEK(P9-3):P3=PEEK(P9+120):P4=PEEK(P9-120)
3520 IFP1=160 OR P2=160 OR P3=160 OR P4=160 THEN RETURN
3530 IF P1=126 OR P2=126 OR P3=126 OR P4=126 THEN RETURN
3540 CT=0
3570 RETURN
3799 REM *** INSTRUCTIONS ***
4000 CLS:PRINT:PRINTSPC(10) "Warlock's mountain"
4010 PRINT:PRINT " Your ultimate task is to recover a "
4020 PRINT "copy of a spellbook stolen by Zeroth"
4030 PRINT "the warlock from your master 137 years";
4040 PRINT "ago.Many others have tried,but failed.":
4050 PRINT " Zeroth lives inside a mountain which"
4060 PRINT "has 5 levels of passages and caverns"
4070 PRINT "all of which shift about.There are "
4080 PRINT "monsters guarding all of the treasure"
4090 PRINT "in the caverns,but they might be "
4100 PRINT "friendly and let you take it.If not"
4110 PRINT "you will have to fight them for it,"
4120 PRINT "possibly getting wounded or maybe "
4130 PRINT "gaining power from the experience."
4140 PRINT " The spellbook is to be found on the"
4150 PRINT "top level of the Warlock's laboratory"
4160 PRINT "and the exit in a corner of the floor"
4170 PRINT "of Escape.Should you meet the warlock"
4180 PRINT "take great care,if you decide to give"
4190 PRINT "him the book back he will go away,but"
4200 PRINT "you will have to find another copy"
4210 PRINT "before you can escape."
4220 PRINT:PRINT " press a key to continue..."
4230 A$=KEY$:GETA$:CLS
4300 PRINT:PRINTSPC(10) "Warlock's mountain":PRINT
4310 PRINT " Collect as much treasure as possible"
4320 PRINT "on your journey as it has magical"
4330 PRINT "properties i.e. when cast at monsters"
4340 PRINT "it can make them disappear, and if it"
4350 PRINT "does you can always retrieve some of"
4360 PRINT "it from the ground."
4370 PRINT " On encountering an obstacle you will"
4380 PRINT "be given a choice of possible courses"
4390 PRINT "of action; just use the initial letter";
4400 PRINT "to determine the one you choose."
4410 PRINT " When dealing with treasure guardians"
4420 PRINT "and wandering animals you can withdraw";
4430 PRINT "before they see you, or approach them"
4440 PRINT "or sneak up on them,maybe causing a"
4470 PRINT "fight,usually ending in their death"
4480 PRINT "and you being wounded,perhaps fatally.":
4500 PRINT "if your power is low.Sneaking up on "
4510 PRINT "them however always causes a fight,but";
4520 PRINT "you have a much better chance of "
4530 PRINT "finishing it unharmed and absorbing"
4540 PRINT "some of your adversaries power."
4550 PRINT:PRINT " press a key to start..."
4580 A$=KEY$:GETA$:RETURN
```



**Pat the Postman**  
Really original. All Pat has to do is collect parcels whilst avoiding obstacles – like cars, fires, trains, etc. Skill level and Hall of Fame.  
48K Spectrum. £6.95



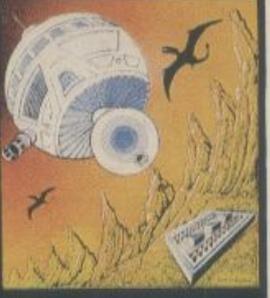
**Deffendar**  
Earth is under attack from mutant aliens in an accurate implementation of a top arcade game – and one of the most difficult to survive in!  
48K Spectrum. £6.95



**Cruise Attack**  
Save the city from annihilation in this wonderful version of an arcade favourite. Nine skill levels, bonus points for attack ships.  
48K Spectrum. £6.95



**Nanas**  
Catch the bananas, miss the coconuts. Easy? Try it and see. Simple in concept, hilariously entertaining – it'll drive you bananas.  
16K Spectrum. £5.95



**Timequest**  
A warp-space accident spreads your capsule across time. As you land in each new era, fresh perils face you. A very skillful graphic adventure  
48K Spectrum. £6.95



**One Hundred & Eighty**  
That famous shout tells you what it's all about! A good implementation of a difficult game – doubles, trebles, twenty-five and bull all possible.  
48K Spectrum. £6.95



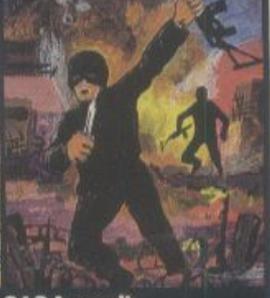
**Land of Sagan**  
A quest to find the long lost Staff of Health. Is it in one of the castles? Or in the Tower? There are plenty of problems – and plenty of opponents – in this great graphic adventure.  
48K Spectrum. £6.95



**Creepy Crawler**  
An authentic version of one of the most addictive arcade games devised. All the usual features (Centipede, Spider, Bug, etc) with full use of Spectrum graphics and sound.  
16K Spectrum. £5.95



**Mad Martha II**  
Great sequel to the best-selling Mad Martha. Hilarious graphic adventure, with hero Henry in sunny Spain, beset by wacky waiters, mad bulls and the wrathful Martha.  
48K Spectrum. £6.95



**SAS Assault**  
Your mission – rescue the Russian ambassador from terrorist kidnappers, before the Kremlin declares war. Loads in two parts – your rating in the second depends on your skill in the first.  
48K Spectrum. £6.95



**Star Trek**  
Defend the star systems against the Klingon attack. Runs in real time – so you have to make the right decisions fast!  
48K Spectrum. £6.95



**Drakmaze**  
Find your way round Dracula's domain. A game to get your teeth into!  
48K Spectrum. £6.95



**Laserwarp**  
Invaders, Aliens, this game has the lot – and you have to survive to destroy the Master! Simple controls, far from simple task.  
48K Spectrum. £6.95



**Knockout**  
No aliens, lasers, invaders or rockets – just simple but absorbing fun which up to 4 players can enjoy.  
48K Spectrum. £6.95



**Galakzions**  
Watch out as the Galakzions break formation to attack in such force that no mere human can survive!  
16K Spectrum £5.95

See them at  
Lightning, PCS,  
Tiger, Co-op,  
Menzies, W H Smith  
& other leading  
retailers

**PHONE YOUR VISA  
OR ACCESS  
NUMBER**

**Other great new Mikro-Gen programs coming soon – watch out for them!**

Please make cheques/PO payable to 'Mikro-Gen' and add 40p post & packing per order.

**MIKRO-GEN**

Mikro-Gen, 1 Devonshire Cottages, London Rd, Bracknell RG12 2TQ Tel: 0344 27317

IN COMPARISON WITH the other features of the ZX Spectrum computer, its sound capabilities are often underused. When compared to the facilities offered by other micros the single channel Beep of the Spectrum does seem rather tame.

However, it is worthwhile to learn how to make the most of the Beep command, since the inclusion of sound or music in your programs can add a great deal to their impact.

For anything other than very short tunes, the amount of work involved is prohibitive. It would be very much easier if you could actually play the tune into the memory of the computer, using the Spectrum keyboard in the same way as a piano keyboard. The Spectrum then becomes a musical instrument upon which you can compose music, storing it as you play, and then sit back and listen as the computer replays it for you.

Once you are satisfied, you could save the stored music in the memory to tape so that it could be included in another program.

It was with this idea in mind that I wrote the program called Spectrum Musicmaker in listing 1. This program runs on a 48K Spectrum, and allows you to play music over a range of four and a half octaves. The bottom two rows of keys operate like a piano keyboard, with Caps Shift to Space playing white notes, and A to L giving the black notes. The number keys 1 to 4 are used to change the pitch of the keys in one octave steps.

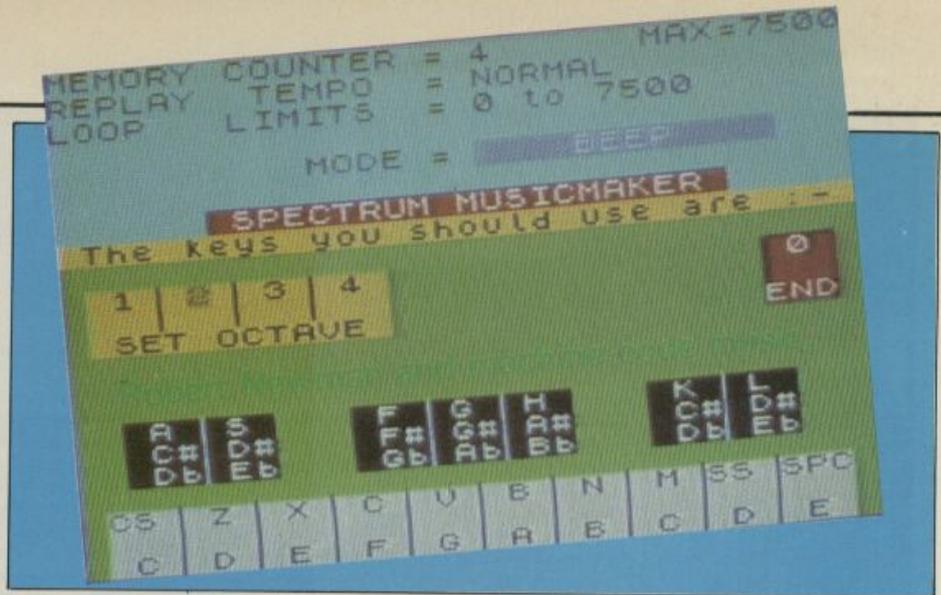
If you wish to store your music as it is being played, it is put into memory between addresses 35000 and 65000, which can hold up to 15000 notes — at least 30 minutes of music. Each note that you play, or each pause between notes, is stored as two bytes in the memory.

The first byte takes values from 0 to 53, where a value of 0 means that no key was being pressed, and values from 1 to 53 correspond to Beeps of pitch -12 to 40. The second bytes tells how long the note — or rest — lasts for, and a value of 40 corresponds to about 1 second. You can stop playing at any time and listen to a playback of your music, either at normal speed or at a faster or slower tempo, and then carry on playing by adding to the end of recording over what you have already stored.

In addition, the computer can be made to play back in a loop — replaying the same piece over and over again. This could be useful if you have another musical instrument and use the Spectrum to set up a backing track to which you can play an accompaniment.

All or part of the music memory can be saved to tape, and later reloaded to be replayed either by the "musicmaker" program, or by a small subroutine — listing 5 described later in this article — which you can include in your own programs.

The musicmaker program uses a machine code routine when the keyboard is being played as a musical instrument. The routine is disassembled in listing 4. The machine code scans the keyboard, plays the correct note if a key is being pressed, counts how long a key is held down, stores the note and its length in memory, updates the memory counter displayed on the TV screen and indicates what octave you are currently playing in, changing



# MUSIC MAKER

this if one of the keys 1 to 4 are pressed.

The usual Break key is disabled while the machine code is running, and you return to the main program by pressing key 0.

To make a copy of the program, you should first type in the Basic program in listing 1. Do not Run the program yet, because it needs the machine code which you have not yet entered. Save the Basic program with the command:

SAVE "musicmaker" LINE 70

After Verifying the program you can enter the machine code. Erase the main program with New, and then type in and Run the loader program in listing 2. Input the machine code from the dump in listing 3. When you have finished, the machine code should be Saved after the main program on your tape with the command:

SAVE "beepcode" CODE 34273,308

You can now rewind the tape and Load musicmaker. The program will auto-run and load the machine code. Before the screen displaying the main menu of options appears, there will be a short delay while the program clears the music memory and Pokes data for the machine code routine. This delay only occurs when the program is Run for the first time.

If you accidentally break out of the program back to Basic without having saved your music to tape, you can simply type RUN to restart without losing the contents of the music memory.

The memory counter at the top of the screen shows you what part of the memory you are recording into or replaying from. If you are using the program to store a tune which you want to be able to use in one of your own programs, you will need to make a note of its value at the beginning and end of your tune.

You can then select the Save to tape option

in the main menu and tell the program that you only want to save part of the memory. When you have input the start and end counter values of your tune, the program will tell you the actual memory address from where your code is stored, and the number of bytes, as it saves your code.

In your own program you are unlikely to want to store the music code in these same memory locations. For example, if your Basic program is longer than the musicmaker Basic program, you might have to store the music code at a higher memory address. Since the music code is just data, it can easily be relocated to any address. In your program you simply load it in using:

LOAD "music" CODE new start address, no. of bytes

Before doing this, you will of course need to have reset RAMtop to a suitable value using the Clear command so that the music code cannot be overwritten by the Basic system. In your program, the tune can be replayed by using the subroutine in listing 5. Before calling it, you should assign variables M\$ and NB. M\$ is the start address of the music code, and NB is the number of bytes.

The volume from the Spectrum's built-in speaker is not very loud. However, with some cassette recorders you can amplify the sound as follows. Connect the Mic lead from computer to recorder, and disconnect the Ear lead. Remove any tape from the recorder, and then press Play. You should then find that the sound from the Spectrum is amplified through the loudspeaker of the recorder.

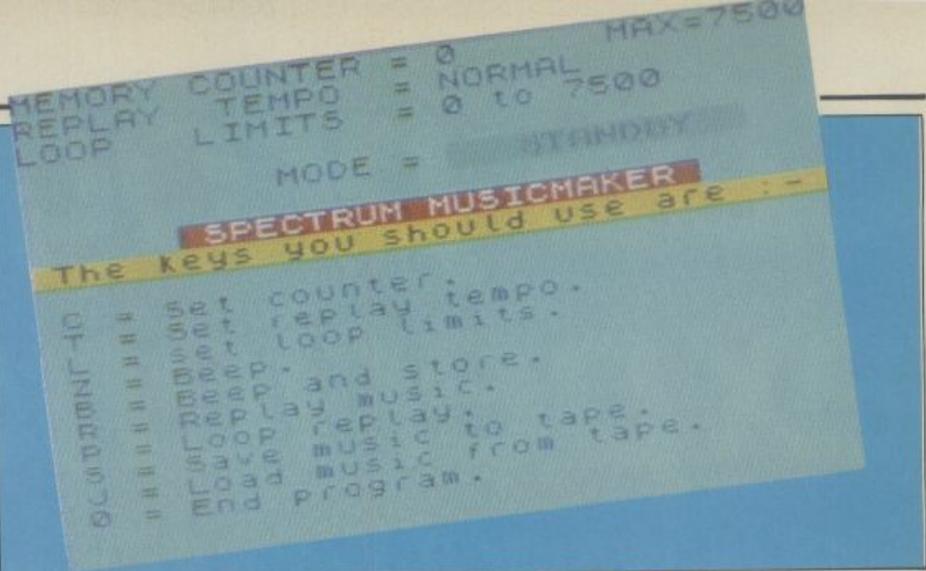
If you would prefer to save yourself the trouble of typing in the program and machine code, I can supply you with a cassette, price £3 from 47 Wellingborough Road, Broughton, Kettering, Northants.

Listing 2. Machine code loader program.

```
10 CLEAR 33999
20 FOR j=34273 TO 34580
30 PRINT j;" ";
40 INPUT n: POKE j,n
50 PRINT n
60 NEXT j
70 SAVE "beepcode"CODE 34273,308
```

Listing 3. Machine code dump.

```
Bytes from 34273 to 34580
243 221 33 208 132 175 50 210 132 50
211 132 50 212 132 50 214 132 221 54
1 12 62 2 205 1 22 205 1 134
251 201 1 254 239 237 120 203 71 204
17 0 1 6 247 205 249 134 123 254
0 40 41 254 5 40 37 22 0 33
221 132 28 126 50 209 132 197 33 33
09 6 12 62 48 119 35 16 252 175
198 3 29 32 251 95 33 31 89 25
62 176 119 193 17 0 1 6 253 205
249 134 6 191 205 249 134 22 0 33
249 134 6 127 205 249 134 22 0 33
226 132 25 126 254 0 40 3 221 134
1 50 208 132 231 203 5 70 40 93
221 190 2 32 18 221 52 3 62 235
221 190 3 32 78 42 215 132 98 210
132 119 35 50 2 1 132 119 35 34 215
132 98 208 132 50 210 132 221 54 3
1 237 91 217 132 167 237 82 56 5
221 94 4 1 201 221 52 6 221 203
6 70 32 29 62 22 215 175 215 62
17 215 237 75 219 132 3 237 67 219
132 205 27 26 62 32 215 62 32 215
62 32 215 50 208 132 254 0 32 12
6 18 14 255 13 32 253 16 249 190
1 134 7 95 22 0 33 247 132
25 78 35 70 35 94 35 86 197 225
221 229 205 181 3 221 225 195 1 134
237 120 4 5 15 56 1 90 20 16
249 201 175 33 184 136 6 118 14 255
119 35 13 32 231 16 247 201
```



Listing 5.

```
980 REM This subroutine can be
981 REM used to replay music
982 REM code saved from the
983 REM "musicmaker" program.
984 REM
985 REM Before calling it, you
986 REM must assign variables
987 REM NB and NB - 1.
988 REM
989 REM NB = address of first
990 REM byte of music code.
991 REM
992 REM NB = number of bytes.
993 REM
994 REM Rebuffer to CLEAR
995 REM RANTIP to a suitable
996 REM value before loading
997 REM the music code
998 REM
999 REM To remove the pauses
1000 REM between notes, take out
1001 REM line 9920
1002 REM
1003 REM *****
1004 REM FOR i=NB TO NB+NB-2 STEP 1
1005 IF PEEK i THEN BEEP PEEK i:GOTO 1003
1006 IF PEEK (i+1) THEN PAUSE PEEK (i+1)
1007 NEXT i
1008 RETURN
1009 REM *****
```

Listing 4. Disassembled machine code.

```
ORG 34000 DEF B 0 DEF B 14 BVALS DEFS 216 LD A,2
NOTE DEF B 0 DEF B 12 DEF B 0 CALL 1601H
OCTAV DEF B 0 DEF B 24 DEF B 11 ORG 34273 CALL MAIN
LASTN DEF B 0 DEF B 36 DEF B 1 EI
TIME DEF B 0 DEF B 3 DEF B 3 RET
MFLAG DEF B 0 KVALS DEF B 0 DEF B 5 START DI
MODE DEF B 0 DEF B 2 DEF B 6 LD IX,NOTE MAIN LD BC,0EFFEH
BOOLY DEF B 0 DEF B 4 DEF B 8 XOR A IN A,(C)
MEMRY DEF W 0 DEF B 0 DEF B 17 LD (LASTN),A BIT 0,A
MEND DEF W 0 DEF B 7 DEF B 15 LD (TIME),A RET Z
COUNT DEF W 0 DEF B 9 DEF B 13 LD (MFLAG),A LD DE,100H
DVALS DEF B 0 DEF B 16 DEF B 10 LD (BOOLY),A
LD (IX+1),12 (listing continued on page 124)
```

Listing 1. Program: musicmaker.

```
10 REM *****
20 REM * Spectrum musicmaker *
30 REM * (c) G. Newman 1982 *
40 REM *****
50 GO TO 250
60 REM auto-run entry point
70 CLEAR 33999
80 BORDER 4: PAPER 6: INK 0: CLS
90 PRINT AT 5,0:"Please wait for the machine code"TAB 12:"to load."
100 LOAD "beepcode"CODE
105 PRINT "PLEASE WAIT A FEW MOMENTS LONGER"
110 RANDOMIZE USR 34565
120 RESTORE
130 FOR j=34013 TO 34038: READ n: POKE j,n: NEXT j
140 DATA 0,0,12,24,36,0,2,4,0,7,9,0,16,14,0,11,1,5,8,8,17,15,13,12,10
150 FOR j=34039 TO 34251 STEP 4
160 READ n: POKE j,FN 1(n): POKE j+1,FN h(n)
170 IF n THEN LET n=INT (10000/n)+3
180 POKE j+2,FN 1(n): POKE j+3,FN h(n)
190 NEXT j
200 DATA 0,3320,3130,2950,2780,2620,2475,2330,2200,2075,1950,1850,1740,1640,154
5,1460,1375,1290,1225,1155,1085,1024,965,910,855
210 DATA 605,760,715,670,632,596,565,530,495,466,438,412,388,365,342,322,302,28
5,265,250,233,218,206,192,180,167,156,146,136
220 REM *** initialization ***
230 DEF FN a(n)=astart+n
240 DEF FN c(x)=INT (x-astart)/4
250 DEF FN h(x)=INT (x/256)
260 DEF FN l(n)=256*FN h(n)
270 DEF FN p(x)=PEEK x+256*PEEK (x+1)
280 DIM t$(3,6): DIM n$(7,12)
290 LET n=""
300 LET astart=35000
310 LET nend=65004
320 LET mcode=34273
330 LET lne=astart
340 LET lne=nend
350 LET c=0
360 LET cmax=7500
370 LET lolim=0
380 LET hilim=cmax
390 LET t=""
400 RESTORE 430
410 FOR j=1 TO 7: READ n$(j): NEXT j
420 FOR j=1 TO 3: READ t$(j): NEXT j
430 DATA " STANDBY", " BEEP", "BEEP & STORE", " REPLAY", "LOOP REPLAY", " TA
PE SAVE", " TAPE LOAD"
440 DATA " BLD", "NORMAL", " FAST"
500 REM * display main screen *
510 BORDER 3: PAPER 6: INK 0: CLS
520 PRINT "MEMORY COUNTER = 0":TAB 24:"MAX=7500"
530 PRINT "REPLAY TEMPO = NORMAL"
540 PRINT "LOOP LIMITS = 0 to 7500"
550 PRINT TAB 10:"MODE = ":FLASH l;n$(1)
560 PRINT AT 6,6: PAPER 2: INK 7: SPECTRUM MUSICMAKER *
570 PRINT PAPER 6: "The keys you should use are :- "
580 GO SUB 5200
1000 REM *** main loop *****
1010 POKE 23658,8
1020 INPUT "Your choice? "i$
1030 IF i$="0" THEN STOP
1040 IF i$="C" THEN GO SUB 1500
1050 IF i$="T" THEN GO SUB 1600
1060 IF i$="L" THEN GO SUB 1800
1070 IF i$="Z" THEN GO SUB 2000
1080 IF i$="B" THEN GO SUB 3000
1090 IF i$="R" THEN GO SUB 4000
1100 IF i$="P" THEN GO SUB 6000
1110 IF i$="S" THEN GO SUB 7000
1120 IF i$="J" THEN GO SUB 7500
1130 GO TO 1010
1140 REM *****
1500 REM *** set counter *****
1510 INPUT "New value for counter? "ic
1520 LET c=INT c: IF c<0 OR c>cmax THEN GO TO 1510
1530 PRINT AT 0,17:ic
1540 RETURN
1550 REM *****
1600 REM *** set replay tempo **
1610 GO SUB 8000
1620 PRINT " S for slow tempo."
1630 PRINT " N for normal tempo."
1640 PRINT " F for fast tempo."
1650 POKE 23658,8
1660 IF INKEY$="S" AND INKEY$="N" AND INKEY$="F" THEN GO TO 1660
1670 IF INKEY$="S" THEN LET t=3: LET s=1
1680 IF INKEY$="N" THEN LET t=1: LET s=2
1690 IF INKEY$="F" THEN LET t=2: LET s=3
1700 PRINT AT 1,17:t$(2)
1710 GO SUB 5200
1720 RETURN
1730 REM *****
1800 REM ** set loop limits ****
1810 GO SUB 8000
1820 PRINT "Enter new values for loop limits"
1830 INPUT "Low limit? "ln
1840 LET n=INT n: IF n<0 OR n>cmax THEN GO TO 1830
1850 LET lolim=n
1860 INPUT "High limit? "hn
1870 LET n=INT n: IF n<lolim OR n>cmax THEN GO TO 1860
1880 LET hilim=n
1890 PRINT AT 2,17:lolim: TAB 2:"to "hilim
1900 GO SUB 5200
1910 RETURN
1920 REM *****
2000 REM ***** beep *****
2010 PRINT AT 4,17: PAPER 1: INK 7: FLASH l;n$(2)
2020 GO SUB 5000
2030 POKE 34005,0
2040 RANDOMIZE USR acode
2050 GO SUB 5200
2060 PRINT AT 4,17: FLASH l;n$(1)
2070 RETURN
2080 REM *****
3000 REM *** beep and store ***
3010 PRINT AT 4,17: PAPER 6: INK 1: FLASH l;n$(3)
3020 GO SUB 5000
3030 LET lne=FN a(c)
3040 POKE 34005,1
3050 POKE 34007,FN l(lms)
```

# CDS programs, experience

*This is 'Winged Warlords'  
a brand new Arcade Adventure  
game from CDS.*

*Just one of a new  
range of exciting  
programs for 1984....*

*Arcade action....*

*3D Space adventures....*

*Education and fantasy....*

CDS Micro Systems

SPECTRUM SAFARI



SPECTRUM 48K

new...  
Spectrum  
Adventure

CDS Micro Systems

WINGED WARLORDS



SPECTRUM 16/48K

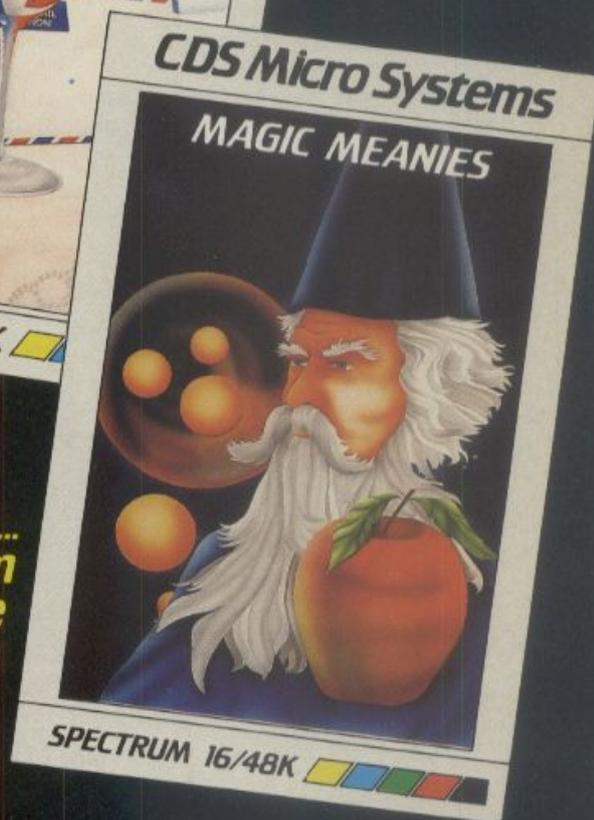


ONLY £5.95 each at W.H.Smiths, \*Boots, John Menzies and other leading Computer Stores  
Available direct from CDS Micro Systems Send Cheque or P.O. To CDS 10, Westfield Clo

# the ultimate



new ....  
Spectrum  
Education



new ....  
Spectrum  
Arcade  
action

## ZX81

DODGEMS/CONNECT 4	XXX	2001
CASTLE ADVENTURE	XXX	2003
BREAKOUT	XXX	2004
BRICK-STOP	XXX	2005
REVERSI	XXX	2006

## ORIC

BOZY BOA	XXX	3001
REVERSI	XXX	3002

## SPECTRUM

GOBBLE A GHOST	XXX	1001
CATERPILLAR	XXX	1002
LEAPFROG	XXX	1003
REVERSI	XXX	1004
3 D PAINTER	XXX	1005
BOZY BOA	XXX	1006
POOL	XXX	1007

## NEW

WINGED WARLORDS	XXX	1008
SPECTRUM SAFARI (48K)	XXX	1009
MAGIC MEANIES	XXX	1010
TIME BOMB	XXX	1012
FRENCH IS FUN (48K)	XXX	1501
GERMAN IS FUN (48K)	XXX	1502

\* Selected titles only

res, or...

se, Tickhill, Doncaster DN11 9LA. Tel: (0302) 744129. (Trade enquiries welcome)

(listing 1 continued from page 121)

```

3060 POKE 24008, FN 1 (GAS)
3070 POKE 24009, FN 1 (MEND)
3080 POKE 24010, FN 1 (REND)
3090 POKE 24011, FN 1 (CY)
3100 POKE 24012, FN 1 (C)
3110 RANDOMIZE USR ACODE
3120 LET lee=FN p (24007)
3130 LET c=FN p (24011)
3140 GO SUB 5200
3150 PRINT AT 4,17: FLASH 1:ms(1)
3160 RETURN
3170 REM *****
4000 REM **** replay music *****
4010 GO SUB 8000
4020 PRINT " L to replay last tune,"
4030 PRINT " R replays from counter onwards,"
4040 PRINT " C to reset counter, then replay,"
4050 POKE 23658,B
4060 IF INKEY$ <> "L" AND INKEY$ <> "R" AND INKEY$ <> "C" THEN GO TO 4060
4070 LET z=INT v
4080 IF z#="L" THEN LET ac=lee: LET me=lee: LET c=FN c (lee): GO TO 4110
4090 IF z#="C" THEN GO SUB 1500
4100 LET me=FN a (c): LET me=rend
4110 PRINT AT 0,17: c: " "
4120 GO SUB 4500
4130 PRINT AT 4,17: FLASH 1:ms(4)
4140 PAPER 5: INK 0
4150 GO SUB 4500
4160 GO SUB 5200
4170 PRINT AT 4,17: FLASH 1:ms(1)
4180 RETURN
4190 REM *****
4500 REM *** replay menu *****
4510 PAPER 2: INK 7: GO SUB 8000
4520 PRINT " A to stop playback,"
4530 PRINT " S for slow tempo,"
4540 PRINT " N for normal tempo,"
4550 PRINT " F for fast tempo,"
4560 RETURN
4570 REM *****
5000 REM **** show piano keys **
5010 PAPER 4: GO SUB 8000
5020 PAPER 6
5030 PRINT AT 9,1: " 1 2 3 4 " : AT 10,1: " " : AT 11,1: " SET OCTAVE "
5040 FOR j=0 TO 2
5050 PLOT 31+j*24,103: DRAW 0,-15
5060 NEXT j
5070 PRINT PAPER 2: INK 7: AT 9,28: " 0 " : AT 10,28: " " : AT 11,28: " END"
5080 PAPER 0: INK 7
5090 PRINT AT 15,21: " A B " : AT 15,11: " F B H " : AT 15,25: " K L "
5100 PRINT AT 16,21: " C# D# " : AT 16,11: " F# G# A# " : AT 16,23: " C# D# "
5110 PRINT AT 17,21: " Db Eb " : AT 17,11: " Db Ab Bb " : AT 17,23: " Db Eb "
5120 PLOT 41,32: DRAW 0,24
5130 PLOT 13,32: DRAW 0,24
5140 PLOT 137,32: DRAW 0,24
5150 PLOT 208,32: DRAW 0,24
5160 PAPER 7: INK 0
5170 PRINT AT 19,1: " C B 2 X C V B N H S SPC "
5180 PRINT AT 20,1: " "
5190 PRINT AT 21,1: " C D E F G A B C D E "
5140 FOR j=0 TO 8
5150 PLOT 31+j*24,0: DRAW 0,24
5155 NEXT j
5160 POKE 22821,17s
5165 PAPER 5
5170 RETURN
5180 REM *****
5200 REM **** show main menu ***
5210 PAPER 3: INK 0
5220 GO SUB 8000
5230 PRINT " C = Set counter,"

```

```

5240 PRINT " T = Set replay tempo,"
5250 PRINT " L = set loop limits,"
5260 PRINT " Z = Beep,"
5270 PRINT " B = Beep and store,"
5280 PRINT " R = Replay music,"
5290 PRINT " P = Loop replay,"
5300 PRINT " S = Save music to tape,"
5310 PRINT " J = Load music from tape,"
5320 PRINT " 0 = End program,"
5330 RETURN
5340 REM *****
6000 REM **** loop replay *****
6010 GO SUB 4500
6020 PRINT AT 4,17: FLASH 1:ms(5)
6030 PAPER 5: INK 0
6040 LET me=FN a (1011): LET me=FN a (1111)+2
6050 LET c=1011: PRINT AT 0,17: c: " "
6060 GO SUB 4500: IF q#<>"A" THEN GO TO 6050
6070 GO SUB 5200
6080 PRINT AT 4,17: FLASH 1:ms(1)
6090 RETURN
6100 REM *****
6500 REM ** play from ns to me **
6510 LET a=ms: LET b=1: LET c#="": LET s#=.025
6520 IF PEEK a THEN BEEP: PEEK (a+1)*s, PEEK a-13: GO TO 6540
6530 IF PEEK (a+1)>20 THEN PAUSE: PEEK (a+1)*t+1
6540 IF INKEY$="" THEN GO TO 6600
6550 LET q#INKEY$
6560 IF q#="A" THEN RETURN
6570 IF q#="S" THEN LET s#=.075: LET t#3: PRINT AT 1,17: s(1)
6580 IF q#="N" THEN LET s#=.025: LET t#1: PRINT AT 1,17: t(2)
6590 IF q#="F" THEN LET s#=.005: LET t#2: PRINT AT 1,17: t(3)
6600 LET a#t+2: IF a#me THEN RETURN
6610 LET a#NOT b: IF b THEN LET c#-1: PRINT AT 0,17: c
6620 GO TO 6520
6630 REM *****
7000 REM **** tape save *****
7010 PAPER 1: INK 7: GO SUB 8000
7020 PRINT " A to save all of music memory,"
7030 PRINT " P to save part of memory,"
7040 POKE 23658,B
7050 IF INKEY$ <> "A" AND INKEY$ <> "P" THEN GO TO 7050
7060 IF INKEY$="A" THEN LET cst=stari: LET cend=end+3: GO TO 7150
7070 PRINT "From "
7080 INPUT "Low value for counter? " : n
7090 LET n=INT n: IF n<0 OR n>=cend THEN GO TO 7080
7100 PRINT n: " to "
7110 INPUT "High value for counter? " : i2
7120 LET z=INT z: IF z<=n OR z>=cend THEN GO TO 7110
7130 PRINT "
7140 LET cst=FN a (n): LET cend=FN a (i2)+3
7150 PRINT "TAB 2: " : PUT DATA: TAPE INTO RECORDER"
7160 PRINT "SAVING " : music " : CODE " : cset: " : cend-cst-1
7170 PRINT AT 4,17: FLASH 1:ms(6)
7180 SAVE "music" : CODE cst, cend-cst+1
7190 GO SUB 5200
7200 PRINT AT 4,17: FLASH 1:ms(1)
7210 RETURN
7220 REM *****
7500 REM **** tape load *****
7510 PAPER 0: INK 7: GO SUB 8000
7520 PRINT AT 4,17: FLASH 1:ms(7)
7530 PRINT AT 12,10: "FLAY DATA TAPE"
7540 LOAD "music" : CODE
7550 GO SUB 5200
7560 PRINT AT 4,17: FLASH 1:ms(1)
7570 RETURN
7580 REM *****
8000 FOR j=8 TO 0: PRINT AT j,0:ms: NEXT j
8010 PRINT AT 9,0
8020 RETURN
8030 REM *****

```

(listing 4 continued from page 121)

LD B, OF7H	LD B, 7FH	LD DE, (MEND)	LD E, A
CALL KEYRT	CALL KEYRT	AND A	LD D, 0
LD A, E	LD D, 0	SBC HL, DE	LD HL, BVALS
CP 0	LD HL, KVALS	JR C, L1	ADD HL, DE
JR Z, MKEYS	ADD HL, DE	MFULL LD (IX+4), 1	LD C, (HL)
CP 5	LD A, (HL)	RET	INC HL
JR Z, MKEYS	CP 0	L1 INC (IX+6)	LD B, (HL)
LD D, 0	JR Z, 3	BIT 0, (IX+6)	INC HL
LD HL, 0VALS	ADD (IX+1)	JR NZ, SOUND	LD E, (HL)
ADD HL, DE	LD (NOTE), A	CDISP LD A, 22	INC HL
LD A, (HL)	BIT 0, (IX+5)	RST 10H	LD D, (HL)
LD (OCTAV), A	JR Z, SOUND	XOR A	PUSH BC
PUSH BC	CP (IX+2)	RST 10H	POP HL
LD HL, 22817	JR NZ, STORE	LD A, 17	PUSH IX
LD B, 12	INC (IX+3)	RST 10H	CALL 03B5H
LD A, 48	LD A, 255	LD BC, (COUNT)	POP IX
M1 LD (HL), A	JR NZ, SOUND	INC BC	JP MAIN
INC HL	LD (COUNT), BC	LD (COUNT), BC	KEYRT IN A, (C)
DJNZ M1	CALL 1A1BH	CALL 1A1BH	LD B, 5
XOR A	LD A, 32	LD A, 32	K1 RRCA
M2 ADD 3	RST 10H	RST 10H	JR C, 1
DEC E	LD A, 32	RST 10H	LD E, D
JR NZ, M2	RST 10H	LD A, 32	INC D
LD E, A	RST 10H	RST 10H	DJNZ K1
LD HL, 22815	LD (MEMRY), HL	LD (MEMRY), HL	RET
ADD HL, DE	LD A, (NOTE)	SOUND LD A, (NOTE)	CLEAR XOR A
LD A, 176	LD A, (LASTN), A	CP 0	LD HL, 35000
LD (HL), A	LD (IX+3), 1	JR NZ, BEEP	LD B, 118
POP BC	LD (IX+3), 1	DELAY LD B, 18	LD C, 255
MKEYS LD DE, 100H	BIT 0, (IX+5)	D1 LD C, 255	LD (HL), A
LD B, OFDH	JR Z, SOUND	D2 DEC C	INC HL
CALL KEYRT	CP (IX+2)	JR NZ, D2	DEC C
LD B, OBFH	JR NZ, STORE	DJNZ D1	JR NZ, C2
CALL KEYRT	INC (IX+3)	JP MAIN	DJNZ C1
LD B, OFEH	LD A, 255	BEEP RLCA	RET
	CP (IX+3)	RLCA	END





John Nash with  
a routine to pep  
up your Dragon's  
commands.

# SOFT KEYS

DRAGON BASIC IS housed in ROM like most other Basics, but frequently dips out into RAM where you can make various alterations. A simple method of adding commands, and a method of adding extra functions to existing routines will be described. All alterations have to be made in machine code, preferably Assembly Code, as Basic itself is a machine

code program. The examples to be given are just that:— examples. The possibilities are limited only by your own imagination and requirements.

If you wish to add new commands to Basic, one way to do this is to intercept the character interpreter feed routine at \$009F. This is a short but clever routine that updates itself,

with the result that it jumps to \$BB26 with the next code in register H. To add a new command, all you need to do is change that jump to your own interpreter, and then feed it on the \$BB26 when you have finished. The Basic will continue to work as normal, and you will not get a "SN error" report, because the new code will not reach the real interpreter.

Listing 1a: Assembler listing for autorepeat.

20100	ORG	\$2220	00210	LDD	\$A6	
00110	START	CMPA	#82	00220	SUBD	#1
00120	BNE	BACK	00230	STD	\$A6	
00130	LDD	\$A6	00240	LDA	#82	
00140	ADDD	#1	00250	BACK	JMP	\$BB26
00150	STD	\$A6	00260	ACTIV	LDD	#\$200
00160	LDA	[\$A6]	00270	STD	\$10D	
00170	CMPA	#65	00280	JMP	\$9F	
00180	BEQ	ACTIV	00290	DEACT	LDD	#\$9D3D
00190	CMPA	#68	00300	STD	\$10D	
00200	BEQ	DEACT	00310	JMP	\$9F	
			00320	END		

Listing 1b: Hex. dump for autorepeat including interrupt routine.

```

512 B6 1 13 84 F 81 0 26 C 8E
522 1 50 86 FF A7 80 8C 1 60 26
532 F9 7E 9D 3D 0 0 0 0 0
542 0 0 81 52 26 1C DC A6 C3 0
552 1 DD A6 A6 9F 0 A6 81 41 27
562 10 81 44 27 14 DC A6 83 0 1
572 DD A6 86 52 7E BB 26 CC 2 0
582 FD 1 D E 9F CC 9D 3D FD 1
592 D E 9F 0 0 0 0 0 A
    
```

Listing 1c: Basic loader for autorepeat including interrupt routine.

```

10 DATAB6,1,13,84,F,81,0,26,C,8E
20 DATA1,50,86,FF,A7,80,8C,1,60,26
30 DATAF9,7E,9D,3D,0,0,0,0,0
40 DATA0,0,81,52,26,1C,DC,A6,C3,0
50 DATA1,DD,A6,A6,9F,0,A6,81,41,27
60 DATA10,81,44,27,14,DC,A6,83,0,1
70 DATADD,A6,86,52,7E,BB,26,CC,2,0
80 DATAFD,1,D,E,9F,CC,9D,3D,FD,1,D,E,9F
100 FORN=512 TO 594:READA$:POKEN,UAL("&H
"+A$):NEXT
110 DATA86,7E,B7,0,A8,86,02,B7,0,A9,86,2
0,B7,0,Af,39
120 FORN=12000 TO 12015:READA$:POKEN,UAL
("&H"+A$):NEXT
130 EXEC12000
    
```

# DRAGON

Listing 2: Assembler listing

```

00100 ORG $2200
00110 BEGIN LDA $113
00120 ANDA #$0F
00130 CMPA #0
00140 BNE NOTNOW
00150 LDX ##150
00160 LDA #$FF
00170 LOOP STA ,X+
00180 CMPX ##160
00190 ENL LOOP
00200 NOTNOW JMP $9D3D
00210 END
    
```

Listing 3a: Assembler listing for Run question routine.

```

00100 ORG $2200
00110 KB EQU $8006
00115 PSHS D,X,Y
00120 START LDX ##400
00130 LDA ##20
00140 LOOP STA ,X+
00150 CMPX ##600
00160 BNE LOOP
00170 WRITE LDX ##500
00180 LDY #STORE
00190 LOOP2 LDA ,Y+
00200 STA ,X+
00210 CMPX ##505
00220 BNE LOOP2
00230 SCAN JSR KB
00240 CMPA #0
00250 BEQ SCAN
00260 CMPA #'Y
00270 BNE DONT
00280 PULS D,X,Y,PC
00290 DONT PULS D,X,Y
00295 JNP #B4AA
00300 STORE FCC /SURE?/
00310 END
    
```

An example will make this clearer: listing 1a.

I wanted to add an auto-repeat to my keyboard, and decided to use RA — Repeat Activate — to turn it on, and RD — Repeat Deactivate — to turn it off. Obviously it is better if you do not use existing Basic words.

Line 100 sets origin to \$2220, which I shall later move to \$0220, which my assembler regards as a forbidden area. Putting the code between \$0200 and \$02FF will make it invisible to Basic programs, and will not consume any usable memory. But exceed \$0300 at your peril

Line 110 checks for "R" and returns if not.

Line 130-150 increment the text pointer at \$00A6.

Line 160,170 get the next character and check for "H".

Line 180 branches to ACTIV if so.

Line 190 checks for "D" and branches to DEACT if so.

Line 210-240 restore \$00A6, and put "R" back in it if neither "H" nor "D" is found.

Line 250 then passes the "R" on to the proper interpreter.

ACTIV alters the interrupt vector in \$10D/E to go to a new routine at \$0200, and DEACT alters the interrupt vector back to its usual destination of \$9D3D.

A few words of explanation about the interrupt; this is a subroutine which is called 50 times per second when enabled. You can divert it to small routines of your own before sending it about its usual tasks. If your routines are too long in time, it will slow the Basic. However you can use it for anything needing frequent updating, such as timers, graphics, and in my program, for clearing the keyboard rollover table, and thus providing an autorepeat. Now look at listing 2a.

Line 100 sets the origin to \$2200. This routine

Listing 3b: Hex. dump for Run question

```

512 34 36 8E 4 0 86 20 A7 80 8C
522 6 0 26 F9 8E 5 0 10 8E 2
532 30 A6 A0 A7 80 8C 5 5 26 F7
542 BD 80 6 81 0 27 F9 81 59 26
552 2 35 B6 35 36 7E B4 AA 53 55
562 52 45 3F 0 0 0 0 0 0
    
```

will sit nicely at \$0200, just below the other one.

Line 110 gets the timer value — incremented 50 times/sec.

Line 120 ANDs this value with \$0F (1111 binary), which will only look at the last four bits. If these are zero, then the rollover table is cleared (set to \$FF) by line 150-190. Finally the routine passes control to \$9D3D, the normal interrupt vector. This routine at \$0200 will only be enabled if you have pressed RA (return).

You will find that you can also use RH and RD in program lines, but they must be prefaced by REM. This will not be ignored by the new interpreter routine. If you wish to vary the speed of repeat, POKE a different number into \$204 — decimal 516.

This technique can be used for redefining single keys also, but you will then need another routine to decide whether to send the character to the new interpreter or not. You could for example use a routine KON — key-on — which would store the address of the new interpreter in \$A8, thus enabling single key functions, and another routine KOF — key-off — which would put JMP \$BB26 back into \$A8 as before. The possibilities are considerable.

You cannot just Poke addresses such as the

interrupt and keyboard vectors — \$10D/E and \$A9/10 — or the system will crash. For the method of making these alterations see below.

Several Basic routines branch, usually with a JSR instruction, to RAM locations. These normally contain just RTS (\$39), so control is sent straight back to the ROM routine. Some of these can be useful: the ones I have used are:

Character Input	\$167
Character Output	\$16A
Error	\$18E
Run	\$194
Read next word	\$19A

Some of these can be Poked directly from Basic — Run, Error — but with others this will cause a crash because the routine will go through the address with the POKE only half complete. In this case you must use a short machine code routine to do the Poking such as:

```

LDA $7E (code for JUMP extended)
STA $NN (where NN is $18E in the case of Error)
LDD #PPQQ (where PPQQ is the start of your routine)
STD $185 (in the case of Error)
RTS
    
```

(continued on page 129)

# Silverlind

**NEW**

SILVERLIND LTD. 156 Newton Road, Burton-on-Trent  
Staffs DE15 0TR. Tel Burton (0283) 63987



ALL PRICES INCLUDE POST & PACKING & VAT

## MASTER DIET PLANNER 48K Spectrum £11.95

The ultimate in diet programs, the MASTER DIET PLANNER contains details of calories, protein, vitamins and other nutrients for 681 foods! The MASTER DIET PLANNER will help you to plan a well-balanced diet, including options to restrict fats, cholesterol and salt, or to increase fibre intake - at the same time offering maximum choice of foods. Instruction and Recipe Book included.

## ADVENTURE GAMES

### HAUNTED HOUSE BBC/B £6.00

An excellent introduction to adventure games. Can you survive the perils of the castle and the graveyard, to collect the 6 treasures AND rescue the princess?

### JOURNEY TO THE STARS BBC/B £6.50

You have been sent on a dangerous mission to find 10 treasures - but how are you going to get back? Beware of the Antiflavian MegaTiger and venomous lizard woman!

### PASSPORT TO DEATH BBC/B £6.50

From the planet Zandra, you have been sent to Earth, a strange place with stranger inhabitants! Finding treasures is not enough - without extra fuel, your starship will not get you home.

## EDUCATIONAL PROGRAMS

### ENJOY MATHS 48K Spectrum £8.00

A suite of 4 highly motivating programs for the 8 - 14 age range: tables, simple equations, polygons and areas. The programs combine explanation with tests and make good use of colour and sound.

### TOWNTEST BBC/B £6.50

Identify the major towns and cities of England, Scotland and Wales, displayed on a high-resolution map. Suitable for all age groups and for school or home use (try it as a quiz for all the family!)

### BIOLOGY BBC/B £12.50

A major collection of programs, written by a GCE examiner, designed to aid the understanding of Biology to CSE, 'O' and 'A' Level standards. These programs - comprising text, animated diagrams and questions - are available in one package and are suitable for individual study at school or in the home. Teachers will also find material suitable for class demonstration.

## STRATEGY GAMES

### PENTILES BBC/B £6.95

### REVERSI (Othello) BBC/B £6.95

*We require good programs to increase our catalogue and pay high royalty rates for published material.*

## Self Adhesive Cassette Labels

- ★ ON ROLLS OR SHEETS
- ★ IDEAL FOR USE IN TYPEWRITERS
- ★ A BOON TO SOFTWARE PRODUCERS
- ★ CAN BE PRINTED WITH CLUB OR COMPANY LOGO OR SYMBOL

### CASSETTE LABELS ON SHEETS (15 Labels per sheet)

100 Labels	£3.50
200 Labels	£5.00
300 Labels	£8.25
400 Labels	£10.00
500 Labels	£12.00

### CASSETTE LABELS ON ROLLS (Complete with tractor feed perforations to allow use in most computer printers)

Square or round ended centre hole
Minimum order 500 labels
500 Labels £11.00
1000 Labels £20.00

All Prices include VAT and postage/ packing  
Excellent discounts for large quantities

Please send stamp for printing price lists and sample labels

Industrial  
Process

UNIT A4  
SMEED-DEAN CENTRE  
EUROLINK INDUSTRIAL ESTATE  
SITTINGBOURNE  
KENT ME10 3RN  
Sittingbourne (0795) 28425

Self Adhesive Computer Labels -

Superfast

## LONDON HOME COMPUTER SHOW

We are sorry  
we had to  
cancel the  
show

(continued from page 127)

which has the same effect but uses only the A register.

Now look at listing 3a. This routine is vectored from Run, so when you type Run you will go via the new routine. The effect is to clear the screen to black, then print "SURE?" and wait for a key press. If you respond Y the Run command will be executed as usual, but any other key will cause the system start-up message to appear — your Basic program will neither be Run nor erased.

Line 100 Listing 3A too is assembled at \$2200 and moved to \$0200. Note that you must move the FCC text string address also, see legend for Figure 3.

Line 110 Define keyboard scan ROM address  
 Line 115 Stack D,X,Y for safe-keeping  
 Line 120-160 Copy black space (\$20) to all text screen (\$400 to \$5FF)  
 Line 170-220 Copy 5 characters from \$STORE to \$500-\$504 (half way down the screen)  
 Line 230-250 Wait for key  
 Line 260 Is it "Y", if so 280  
 Line 280 Get back D,X,Y,PC (i.e. return)

**Listing 3c: Basic loader for Run question.**

```

10 DATA34,36,8E,4,0,85,20,A7,80,8C
20 DATA6,0,26,F9,8E,5,0,10,8E,2
30 DATA30,A6,A0,A7,80,8C,5,5,26,F7
40 DATA8D,80,6,81,0,27,F9,81,59,26
50 DATA2,35,86,35,36,7E,B4,AA,53,55
60 DATA52,45,3F
100 FORN=512 TO 564:READA#:POKEN,UAL(" &H
'+A#):NEXT
110 POKE&H195,2:POKE&H196,0:POKE&H194,12
5
  
```

Line 270 No it wasn't "Y" so 290  
 Line 290-295 Get back D,X,Y and Jump to \$B4AA (start-up)

This is only a simple example, but you could obviously adapt the technique to write various messages on error, etc.

The routine in listing 4 is a synthesis of some of these techniques and will check for the command New. If this is found, it will clear the screen and print "CONFIRMATION?" and wait for a key. If Y, it will execute the NEW, otherwise it will restart Basic as above, without losing the program. The assembly code is given in Listing 4a, which is merely a re-arrangement

of the routines explained above. Once again, if you are using an assembler, you will probably have to assemble it elsewhere and move it, in which case do not forget to move the FCC text address also — legend 4b.

Finally, it is possible to disable Break by changing the stack pointer and jumping over a subroutine call. The extra code can be Poked into \$19A to \$19E provided that you Poke \$19H last of all. The following code

```

POKE &H19B,6
POKE &H19C,&H7E
POKE &H19D,&H84
POKE &H19E,&HA6
POKE &H19A,&H35 (note the order).
PULS D (pop one from stack)
JMP $84A6 (skips over BREAK check)
  
```

To disable this, POKE&H19A,&H39.

Any of these routines, once loaded, can be saved for future use by the following:

```
CSAVEM"NAME",168,637,470
```

You can then erase the Basic program as it is no longer needed. To reload from tape, type CLoadM.

**Listing 4a: Assembler listing for New protect routine.**

00100	ORG	\$2200	00420	JMP	\$B4AA		
00110	KB	EQU	\$8006	00430	BACK LDA	[\$A6]	
00120	START	CPMA	#'N	00435	JMP	\$BB26	
00130		BNE	BACK	00440	BACK2	BSR	DEC
00140		BSR	INC	00450		BRA	BACK
00150		LDA	[\$A6]	00460	BACK3	BSR	DEC
00160		CPMA	#'E	00470		BSR	DEC
00170		BNE	BACK2	00480		BRA	BACK
00180		BSR	INC	00490	INC	LDD	\$A6
00190		LDA	[\$A6]	00500		ADDD	#1
00200		CPMA	#'W	00510		STD	\$A6
00210		BNE	BACK3	00520		RTS	
00220		PSHS	X,Y	00530	DEC	LDD	\$A6
00230		LDX	#\$400	00540		SUBD	#1
00240		LDA	#\$60	00550		STD	\$A6
00250	LOOP	STA	,X+	00560		RTS	
00260		CMPX	#\$600	00570	MESSAG	FCC	/CONFIRMATION?/
00270		BNE	LOOP	00580		END	
00280	WRITE	LDX	#\$500				
00290		LDY	#MESSAG				
00300	LOOP2	LDA	,Y+				
00310		STA	,X+				
00320		CMPX	#\$500				
00330		BNE	LOOP2				
00340	SCAN	JSR	KB				
00350		CPMA	#0				
00360		BEQ	SCAN				
00370		CPMA	#'Y				
00380		BNE	DONT				
00390		PULS	X,Y				
00400		JMP	\$8415				/NEW
00410	DONT	PULS	X,Y				

**Listing 4b: Hex. dump for New protect.**

```

512 81 4E 26 47 8D 56 A6 9F 0 A6
522 81 45 26 44 8D 4C A6 9F 0 A6
532 81 57 26 3E 34 30 8E 4 0 86
542 60 A7 80 8C 6 0 26 F9 8E 5
552 0 10 8E 2 6C A6 A0 A7 80 8C
562 5 0 26 F7 BD 80 6 81 0 27
572 F9 81 59 26 5 35 30 7E 84 15
582 35 30 7E B4 AA A6 9F 0 A6 7E
592 BB 26 8D 10 20 F5 8D C 8D A
602 20 EF DC A6 C3 0 1 DD A6 39
612 DC A6 83 0 1 DD A6 39 43 4F
622 4E 46 49 52 4D 41 54 49 4F 4E
632 3F 0 0 0 0 0 0 0 0
  
```

**Listing 4c: Basic loader for New protect.**

```

10 DATA1,4E,26,47,8D,56,A6,9F,0,A6
20 DATA1,45,26,44,8D,4C,A6,9F,0,A6
30 DATA1,57,26,3E,34,30,8E,4,0,86
40 DATA0,A7,80,8C,6,0,26,F9,8E,5
50 DATA0,10,8E,2,6C,A6,A0,A7,80,8C
60 DATA5,0,26,F7,BD,80,6,81,0,27
70 DATAF9,81,59,26,5,35,30,7E,B4,15
80 DATA35,30,7E,B4,AA,A6,9F,0,A6,7E
90 DATABB,26,8D,10,20,F5,8D,C,8D,A
100 DATA20,EF,DC,A6,C3,0,1,DD,A6,39
110 DATAD0C,A6,83,0,1,DD,A6,39,43,4F
120 DATA4E,46,49,52,4D,41,54,49,4F,4E
130 DATA3F
200 FORN=512 TO 632:READA#:POKEN,UAL(" &H
'+A#):NEXT
210 DATA86,2,B7,0,A9,86,0,B7,0,AA,39
220 FORN=12000 TO 12010:READA#:POKEN,UAL
(" &H'+A#):NEXT
230 EXEC12000
  
```

# DATA CALC

Brain Law presents a spreadsheet program for the ZX-81 which works on columns of figures rather than on individual cells.

DATA CALC IS A general purpose spreadsheet type program for use on the ZX-81 with 16K RAM.

When loaded the program will run automatically and display a menu asking you to enter a 1 or a 2, 1 gives you the sheet that was Saved. It will actually give you error code 2/1045 if only the program was Saved.

Entering 2 asks you for the number of rows to be used, followed by the number of columns. Enter 10 N/L and then 10 N/L. This should give you a display showing 10 rows and three columns on the screen, with a flashing cursor in the top left hand corner.

To demonstrate the use of the program I shall use a simple example showing the calculation of profits on a range of products sold by a shopkeeper.

To enter column 1 as shown in figure 2 press the key K, the screen blanks out for a short time and then returns with the cursor fixed in row 1 of column 1. Now enter a space ' ' this blanks out the zero that was there. You will notice that the cursor has moved down to the next row ready for you to make the next entry, so now enter 'PRODUCT' N/L. To underline all of the headings enter '\_\_\_\_\_':. The : at the end tells the computer to enter this same string into each column along the row. Now enter each name in turn.

To prevent errors in calculation later on the computer needs to be told where headings and titles are. In the case of titles these can only be put into column 1 anyway, so to tell the computer you are using column 1 for titles press T for two or three seconds. The headings can take up as many of the top rows as you like, so to tell the computer where they finish, move the flashing cursor down to row 3 by hold down the 6 key and then press H.

To enter the next column move the cursor using the cursor keys to column 2 row 1, now press 'A' followed by the word 'SALES' then move cursor down to row 2 press 'A' again followed by the word 'VOLUME'. Now press K and enter each of the values in turn. You will have noticed that the cursor moved automatically to row 4 after pressing K.

This is why the A command was used to put in the headings. A is the command used when entries are made into individual cells. Anyway repeat the above procedure to enter headings and data into column 3, then by holding the 8 key down the sheet will be re-written to bring column 4 onto the screen. After filling in the headings press key F the computer will now be waiting for you to enter a formula.

A formula in Datacalc can take several forms, in this case we want to multiply the Sales Volume by the Sales Price to get the Turnover for each product. This is to say that we wish to multiply each value in column 2 by

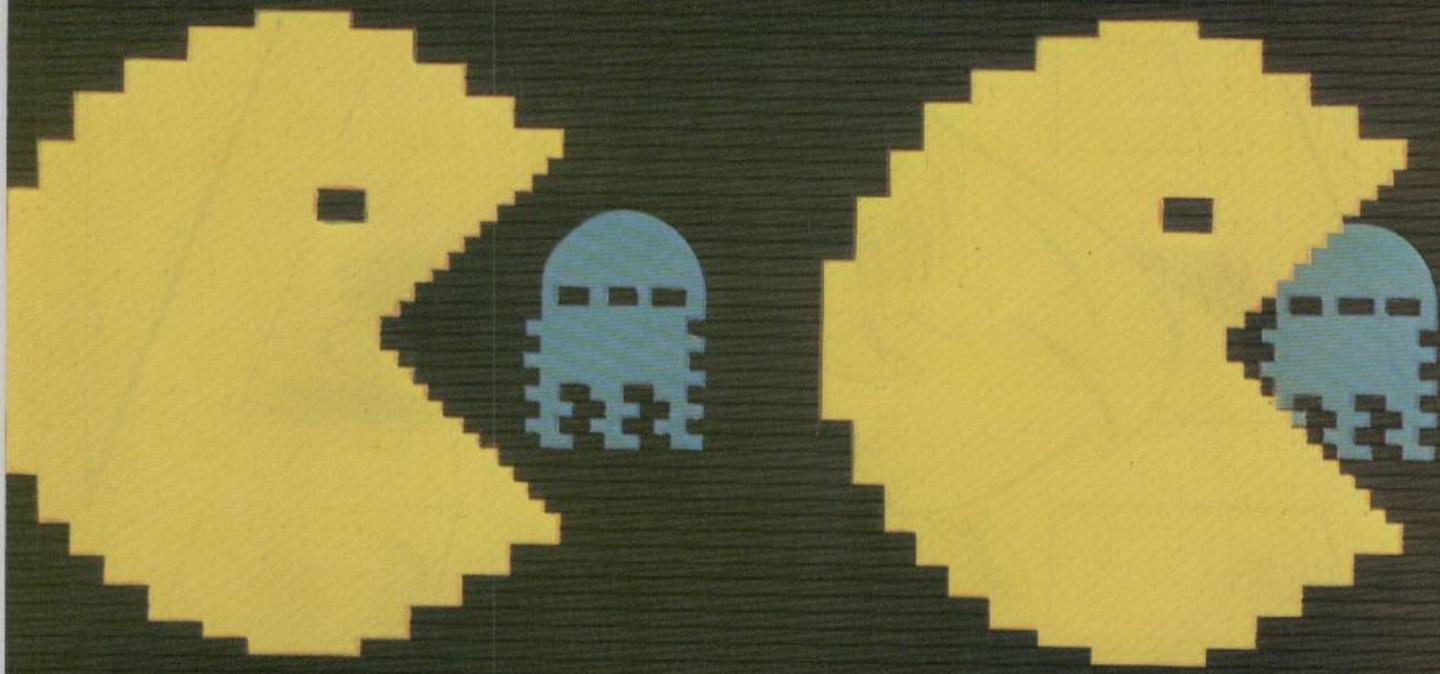
(continued on page 135)

Figure 1.

Mode	Command	Description	What is required next	Sub command	What they do
Menu	1	To enter existing sheet	-	-	-
	2	To set up new sheet	Enter number of columns required	-	-
Cursor	5	Move cursor left	Holding down at edge if screen will move sheet along 1 column	-	-
	8	Move cursor right		-	-
	7	Move cursor up	-	-	-
	6	Move cursor down	-	-	-
Main sheet	H	Headings to be used up to current cursor row	NB! Move cursor to the row where headings finish first	-	-
	T	Titles required in column 1	NB! Text can only be used in column 1	-	-
	K *	To enter a column of figures	Enter each figure or title in turn cursor jumps to next row after entry	N/L	Cursor increments one row, leaving existing figure or title unchanged
	A *	To add or amend an entry	Enter Figure or title	R	Returns operation of cursor mode
	F	Enter formula over current column	eg K1 x K2 multiply values in column 1 by values in column 2	P	Progressively sums previous column
	C	Calculate the whole sheet	-	I	Inverts values in previous column
	J	Jump to another column	Enter column number to be at first position on screen	-	-
	D	Drop or rise	Enter row number to be at top of the screen	-	-
	S	Sum of current column	-	-	-
	X	Delete sum of current column	-	-	-
	M	Rounds up decimals to two places and aligns print out on decimal point	-	-	-
	L	Overprints column 1 onto first screen column	-	-	-
	O	Sorts current column into ascending order	NB! All other columns follow the sort	-	-
	V	Save existing sheet	-	-	-
P	Prints copy of screen	-	-	-	

\* by adding A":" to a figure or title it will be repeated in all subsequent columns in current row.





“Gobble”

“Gobble”

# Now that Atari your computer, ou Forget ghostly imitations. They need not darken your screens a moment longer.

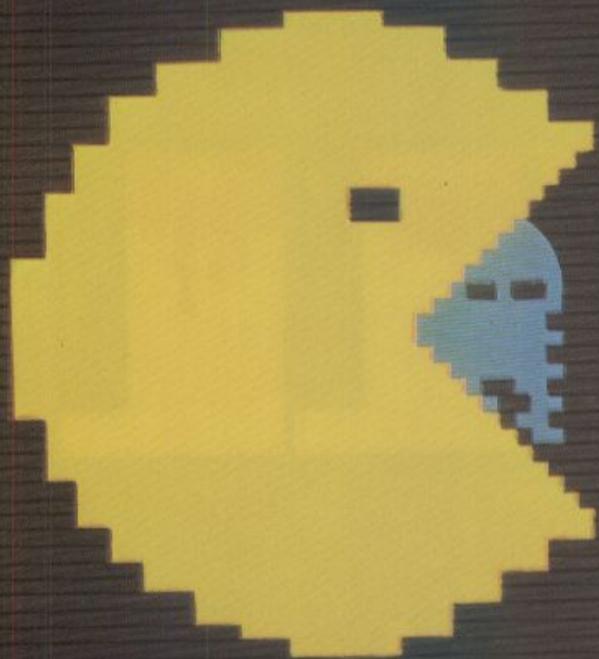
Because now you can play Atarisoft™ games on your own home computer.

Pin-sharp graphics, quick slick movements – games that really challenge your skills.

Games so close to our originals, it's like having an “Amusement Arcade” in your own living room.

SINCLAIR ZX SPECTRUM: ALL AVAILABLE ON CASSETTE. OUT NOW – PAC-MAN! MS PAC-MAN! GALAXIAN! OUT SOON – DONKEY KONG,\* DIG DUG,† POLE POSITION,‡ MOON PATROL,§ B.B.C. MODEL B/ACORN ELECTRON: ALL AVAILABLE ON CASSETTE. OUT SOON – MS PAC-MAN! DONKEY KONG,\* DIG DUG,† POLE POSITION,‡ BATTLE ZONE,§ COMMODORE VIC 20: ALL AVAILABLE ON ROM CARTRIDGE. OUT NOW – PAC-MAN! DONKEY KONG,\* DIG DUG,† OUT SOON – MS PAC-MAN! GALAXIAN,‡ POLE POSITION,‡ JUNGLE HUNT,§ MOON PATROL,§ STARGATE,§ JOUST,§ COMMODORE 64: ALL AVAILABLE ON ROM CARTRIDGE. OUT NOW – PAC-MAN! DIG

PAC-MAN, MS PAC-MAN AND CHARACTERS ARE TRADEMARKS OF NAMCO LTD. § TRADEMARK OF NAMCO LTD. \* TRADEMARK AND © NINTENDO OF AMERICA INC. 1982, 1983. † DIG DUG IS CREATED AND DESIGNED BY NAMCO LTD. MANUFACTURED UNDER LICENSE BY ATARI INC. ‡ TRADEMARK AND © NAMCO



"Gobble"

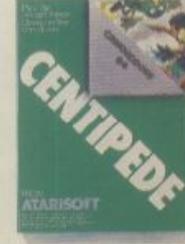


"Gulp"

# make games for r rivals don't stand a chance.

We've written the programs to suit your computer's exact requirements.

Look at our extensive range of titles. We will be adding to this list so that you can expand your library of Atari games. After all why choose a ghost now that you can have the real thing?



DUG, ROBOTRON, CENTIPEDE, DEFENDER, OUT SOON - MS PAC-MAN, GALAXIAN, JUNGLE HUNT, MOON PATROL, POLE POSITION, STARGATE, JOUST, TI 99/4A: ALL AVAILABLE ON ROM CARTRIDGE. OUT NOW - PAC-MAN, DONKEY KONG, DIG DUG, ROBOTRON, CENTIPEDE, DEFENDER, STARGATE.

For further information, write to Atari International (UK) Inc., P.O. Box 407, Blackhorse Road, London SE8 5JH.

# ATARI SOFT™

# SKULL

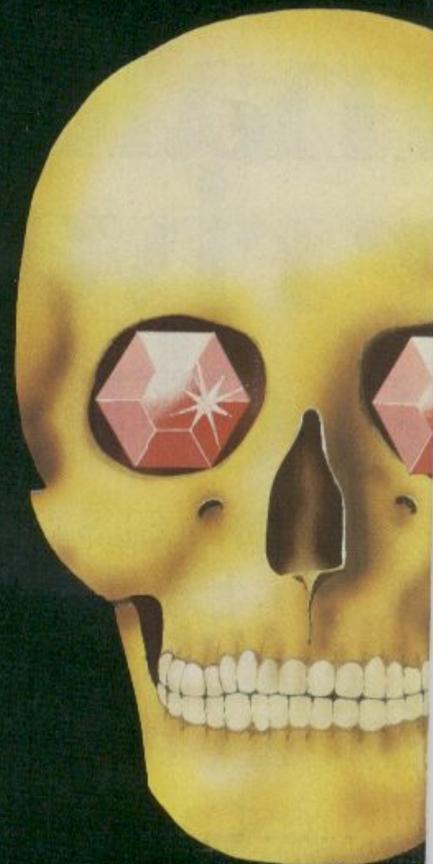
**It's a monster...**

**...and it's waiting for you**

**ENTER THE CATACOMBS ...  
HUNT THE TREASURE ...  
AVOID THE TRAPS ...  
WATCH OUT FOR SKULL!**

**SUPER NEW, ORIGINAL, 3-DIMENSIONAL  
FULL-GRAPHICS MAZE GAME FOR THE SPECTRUM 48K.  
HUNT THE TREASURE THROUGH MULTI-LEVEL MAZES  
AVOIDING HAZARDS AND DEADLY WANDERING SKULLS.  
*THIS GAME WILL BLOW YOUR MIND.  
THERE IS NOTHING ELSE LIKE IT!***

**Write for details on the GRAND HIGH SCORE COMPETITION  
GAMES MACHINE LTD.,  
40 FRETHERNE ROAD, WELWYN GARDEN CITY, HERTFORDSHIRE.  
☎ (07073) 28444/28435**



# GAMES MACHINE

	K1	K2	K3	K4	K5	K6	K7	K8
	PRODUCT	SALES VOLUME	SALES PRICE	TURNOVER	COST EACH	TOTAL COST	PROFIT	PERCENT PROFIT
1	JIGSAW	1000	13.00	13000	11.00	11000	2000	9.8522167
2	BANDSAW	200	70.00	14000	57.00	11400	2600	12.807882
3	BENCH SAW	700	35.00	24500	31.00	21700	2800	13.793104
4	DRILL	1500	15.00	22500	13.00	19500	3000	14.778325
5	ROUTER	1100	20.00	22000	17.00	18700	3300	16.256158
6	SANDER	1300	18.00	23400	15.00	19500	3900	19.211823
7	TOOL BOX	900	7.00	6300	4.00	3600	2700	13.300493
				125700		105400	20300.00	

Figure 2.

(continued from page 131)

its corresponding value in column 3. The formula used to do this is  $k2 * k3$ .

To find the total turnover for all the products we need to add together all the individual values in column 4, to do this simply press S.

We can move across the sheet by more than one column at a time by using the J command. For example we need to enter figures into column 5 next, so press J followed by 5 — that is — column 5 — the sheet is now re-written with columns 5, 6 and 7 on the screen. Before doing anything else put in the headings for these columns.

Before moving back to column 5 to enter the cost figures it would be rather nice to have the products listed down the screen to see which product the costs referred to, so use the J command again to get the screen to show columns 4, 5 and 6 — that is 'J' '4' N/L. Now press L this overprints the first screen column with column 1.

Now use the K command and enter figures into column 5. Move the cursor to column 6 now and press F again ready for entering another formula. This formula is to calculate the total costs which is the cost of each multiplied by the sales volume i.e.  $K2 * K5$ . Enter this formula and then use the S.

Move the cursor now to column 7 either by keeping the cursor pressed down or by using the J command and after putting in the heading enter the formula  $K4-K6$  to find the profit for each product. Use S again to find total profit.

Finally, move the column 8, put in the heading and press F to enter the formula for percentage profit. What we will be calculating here is what percentage of the total profit each individual product makes.

Now total profit is the sum of all individual profits and is the figure at the bottom of column 7 calculated by the 'S' command. The formula to be entered is  $K7/S7 * 100$ .

Now to demonstrate one of the features of Datacalc not normally found in spreadsheet programs, that is the SORT command. Put the cursor on column 8 and press 0 the computer will sort on column 8 and rearrange it into ascending order — that is lowest figure at the top.

All the other entries along a given row are also moved into the new order at the same time. Use the 'L' command again to print the product names.

Now move the cursor back to column 2 and position it over the 1,000 figure for the jigsaw press A and put in a new value, say 1,450. Now press C this will recalculate the whole

sheet, if you move back to column 8 you will see that all the values have been changed slightly and need re-ordering so press 0 again.

To tidy up the display press M.

It was mentioned earlier that a formula can take several forms, and we have used one of those forms when we multiply 2 columns together, for example  $K2 * K3$ . You can also use it for calculations of the type  $(27.5 \times 6) - 5$  or  $\pi \times 17/4$  in fact any of the computer's own functions can be used; for example  $\text{INT}(\pi^*30)$  is quite valid.

An interesting variation is achieved, however, if the letter R is used in a formula. Now R is the variable used in the program to denote the row number. If R is used on its own it will result in the row number being printed in each row of a column or if used in combination with some other function or number it can be used to increment for example,  $10 + (R \times 1)$  will progressively increment the value 10 by 10 percent.

The reversal of this formula will of course decrement the value. R is therefore a powerful tool for loading data into the worksheet. Two other useful functions are provided under the F command if you enter the letter P as a formula you will get a progressive sum of the previous column. If you enter I you will get the previous column inverted.

(listing continued from page 132)

```

1=(M+10)>N1
3640 GOSUB 1045
3645 RETURN
3650 REM DROP ONE PAGE
3651 REM *****
3652 FAST
3653 CLS
3655 LET M=M+10
3660 LET J=(M+10)+(M+10)<=N1)+N1
1=(M+10)>N1
3670 GOSUB 1045
3675 SLOW
3680 RETURN
3700 REM CALCULATE
3701 REM *****
3705 FAST
3710 FOR C=HC TO C1
3720 LET F=C+10-6
3730 IF A$(C,1)=" " THEN GOTO 37
90
3740 FOR R=HL TO N1
3750 LET F$(R,F TO F+8)=STR$ VAL
A$(C)
3770 NEXT R
3780 IF F$(N,F)<>" " THEN GOSUB
3810
3810 NEXT C
3792 GOSUB 1045
3795 RETURN
3800 REM SUM OF A COLUMN
3801 REM *****
3805 GOSUB 400
3808 FAST
3810 LET S=0
3820 FOR R=HL TO N1
3830 LET S=S+VAL F$(R,F TO F+8)
3840 NEXT R
3850 LET F$(N,F TO F+8)=STR$ VAL
S
3870 GOSUB 1090
3880 RETURN
3900 REM ADD OR AMEND
3901 REM *****
3910 POKE PC,PEEK(PC)+128
3920 GOSUB 400
3930 LET D=R
3950 INPUT X$
3965 IF X$(1)="R" CR X$="" THEN GOT
0 3990
3965 IF X$(1)="=" THEN GOSUB 347
3967 IF X$(1)="?" THEN GOSUB 349
3970 IF X$(LEN X$)=":" THEN GOSUB
B 3420

```

```

3980 LET F$(R,F TO F+8)=X$
3990 PRINT AT R-M+1,P;F$(R,F TO
F-P+31)
3992 IF F$(N,F)<>" " THEN GOSUB
3850
3995 RETURN
4000 REM FORMULA ENTRY
4001 REM *****
4005 FAST
4010 GOSUB 400
4020 INPUT A$(C)
4030 GOSUB 4500
4031 GOSUB 400
4040 FOR R=HL TO N1
4060 LET F$(R,F TO F+8)=STR$ VAL
A$(C)
4070 NEXT R
4075 IF A$(C,1 TO 3)="R " THEN
LET A$(C)=" "
4080 IF F$(N,F)<>" " THEN GOSUB
3810
4090 GOSUB 1045
4095 RETURN
4500 REM FORMULA ENCODE
4501 REM *****
4505 IF A$(C,1)="P" THEN GOTO 47
30
4510 IF A$(C,1)="I" THEN GOTO 47
4515 LET X=1
4520 LET A=1
4522 IF A$(C,A+1 TO A+3)=" " T
HEN GOTO 4530
4524 LET A=A+1
4526 GOTO 4522
4530 LET B=A$(C)
4540 LET C$=""
4550 IF X>A+1 THEN GOTO 4710
4560 REM
4570 IF B$(X)<>"K" AND B$(X)<>"S
" THEN GOTO 4640
4580 LET X$="R"
4590 IF B$(X)<>"K" THEN LET X$="
N"
4600 IF B$(X+2)="*" OR B$(X+2)="
/" OR B$(X+2)="/" OR B$(X+2)="*"
" OR B$(X+2)="+" OR B$(X+2)="-"
THEN GOTO 4670
4605 LET F=VAL (B$(X+1 TO X+2))*
10-6
4610 LET C=C$+VAL F$(X+1 TO X+
2)
4620 LET X=X+3
4630 GOTO 4550
4640 LET C=C$+B$(X)
4650 LET X=X+1
4660 GOTO 4550

```

```

4670 LET F=VAL B$(X+1)+10-6
4680 LET C=C$+VAL F$(X+1 TO X+
2)
4690 LET X=X+2
4700 GOTO 4550
4710 LET A$(C)=C$
4720 RETURN
4730 REM PROGRESSIVE SUM
4731 REM *****
4745 LET A$(C)=VAL F$(R,F-10 TO
F-2)+(R>HL)+VAL F$(R-1+(R>HL)
,F TO F+8)
4750 RETURN
4755 REM INVERT COLUMN
4756 REM *****
4770 LET A$(C)=VAL F$(N-(R-HL+1
),F-10 TO F-2)
4780 RETURN
4785 REM CANCEL SUM
4786 REM *****
4790 GOSUB 400
4792 LET F$(N,F TO F+8)=" "
4794 GOTO 1090
4800 REM SORT
4801 REM *****
4810 GOSUB 400
4820 LET R=1
4830 IF 2>R-N1 THEN GOTO 4860
4840 LET R=R+1
4850 GOTO 4830
4860 LET F1=2**R-1
4870 LET F2=INT (F1/2)
4880 IF F1=0 THEN GOTO 1045
4890 LET D=N1-F1
4900 LET B=1
4910 LET R=B
4920 LET E=R+F1
4925 IF R<HL OR E<HL THEN GOTO 4
940
4930 IF VAL F$(R,F TO F+8) VAL F
$(E,F TO F+8) THEN GOTO 4955
4940 LET B=B+1
4945 IF B>0 THEN GOTO 4870
4950 GOTO 4910
4955 LET X$=F$(R,3 TO J)
4960 LET F$(R,3 TO J)=F$(E,3 TO J)
4965 LET F$(E,3 TO J)=X$
4970 LET R=R-F1
4975 IF R<1 THEN GOTO 4940
4980 GOTO 4920
5000 REM SAVE
5001 REM *****
5002 SAVE "DATACAL"
5003 CLS
5004 GOTO 1

```

CAMEL PRODUCTS

Firm up your S/ware with an  
**EPROM PROGRAMMER**

AT LAST! for the Spectrum user. Put your programs, utilities, Assemblers into EPROMs for instant load from the unique ROM-SP.

**ROM-SP** for Spectrum  
Ingenious unit for Spectrum, with 2x28 pin sockets and a Reset button allows up to 16K of Basic or M/C program to RUN or LOAD instantly from EPROMS. Cabled connector and full extender card.  
NOTE: Does not disable Sinclair ROM. £29.95

**PROMER-SP** NEW for Spectrum  
A brand new Spectrum programmer for 2764/128. Zero insertion force socket & software on tape. £29.95

**PROMER 81S** NEW for Spectrum  
The very popular PROMER-81 for the ZX81 has been adapted to the Spectrum, and the price kept low. £22.95

**ROM-81** for ZX81  
Provides two 24 pin sockets for up to 8K of EPROM memory in the 8-16K area. Can use 2516/32 or 2716/32 £14.95

**PROMER-81** for ZX81  
At last! A low cost reliable programmer for 2516/32, 2716/32 EPROMS. This is the solution to using EPROMS instead of tape. Requires 4xPP3 batteries for a regulated 25 volts. Remarkably priced at £19.95

**BLOPROM-81**  
A uniquely sophisticated  
EPROM  
PROGRAMMER

In use at various labs incl. Sinclair Research

EPROM programmer for the 2516, 27XX single supply families, yes, even the 27128 from Intel. Check, Read, Program + Verify all or part of Eprom.

So immensely user friendly you'll hardly need the manual. Designed for the beginner but includes a single key entry route for the professional. Supplied as firmware, the m/c driver routine alone is worth more than the price of BLOPROM-81. No personality

Cards, or other additions, just a ZX81. Several inbuilt safety features. On-board Vpp generation. 28pin ZIF socket. Cabled connector and extender plug. ABS case.

Note: Can provide up to 36 inputs or 40 outputs as an I/O £79.95

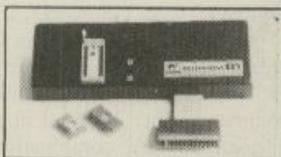
**Dream-81**  
Full 64K Rampack with link options to disable 0-8-16K. Plus a 28 pin EPROM socket for 2716, 2732/2764 and even the latest 27128 from Intel, Fast/slow Eprom option, professionally built and tested. In an ABS case with an LED indicator £59.95

**DHOB1 1**  
Compact. Mains powered. Save. Fully cased. Up to 3 EPROMS £18.95

**DHOB1 2**  
With automatic timer £22.95

**MEMIC-81**  
A 4K CMOS RAM and lithium battery unit. Easy SAVing, 10yr storage and instant retrieval of programs. Resides in 8-12K or 12-16K of ZX81. £29.95

**CRAMIC-81**  
Ingenious hardware/software allows this 16K CMOS RAM with lithium battery to CO-exist in same memory area as ordinary RAM. ZX81 can multitask on two completely independent programs. £79.95



STATUS NO. OF SYSTEM —HEX  
EPROM TYPE —27128  
RAM START ADDR —4000  
EPROM ST. ADDR —8000  
JOB LENGTH —4000  
TASK —CHECK

WHICH TASK DO YOU WISH TO DO  
W) CHECK THAT EPROM IS CLEAN  
X) READ THE CONTENTS OF EPROM INTO RAM  
Y) BLOW AN EPROM WITH DATA FROM RAM  
Z) VERIFY THAT EPROM DATA IS THE SAME AS IN RAM  
Q TO QUIT .....R TO RESTART

FAST CODES AVAILABLE:  
D H PDR WXYZ

**UV ERASER**



**PRINTER/MONITOR ACCESSORIES**

MSB Monitor Stand for BBC micro. Sits over the Beeb 17" x 12" x 3.75" P&P £3.50 £19.95  
PSS Standard printer stands for OKI, Epson etc. 15" x 12" x 4.5". P + P £3.50 £16.95  
PSL Large model 17" x 14.5" x 3.75" P&P £3.50 £19.95



**PSC-3** for Epson MX-100 etc. etc. 21" x 14" x 3.75" P&P £3.50 £22.95  
**CUSTOM PRINTER STANDS** for larger printers P.O.A.  
**POT** Printer Output Tray for 11" fanfold paper P&P £3.50 £16.95

UK. VAT extra. No VAT on exports P + P UK. Free Europe + 5% — Overseas + 10% TLX 81574



Cambridge Microelectronics Ltd, One Milton Rd, Cambridge, CB4 1UY tel (0223) 314 814

**ORIC AND SINCLAIR COMPUTERS**



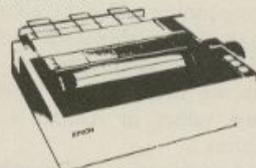
Oric 1 computer 48K £143 (£141) £151.  
Oric colour printer £134 (£123) £140.  
Sinclair Spectrum 48K £131 (£131) £143.  
Spectrum 16K £101 (£105) £117. 32K memory upgrade kit for 16K Spectrum (issue 2 and 3 only) £31 (£28) £30. Fuller Master Unit for the Spectrum including speech unit, sound synthesizer, amplifier and joystick port £56 (£56) £62. Fuller full sized FDS keyboard for the Spectrum with proper space bar £52 (£52) £62.  
Spectrum printer interfaces with cables:— Contronics £57 (£53) £58, RS232 £35 (£33) £38. ZX printer with 5 free rolls paper £41 (£46) £56. ZX printer alone £36 (£38) £50. 5 printer rolls £13 (£16) £21. Special offer pack computer + 16K Ram pack + four games tapes £55 (£61) £71. ZX81 16K ram packs £31 (£28) £30.

Vic 20 £42 (£41) £46, for Commodore 64 £45 (£44) £50. 1541 Disc drive £233 (£209) £234. 1525 Printer £235 (£220) £245. 1526 Printer £350 (£330) £360.

**ACORN COMPUTERS**

Electron £203 (£209) £229. BBC Model B £424 (£388) £408. Kenda double density disk interface system for beeb £139 (£125) £135. We stock the whole range of Cumana disc drives for the beeb e.g. 100K single £230 (£220) £240, Double 2 x 400K £625 (£560) £580.

**PRINTERS**



Epson RX80 £326 (£309) £340. Epson RX80F/T £346 (£316) £346. Shinwa CT1 CP80 £203 (£271) £312. Epson GX80 £440 (£408) £438. Epson MX100/3 £494 (£465) £495. Seikosa GP100A £234 (£219) £254. OKI Microline 80 £223 (£207) £248. OKI Microline 84 £831. The Ultra 21 combined daisy wheel and electric typewriter £438 (£415) £445. The brother EP22 combined matrix printer and electric typewriter £173 (£166) £186. Juki 6100 proportional daisy wheel printer £423 (£404) £434. MCP40 colour printer £134 (£123) £140. Star STX80 thermal printer £165 (£159) £169. Interfaces to run the above printers from Commodore machines:— Vic 20 £42 (£41) £46, Commodore 64 £45 (£44) £50. We can supply interfaces to run the above printers from Sharp computers £58 (£52) £55.

**COMMODORE COMPUTERS**

Commodore 64 £204 (£184) £204. Vic 20 £104 (£97) £117. Converter to allow most ordinary mono cassette recorders to be used with the Vic 20 and Commodore 64:— built £9.78 (£9) £11, kit £7.47 (£7) £9. Bargain package:— cassette converter + compatible cassette recorder £37 (£38) £44. Commodore cassette recorder £43 (£44) £50. Contronics printer interfaces:— for

**SWANLEY ELECTRONICS**

The Computer Export Specialists.

Dept YC, 32 Goldsel Rd., Swanley, Kent BR8 8EZ, England.

Tel: SWANLEY (0322) 64851

Nothing extra to pay. All prices are inclusive. UK prices are shown first and include post and VAT. The second price in brackets is for export customers in Europe and includes insured air mail postage. The third price is for export customers outside Europe (including Australia etc) and includes insured airmail postage. Official orders welcome.

**Educational Software LCL**



**BBC Micro  
ZX Spectrum  
Commodore 64  
Electron  
unexpanded VIC  
ZX81  
Apple  
PET** **NEW**

**All Software for the above computers.**

**MICRO MATHS** 24 program revision of self-tuition course to O-Level. £24.50 (except ZX81 & Vic 12) (Tapes or disc).  
**PICTURE PUZZLES** (BBC & Electron only) Early learning fun using educational tests. 3D graphics. £6.50.  
**ANIMATED ARITHMETIC** Teaches using moving colour pictures (not words) Ages 3-8. £6.50 (disc £7.50).  
**MASTER MATHS** (CBM 64, Apple and PET only). 50 program O-Level course of teacher's aid, amazing graphics.  
**BRAINTEASERS** (BBC, Electron) Books of puzzles IQ Tests, ed. games and adv. games. £5.95.

"... the programming standard is high. The programs are robust..."  
TIMES EDUCATIONAL SUPPLEMENT  
Immediate dispatch of Micro Maths and Apple Master Maths. Phone or send orders or requests for free catalogue (200 programs) to:

World leaders in Maths educational software (distributors in 24 countries).

**LCL**  
26 Avondale Ave.  
Staines, Middx.  
Tel:0784 58771



GENEROUS TRADE DISCOUNTS.



Kathleen Peel continues the series on Microdrives with a look at how to create paint commands.

# THE

# MICRODRIVE

# FILE

WITH THE INTRODUCTION of Interface 1 the Spectrum entered a new phase. Previously the only commands that could be used were those laid out on the keyboard, this is now no longer true.

The Spectrum coupled to Interface 1 has the capability of creating new commands which will be checked for syntax on entry just like any of the existing commands.

There is only one allusion to this facility in the Microdrive and Interface manual in the list of system variables, which is a little surprising as Sinclair is not known for his reticence in expounding the virtues of his products.

As this subject is a little tricky to understand, I think the best way of demonstrating a technique of creating a new command is by stepping very slowly through an example. There are many ways of creating new commands, some more complex than others, in this instance we will use a fairly simple technique.

As with all articles in the series we will take a simplistic view of what is happening in order to present the least complicated approach. In other words, I may lie a little here and there to explain a principle.

Perhaps before we actually produce the command a few words on a systematic approach to storing these commands is required.

The new commands, like the old ones, consist of machine code routines stored in memory, but in RAM and not ROM. This obviously will cause problems in positioning the code in memory as it is not known what

other software and commands are required. The user may require a monitor, an assembler or even a compiler, so it needs to be carefully thought through to enable the commands to work with any software resident in memory.

The approach used is to use the top of Basic to hold subroutines for the new commands and as a later article, the cassette backup routines necessary to off-line all your cartridge files. The off-lining of files is thought necessary as at £5 each cartridge with an unknown life span, the cost mounts up extremely quickly. I have nine and that's £45, I mean cartridges not lives.

To be able to use the routines as and when necessary, each routine must be relocatable and have a predetermined entry point which is relative rather than absolute. This will enable routines to be stacked in any order in any position in RAM giving a high degree of flexibility.

That is just jargon for saying I do not know what I am doing so better leave myself lots of options.

The example chosen is a very simple paint command, the command itself is not important, it is the technique in creating syntax and run time checks that you should follow.

If you type in a command which the computer does not understand then it finds its error routines, works out what is wrong and provides the appropriate message.

With Interface 1 connected the very last error call is indirect to the address in the register pair at 23735 which is described as the

address used to extend the Basic interpreter. The register normally holds the address 496 which curtails the normal ROM error checking routines with a message and line syntax marker.

To create a new command we just change this address and write our own routine, I really mean copy an existing routine and add a few small changes but it sounds better expressed the first way.

In writing our routine we are using a system where the new shadow ROM built into the interface is paged in, we can not therefore make calls to the old ROM routines using the format:

```
CALL NN 205 x y  
instead we simply change the 205 to 215 i.e.,  
CALL NN 215 x y
```

This acts like a call but to the old ROM. Remember this will only apply with the new ROM paged in and the new ROM is only paged in if the line fails the old ROM syntax check.

To write out new command therefore simply requires a line which will fail the old ROM syntax check, allowing the user to redirect the new ROM end of error check vector

*(continued on page 139)*

# DUSTMAN!

Meet Alf, the Dustman. Not any ordinary Dustman, but a hyper-intelligent mega-dustman. He has found himself in a spot of bover with neither bears or lawnmowers, but ton after ton of homicidal rubbish. To make things more confusing his favourite beer is in hot pursuit! But there is help on the way, 'The friends of the Binless' try to assist Alf. That is just the tip of the iceberg. Amongst the twenty waves of sheer lunacy you will meet: 'Jaws' the snappy scissors, 'Wocka' the hungry dot, 'People pumpers' the beating hearts, and many more crazy characters. All beautifully animated in smooth, hi-resolution graphics. Meet Alf, his friends, his enemies, and, if you are not careful, the 'Great Lid' in Dustman for the 48K ZX Spectrum.

KEMPSTON JOYSTICK COMPATIBLE

## WILD WEST HERO

For the 48K ZX Spectrum

The fastest meanest most devastating game around. Up to 80 bandits on the screen, all smooth and animated. High score, two player option, 'Distubing' sound super fast auto fire, and much more.

KEMPSTON JOYSTICK COMPATIBLE

# TIMESCAPE

1 VIRGINIA GARDENS, FAIRWAYS  
MILNGAVIE, GLASGOW G62 6LG  
Telephone: 041-956 5058

For the 48K Spectrum

Timescape software is now available from branches of John Menzies and many leading computer shops or by mail order direct.

Both Games

£5.90

INC VAT & P&P

*All Software is guaranteed for life and normally despatched within 24 hours. If for any reason this is not possible you will be informed immediately.*

Please Send \_\_\_\_\_

I Enclose \_\_\_\_\_

Telephone no. \_\_\_\_\_

Name \_\_\_\_\_

Address \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

(continued from page 137)

to our own routines somewhere in RAM.

The first requirement to create a paint command is to develop a command syntax that will fail the normal syntax check. PRINT \* x, y, c fits the fill and can logically be used as a paint command. Where x and y define the pixel start position on the screen and c is the colour. The machine code syntax checking routine is in table 1.

Basically all the above does is step along the line and check each character or expression and separator, these items can be used in any combination so we could have used \* PAINT instead of PRINT \*, it is just a means of checking a non-standard command syntax.

The above syntax check will evaluate the line as it is entered, when the program is run, the final call will not exit but carry on to the following machine code routine. When it is evaluated in what is called run time.

So the line has been successfully entered, we have typed Run and the computer has reached the new command line, it carries out the above syntax check, finds everything alright and proceeds to the machine code in table 2.

In run time each expression is tested for value and if necessary a jump made to the error routine in the old ROM. One variable is put in the system variables tables and two others placed in working Z-80 registers. Using the above techniques you should be able to manipulate the data in the command expression into any system variable or Z-80 register.

In order to demonstrate the above techniques I have written a very simple paint routine and then a short Basic program to use it.

I must point out that this command resides in RAM and so will need to be loaded into memory whenever it is required. You will not be able to enter a line with the above syntax unless the command has been loaded although a program which is saved with this syntax is reloadable but not runnable.

After entering the remaining paint machine code routines all that will remain is to tell the computer where to jump to in RAM if it finds a syntax error to test for new commands.

The paint routine machine code does not use subroutine calls to any code outside ROM. This makes the code a little longer but does

Table 1.

** NOP	42 42 0	This is included as a start of routine market may be needed later on.
CALL nn	215 24 0	Get character routine in the OLD Rom. See if character is print
CP 'Print'	254 245	No jump to original vector address.
JP N2 ERR	194 240 1	Call next character routine in OLD ROM
CALL nn	215 32 0	See if character is *
CP '**	254 42	No jump to syntax error ERR2
JP NZ ERR2	32 10	Call next character routine in OLD ROM.
CALL nn	215 32 0	Call numerical expression routine, we would want the ability to use a function as well as a number here.
CALL nn	215 130 28	Check for correct separator
CP'' ''	254 44	Correct separator — jump
JP 2 NXT	40 2	This calls the NEW ROM error routine and prints the 0 error 'Nonsense in basic'
ERR2 RST 32	231	Get and check next expression
DEFW	0	
NXT CALL nn	215 32 0	
CALL nn	215 130 28	
CP','	254 44	
JP N2 ERR2	32 244	Jump to error if it fails syntax check
CALL nn	215 32 0	Check last expression
CALL nn	215 130 28	
CALL NN	205 183 5	This is a call to the NEW ROM and will exit entering the line if in syntax check, and all is correct, otherwise flagging the error.

Table 2.

CALL nn	215 148 30	Get 'C' expression, (we are at this end of the line into the 'A' register.
CP '8'	254 8	Check that colour is valid (anything greater 7 is an error)
JP C NXT 2	56 5	Yes jump
ERR3 LD (Y + ERR), 10	253 54 00 10	Sat error to message 10. 'Integer out of range' in OLD ROM
N RST 40	239	
NXT2 LD E A	95	Save ink colour in E
LD A (NN)	58 143 92	Get attributes into A and mask off old ink colour
AND 248	230 248	
OR E	179	Add new ink colour
LD (NN) A	50 143 92	replace attributes.
CALL nn	215 148 30	Get 'Y' expression into 'A'
AND A	167	Check for zero
JP Z ERR3	40 235	If zero call 'integer out of range' error. Errors can be caught here or in the machine code of the routine.
LD D A	87	save 'y' in D
PUSH DE	213	
CALL nn	215 148 30	Get 'x' expression into A
POP DE 209	recover 'y'	
AND A	167	Check x for zero
JP Z ERR3	40 226	Jump to error if zero
LD E A	95	save 'x' in E.

allow it to be relocatable anywhere in RAM.

LD HL NN	33 1 1	
UP LD B D	66	
NXTR LD C E	75	
NXTP PUSH —	229 213 197	
CALL PLOT	215 229 34	! Note call to old Rom
POP —	193 209 225	
LD A L	125	

ADD C	129
LD C A	79
JP 2 INV	40 15
PUSH —	229 213 197
CALL POINT	215 234
CALL FP-A	215 213 45
POP —	193 209 225
AND A	167

(continued on page 140)

Program 1.

This program draws five circles and then fills parts to demonstrate the use of the new command.

10 INK 0: PAPER 7:	29 PRINT *128,90,0
BORDER 7: CLS	31 PRINT *164,120,1
20 CIRCLE 128,54,50	32 PRINT *92,120,1
22 CIRCLE 55,54,50	35 PRINT *46,80,2
24 CIRCLE 200,54,50	50 PRINT *211,80,2
26 CIRCLE 92,121,50	60 PRINT *92,84,0
28 CIRCLE 164,121,50	65 PRINT *164,82,0
	70 PRINT *128,50,4

(continued from page 139)

<pre> JP Z NXTP 40 INV XOR A 175 SUB L 149 LD L A 111 CP '1 254 1 JP N2 NXTR 32 219 LD A W 124 ADD B 128 </pre>	<pre> LD B A 71 JP Z NXTC 40 22 CP '175' 254 175 JP C NXTC 40 18 LD I '1' 46 1 LD C E 75 PUSH - 229 213 197 CALL POINT 215 206 34 ! CALL FP-A 215 213 45 ! </pre>	<pre> AND A 167 JP Z NXTR 40 192 NXTC XORA 175 SUB H 148 LD H A 103 CP 1 254 1 JP N2 UP 32 184 JP END 195 193 5 </pre>
---	---	--

Exit  
Runtime.

**Program 2.**

9981 Calculate previous value of RAMtop (rt) decrease by 171 to a new RAMtop (nt). Reset all variables deleted by clear. Check to see if RAMtop has previously been lowered if it has and by a new command routine - redirect the vector jump address in previous command routine and jump to 9933.

9932 Redirect vector jump address in system variables.

9933 load machine code in Data statements above RAMtop.

```

9931 DEF FN t(s)=PEEK s+256*PEEK (s+1):
LET s=23730: LET nt=FN t(s)-171: CLEAR n
t: RESTORE 9934: LET s=23730: LET nt=FN
t(s): LET rt=nt+171: LET h=INT (nt/256):
LET l=nt-256*h: IF rt<=FN t(s+2)-2 THEN
IF PEEK (rt+2)=42 AND PEEK (rt+3)=42 T
HEN POKE (rt+10),l: POKE (rt+11),h: GO
TO 9933
9932 POKE 23736,h: POKE 23735,l+4
9933 POKE (s+1),h: POKE s,l: FOR a=1 TO
171: READ d: POKE (nt+a),d: NEXT a: RETU
RN

```

```

9934 DATA 42,42,0,215,24,0,254,245,194,2
40,1,215,32,0,254,42,32,10,215,32,0,215,
130,28,254,44,40,2,231,00,215,32,0,215,1
30,28,254,44,32,244,215,32,0,215,130,28,
205,183,5
9935 DATA 215,148,30,254,8,56,5,253,54,0
0,10,239,95,58,143,92,230,248,179,50,143
,92,215,148,30,167,40,235,87,213,215,148
,30,209,167,40,226,95
9936 DATA 33,1,1,66,75,229,213,197,215,2
29,34,193,209,225,125,129,79,40,15,229,2
13,197,215,206,34,215,213,45,193,209,225
,167,40,227,175,149,111,254,1,32,219
9938 DATA 124,128,71,40,22,254,175,48,18
,46,1,75,229,213,197,215,205,34,215,213,
45,193,209,225,167,40,192,175,148,103,25
4,1,32,184,195,193,5
9939 DATA 0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,
0,0,0,0

```

**Joining programs 1 and 2 and adding line 1:**  
1 GOSUB 9931

will run the whole program. The reader may prefer to load the paint routine permanently above RAMtop as one of a series of utilities set up by the Run command from drive 1 as yet I am unsure of the best way to handle the required routines.

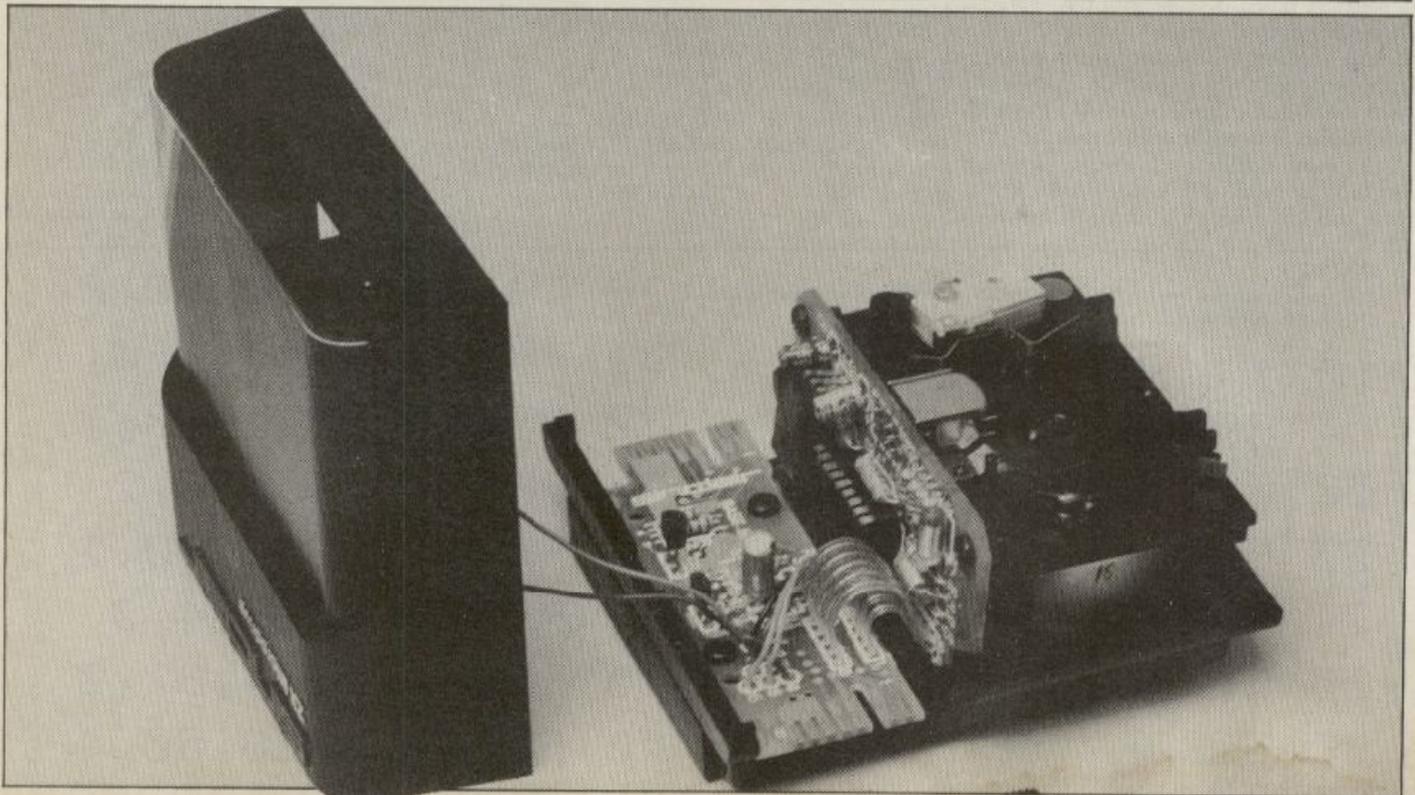
It may well be that the following is a more logical format as all \* commands are easily read in a listing.

- Perhaps \* F X, Y, c  
 \* R, s  
 \* M, N  
 \* B, a\$  
 \* E

To get an idea of the ease with which the format can be changed the syntax check held in data statement line 9934 can be altered as follows:

Fill starting at x y pixel with colour c.  
 Renumber with steps of s.  
 Disassemble from address n.  
 Back up program a\$ onto cassette tape.  
 Explosion

Change the 245(print) to 42 (\*) at the end of the 1st and beginning of 2nd line of Data.  
 Change the 42 (\*) to 70 (F two thirds across the 2nd line down.  
 Now type GOSUB 9934.  
 and the syntax for fill is now:  
 \*F x,y,c  
 change lines 29 to 70 to the new syntax and Run the program. As they say "that's all there is to it".



### BLASTERMIND! ★

At first glance this might seem to be just another version of a very popular game. How wrong can you be!!! True, the start is simple enough. The Spectrum picks a code of numbers or colours with a selection of levels of difficulty — and invites you to do the same. You then take it in turns to guess each others code from the clue supplied after each guess. An extremely well written, fast and very clearly displayed game, with almost inevitable defeat.

This was exactly as intended but unfortunately *something went wrong*. During the programming strange complimentary messages began to appear on the screen. At first they were so few they were not taken too seriously, but soon they could no longer be ignored. Somehow the Spectrum had been given a personality — a rather devious, supercilious, dislikeable, hateful, horrible mind.

SPECTRUM 48k £5.50



Side B contains a version of the game compatible with the excellent Currah  $\mu$ Speech unit — even worse!!

### The Quest of Merravid ★

VIC 20 (16k) £7.95 or Commodore 64 £7.95

A really challenging and enjoyable adventure, written by a confirmed adventure addict who grew tired of the ease with which he solved other adventures himself. Will accept and act on sentences containing up to nine words.

The adventurer becomes Merravid, charged with the task of finding, taking and then returning the magic Firestone of the Dwarves. However, overcoming the many novel and original hazards is no easy matter. Careful and imaginative thought is required if progress is to be made and the Firestone tracked down to the lair of the Dragon of Thargon. Even then the Dragon has to be defeated and the stone retrieved. A compulsive, extremely enjoyable and very user friendly adventure.

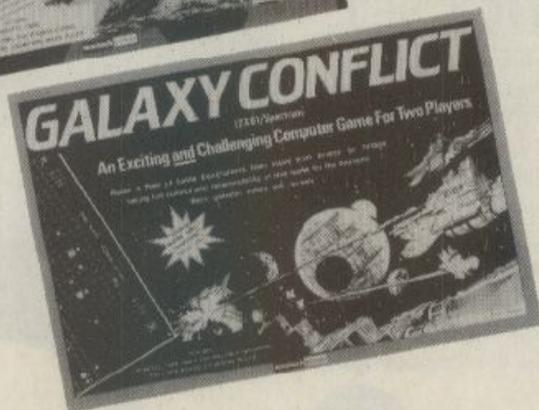


### ★ COMPUTER MODERATED BOARD GAMES

The original and completely unique two player games of cunning and strategy, strictly for more demanding games enthusiasts.



- ★ **CONFLICT** — a full scale military and economic battle demanding clear thought and decisive action.
- ★ **GALAXY CONFLICT** — a complex battle for control of the Universe.



Each game:—  
ZX81 (16k) and SPECTRUM (48k) £11.95  
BBC 'B', CBM-64, ATARI 800 £14.75

*Attractively boxed containing cassette, full size board, pieces, maps, and full instructions.*

Most games available from leading retail outlets.

Prices include VAT, Post and Packing

Mail order to: MARTECH HOUSE, BAY TERRACE, PEVENSEY BAY, EAST SUSSEX BN24 6EE  
Telephone: (0323) 768456 Telex: 87465 EXIM Brighton

# ARCADE ACTION FOR THE ZX SPECTRUM!



JOYSTICK  
**£9.95**  
JOYSTICK INTERFACE  
**£12.95**

## INCREASE YOUR COMPUTER FUN WITH A PROTEK JOYSTICK SET.

Playing the computer game? Then take control of the situation the Protek way. Our unbeatable combination of joystick and interface has been specially designed to give you arcade quality control on your Sinclair ZX Spectrum.

The Protek joystick interface simply plugs in at the back of your Spectrum and is compatible with a wide range of software including bestsellers from Quicksilver, Ultimate, Ocean, A & F CRL, and other leading software publishers.

The Spectravision joystick controller has a handy pistol grip, top and base fire button, and rubber suction cup footing for single hand operation.

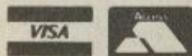
**You can buy them separately or in a special presentation set which comes complete with "Airliner", a flight simulator. And it's only £24.95.**

Either way, they'll give you maximum fun whenever you play the computer game.



# Protek

Protek Computing Ltd, 1A Young Square,  
Brucefield Industrial Park, Livingston, West Lothian. 0506 415353.







(continued from page 143)

before entering and running your program.

Type in the MacBasic program and Save it. Keep this as a clean copy. When you load MacBasic as described earlier Save it with your own code until you are satisfied that you have finished creating and editing sprites etc. It is a good idea to start your own program at say line 300. Alter line 1 to say Run 300, so that when you are testing your own program you jump past the MacBasic.

If you need more sprites or machine code then use Run 2 to get the MacBasic utilities. When your testing is complete use the final option to delete the MacBasic as described above. Remember you can convert the sprite control codes into data also. Use option 3 and convert 53248 to 54271 into data statements.

If you have keyed the example — figure 1 — correctly you should have a simple sprite flying across the screen from top left to centre right. You can use MacBasic to do the same

thing with automatically generated data statements. You can also convert the sprite control area into data.

The following procedure shows how to convert sprites or areas of the CBM-64 memory into data in your own program. Figure 2 is a listing of the final program which produces the same result as the above program.

Care should be taken when loading a new program if the previous program ran with sprites. If a load error message is displayed then it will be necessary to use Run/Stop/Restore before loading the next program. This will turn off the sprites.

Save the figure 1 as a reference if you wish.

Type  
RUN/STOP  
NEW  
and  
so that the sprite is still displayed, otherwise you will have to turn the sprite on in figure 2. Your first program to key in should be

MacBasic. Save a clean copy of MacBasic as it has a number of uses which result in data being added to the initial program.

Load MacBasic and use option 2 to convert sprite O to data. Enter O for the sprite and 1 for the number of sprites. Enter 1000 for the start of the data. MacBasic will generate four lines of data which describe the simple sprite.

Use option 3 to convert the video interface control data into data statements. This starts at 53248 for 1023 bytes. This produces another 64 lines of data from 2000 to 2063 in the figure 2 program.

Now use option 7 and watch the MacBasic delete the first 216 lines. This leaves a clean copy of the data. Add lines 300-350 which drive the sprite around the screen. The second example program — figure 2 — seems large in this example but if you have lots of sprites and machine code to use you will soon see that MacBasic can be the starting point and workhorse for many programs.

### MacBasic listing.

```

1 REM GOTO 300 OR START OF YOUR PROGRAM ** CONVERT MEMORY TO BASIC DATA **
2 POKE3201,1:POKE5328,13
3 DIMZ(164)
4 PRINT*
5 CLR:GOSUB 200:REM BORDER
6 PRINTSPC(1)*
7 (CUR DN)(CUR DN)(BLU) OPTIONS AVAILABLE*
8 PRINTSPC(1)*
9 (CUR DN)*
10 PRINTSPC(1)* INSTRUCTIONS ON USE.....1:PRINT
11 PRINTSPC(1)* SAVE SPRITES AS DATA.....2:PRINT
12 PRINTSPC(1)* SAVE MACHINE CODE AS DATA.....3:PRINT
13 PRINTSPC(1)* DELETE DATA STATEMENTS.....4:PRINT
14 PRINTSPC(1)* LIST STATEMENTS TO TAPE.....5:PRINT
15 PRINTSPC(1)* ASSEMBLE DATA FROM TAPE.....6:PRINT
16 PRINTSPC(1)* DELETE STATEMENTS 0-255.....7:PRINT:PRINT
17 (CUR DN)*
18 (CUR DN)KEY IN DESIRED OPTION(RVS OFF)*
19 GET#(IFKB)=""THEN3
20 IFVAL(KB)=-ODRVAL(KB)THENPRINT*
21 (CUR UP)(CUR UP):GOTO14
22 ON VAL(KB)GOSUB20,40,50,60,120,150,20
23 IFVAL(KB)=-GTHENSTOP
24 END
25 PRINT*
26 CLR:GOSUB200:PRINT*(CUR DN)(CUR DN)(CUR DN)(CUR DN)INSTRUCTIO
27 NS ON USE OF UTILITY*
28 PRINTSPC(1)* *****
29 PRINTSPC(1)* SPRITES ARE SAVED AS DATA STATEMENTS.*
30 PRINTSPC(1)* SPRITES 0-47 RAM ADDRESS 12200-12340 *
31 PRINTSPC(1)* OR MACHINE CODE CAN BE SAVED AS DATA.*
32 PRINTSPC(1)* DATA STATEMENTS CAN BE DELETED.*
33 PRINTSPC(1)* THE REST OF THIS PROGRAM MAY BE *
34 PRINTSPC(1)* DELETED IF REQUIRED,THIS LEAVES ONLY*
35 PRINTSPC(1)* DATA STATEMENTS FOR USER PROGRAMS*
36 PRINTSPC(1)*
37 (CUR DN)(CUR DN)(RVS ON) TO CREATE NEW PROGRAM (RVS OFF)*
38 PRINTSPC(1)*
39 (CUR DN) WAIT FOR READY TO STOP FLASHING *
40 PRINTSPC(1)* IN THIS MODE,THEN SAVE DATA TAPE.*
41 PRINTSPC(1)* LOAD NEW DATA AND KEY IN PROGRAM.*
42 PRINTSPC(1)*
43 (CUR DN)(CUR DN)(RVS ON) ANY KEY TO CONTINUE(RVS OFF)*
44 GET#(IFKB)=""THEN37
45 GOTO4
46 PRINT*
47 CLR:(CUR DN)(CUR DN)(CUR DN)(CUR DN) SPRITES 0-47:GOSUB200
48 PRINTSPC(4)*
49 (RVS ON)FIRST SPRITE NO. (RVS OFF)*1:N=0:GOSUB75:G=H:IF59>47OR59<OTHER41
50 PRINTSPC(1)*
51 (CUR DN)(CUR DN) FOR CONSECUTIVE SPRITES:PRINTSPC(1)* (RVS ON) NO.OF SPRI
52 TES(RVS OFF)*
53 N=0:GOSUB75:G3=N:IF(48-59-53) <OR53<(1)HEN42
54 PRINTSPC(1)*
55 (CUR DN)(CUR DN) DATA STATEMENTS > 299:1=N=0
56 PRINTSPC(1)*
57 (RVS ON) START OF DATA(RVS OFF)*1:GOSUB75:DO=N:IFN<300THEN44
58 5=12200+64*5:G=INT(5/256):S7=INT(5-56*256):S3=S3+64:OP=0:POKE828,0
59 E=0:POKE829,0:58=INT(53/256):S9=INT(53-58*256)
60 POKE830,58:POKE831,59:DB=INT(10/256):D9=INT(10-DB*256):POKE832,DB
61 POKE833,D9:POKE834,56:POKE835,57:GOSUB80:GOTO4
62 PRINT*
63 CLR:(CUR DN)(CUR DN)(CUR DN)(CUR DN) RAM TO DATA *:GOSUB200
64 PRINTSPC(4)*
65 (RVS ON)START ADDRESS (RVS OFF)*1:N=0:GOSUB75:R9=N
66 PRINTSPC(1)*
67 (CUR DN)(CUR DN) CONSECUTIVE ADDRESSES *:PRINTSPC(1)* (RVS ON)NO.OF ADDRESSE
68 S (RVS OFF)*
69 N=0:GOSUB75:G3=N
70 PRINTSPC(1)*
71 (CUR DN)(CUR DN) DATA STATEMENTS > 299:1=N=0
72 PRINTSPC(1)*
73 (RVS ON) START OF DATA(RVS OFF)*1:GOSUB75:DO=N:IFN<300THEN54
74 5=INT(5/256):S7=INT(5-56*256):OP=0:POKE828,0:E=0:POKE829,0
75 58=INT(53/256):S9=INT(53-58*256)
76 POKE830,58:POKE831,59:DB=INT(10/256):D9=INT(10-DB*256):POKE832,DB
77 POKE833,D9:POKE834,56:POKE835,57:GOSUB80:GOTO4
78 PRINT*
79 CLR:(CUR DN)(CUR DN)(CUR DN)(CUR DN) DELETE DATA *:GOSUB200*
80 PRINTSPC(4)*
81 (RVS ON)START DATA >299 (RVS OFF)*1:N=0:GOSUB75:DO=N:IFN<300THEN60
82 PRINTSPC(1)*
83 (CUR DN)(CUR DN) CONSECUTIVE STATEMENTS *:PRINTSPC(1)* (RVS ON)NO.OF STATEME
84 TS (RVS OFF)*
85 N=0:GOSUB75:G3=N
86 5=0:56=INT(5/256):S7=INT(5-56*256):OP=0:POKE828,0:PE=0:POKE829,0
87 58=INT(53/256):S9=INT(53-58*256)
88 POKE830,58:POKE831,59:DB=INT(10/256):D9=INT(10-DB*256):POKE832,DB
89 POKE833,D9:POKE834,56:POKE835,57:GOSUB80:GOTO4
90 PRINT*
91 CLR:GOSUB200:PRINTSPC(1)* (CUR DN)(CUR DN) REMEMBER THIS OPTION DELETES THIS*

```

```

92 PRINT*
93 (CUR L)DATA*
94 FOR=0:GOTO14:AS=STR$(Z(J)+B(16)):AB=RIGHT$(AS,LEN(AS)-1):PRINTAB*,"":T=T+1
95 IF T=53THEN:POKE829,1:PRINT:GOTO10
96 NEXT J:T=T+1:AS=STR$(Z(B(16)+15)):PRINTAB:IF T=53THEN:POKE829,1:PRINT:GOTO10
97 GOTO10
98 IFOP=3THENH=1:POKE829,E
99 PRINT:GOTO10
100 DIMZ(164)
101 E=PEEK(829):EE=OTHER41
102 GOTO 4
103 X=T:Y=0:V=B(3):M=87:GOSUB205
104 PRINT*
105 (CUR DN)START LINE NO. (RVS OFF)*1:N=0:GOSUB75:G=H
106 PRINTSPC(1)*
107 (CUR DN)(CUR DN) LIST PROGRAM TO TAPE *:GOSUB200
108 PRINTSPC(4)*
109 (RVS ON)START LINE NO. (RVS OFF)*1:N=0:GOSUB75:G=H
110 PRINTSPC(1)*
111 (CUR DN)(CUR DN) LIST PROGRAM TO ONLY *:PRINTSPC(1)* (RVS ON)FINAL LINE NO.
112 (RVS OFF)*
113 N=0:GOSUB75:G3=N
114 INPUT*
115 CLR:(CUR DN)(CUR DN)(CUR DN)(CUR DN) (RVS ON)TAPE TITLE (RVS OFF)*1:N=
116 PRINTCHR$(147):PRINT*
117 (HOME)OPEN,L,1,NP#;CMD:LIST:IS9:~:1:53
118 PRINT*
119 CLR:(CUR DN)(CUR DN)PRINTH:CLDSE 1:GOTO129*
120 POKE631,19:FORI=0:GOTO6:POKE632+I,13:NEXTI:POKE198,4
121 END
122 GOTO4
123 PRINT*
124 CLR:(CUR DN)(CUR DN)(CUR DN)(CUR DN) READ PROGRAM FROM TAPE *
125 INPUT*
126 (CUR DN)(CUR DN) (RVS ON)TAPE TITLE (RVS OFF)*1:N=
127 OPEN,L,0,NP#;K:0:K9=0:K8=0
128 PRINT*
129 CLR:(HOME)*
130 GET#1,Y#;Y#ASC(Y#)+CHR$(0):POKE20000+K,Y
131 IFST=64THENCLOSE 1:FORL=0:GOTO4:POKE20000+K,L:GOTO140
132 PRINTY#;K#;1:GOTO135
133 K=0
134 PRINT*
135 CLR:(HOME)*
136 Y#PEEK(20000+K):IFY=0:Y=10THENZ
137 Y#CHR$(Y#)+K#;K#9=INT(K/256):K8=INT(K-K#256):POKE820,K9:POKE821,K8
138 IFY#CHR$(13)THENI47
139 PRINTY#;GOTO142
140 PRINT:PRINT*RUN 150:REM PLEASE WAIT *
141 POKE631,19:FORI=0:GOTO4:POKE632+I,13:NEXTI:POKE198,5
142 END
143 K9=PEEK(820):K8=PEEK(821):K#K9*256+K8:PRINT*
144 CLR*
145 GOTO142
146 80=1024:C0=40:80=54272:FORC1=0:GOTO31:G1=50+C1:G2=90+C1-L:G3=90:GOSUB202:HEXTC1
147 FORC1=1023:G1=40+C0+C1:G2=50+C0+C1+39:GOSUB202:HEXTC1:RETURN
148 POKE82,214:POKE82+80,5:POKE81,214:POKE81+80,5:RETURN
149 X#K#1:K8=INT(Y/256):X9=INT(Y-K8*256):POKEV,K8:POKEV,K9:RETURN
150 1=PEEK(839):PRINT*
151 CLR*
152 IFI=206THENZ14
153 PRINT*
154 CLR*1:1=1:POKE839,1:PRINT*RUN 210:REM WAIT FOR CLEAR SCREEN*
155 POKE631,19:POKE632,13:POKE633,13:POKE634,13:POKE635,13:POKE198,5
156 END
157 FOR I=2:GOTO16:PRINT:HEXTC1:PRINT:PRINTCHR$(147)*
158 POKE631,19:FORI=1:GOTO16:POKE631+I,13:HEXTC1:POKE198,12
159 END

```



# GRAPHICS

## Listing 2.

```

6700REM object / add to data base
6710DEF PROCobject
6719REM data for a ICOSAHEDRON
6720LOCAL IX,XY,VY,TZ,L1,L2,D
6730D=(1+SQRT5)/2
6740DATA 1,2, 1,3, 1,4, 1,6, 1,8, 2,3, 2,4, 2,5, 2,9,
3,5, 3,6, 3,7, 4,8, 4,9, 4,12, 5,7, 5,9, 5,10, 6,7, 6
,8, 6,11, 7,10, 7,11, 8,11, 8,12, 9,10, 9,12, 10,11, 1
0,12, 11,12
6750DATA 0,1,D, D,0,1, 1,0,0, 0,-1,0, D,0,-1, -1,0,0
,0,1,-D, -D,0,1, 1,-D,0, 0,-1,-D, -D,0,-1, -1,-D,0
6760RESTORE
6769REM store line information.
6770FOR IX=1 TO 30
6780READ L1,L2 : NOL=NOL+1
6790LIN(L1,NOL)=L1+NOV : LIN(L2,NOL)=L2+NOV
6800NEXT IX
6809REM store vertex information
n position by matrix R.
6810FOR IX=1 TO 12
6820READ XX,VY,VZ : NOV=NOV+1
6830X(NOV)=R(1,1)*XX+R(1,2)*VY+R(1,3)*VZ+R(1,4)
6840Y(NOV)=R(2,1)*XX+R(2,2)*VY+R(2,3)*VZ+R(2,4)
6850Z(NOV)=R(3,1)*XX+R(3,2)*VY+R(3,3)*VZ+R(3,4)
6860NEXT IX
6870ENDPROC
    
```

## Listing 3.

```

8200REM look3 / maintain vertical
8210DEF PROClook3
8220LOCAL FX,FY,FZ,THETA
8230CLS : INPUT "EX,EY,EZ",EX,EY,EZ
8240INPUT "DX,DY,DZ",DX,DY,DZ
8250PROCtran3(-DX,-DY,-DZ) : PROCmult3
8260FX=EX-DX : FY=EY-DY : FZ=EZ-DZ
8270THETA=FNangle(FX,FY)
8280PROCrot3(-THETA,2) : PROCmult3
8290SI=SGR(FX*FX+FY*FY)
8300THETA=FNangle(FZ,D*BT)
8310PROCrot3(PI-THETA,2) : PROCmult3
8320BT=SGR(DIST*DIST-FZ*FZ)
8330THETA=FNangle(DIST*FX,-FY*FZ)
8340PROCrot3(THETA,3) : PROCmult3
8350PROCtran3(0,0,DIST) : PROCmult3
8360ENDPROC
8400REM rot3
8410DEF PROCrot3(THETA,AXIS)
8420LOCAL AX1,AX2,CT,BT
8430AX1=(AX1 MOD 3)+1
8440AX2=(AX1 MOD 3)+1
8450CT=COS(THETA) : BT=SIN(THETA)
8460R(AX1,AX1)=1 : A(AX1,AX1)=0 : A(AX1,AX2)=BT
8470R(AX1,AX2)=0 : A(AX1,AX2)=CT : A(AX1,AX2)=BT
8480R(AX2,AX1)=0 : A(AX2,AX1)=BT : A(AX2,AX2)=CT
8490R(AX2,AX2)=0 : A(AX2,AX2)=0 : A(AX2,AX2)=0
8490R(AX2,AX2)=0 : A(AX2,AX2)=0 : A(AX2,AX2)=0
8500ENDPROC
8600REM angle
8610DEF FNangle(AX,AY)
8620IF ABS(AX) > 0.0001 THEN BB=0
8630IF ABS(AY) < 0.0001 THEN TH=0
8640IF AY < 0 THEN TH=1.5708
8650PI=2
8660IF AX < 0 THEN TH=(AY/AX)+PI ELSE TH=(AY/AX)
    
```

about the screen — setorigin.

Originally the origin is identified with the bottom left hand corner of the screen, but with setorigin we can move it to any other pixel on or off the screen — we can imagine the pixels going off the screen to infinity in all directions.

We may also move the graphics pen to a pixel corresponding to a real vector — moveto — and draw a line between real vectors — lineto. These procedures, which relate real two-dimensional space with the rectangular matrix of pixels on a micro screen are called

primitives, and will be the basis of all future constructions.

From this point on we will not refer to a pixel again: everything will be in real-world units, and device independent — within variations of different dialects of Basic. If you wish to find out more details about the construction of the procedures, and others in this article, you should read *Advanced Graphics on the BBC Model B Microcomputer* by I O Angell and B J Jones.

We now have to create a method for describing a point in 3-D Space. To do this we return to the vector: now a three-dimensional vector, which will be written as three co-ordinates inside brackets thus: (x,y,z). The three values refer to the position of that point relative to an origin and three mutually perpendicular axes. As with 2-D space, we can arbitrarily fix any point in the space and call it the co-ordinate origin — origin for short. We then imagine three mutually perpendicular lines through this point, each line goes off to infinity in both directions.

These are the x-axis, y-axis and z-axis. Each axis is thought to have a positive and a negative half, both starting at the origin, ie, distance measured from the origin along the axis are positive on one side and negative on the other.

We may think of the x- and y-axes in a similar way to 2-D space, both lying on the page of this magazine say, the positive x-axis horizontal and to the right of the origin, and the positive y-axis vertical and above the origin. This just leaves the position of the z-axis: it has to be perpendicular to the page since it is perpendicular to both x- and y-axes. The positive z-axis can be into the page — the so-called left handed triad of axes — or out of the page — the right handed triad. We always use the left-handed triad. We always use the left-handed triad notation.

Thus every important point on our object will be uniquely described by three numbers, the x-, y- and z-co-ordinates of the point vector. So if we have NOV important vertices

in a scene, then the natural approach is to place them in arrays (X(1:NOV), Y(1:NOV) and Z(1:NOV), so that the I'th vertex is given by the vector (X(I), Y(I), Z(I)). The notation 1:NOV simply means we use that part of the array with index ranging from 1 to NOV.

We next have to consider line segments. Each line segment joins two vertices, which we assume are two of the above-mentioned important vertices. In order to define the line all we need do is give the indices of the two vertices at the ends of the line segment, and this line can be completely described by using the information stored in arrays X, Y and Z.

If our scene has NOL lines in total then we use the two-dimensional array

```
LIN(1:2, 1:NOL)
```

to store the vertex indices. That is the I'th line joins the two vertices with indice LIN(1,I) and LIN(2,I).

Of course, we can define the surface of an object, perhaps in terms of polygonal planar facets. These facets may be given in terms of either the vertices or the lines of the polygons. We may wish to specify the order of the vertices around each facet. In a certain type of hidden surface algorithm it is necessary to have these vertices stored in an anticlockwise order when viewed from the outside of the object. But all of this goes way beyond this article.

To introduce the whole concept of 3-D manipulation it is best to start with wire object defined by vertices and lines, and only when these are totally understood should we venture into a study of solid objects defined by vertices and facets.

One of the simplest 3-D objects is the cube. So we shall use it to introduce the ideas of transforming objects in space. A simple way to describe a cube with edge length two units is to define eight vertices.

```
(1,1,1), (1,1, -1), (1, -1, -1), (1, -1, 1), (-1,1,1)
(-1,1, -1), (-1, -1, -1), (-1, -1, 1)
```

which we label 1 to 8 respectively. The edges of the cube are then 12 lines which join vertices

```
1-2, 2-3, 3-4, 4-1, 5-6, 6-7, 7-8,
8-5, 1-5, 2-6, 3-7 and 4-8
respectively. Any such simple way we devise for constructing a given object will be called a Setup position for that object.
```

We will therefore consider our scene as a data base of vertices, X, Y and Z and lines LIN: we also use arrays XD(1:NOV) and YD(1:NOV) for drawing the object, but more

(continued on page 151)

## Listing 4.

```

5000REM genrot / rotate space about a
general axis
5010DEF PROCgenrot(PX,PY,PZ,QX,QY,QZ,GAMMA)
5020LOCAL ALPHA,BETA
5030PROCtran3(-PX,-PY,-PZ) : PROCmult3
5040ALPHA=FNangle(QX,QY)
5050PROCrot3(-ALPHA,3) : PROCmult3
5060BETA=FNangle(QZ,SGR(QX*QX+QY*QY))
5070PROCrot3(-BETA,2) : PROCmult3
5080PROCrot3(GAMMA,3) : PROCmult3
5090PROCrot3(BETA,2) : PROCmult3
5100PROCrot3(ALPHA,3) : PROCmult3
5110PROCtran3(PX,PY,PZ) : PROCmult3
5120ENDPROC
6000REM scene3 / consisting of
2 similar objects
6010DEF PROCscene3
6020DIM X(24),Y(24),Z(24),XD(24),YD(24)
6030DIM LIN(2,60),A(4,4),B(4,4),R(4,4)
6040NOV=0 : NOL=0
6049REM place first object in SETUP position
    
```

```

6050PROCidR3 : PROCobject
6059REM place second object in a
peculiar position
6060PROCidR3
6070PROCrot3(PI/5,1) : PROCmult3
6080PROCrot3(PI/6,2) : PROCmult3
6090PROCtran3(3,2,2) : PROCmult3
6100PROCobject
6109REM specify general rotation
6110PROCidR3 : CLS
6120INPUT "PX,PY,PZ",PX,PY,PZ
6130INPUT "QX,QY,QZ",QX,QY,QZ
6140INPUT "GAMMA",GAMMA
6150PROCgenrot(PX,PY,PZ,QX,QY,QZ,GAMMA)
6159REM OBSERVED position
6160PROClook3
6169REM draw the scene
6170PROCdrawit
6179REM draw another picture
6180GOTO 6110
6190ENDPROC
    
```

# JUST AROUND THE CORNER, A NEW



**BLACK CRYSTAL**

The Classic, six program adventure game for the 48K Spectrum and 16K ZX-81 computers. No software collection is complete without it.

"BLACK CRYSTAL is an excellent graphics adventure and a well thought out package" (Sinclair User, April '83).

"BLACK CRYSTAL has impressed me by its sheer quantity and generally high quality of presentation. I am afraid I have become an addict" (Home Computing Weekly, April '83).

SPECTRUM 48K 180K of program in six parts . . . only £7.50

ZX-81 16K over 100K of program in seven parts . . . only £7.50

Why pay more for less of an adventure?



**THE ADVENTURES OF ST. BERNARD**

An exciting, fast moving, machine code, arcade game where you guide your intrepid St. Bernard through the perils of the icy wastelands to rescue his Mistress from the clutches of the abominable snowman.



**THE CRYPT**  
written by Stephen Renton

Prepare yourself for the many challenges that shall confront you when you dare to enter "THE CRYPT".

You will battle with giant scorpions, Hell spawn, Craners, Pos-Negs and if you are unlucky enough — the Dark Cyclops in this arcade style adventure.

Available now for the 48K Spectrum @ £4.95



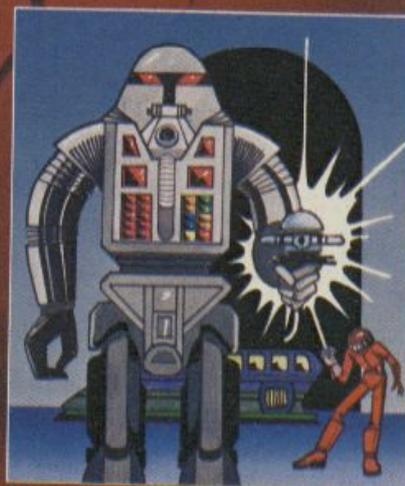
**ZX-81 COMPENDIUM**

Alien Intruder, Wumpus Adventure, Numerology, Hangman, Hieroglyphics, Movie Mogul.

The ideal software package for all 16K ZX-81 owners. Six major programmes on two cassettes for only £6.50.

"Alien Intruder/Hieroglyphics — Both programs make good use of graphics and words to make a very entertaining package." (Sinclair User, Aug '82)

"Alien/Hieroglyphics/Wumpus/Movie — A varied mix from Carnell, all featuring imaginative responses and graphics and all of them good games for all ages (Hieroglyphics is particularly good for children)." (Popular Computing Weekly, Aug '82)



**STARFORCE ONE**

Take on the robot guardians of the central computer in a superbly stylised three dimensional battle game.

(100% MACHINE CODE ARCADE ACTION)



**THE DEVIL RIDES IN**

I uttered the last incantations as the clock struck thirteen. All fell silent except for a faint rustling in the corner. From out of the shadows they came, all Hell's fury against me but I was not defenceless until the Angel Of Death, astride a winged horse, joined the battle. Avoiding his bolts of hell fire, I took careful aim. My chances were slim, but if my luck held . . .

(Fast moving, machine code, all action, Arcade game)

# RANGE FROM CARNELL SOFTWARE



## COMING SOON

### "THE WRATH OF MAGRA"

The first born has been destroyed. The Black Crystal of Beroth has been banished. The alliance of Evil has been defeated by the armies of Lord Fendal. So ends the Third Age. Now we invite you to write your name in the history of the Fourth Age of the Third Continent.

You will meet friends and enemies, old and new, in the long awaited sequel to Volcanic Dungeon. Using high resolution graphics and combining the best qualities of "Black Crystal" and "Volcanic Dungeon", we will allow you to become part of this tale of revenge.

"The Wrath Of Magra" comes as three, 48K programs on cassette, boxed with instruction manual and book detailing the history of the Third Continent and the many spells you will be using throughout the game.

NOTE: "The Wrath Of Magra" is a complete adventure. You need not buy "Volcanic Dungeon" or "Black Crystal" to play it.

Available through most good computer stores or direct from:  
Carnell Software Ltd, North Weylands Industrial Estate, Molesey Road, Hersham, Surrey KT12 3PL.  
Dealers: Contact us for your nearest wholesaler.



CARNELL SOFTWARE LTD

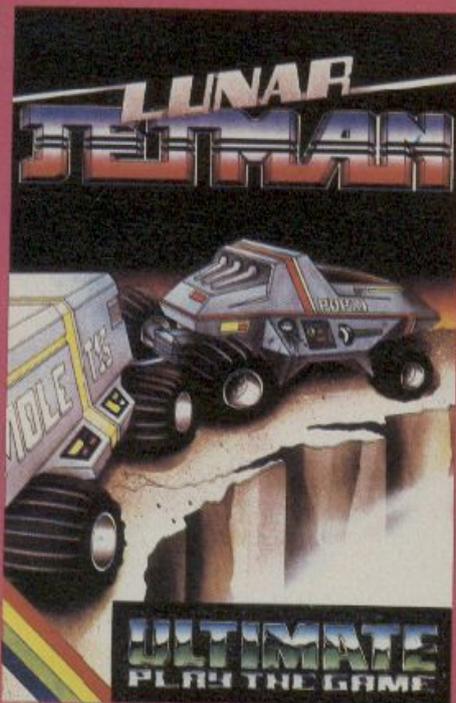
**LUNAR JETMAN** - 48K ZX Spectrum

**LUNAR JETMAN** - For the 48K Sinclair ZX Spectrum

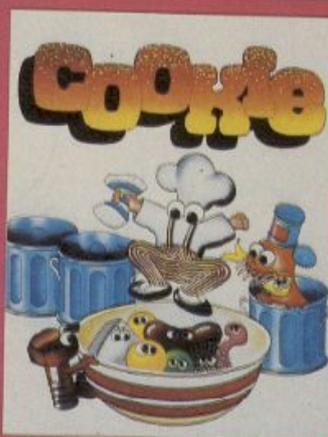
**LUNAR JETMAN** - The Ultimate Intergalactic G.A.S. (Graphic Arcade Simulation) Adventure Space Battle.

**LUNAR JETMAN** - Arcade standard, 100% machine code, incredible sound effects, amazing smooth high resolution graphics, the totally new addictive concept and all those extra features you expect from the **ULTIMATE** games people.

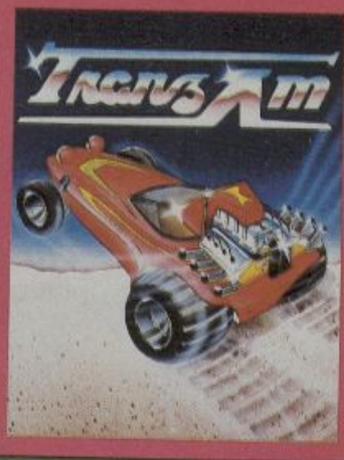
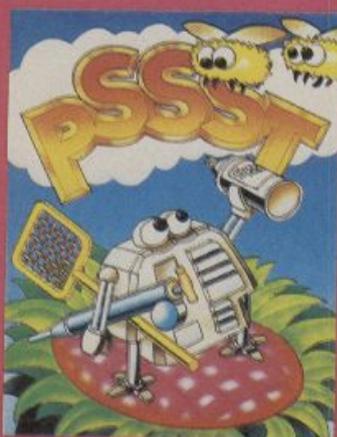
Design - The **ULTIMATE PLAY THE GAME** design team.



**COOKIE** - 16/48K ZX Spectrum



**PSSST** - 19/48K ZX Spectrum



**TRANZ AM** - 16/48K ZX Spectrum

**ATIC ATAC** - For the 48K Sinclair ZX Spectrum

**ATIC ATAC** - The super spooky 3D horror G.A.S. (Graphic Arcade Simulation) Adventure Game.

**ATIC ATAC** - Arcade standard, 100% machine code, incredible sound effects, amazing smooth high resolution graphics, the totally new addictive concept and all those extra features you expect from the **ULTIMATE** games people.

Design - The **ULTIMATE PLAY THE GAME** design team.

**JET PAC** - 16/48K ZX Spectrum or 8K Expanded VIC 20

**ATIC ATAC** - 48K ZX Spectrum

Dealer enquiries welcome. Phone (0530) 411485

These games should be available from **W.H. SMITHS, BOOTS, JOHN MENZIES, LASKYS, SPECTRUM CENTRES**, other large department stores and all good major software retailers. Alternatively, send the coupon to **ULTIMATE PLAY THE GAME** for immediate dispatch by return, subject to availability.

**£5.50** each including VAT, first class postage and packing within UK.

Post this coupon to:

**ULTIMATE PLAY THE GAME**, The Green, Ashby de la Zouch, Leicestershire, LE6 5JU

Please rush me the following:

- LUNAR JETMAN       ATIC ATAC       JET PAC  
 COOKIE             TRANZ AM       PSSST  
 JET PAC (8K Expanded VIC 20)

I enclose cheque/PO for £ .....

Name .....

Address .....

Post Code .....

(continued from page 147)

of these later. In order to create our scene we require procedures which will add the data for a given object to the data base. The procedure object for adding a cube to a given scene is given in listing 1. The reason for the matrix R is given in the next section.

The cube we give here is in a very simple position and orientation. It includes the origin and its edges are parallel to the co-ordinate axes. Naturally we will not necessarily want the cube to stay in this Setup position, we may wish to move it to some other position and orientation in space, what we call the Actual position. In order to relate the Setup and Actual positions we will have to move the object through space. Surprisingly this is not too difficult a task. Luckily, all realistic transformations can be broken down into combinations of three basic transformations: translation, rotation and scaling. We do not consider scaling here.

We need a method that describes a transformation which changes a vertex (x,y,z) to (x',y',z') say. There is no need to worry about lines. A line which joins two vertices before the transformation joins the same two newly-positioned vertices after the move. The same would be true for polygonal facets also. So the problem reduces to a consideration of the vertices.

All realistic transformations are known as linear transformations. That is the new and old co-ordinates of a vertex are related by three linear equations of the type given below:

$$\begin{aligned} x' &= A(1,1).x + A(1,2).y + A(1,3).z + A(1,4) \\ y' &= A(2,1).x + A(2,2).y + A(2,3).z + A(2,4) \\ z' &= A(3,1).x + A(3,2).y + A(3,3).z + A(3,4) \end{aligned}$$

You will recognise equations like these appearing in many parts of our listings. For convenience we add the trivial extra equation:

$$1 = A(4,1).x + A(4,2).y + A(4,3).z + A(4,4)$$

where

$$A(4,1) = A(4,2) = A(4,3) = 0 \text{ and } A(4,4) = 1$$

In other words  $1=1$ . Convenience, because now we can think of the transformation as the matrix of coefficients, the two-dimensional 4 by 4 array A:

$$\begin{matrix} A(1,1) & A(1,2) & A(1,3) & A(1,4) \\ A(2,1) & A(2,2) & A(2,3) & A(2,4) \\ A(4,1) & A(4,2) & A(4,3) & A(4,4) \end{matrix}$$

Another reason for using matrices is the ease with which we can combine two transformations: say we first use a transformation described by matrix R, then a second described by matrix A. The combined transformation is described by the product of two 4 by 4 matrices  $A \times R$ : note the order of the matrix product  $A \times R$  and not  $R \times A$ .

In listing 1 we include two procedures — idR3 and mult3 — to implement these ideas. idR3 sets up a matrix R as the unit or identity matrix — ie, 0's — that is the matrix corresponding to a transformation which doesn't change space — ie,  $x'=x$ ,  $y'=y$  and  $z'=z$ . mult3 multiplies matrix A by matrix R, and copies the result back into R, using a matrix B to hold intermediate results.

The reason for this apparently overcomplicated procedure is that since we cannot pass arrays as parameters into a procedure, and we are likely to combine lots of transformations — ie, multiply many matrices together — then we set up matrix R so that it may be repeatedly updated by each new transformation matrix A.

Let us now look at the two types of transformation.

Suppose we translate each point (x,y,z) to (x+TX,y+TY,z+TZ), then we have the equations:

$$\begin{aligned} x' &= 1.x + 0.y + 0.z + TX && 100TX \\ y' &= 0.x + 1.y + 0.z + TY && \text{ie, } A = 010TY \\ z' &= 0.x + 0.y + 1.z + TZ && 001TZ \\ 1 &= 0.z + 0.y + 0.z + 1 && 0001 \end{aligned}$$

A procedure which creates matrix A given TX, TY and TZ is given in tran3 in listing 1. Note that this procedure creates matrix A so that mult3 can use it immediately to update matrix R.

Rotation is a little more complex. We start by defining three special rotations: by an angle 0 — a variable named Theta — about a given co-ordinate axis — variable Axis. AXIS=1 is the x-axis, AXIS=2 the y-axis and AXIS=3 the z-axis.

For AXIS=1 the equations are:

$$\begin{aligned} x' &= 1.x + 0.y + 0.z + 0 \\ y' &= 0.x + \cos 0.y + \sin 0.z + 0 \\ z' &= 0.x + \sin 0.y + \cos 0.z + 0 \end{aligned}$$

You will find the reasons for the use of sines and cosines in any O-Level text on co-ordinate geometry.

For AXIS=2 the equations are:

$$\begin{aligned} x' &= \cos 0.x + 0.y + \sin 0.z + 0 \\ y' &= 0.x + 1.y + 0.z + 0 \\ z' &= \sin 0.y + 0.y + \cos 0.z + 0 \end{aligned}$$

and for AXIS=3 the equations are:

$$\begin{aligned} x' &= \cos 0.z - \sin 0.y + 0.z + 0 \\ y' &= \sin 0.x + \cos 0.y + 0.z + 0 \\ z' &= 0.x + 0.y + 0.z + 0 \end{aligned}$$

These the types of rotation are programmed in listing 1 as one procedure rot3. We will consider the case of the general rotation later.

Now that we know how to create a matrix R which moves an object from its Setup position to its Actual position: simply use combinations of translations and rotations. We can use the R — the result of idR3 and repeated applications of tran3, rot3 and mult3 — in our equations to calculate the transformed co-ordinates  $x',y'$  and  $z'$ , and add the data for a transformed object to our data base. The problem of creating a scene is now solved. A main program prepares the graphics screen and then calls a procedure — scene3 — in which we declare our data base. We initially allow space for 24 vertices and 60 lines for the icosahedron. The procedure must then call various procedures for creating particular objects — such as a cube or icosahedron — using a variety of transformation matrices R to create the data base. Then it must describe where the observer is positioned in space — a call to procedure look3 — and finally draw the picture. The scene3 procedure in listing 1 creates a scene of two cubes, one remaining in

the original Setup position, the other placed in an arbitrary peculiar position by rotating the Setup cube by  $\pi/5$  about the x-axis, then by  $\pi/6$  about the y-axis and finally translating it by (3,2,2). Here we give a trivial look3 procedure — it returns immediately — later we will consider the general case.

Like all other aspects of computer graphics, there is never just one way to draw an object. We have to devise a method for drawing a three-dimensional object on a two-dimensional screen using our procedures moveto and lineto etc. Any method used to draw a two-dimensional view of a three-dimensional scene is called a projection. There are many, many projections. Probably the best known is the Mercator Projection which draws the surface of a sphere — the earth — on a flat rectangular area — a map.

The projection is quite complicated, involving a variety of trigonometric functions and is not really valid in this situation anyway. We will describe the most straightforward of all 3-D to 2-D projections, the orthographic. The idea is very simple. Imagine you are an observer at the origin of space, looking along the positive z-axis, what we will call the Observed position.

We ignore the z-co-ordinates of all the vertices, each three-dimensional vertex now being considered as a two-dimensional vector — defined by the x- and y-co-ordinates of the original 3-D vector — which are stored in the arrays XD and YD and can be drawn as points in our two-dimensional window — the screen — the real x- and y-axes of the screen which we created start etc. being identified with the corresponding axes in 3-D space.

The procedure drawit in listing 1, draws all the NOL lines joining the NOV vertices in our scene. Note how drawit only needs to know the form of the data base, the details of a scene are irrelevant.

So we finally have our program for drawing a 3-D scene. With all the comment's in the program, and the liberal use of spaces to make the listing readable, you will have to Load this program at PAGE=\$1100 should you wish to Run in modes 0,1 or 2. Because we placed most comments on program lines ending with a 9, you can get rid of these quickly using the Rem-stripper, that is by typing AUTO 9,10 and holding down the Return key.

Try the program with HORIZ=10, using all the graphics modes — 0, 1, 2, 4 and 5. Then try HORIZ=5, 20, 30, 40 etc. We get the same shapes and orientation in the scene, only the scale changes. You will also note that the first cube is always drawn as a square. This

(continued on next page)

### Listing 5.

```

600000 scene3 / a jet
601000 PROCEDURE scene3
602000 X(74),Y(74),Z(74),ID(74),NOV(74)
603000 LIN(2,74),A(4,4),R(4,4),B(4,4)
604000 place jet in SETUP
point
605000 jet
606000 specify general rotation
607000 INPUT: TX,TY,TZ
608000 INPUT: ID(1,74),ID(2,74),ID(3,74)
609000 INPUT: ID(4,74),ID(5,74),ID(6,74)
610000 INPUT: ID(7,74),ID(8,74),ID(9,74),ID(10,74)
611000 INPUT: ID(11,74),ID(12,74),ID(13,74),ID(14,74)
612000 INPUT: ID(15,74),ID(16,74),ID(17,74),ID(18,74)
613000 INPUT: ID(19,74),ID(20,74),ID(21,74),ID(22,74)
614000 INPUT: ID(23,74),ID(24,74),ID(25,74),ID(26,74)
615000 INPUT: ID(27,74),ID(28,74),ID(29,74),ID(30,74)
616000 INPUT: ID(31,74),ID(32,74),ID(33,74),ID(34,74)
617000 INPUT: ID(35,74),ID(36,74),ID(37,74),ID(38,74)
618000 INPUT: ID(39,74),ID(40,74),ID(41,74),ID(42,74)
619000 INPUT: ID(43,74),ID(44,74),ID(45,74),ID(46,74)
620000 INPUT: ID(47,74),ID(48,74),ID(49,74),ID(50,74)
621000 INPUT: ID(51,74),ID(52,74),ID(53,74),ID(54,74)
622000 INPUT: ID(55,74),ID(56,74),ID(57,74),ID(58,74)
623000 INPUT: ID(59,74),ID(60,74),ID(61,74),ID(62,74)
624000 INPUT: ID(63,74),ID(64,74),ID(65,74),ID(66,74)
625000 INPUT: ID(67,74),ID(68,74),ID(69,74),ID(70,74)
626000 INPUT: ID(71,74),ID(72,74),ID(73,74),ID(74,74)
627000 INPUT: ID(75,74),ID(76,74),ID(77,74),ID(78,74)
628000 INPUT: ID(79,74),ID(80,74),ID(81,74),ID(82,74)
629000 INPUT: ID(83,74),ID(84,74),ID(85,74),ID(86,74)
630000 INPUT: ID(87,74),ID(88,74),ID(89,74),ID(90,74)
631000 INPUT: ID(91,74),ID(92,74),ID(93,74),ID(94,74)
632000 INPUT: ID(95,74),ID(96,74),ID(97,74),ID(98,74)
633000 INPUT: ID(99,74),ID(100,74),ID(101,74),ID(102,74)
634000 INPUT: ID(103,74),ID(104,74),ID(105,74),ID(106,74)
635000 INPUT: ID(107,74),ID(108,74),ID(109,74),ID(110,74)
636000 INPUT: ID(111,74),ID(112,74),ID(113,74),ID(114,74)
637000 INPUT: ID(115,74),ID(116,74),ID(117,74),ID(118,74)
638000 INPUT: ID(119,74),ID(120,74),ID(121,74),ID(122,74)
639000 INPUT: ID(123,74),ID(124,74),ID(125,74),ID(126,74)
640000 INPUT: ID(127,74),ID(128,74),ID(129,74),ID(130,74)
641000 INPUT: ID(131,74),ID(132,74),ID(133,74),ID(134,74)
642000 INPUT: ID(135,74),ID(136,74),ID(137,74),ID(138,74)
643000 INPUT: ID(139,74),ID(140,74),ID(141,74),ID(142,74)
644000 INPUT: ID(143,74),ID(144,74),ID(145,74),ID(146,74)
645000 INPUT: ID(147,74),ID(148,74),ID(149,74),ID(150,74)
646000 INPUT: ID(151,74),ID(152,74),ID(153,74),ID(154,74)
647000 INPUT: ID(155,74),ID(156,74),ID(157,74),ID(158,74)
648000 INPUT: ID(159,74),ID(160,74),ID(161,74),ID(162,74)
649000 INPUT: ID(163,74),ID(164,74),ID(165,74),ID(166,74)
650000 INPUT: ID(167,74),ID(168,74),ID(169,74),ID(170,74)
651000 INPUT: ID(171,74),ID(172,74),ID(173,74),ID(174,74)
652000 INPUT: ID(175,74),ID(176,74),ID(177,74),ID(178,74)
653000 INPUT: ID(179,74),ID(180,74),ID(181,74),ID(182,74)
654000 INPUT: ID(183,74),ID(184,74),ID(185,74),ID(186,74)
655000 INPUT: ID(187,74),ID(188,74),ID(189,74),ID(190,74)
656000 INPUT: ID(191,74),ID(192,74),ID(193,74),ID(194,74)
657000 INPUT: ID(195,74),ID(196,74),ID(197,74),ID(198,74)
658000 INPUT: ID(199,74),ID(200,74),ID(201,74),ID(202,74)
659000 INPUT: ID(203,74),ID(204,74),ID(205,74),ID(206,74)
660000 INPUT: ID(207,74),ID(208,74),ID(209,74),ID(210,74)
661000 INPUT: ID(211,74),ID(212,74),ID(213,74),ID(214,74)
662000 INPUT: ID(215,74),ID(216,74),ID(217,74),ID(218,74)
663000 INPUT: ID(219,74),ID(220,74),ID(221,74),ID(222,74)
664000 INPUT: ID(223,74),ID(224,74),ID(225,74),ID(226,74)
665000 INPUT: ID(227,74),ID(228,74),ID(229,74),ID(230,74)
666000 INPUT: ID(231,74),ID(232,74),ID(233,74),ID(234,74)
667000 INPUT: ID(235,74),ID(236,74),ID(237,74),ID(238,74)
668000 INPUT: ID(239,74),ID(240,74),ID(241,74),ID(242,74)
669000 INPUT: ID(243,74),ID(244,74),ID(245,74),ID(246,74)
670000 INPUT: ID(247,74),ID(248,74),ID(249,74),ID(250,74)
671000 INPUT: ID(251,74),ID(252,74),ID(253,74),ID(254,74)
672000 INPUT: ID(255,74),ID(256,74),ID(257,74),ID(258,74)
673000 INPUT: ID(259,74),ID(260,74),ID(261,74),ID(262,74)
674000 INPUT: ID(263,74),ID(264,74),ID(265,74),ID(266,74)
675000 INPUT: ID(267,74),ID(268,74),ID(269,74),ID(270,74)
676000 INPUT: ID(271,74),ID(272,74),ID(273,74),ID(274,74)
677000 INPUT: ID(275,74),ID(276,74),ID(277,74),ID(278,74)
678000 INPUT: ID(279,74),ID(280,74),ID(281,74),ID(282,74)
679000 INPUT: ID(283,74),ID(284,74),ID(285,74),ID(286,74)
680000 INPUT: ID(287,74),ID(288,74),ID(289,74),ID(290,74)
681000 INPUT: ID(291,74),ID(292,74),ID(293,74),ID(294,74)
682000 INPUT: ID(295,74),ID(296,74),ID(297,74),ID(298,74)
683000 INPUT: ID(299,74),ID(300,74),ID(301,74),ID(302,74)
684000 INPUT: ID(303,74),ID(304,74),ID(305,74),ID(306,74)
685000 INPUT: ID(307,74),ID(308,74),ID(309,74),ID(310,74)
686000 INPUT: ID(311,74),ID(312,74),ID(313,74),ID(314,74)
687000 INPUT: ID(315,74),ID(316,74),ID(317,74),ID(318,74)
688000 INPUT: ID(319,74),ID(320,74),ID(321,74),ID(322,74)
689000 INPUT: ID(323,74),ID(324,74),ID(325,74),ID(326,74)
690000 INPUT: ID(327,74),ID(328,74),ID(329,74),ID(330,74)
691000 INPUT: ID(331,74),ID(332,74),ID(333,74),ID(334,74)
692000 INPUT: ID(335,74),ID(336,74),ID(337,74),ID(338,74)
693000 INPUT: ID(339,74),ID(340,74),ID(341,74),ID(342,74)
694000 INPUT: ID(343,74),ID(344,74),ID(345,74),ID(346,74)
695000 INPUT: ID(347,74),ID(348,74),ID(349,74),ID(350,74)
696000 INPUT: ID(351,74),ID(352,74),ID(353,74),ID(354,74)
697000 INPUT: ID(355,74),ID(356,74),ID(357,74),ID(358,74)
698000 INPUT: ID(359,74),ID(360,74),ID(361,74),ID(362,74)
699000 INPUT: ID(363,74),ID(364,74),ID(365,74),ID(366,74)
700000 INPUT: ID(367,74),ID(368,74),ID(369,74),ID(370,74)
701000 INPUT: ID(371,74),ID(372,74),ID(373,74),ID(374,74)
702000 INPUT: ID(375,74),ID(376,74),ID(377,74),ID(378,74)
703000 INPUT: ID(379,74),ID(380,74),ID(381,74),ID(382,74)
704000 INPUT: ID(383,74),ID(384,74),ID(385,74),ID(386,74)
705000 INPUT: ID(387,74),ID(388,74),ID(389,74),ID(390,74)
706000 INPUT: ID(391,74),ID(392,74),ID(393,74),ID(394,74)
707000 INPUT: ID(395,74),ID(396,74),ID(397,74),ID(398,74)
708000 INPUT: ID(399,74),ID(400,74),ID(401,74),ID(402,74)
709000 INPUT: ID(403,74),ID(404,74),ID(405,74),ID(406,74)
710000 INPUT: ID(407,74),ID(408,74),ID(409,74),ID(410,74)
711000 INPUT: ID(411,74),ID(412,74),ID(413,74),ID(414,74)
712000 INPUT: ID(415,74),ID(416,74),ID(417,74),ID(418,74)
713000 INPUT: ID(419,74),ID(420,74),ID(421,74),ID(422,74)
714000 INPUT: ID(423,74),ID(424,74),ID(425,74),ID(426,74)
715000 INPUT: ID(427,74),ID(428,74),ID(429,74),ID(430,74)
716000 INPUT: ID(431,74),ID(432,74),ID(433,74),ID(434,74)
717000 INPUT: ID(435,74),ID(436,74),ID(437,74),ID(438,74)
718000 INPUT: ID(439,74),ID(440,74),ID(441,74),ID(442,74)
719000 INPUT: ID(443,74),ID(444,74),ID(445,74),ID(446,74)
720000 INPUT: ID(447,74),ID(448,74),ID(449,74),ID(450,74)
721000 INPUT: ID(451,74),ID(452,74),ID(453,74),ID(454,74)
722000 INPUT: ID(455,74),ID(456,74),ID(457,74),ID(458,74)
723000 INPUT: ID(459,74),ID(460,74),ID(461,74),ID(462,74)
724000 INPUT: ID(463,74),ID(464,74),ID(465,74),ID(466,74)
725000 INPUT: ID(467,74),ID(468,74),ID(469,74),ID(470,74)
726000 INPUT: ID(471,74),ID(472,74),ID(473,74),ID(474,74)
727000 INPUT: ID(475,74),ID(476,74),ID(477,74),ID(478,74)
728000 INPUT: ID(479,74),ID(480,74),ID(481,74),ID(482,74)
729000 INPUT: ID(483,74),ID(484,74),ID(485,74),ID(486,74)
730000 INPUT: ID(487,74),ID(488,74),ID(489,74),ID(490,74)
731000 INPUT: ID(491,74),ID(492,74),ID(493,74),ID(494,74)
732000 INPUT: ID(495,74),ID(496,74),ID(497,74),ID(498,74)
733000 INPUT: ID(499,74),ID(500,74),ID(501,74),ID(502,74)
734000 INPUT: ID(503,74),ID(504,74),ID(505,74),ID(506,74)
735000 INPUT: ID(507,74),ID(508,74),ID(509,74),ID(510,74)
736000 INPUT: ID(511,74),ID(512,74),ID(513,74),ID(514,74)
737000 INPUT: ID(515,74),ID(516,74),ID(517,74),ID(518,74)
738000 INPUT: ID(519,74),ID(520,74),ID(521,74),ID(522,74)
739000 INPUT: ID(523,74),ID(524,74),ID(525,74),ID(526,74)
740000 INPUT: ID(527,74),ID(528,74),ID(529,74),ID(530,74)
741000 INPUT: ID(531,74),ID(532,74),ID(533,74),ID(534,74)
742000 INPUT: ID(535,74),ID(536,74),ID(537,74),ID(538,74)
743000 INPUT: ID(539,74),ID(540,74),ID(541,74),ID(542,74)
744000 INPUT: ID(543,74),ID(544,74),ID(545,74),ID(546,74)
745000 INPUT: ID(547,74),ID(548,74),ID(549,74),ID(550,74)
746000 INPUT: ID(551,74),ID(552,74),ID(553,74),ID(554,74)
747000 INPUT: ID(555,74),ID(556,74),ID(557,74),ID(558,74)
748000 INPUT: ID(559,74),ID(560,74),ID(561,74),ID(562,74)
749000 INPUT: ID(563,74),ID(564,74),ID(565,74),ID(566,74)
750000 INPUT: ID(567,74),ID(568,74),ID(569,74),ID(570,74)
751000 INPUT: ID(571,74),ID(572,74),ID(573,74),ID(574,74)
752000 INPUT: ID(575,74),ID(576,74),ID(577,74),ID(578,74)
753000 INPUT: ID(579,74),ID(580,74),ID(581,74),ID(582,74)
754000 INPUT: ID(583,74),ID(584,74),ID(585,74),ID(586,74)
755000 INPUT: ID(587,74),ID(588,74),ID(589,74),ID(590,74)
756000 INPUT: ID(591,74),ID(592,74),ID(593,74),ID(594,74)
757000 INPUT: ID(595,74),ID(596,74),ID(597,74),ID(598,74)
758000 INPUT: ID(599,74),ID(600,74),ID(601,74),ID(602,74)
759000 INPUT: ID(603,74),ID(604,74),ID(605,74),ID(606,74)
760000 INPUT: ID(607,74),ID(608,74),ID(609,74),ID(610,74)
761000 INPUT: ID(611,74),ID(612,74),ID(613,74),ID(614,74)
762000 INPUT: ID(615,74),ID(616,74),ID(617,74),ID(618,74)
763000 INPUT: ID(619,74),ID(620,74),ID(621,74),ID(622,74)
764000 INPUT: ID(623,74),ID(624,74),ID(625,74),ID(626,74)
765000 INPUT: ID(627,74),ID(628,74),ID(629,74),ID(630,74)
766000 INPUT: ID(631,74),ID(632,74),ID(633,74),ID(634,74)
767000 INPUT: ID(635,74),ID(636,74),ID(637,74),ID(638,74)
768000 INPUT: ID(639,74),ID(640,74),ID(641,74),ID(642,74)
769000 INPUT: ID(643,74),ID(644,74),ID(645,74),ID(646,74)
770000 INPUT: ID(647,74),ID(648,74),ID(649,74),ID(650,74)
771000 INPUT: ID(651,74),ID(652,74),ID(653,74),ID(654,74)
772000 INPUT: ID(655,74),ID(656,74),ID(657,74),ID(658,74)
773000 INPUT: ID(659,74),ID(660,74),ID(661,74),ID(662,74)
774000 INPUT: ID(663,74),ID(664,74),ID(665,74),ID(666,74)
775000 INPUT: ID(667,74),ID(668,74),ID(669,74),ID(670,74)
776000 INPUT: ID(671,74),ID(672,74),ID(673,74),ID(674,74)
777000 INPUT: ID(675,74),ID(676,74),ID(677,74),ID(678,74)
778000 INPUT: ID(679,74),ID(680,74),ID(681,74),ID(682,74)
779000 INPUT: ID(683,74),ID(684,74),ID(685,74),ID(686,74)
780000 INPUT: ID(687,74),ID(688,74),ID(689,74),ID(690,74)
781000 INPUT: ID(691,74),ID(692,74),ID(693,74),ID(694,74)
782000 INPUT: ID(695,74),ID(696,74),ID(697,74),ID(698,74)
783000 INPUT: ID(699,74),ID(700,74),ID(701,74),ID(702,74)
784000 INPUT: ID(703,74),ID(704,74),ID(705,74),ID(706,74)
785000 INPUT: ID(707,74),ID(708,74),ID(709,74),ID(710,74)
786000 INPUT: ID(711,74),ID(712,74),ID(713,74),ID(714,74)
787000 INPUT: ID(715,74),ID(716,74),ID(717,74),ID(718,74)
788000 INPUT: ID(719,74),ID(720,74),ID(721,74),ID(722,74)
789000 INPUT: ID(723,74),ID(724,74),ID(725,74),ID(726,74)
790000 INPUT: ID(727,74),ID(728,74),ID(729,74),ID(730,74)
791000 INPUT: ID(731,74),ID(732,74),ID(733,74),ID(734,74)
792000 INPUT: ID(735,74),ID(736,74),ID(737,74),ID(738,74)
793000 INPUT: ID(739,74),ID(740,74),ID(741,74),ID(742,74)
794000 INPUT: ID(743,74),ID(744,74),ID(745,74),ID(746,74)
795000 INPUT: ID(747,74),ID(748,74),ID(749,74),ID(750,74)
796000 INPUT: ID(751,74),ID(752,74),ID(753,74),ID(754,74)
797000 INPUT: ID(755,74),ID(756,74),ID(757,74),ID(758,74)
798000 INPUT: ID(759,74),ID(760,74),ID(761,74),ID(762,74)
799000 INPUT: ID(763,74),ID(764,74),ID(765,74),ID(766,74)
800000 INPUT: ID(767,74),ID(768,74),ID(769,74),ID(770,74)
801000 INPUT: ID(771,74),ID(772,74),ID(773,7
```

(continued from previous page)

is because in the orthographic projection, we are looking face-on to this cube and the front and back faces are projected into the same square, and the other four faces are projected into lines in the square.

Here we will show the value of this structured approach to our program. Suppose the object procedure in listing 1 is meant to create an icosahedron instead of a cube. We simply delete lines 6500 to 6660 of the program and replace them with the object procedure in listing 2: all the other procedures stay the same.

Running with the same values mentioned above we now get a scene containing two icosahedra. As an exercise you can write your own object procedure which constructs a tetrahedron. Four Vertices (1,1,1), (1,-1,-1), (-1,1,-1) and (-1,-1,1), with six lines 1→2, 1→3, 1→4, 2→3, 2→4 and 3→4.

We now vary the position of the observer, ie, its Actual position may be placed at a general point (EX,EY,EX) say, looking towards the point (DX,DY,DZ) a change for our special situation, the Observer position where the observer is at (0,0,0) looking towards (0,0,1). The general look3 procedure referred to earlier is given in listing 3. It creates a matrix which has the effect of moving the observer from this Actual position in space to the Observer position.

This Actual to Observer matrix will again be incorporated in the matrix R for placing an object in arrays XD and YD. Note how again we use matrices to reduce a general problem to a simpler one which has already been solved. The value of structured reasoning! Also note that if we only use matrices to move the observation line — ie, (EX,EY,EZ) to (DX,DY,DZ) — then we will find that the scene will take on a peculiar orientation. To

counteract this problem we maintain the vertical so that lines that are vertical in the scene — ie, parallel to the y-axis — remain vertical in the projected picture. Also note that we also require another routine — angle — which calculates the angle that a line from the origin to a point (AX,AY) of 2.D space makes with the positive x-axis.

Now Run the first program with the new look3, typing in (EX,EY,EZ) and (DX,DY,DZ) from the keyboard on request. Now you will see that the first cube need no longer look like a square.

You can change the names of the two object procedures to cube and icosahedron and write a new scene3 procedure to call them individually and create a new scene which contains one cube and one icosahedron.

Listing 4 gives a procedure genrot which again introduces a matrix to update matrix R. Note this too uses function angle, again demonstrating the value of structured programming. Genrot has the effect of rotating space by an angle Gamma about a line — an axis of rotation — which passes through the point (PX,PY,PZ) and which is parallel to the line from the origin to (QX,QY,QZ). The problem reduces to the construction and product of seven matrices.

$$F-1 \times G-1 \times H-1 \times W+H+G \times F$$

F translates space so that the line now passes through the origin. G moves the axis of rotation into the x-z plane through the origin, H rotates space so that the axis is now identical to the z-axis. W represents the rotation by an angle GAMMA about the z-axis — now the axis of rotation — and the remaining matrices F-1, G-1 and H-1 reverse the effect of F, G and H. There is no need to calculate the inverse of F, G and H explicitly, they can be evaluated directly. Note that F created by tran3 with TX, TY and TZ is inverted by

tran3 with -TX, -TY and -TZ. G and H, created by 'rot3' given Theta and the axis, are inverted by calls to rot 3 with -Theta and the same axis.

Listing 4 also contains a scene3 procedure which is an expanded version of that given in listing 1, and must be used to replace lines 6000 to 6130 of that listing.

Try the program with MODE = 4, HORIZ = 2, (PX,PY,PZ) = (0,1,0) (QZ,QY,QZ) = (1,1,1), Gamma = 1. Use (EX,EY,EZ) = (0,0,0) and (DX,DY,DZ) = (0,0,1), ie, the original Observed position.

Having considered how to use matrices to move vertices about space in a systematic way, and also how to create scenes relative to a moveable observer we now concentrate on constructing more complex scenes. You will have realised by now that the most tedious part of creating a picture is the construction of data. There are many techniques for saving time and effort. One of the simpler methods is to make use of any symmetry in the object.

Take the construction of a wire jet, you will notice that the figure is symmetrical about the plane down the centre of the object, that is for every vertex (x,y,z) with positive x, there is an equivalent vertex (-x,y,z). We can use this symmetry to give the machine just half of the data, and let it construct the other half. This method is given in procedure jet in listing 5, together with a new scene3 procedure.

When creating objects like this you first make a rough plan of the construction on graph-paper, and then transfer it to data statements.

Try Running the program in Mode 4 with HORIZ=200, (PX,PY,PZ)=(1,2,3), (QX,QY,QZ)=(1,1,1), GAMMA=1, with (EX,EY,EX)=(1,2,3) and (DX,DY,DZ)=(0,0,0). You are now in a position to construct spaceships, cars and houses using this same method.

#### Listing 6.

```
6000REM" scene3 / consisting of
  2 similar objects
6010DEF PROCscene3
6020DIM X(66),Y(66),Z(66),XD(66),YD(66)
6030DIM LIN(2,99),A(4,4),B(4,4),R(4,4)
6040NOV=0 : NOL=0
6049REM" place IAN in SETUPposition
6050PROCi : PROCa : PROCn
6059REM" specify general rotation
6060PROCidR3 : CLS
6070INPUT" (PX,PY,PZ) ",PX,PY,PZ
6080INPUT" (QX,QY,QZ) ",QX,QY,QZ
6090INPUT"GAMMA",GAMMA
6100PROCgenrot (PX,PY,PZ,QX,QY,QZ,GAMMA)
6109REM" OBSERVED position
6110PROClook3
6119REM" draw the scene
6120PROCdrawit
6129REM" draw another picture
6130GOTO 6060
6140ENDPROC
6500REM" letter I
6510DEF PROCi
6519REM" data for front-face of I
6520DATA 1,2, 2,3, 3,4, 4,5, 5,6, 6,7, 7,8, 8,9, 9,10
, 10,11, 11,12, 12,1
6530DATA -96,60, -96,30, -135,30, -135,-30, -96,-30,
-96,-60, -204,-60, -204,-30, -165,-30, -165,30, -204,3
0, -204,60
6540RESTORE 6520
6550NUMV=12 : PROCfillit
6560ENDPROC
6600REM" letter A
6610DEF PROCa
6619REM" data for front-face of A
6620DATA 1,2, 2,3, 3,4, 4,5, 5,6, 6,7, 7,8, 8,1, 9,10
, 10,11, 11,9
6630DATA 15,60, 60,-60, 30,-60, 22,-40, -22,-40, -30,
-60, -60,-60, -15,60, 0,20, 15,-20, -15,-20
6640RESTORE 6620
6650NUMV=11 : PROCfillit
6660ENDPROC
6700REM" letter N
6710DEF PROCn
6719REM" data for front-face of N
6720DATA 1,2, 2,3, 3,4, 4,5, 5,6, 6,7, 7,8, 8,9, 9,10
, 10,1
6730DATA 90,60, 120,60, 180,-18, 180,60, 210,60, 210,
-60, 180,-60, 120,18, 120,-60, 90,-60
6740RESTORE 6720
6750NUMV=10 : PROCfillit
6760ENDPROC
6800REM" fillit
6810DEF PROCfillit
6820FOR IX=1 TO NUMV
6828REM" create 3*NUMV lines
6829REM" READ 2-D line-DATA for letter
6830READ L1,L2
6839REM" place front-face lines
6840JX=NOL+IX : LIN(1,JX)=L1+NOV : LIN(2,JX)=L2+NOV
6849REM" place back-face lines
6850JX=JX+NUMV : LIN(1,JX)=L1+NOV+NUMV : LIN(2,JX)=L2
+NOV+NUMV
6859REM" place lines joining faces
6860JX=JX+NUMV : LIN(1,JX)=IX+NOV : LIN(2,JX)=IX+NOV+
NUMV
6870NEXT IX
6880NOL=NOL+3*NUMV
6889REM" create 2*NUMV vertices
6890FOR IX=1 TO NUMV
6899REM" READ front-face vertices
6900READ XV,YV
6909REM" place front-face vertices
6910JX=NOV+IX : X(JX)=XV : Y(JX)=YV : Z(JX)=0
6919REM" place back-face vertices
6920JX=JX+NUMV : X(JX)=XV : Y(JX)=YV : Z(JX)=10
6930NEXT IX
6940NOV=NOV+2*NUMV
6950ENDPROC
```

# THE CHALLENGE IS WITHIN YOUR GRASP



**JOYSTICK ONLY  
£13.50  
SPECTRUM  
JOYSTICK ONLY  
£24.99**

With the vast range of games now available for home computers each holds a different challenge. Now the Kempston Competition-Pro Joystick will come to your aid and improve your playing capabilities. Your movements will become quicker, your finger poised over the fire button at the ready, your scores will be out of this world. Playing will be easier.

If you're serious about the challenge your computer presents then you shouldn't be without the Kempston Competition-Pro Joystick.

Compatible with any Atari 400/800, Vic-20, Commodore 64.



Now Available separately the Kempston Joystick Interface for the ZX Spectrum **ONLY £14.99**

Allows the use of any Atari/Commodore type Joystick with the popular ZX Spectrum computer. A must for any Spectrum owner who wants the power of a joystick added to the power of the Spectrum. Simply plugs into the edge connector at the back of the Spectrum. No modifications necessary. Only £14.99

Exclusive offer to mail order customers - a **FREE** Conversion Tape of your choice (value £4.95) if you order either the Spectrum Joystick or Spectrum Interface. Limited offer so order NOW!

If you have the hardware you'll want the software...

LATEST RELEASE FROM KEMPSOFT

**MISSION MARS** Rescue the martians from their crumbling planet and transport them through the meteor belt to safety in the mother ship.  
48K Spectrum Only £4.95

## Joystick Compatible Software for the ZX Spectrum

Aquaplane (48K)	£6.95	Meteoroids	£5.95
Aquarius	£5.95	Missile Defence	£5.95
Armedgeddon	£4.95	Night Flight	£5.95
Astro Blaster	£4.95	Cebron	£5.95
Atic Atac (48K)	£5.50	Phoenix	£5.50
Blind Alley	£4.95	Pass	£5.50
Booby Boa	£5.95	Punchy (48K)	£5.90
Cookie	£8.50	Repulsar	£5.95
Combat Zone	£5.95	Rescue (48K)	£5.90
Corridors of Genoa (48K)	£5.95	Robotics	£5.90
Cosmic Guentia	£5.95	Sheepwalk (48K)	£7.95
Cosmos	£5.95	Slap Daz	£5.95
Crazy Golf (48K)	£6.90	Slippery Sid	£5.95
Cyber Rats	£5.95	Spectropede	£5.50
E.T.	£5.95	Spectra Smash and Break Out	£6.99
Froggy	£5.95	Splat (48K)	£5.50
Frog Run	£4.95	Spookymon	£5.95
Galactic Abductor	£7.90	Terror Dakti 4D (48K)	£6.95
Galactic Trooper	£5.99	Time Gate (48K)	£6.95
Galaxians	£4.95	Transversion	£5.90
Grasher	£4.95	Tranz Am	£5.50
Gulpmen	£4.95	Violent Universe	£5.95
Harequin	£6.90	Mr Wimpy (48K)	£5.90
Jet Pac	£5.50	Wizard Warriors (48K)	£4.95
Knot in 3D (48K)	£5.95	Zip Zap (48K)	£5.50
Kong (48K)	£5.90	Zzoom (48K)	£5.50
Krazy Kong	£5.95	3D Maze of Gold	£5.95
Lunar Jetman (48K)	£5.50	3D Monster Maze	£5.95
Manic Miner (48K)	£5.95	3D Painter	£5.95
Mazeman	£5.95	3D Spacer Wars	£5.95
		3D Tunnel (16K/48K)	£5.95

All games 16K unless otherwise stated

All the above games simply load and play with the Kempston range of Joysticks. However, some games available were produced before Joysticks were available for the ZX Spectrum. With the aid of Kempston Conversion Tapes these games can now be played with the Kempston Joysticks.



### Conversion Tape I

- Converts: Horace Goes Skiing, Hungry Horace, Flight Simulation (Sinclair), Arcadia, Penetrator, Spectres

### Conversion Tape II

- Converts: Orbiter, Escape, Tanx, Centipede, Spectral Invaders, Cruising on Broadway, Frenzy

ALL £4.95 each

### Conversion Tape III

- Converts: Ah Diddums, Jumping Jack, Molar Maul, Androids, Horace And The Spiders, Space Raiders, Winged Avenger, Muncher

Most items are available from W H Smith, Boots, Spectrum Computer Centres and good computing shops or direct from:

**KEMPSTON**  
MICRO ELECTRONICS LTD

Unit 30 Singer Way Woburn Road Industrial Estate  
Kempston, Bedford, MK42 7AF. Tel: (0234) 856633  
Telex: 826078 KEMPMI G

TRADE ENQUIRIES WELCOME





# Mastercode Assembler for the Commodore 64

Full Commodore 64 Assembler/Disassembler

**£14.95**  
inc VAT



**Mastercode is a substantial and complex program of use to anyone interested in writing machine code on the Commodore 64.**

**Its features include:**

- Machinecode monitor
- File Editor
- Disassembler
- Assembler

Mastercode is a full two pass assembler. It accepts labels, variables and equations within assembly language programs. It is possible to store programs anywhere in memory, even in parts occupied by the Assembler. Programs can be saved to either tape or disc.

**The Machine Code Monitor includes:**

- OUTPUT OF MEMORY TO SCREEN OR PRINTER ■ MODIFICATION OF MEMORY ■ EXECUTION OF MACHINE CODE PROGRAMS ■ SAVING OF MACHINE CODE FILES ON TO TAPE OR DISC
- LOADING OF MACHINE CODE FILES FROM TAPE OR DISC ■ STEP BY STEP TRACING OF THE EXECUTION OF A MACHINE CODE PROGRAM, INCLUDING DISPLAY OF REGISTER CONTENTS.

The Disassembler will translate into assembly language the contents of any area of memory, whether the 64's ROM or a user program. Output may be sent either to the screen or a printer.

**The File Editor includes:**

- ENTRY OF NUMBERED LINES OF ASSEMBLY LANGUAGE INSTRUCTIONS ■ LISTING, INDIVIDUALLY OR IN BLOCKS, OF PREVIOUSLY ENTERED LINES ■ DELETION, INDIVIDUALLY OR IN BLOCKS, OF EXISTING LINES ■ RENUMBERING OF EXISTING LINES ■ SAVING OF ASSEMBLY LANGUAGE FILES TO TAPE OR DISC ■ LOADING OF ASSEMBLY LANGUAGE FILES FROM TAPE OR DISC ■ ADDITION OF A BLOCK OF MEMORY SPECIFIED BY THE USER TO THE USER'S ASSEMBLY PROGRAM

The Assembler allows the translation of assembly language programs into machine code with full error checking, labelling and a range of assembler directives.

**LOOK OUT FOR THE SUNSHINE RANGE IN W.H. SMITH'S, BOOTS, JOHN MENZIES, OTHER LEADING RETAIL CHAINS AND THROUGH OUR NATIONAL NETWORK OF BOOK SHOPS AND SPECIALIST STORES.**

Please send me Commodore 64 Mastercode Assembler @ £14.95 inc VAT. I enclose cheque/postal order for £\_\_\_\_\_ made payable to Sunshine: 12/13 Little Newport Street, London WC2R 3LD. Or telephone your order through Access/Mastercard on 01-437 4343

Name \_\_\_\_\_

Address \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Signature \_\_\_\_\_



**BBC**

This month John Dawson explains how to reach a diagnosis and what to do about it.

# HEARTSTOP

However, at the moment when a new patient walks in the doctor's antenae — his cognitive span — must be extended as far as possible to pick up both the gross signs of disease and to appreciate how the patient's problems relate to the whole of his personality and environment. This process will be familiar to any reader of Sherlock Holmes, said to have been modelled on one of Conan Doyle's medical teachers.

Watson: "But what were his relations with the governess and how did you discover them?"

Holmes: "When I considered the passionate, unconventional, unbusinesslike tone of his letter, and contrasted it with his self-contained manner and appearance, it was pretty clear that there

*(continued on page 158)*

THE PREVIOUS instalments of Heartstop have been concerned with the parts of the game that present information to the player and take in his or her responses. That work is not finished but the rest appears to be a matter of writing the code rather than developing new ideas.

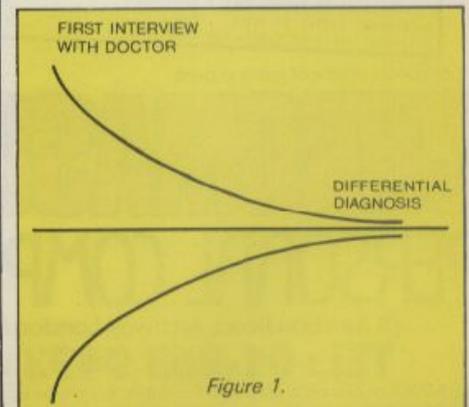
This month I have written about the central part of the game, the section where the player has to identify the cause of the patient's illness and decide what to do about it. This process is an enormously simplified model of the work undertaken by junior hospital doctors. Heartstop must be organised to present the patient's symptoms and allow a player to work towards a correct diagnosis, which, incidentally, will be allocated almost randomly like the names of the patients. It would be satisfying to weight the diagnosis towards certain classes of disease according to the age or sex of the patient but that is a minor refinement.

In real life computers are used to assist doctors in making a diagnosis, not to play the

patient's part. Many doctors still believe that there is no place for computers in making medical judgments so let us look at the idea first before going on to see how the computer's role can be reversed.

When a patient that the doctor has not seen before comes into the consulting room, the range of things that could be wrong is very large indeed. The patient may be suffering from one or more of several thousand diseases. In addition to the things that are troubling the patient, he or she may have any number of aspects of their body or personality that are close to the limits of the normal range.

Each patient is a unique individual although a "family resemblance" or shared genetic characteristics make it easier to strike up a relationship by providing indicators as to the response we are likely to get. The negative side of prejudging a person on the basis of a family resemblance is that we tend to ignore the unique characteristics of the person in favour of the easier stereotype.



# First Check our prices. Then Count the Coupons!

## 4 SPECIAL OFFER PACKAGES



**1. commodore 64**  
+ cassette deck + dust covers  
If purchased separately these items would cost £278.85  
OUR PRICE **£229.00** d

**2. commodore 64**  
+ cassette deck + introduction to Basics Part I (Manual and 2 cassettes to take you through the first steps in computing) + DFM Data Base (Information Storage Programme) + 2 dust covers.  
If purchased separately these items would cost £313.00  
OUR PRICE **£257.00** d

**3. commodore 64**  
+ VIC 1541 disk drive + Box of 10 diskettes + 2 dust covers.  
If purchased separately these items would cost £490.00  
OUR PRICE **£429.00** d

**4. Businessman's Starter System.**  
Comprises Commodore 64 + VIC 1541 disk drive + Box of 10 diskettes + VIC 1525 Printer + Box of paper + 3 dust covers.  
If purchased separately these would cost £735.00  
OUR PRICE **£649.00** d

- NEW 64 Printer VIC 1526 with cable ..... £310.00 d
- NEW Printer/Plotter (4-colour) ..... £152.99 d
- NEW LOW PRICE - Disk Drive VIC 1541 with cable ..... £210.00 d
- Printer VIC 1525 with cable ..... £212.75 d
- Book: 'Programmer's Reference Guide' ..... £ 9.95 b
- Easy Script (Word processing package) .... £ 75.00 b
- DFM Data Base - Disk or Cassette (state which required).... £ 19.50 b
- DFM Mail labels (Print labels to your specification) £ 9.50 b
- Catalogue (Dedicated filing system) ..... £ 16.50 b
- DataLog (User orientated filing system) .. £ 17.50 b
- Journal (A financial diary with permanent display).. £ 19.50 b
- Gortek & Microchips (Designed to teach 10/13 year olds basics) £ 12.95 b
- Sales Ledger ..... £ 75.00 b
- Purchase Ledger ..... £ 75.00 b
- Easy Stock ..... £ 75.00 b
- Attack of the Mutant Camels (Try and beat hostile Aliens) ..... £ 8.50 a
- Motor Mania (A thrilling cross country car race) ..... £ 8.95 a
- Dust cover for 64/VIC 1525 ..... £ 2.95 a
- Joystick ..... £ 6.90 b
- Introduction to Basics Part I (see above) ..... £ 14.95 b
- Many other titles in stock. Free list with first delivery. Or send S.A.E. for full list.

## A Chromasonic special.

On every £5 worth of Software\* you buy from us, over the counter or by mail, we'll give you a 50p ADC. So, with a £20 purchase, you get four ADC's and so on.

# ACCUMULATOR DISCOUNT COUPONS

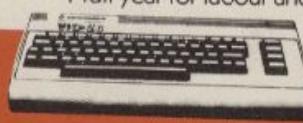
## BBC 'Special Offers'

**Model 'B' with FREE dust cover £399.00**  
Cumana Teac Drives with power supply & including Disc Formatter, manual & cables.  
100K Drive 40 Track..... £225.00 d  
200K Drive 80 Track..... £257.00 d  
800K Dual Drive 80 Track..... £632.50 d

	p&p code
Torch 280 Disk Pack.	
800K plus 280 Processor running Torch's own CP/M.....	£839.50 d
Disk Interface (including fitting charge).....	£ 95.00 d
"View" ROM Word Processor.....	£ 59.80 a
Printer Driver.....	£ 9.95 a
Graphs & Charts on cassette.....	£ 9.95 a
MONITORS	
MICROVITEC 1431 "14" Colour Monitor....	£264.50 d
SANYO HI-RES Green Screen Monitor.....	£114.00 d

Our Guarantee (2 years on 64<sup>15</sup>)  
1 full year for labour and parts on all Hardware.

## SPECIAL OFFER PACKAGE



## Commodore VIC20

+ C2N cassette recorder + Introduction to Basics Part I (Manual and 2 cassettes to take you through the first steps in computing) + 1 cassette with four games + Only from Chromasonic. FREE DUST COVER normally sold for £2.95. If purchased separately these items would cost £249.99  
OUR PRICE **£134.99** d

- VIC 1525 Printer with cable ..... £212.75 d
- VIC 1541 Disk Drive with cable ..... £210.00 d
- 16K RAM pack ..... £ 28.95 b
- 24K RAM pack ..... £ 47.95 b
- Joystick ..... £ 6.90 a
- 4-slot motherboard ..... £ 33.35 c
- Dust cover for VIC 20/VIC 1525 ..... £ 2.95 a
- NEW Printer/Plotter (4-colour)..... £152.99 d
- Super Expander (High resolution cartridge with 3K RAM) £ 31.00 b
- Programmers Aid cartridge (Adds more than 20 commands) £ 28.00 b
- C2N cassette unit with cable ..... £ 39.10 c
- Sargor Chess (6 levels of play) ..... £ 23.00 b
- Choplifter (Rescue your men and then return to base) £ 24.95 b
- VIC Programmer's Reference Guide ..... £ 12.50 b
- Introduction to Basics Part I..... £ 13.50 b

Send SAE for FREE hardware/software booklet.

## DRAGON 32 Free

Basic Training Manual supplied



\* 9 colours \* 32K RAM memory as standard, expandable to 64K \* Extended Microsoft colour basic as standard \* Typewriter Keyboard \* 6809E CPU \* Advanced sound feature \* 32 columns x 5 lines \*  
**£157.50** d

- Printer & Cable ..... £232.30 d
- Seikosha GP100A and necessary cable ..... £ 14.95 b
- Pair of Joysticks ..... £ 2.95 a
- Dust cover for Dragon 32/GP100A ..... £275.00 d
- Single Disk Drive with controller ..... £225.00 d
- Single Disc Drive without controller ..... £200.00 d
- Additional Single Drive ..... £200.00 d
- The King (Save the damsel in distress from the gorilla) £ 7.95 a
- Katerpillar Attack (Stop the katerpillar reaching the bottom) £ 7.95 a
- Talking Android Attack (This game speaks for itself) ..... £ 7.95 a
- Telewriter (Word processor that gives 51 cols. x 24 lines) £ 49.95 b
- DFM (A powerful easy to use database) .... £ 19.50 a
- Racer Ball (Defend your moon base from enemy lasers). £ 7.95 a
- Scarfman (Run around a maze eating blocks as nasties chase you) ..... £ 7.95 a
- Many other titles in stock. Free list with first delivery. Or send S.A.E. for full list.

Official DRAGON sales and service agents for the whole Greater London Area.

# CHROMASONIC PERSONAL COMPUTERS

48 Junction Road, Archway, London N19 5RD  
**TEL: 01-263 9493 or 5**

- FREE ADVICE on all aspects of Personal Computers. You only have to ask.
- DELIVERY: On P.O.'s, Access or Barclaycard, dispatch usually within 24 hrs. Or we'll advise by return. On cheques allow about 5 days.
- If not completely satisfied, return the goods to us undamaged within 14 days for a full refund including p&p. VAT included in all prices.

## CHROMASONIC PERSONAL COMPUTERS

Send to: Chromasonic Personal Computers, 48 Junction Road, Archway, London N19 5RD.

Please send me the following items. All prices include VAT.

..... £ .....

..... £ .....

..... £ .....

p&p code d = £8.00, c = £3.50, b = £2. and a = 60p. (if more than one item ordered, add only one p&p amount - the highest) p&p £ .....

Total £ .....



I enclose my Cheque/P.O. for £ .....

Please debit my Access/Barclaycard no .....

Name: .....

Address: .....

# OMETRON

By Simon Munnery

**SUPERB 3D GRAPHICS  
100% MACHINE CODE,  
FUN PACKED ARCADE ACTION**

**£5.95**

**OMETRON**

48K SPECTRUM

Stuck out on a lonely uninhabited outpost of the empire, your mission is to protect the landing site from the hostile forces. You are in a prime site, right in the middle of the landing grid, armed to the teeth with cannons in a revolving turret. Nothing is going to get past you... or is it? **RED ALERT, RED ALERT!** Ships sighted, treat all craft as hostile and fire on sight!

**AVAILABLE AT SELECTED  
BRANCHES OF JOHN MENZIES**

Distributors contact:

**SOFTWARE  
PROJECTS**

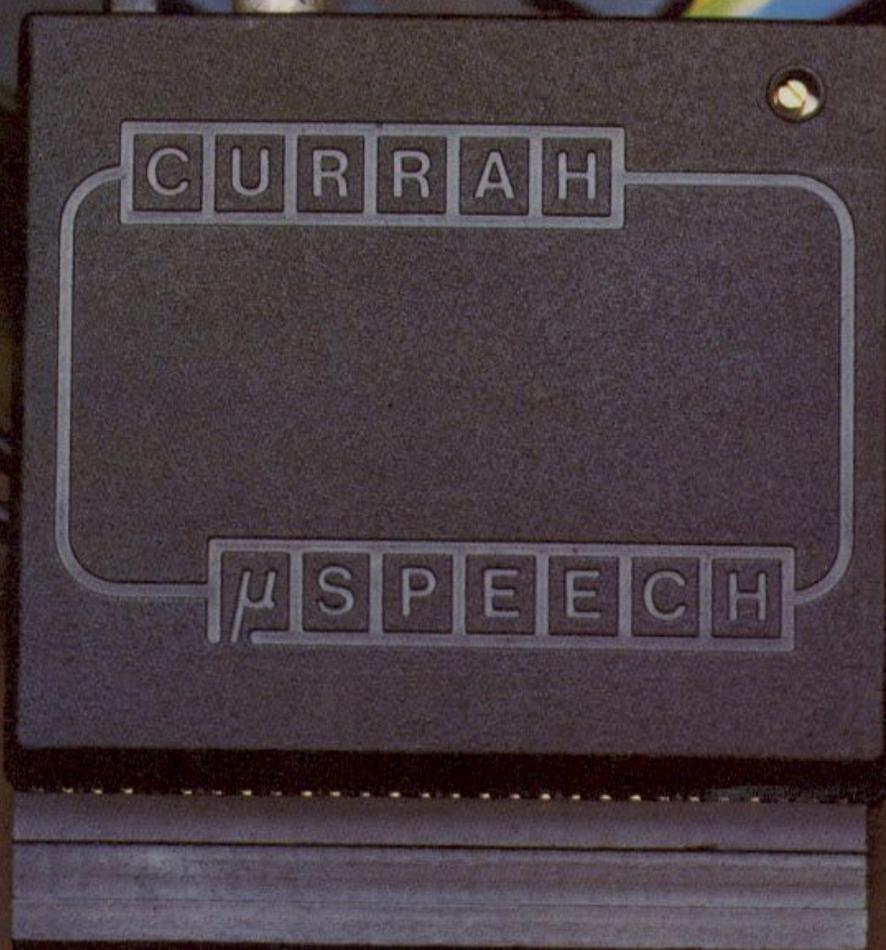
Bear Brand Complex,  
Allerton Road,  
Woolton, Liverpool,  
Merseyside L25 7SF  
051-428 7990

**DEALER ENQUIRIES TO:**

TIGER DISTRIBUTION,  
4 VICTORIA ROAD,  
WIDNES,  
CHESHIRE  
051-420 8888

# SPEECHLESS??

## Micro Speech lets ZX Spectrum talk!!



### JUST PLUG IN AND USE

Micro Speech is easy to use – simply plug into your Spectrum and TV and enjoy a new dimension; instant voicing of all the keys ..... infinite vocabulary at your command ..... intonation to add character to speech ..... exciting new range of sound and speech games .....

### IT'S AS EASY AS THIS!

LET S\$ = ac(sh)un st(aa)(sh)uns will say "ACTION STATIONS"

### GAMES SOUND ON THE TV

Micro Speech talks through your TV's loudspeaker, ensuring top quality sound.

### WHAT CAN'T IT DO!

Unlimited vocabulary means that Micro Speech can say anything ..... it can even be made to yodel! There is nothing it cannot say!

### NEW SOUND GAMES USING MICRO SPEECH INCLUDE:

- Mr. Wimpy : Moon Alert : Hunchback (*Ocean*)
- Lunar Jetman (*Ultimate*) Las Vegas Lady (*Mogul*)
- Colour Clash : Shark Attack : 3D Monster Chase (*Romik*)
- Lunar Rescue (*Lyversoft*) The Island (*Crystal*)
- Voice Chess (*Artic*) Mined Out (*Quicksilva*)
- Mysterious Adventures Part 1-4 (*Digital Fantasia*)
- The Birds and the Bees (*Bug Byte*)
- Blastermind (*Martech*) Blade Alley (*P.S.S.*)

Available from: **COMET : W.H. SMITH : MENZIES : GREENS : WOOLWORTHS SPECTRUM and COMPUTERS FOR ALL DEALERS : DEPARTMENT STORES AND SELFRIDGES**

NOW DEMONSTRATING AT SPECIALIST DEALERS NATIONWIDE

For personal attention and seven day turnaround of your order **PLUS** a free entry in the holiday draw (5 choices, 3 winners) **AND** an extra free game (exclusive to us) when you order from us.

Send to: MICRO SPEECH OFFER, P.O.BOX 1, GATESHEAD NE8 1AJ or telephone: NEWCASTLE (0632) 824683

Please send me .....MICRO SPEECH units.

Name (Print clearly) .....

Address.....

.....Postcode.....

I enclose Cheque/Postal Order payable to "Micro Speech Offer"

or debit my Barclaycard/Access account No.

I understand that I can have my money back within 10 days of purchase if I am not delighted.

Please allow 21 days for delivery. 12 months parts and labour guarantee.

Signed..... Ref

ONLY **£29.95** EACH

INCLUDING

- FREE SOUND GAME
- COMPREHENSIVE MANUAL
- DEMO CASSETTE

(continued from page 155)

was some deep emotion which centred upon the accused woman rather than the victim. We've got to understand the exact relations of those three people if we are to reach the truth."

The Client: "You're like a surgeon who wants every symptom before he can give his diagnosis."

That is taken from *Thor Bridge* in *The Case Book of Sherlock Holmes*. The next extract from *The Creeping Man* makes the point that a good doctor watches for small events or signs that will help him to understand the whole patient, not just the gross symptoms of an illness:

Holmes: "A dog reflects the family life. Whoever saw a frisky dog in a gloomy family, or a sad dog in a happy one?"

Watson: "Surely, Homes, this is a little far-fetched?"

Holmes: "One possible loose end lies in the question: why does Professor Presbury's faithful wolf-hound Roy, attempt to bite him?"

Watson: "I sank back in my chair in some disappointment. Was it for so trivial a question as this that I had been summoned from my work?"

Holmes glanced across at me. "The same old Watson!" said he. "You never learn that the gravest issue may depend upon the smallest things."

As the doctor listens to the patient's history, bits of the pattern will begin to fall into place and the nature of the problem starts to emerge from the thousands of possibilities. A physical examination, backed up, perhaps, by some laboratory tests narrow the possibilities still further, to the point where the doctor can write out a short list of causes for the patient's condition — a differential diagnosis — or make a firm diagnosis.

Dr Marsden S. Blois from the University of California, writing in the *New England Journal of Medicine* in 1980, represents the process I have outlined above as a horn or funnel — figure 1. The large, open end of the horn represents the doctor's cognitive span at the time he first sees the patient. The closed end of the horn, the point at which the doctor has a differential diagnosis, is also the point at which he believes computers have most to offer in clinical management.

Expert systems, which are equivalent to the Intelligent Knowledge Based Systems — IKBS — discussed in the *Alvey Report*, work by using a set of rules to construct a "micro-world". Within the computer's micro-world the machine is able to predict with a fair degree of certainty what is causing a certain condition, what is the chance of finding oil under a particular piece of countryside, or

what is the cause of your car's failure to start one morning. What the machines cannot do at present is to relate the illness to the patient's environment, assess the aesthetic damage that will be caused by drilling for oil, or decide what should be the balance between motor cars and pedestrians in a town shopping area.

Medial expert systems have been built for a number of purposes. Suppose you were programming a computer to deal with a person who had a pain in their arm. There are some simple questions you would need to have answered about the nature of the pain:

When did the pain start? Did it come on suddenly or slowly? Is it constant, or is it getting better or worse? Does movement make the pain worse? Does the pain spread to anywhere else? Can the patient feel normally with his fingers? Are the muscles in the arm as powerful as usual?

These questions presuppose that the pain is inside the arm and that there is nothing visibly wrong with the arm. So you might like to add some more questions:

Does the patient know what made the pain start? Does he have any other illnesses at present? Has he fallen over on to the arm? What was he doing at the time that the pain started?

Already you have quite a lot of information about a very small part of the patient's body, and I have deliberately reduced the questions that would link a pain in someone's arm to a condition somewhere else. Some simple rules can be applied immediately to the results of these questions.

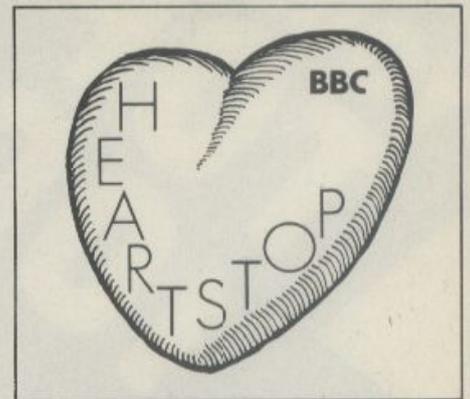
■ If the patient fell over, or was involved in a road traffic accident; and if the pain is worse when the arm is moved; and if it is not getting better; and if there is less power in the muscles than usual; then there is a reasonable possibility that the patient has broken a bone.

■ If the patient is a middle aged male; and if the pain started in the centre of his chest; and if the pain spread down his arm; and if there is a previous history of heart disease; then there is a possibility that the patient has angina, or has had a heart attack.

■ If the patient was involved in a road traffic accident at some time in the past; and if there is some loss of feeling in parts of the arm; and if there is some loss of power in the muscles; then the patient may have damaged part of his neck where the peripheral nerves serving his arm leave the spinal cord.

All three of these networks of rules use multiple and operators to link one rule with another. None of them lead to a definite answer and all of them would be intensely unsatisfactory for a patient to use. The second example is entirely unconcerned with the patient's occupation and the amount of stress that he may feel at work or at home. Nevertheless, within a micro-world an expert rule based system can provide answers that are at least as good as any single doctor.

Dr Marsden says in his article that there is no threat to the doctor's work because it is impossible to create enough micro-worlds to mimic the judgments made by the doctor at the open end of the funnel. I am not so sure. At the least, it seems that the development of more sophisticated expert systems will tend to move more and more medical care out of



hospitals and into the general practitioner's surgery.

After all it is the GP who deals with the thousands of possibilities at the open end of the horn; by the time a patient sees a junior doctor or consultant in hospital, the GP should have excluded all but a few possibilities. The GP may have arrived at a definite diagnosis and then refer the patient to hospital for treatment that cannot be provided in the community.

How does all this relate to Heartstop? Well, the program needs an orderly way of releasing information about the patient's condition to the player. In other words the program must respond to the "doctor's" questions, giving information that is consistent with the diagnosis that has been assigned to the patient. If the "doctor", the player, draws the correct conclusion from the information presented by the program, Heartstop should allow him or her to advance closer to the right answer until a definite diagnosis is made.

The first, obvious problem here is that most people are not doctors and will not know what questions to ask their BBC computers. Secondly, computers do not like variations on a theme and there must be several hundred ways of asking "Where's the pain?" Multiple choice questions seem to be the answer to both of these problems. The selection of questions offered to the player at any one time should depend on previous questions that have been selected.

An interrogation process of the type I have outlined will need a fixed starting point and a firm perimeter fence to limit the branches down which a player can travel. The first set of questions might include these:

Do you have any pain? Can you breathe all right? Are you taking any medicines? Is your weight going up or down?

The firm perimeter may be a bleep message requiring the player's attention in a different part of the hospital, which will end that examination of the patient. Clearly, also, the "doctor" must be able to resume the patient's examination and that will require the program to store the current status of the patient's differential diagnosis. Heartstop might well give a new patient not only the final diagnosis but also a set of more or less probable alternatives; these could be stored as integer numbers in an array and erased as the player discards them in the course of his examination.

All this sounds pretty difficult to achieve and the quantities of text involved may not fit easily into a cassette-based BBC computer. ■



# Your TOP 100 PROGRAMS

Please add 15% VAT to all prices.

## Sinclair SPECTRUM

- LOGOS £8.65**  
The 'Turtle' Graphics language
- MAP OF THE UK £10.40**  
Educational U.K. Geography
- HORSE RACE FORECAST £13.04**
- FOOTBALL FORECAST £13.04**
- SCEPTRE £8.00**  
New Adventure Game
- ZEN EDITOR/ASSEMBLER £12.50**
- XANAGRAM £6.91**  
Superb blend between crosswords and anagrams

## Commodore 64

- DATABASE £21.30**  
255 pages of 10 items
- SIMPLE ACCOUNTS £21.30**  
Up to 80 entries/month
- EASIVAT £34.34**  
VAT accounts program
- STOCK CONTROL £24.50**  
Keep track of your stock
- BC BASIC t.b.a.**  
The Ultimate Basic Extension ROM
- HORSE RACE FORECAST £17.34**
- FOOTBALL FORECAST £17.34**

## SIRIUS 1

- FORTH £185.00**  
Full FIG Forth
- CHREDIT £24.50**  
Character set editor
- ISLES OF ARTUAN £19.50**  
Extensive Adventure game
- OTHELLO £19.50**  
With fine graphics
- MAZE RUNNER £14.50**  
Thinking Man's Maze Game
- RX £80.00**  
File Transfer Program

## NewBrain

- MODEMS/COMMS £99.00**  
For Electronic Mail
- EDITOR/ASSEMBLER £29.50**  
The first Z80 Ed/Ass for the NewBrain
- DISASM £14.50**  
Disassembler
- HISOFT PASCAL £35.00**  
Compiling Pascal
- CARD INDEX £30.43**  
Multipurpose data management program

- FILE MANAGER £20.00**  
Creates and maintains records
- GOBBLER £8.00**  
Negotiate a maze filled with hazards
- FOOTBALL FORECAST £25.00**  
Sophisticated Pools Forecasting
- STAR TREK £8.00**  
Save the galaxy from the Klingons!
- NDUMP £14.50**  
Dump graphics on Epson printers
- ALIEN INVADERS £8.00**  
High Speed arcade game
- HORSE RACE FORECASTING £24.50**  
The Serious Funter's Aid

## SHARP MZ MZ MZ 80A 80B 80K

Send for catalogue — an outstanding selection of programs available

## SHARP MZ 700

- PAKMAN/MILLIPEDE £8.65**  
Superb graphics and sound effects
- QUEST £6.04**  
An addictive testing adventure game
- COMPETITION £8.65**  
An amazing challenge game
- BASMOD TOOLKIT £12.61**  
Sharp Basic extension
- PASCAL COMPILER £34.35**  
Professional, proven and reliable software tool
- KUMA FORTH £25.65**  
Full fig forth
- ZEN EDITOR/ASSEMBLER £14.35**  
The complete system for the Z80 programmer
- CASTLE QUEST £6.91**  
An adventure you'll never forget
- BUG ZAPPER £6.04**  
Arcade style game
- MAZE MINDER £6.04**  
Superb graphics and sound effects
- BEGINNERS CHESS £8.65**  
The ideal way to learn, practise and become proficient
- ELECTRON 22622 £6.04**  
Fast and furious space game
- MUSIC COMPOSER £8.65**  
Write and display music visually and audibly
- FUN PACK £6.04**  
Six exciting games for the price of one Superfire, Evasion, Gun, 3-D, Towers of Hanoi, Zrimm.

# » KUMA « COMPUTERS Ltd.

Unit 12, Horseshoe Park, Horseshoe Road, Pangbourne, Berks RG8 7JW  
Tel: (073 57) 4335 Telex: 849462 TELFAC.KUM

## THE SOFTWARE LIST

- FIENDISH ENIGMA £8.65**  
Decipher the coded message
- DATABASE £10.43**  
Electronic Card Index System
- NON-VAT ACCOUNTS £10.43**  
Makes light work of necessary accounts
- EASIVAT ACCOUNTS £25.65**  
Up to 75 entries per month
- HOMEBUDGET £8.65**  
Keep track of your home finance
- EASIDATA £17.35**  
Superb Database written M/C
- XANAGRAM £8.65**  
Superb blend between crosswords and anagrams
- STOCKCONTROL £29.50**  
*Another 20 programs in New Catalogue*
- SHARP PC 'TANDY PC-2' 1500**
- PC-CALC 3 £19.50**  
Spreadsheet
- PC-PLOT 3 £12.50**  
Graphics for Calc3
- PC-CALC 4 £19.50**  
More powerful Spreadsheet with graphics
- PC-DATABASE £19.50**
- PC-MACRO £29.50**  
Macro Assembler/Disassembler
- PC-WORD £24.50**  
Word Processor
- BBC - B.**
- XANAGRAM £6.91**  
Superb blend between crosswords and anagrams
- EPSON HX-20**
- DESK MASTER 1 £29.50**  
Office Aid Calculator program
- DESK MASTER 2 £29.50**  
Word Processor
- DESK MASTER 3 £29.50**  
Spread Sheet Calculator
- DESK MASTER 4 £29.50**  
The Friendly Terminal
- DESK MASTER 5 £39.50**  
The Editing Terminal
- DESK MASTER 6 £19.50**  
Decision Maker
- DESK MASTER 7 £19.50**  
Editor/Assembler
- DESK MASTER 8 £19.50**  
Mail Lister
- DESK MASTER ( £29.50**  
RAM Database
- DESK MASTER 10 £19.50**  
Labeller
- DESK MASTER £29.50**  
Mobile Stock Recorder
- DESK MASTER 12 £49.50**  
Computerised Payroll
- DESK MASTER 14 £29.50**  
Expenses (32K)
- DESK MASTER 15 £29.50**  
Stock Control
- DESK MASTER 16 £39.50**  
Bar Stock Control
- DESK MASTER 17 £49.50**  
Pert and Critical Path Analysis
- HOME BUDGET £17.35**  
Home Accounting System
- HORSE RACE FORECAST £24.50**  
Win or place — it's a winner!
- COMPUTAX £49.50**  
Personal Income Tax Planning
- TINY PASCAL COMPILER £39.50**
- CHEMLABEL £149.00**  
Pharaceutica Labelling
- DISASSEMBLER-PROLOG £19.50**  
Disassembler with adifference
- SALES ORDER ENTRY £29.50**  
Sales/Order Records
- ASTRONOMY 1 £19.50**  
Geocentric Planetary Ephemeris
- ASTRONOMY 2 £17.50**  
Heliocentric Planetary Ephemeris
- FFOSSWRITER £95.00**  
Wordprocessor
- NAVIGATIONAL ALMANAC £19.50**  
For Expanded HX-20
- CURRENCY CONVERSION £149.00**  
Worldwide currency calculation.
- GAMES COMPENDIUM £14.50**  
Bandit, Hangman, Dice
- AIRLINE £17.50**  
Run your own airline!
- USER DEFIN GRAPHICS £17.50**
- CASH EXCHANGE £19.50**
- + BOOKS**  
Plus lots more ...

Please tick box  for information required, and send coupon to:

Kuma Computers Ltd., Unit 12, Horseshoe Park, Horseshoe Road, Pangbourne, Berks RG8 7JW

- | Hardware                               | Software                 | Hardware                                    | Software                 |
|--|--------------------------|---|--------------------------|
| <input type="checkbox"/> SHARP PC-5000 | <input type="checkbox"/> | <input type="checkbox"/> APRICOT            | <input type="checkbox"/> |
| <input type="checkbox"/> SIRIUS        | <input type="checkbox"/> | <input type="checkbox"/> EPSON HX-20        | <input type="checkbox"/> |
| <input type="checkbox"/> SAGE          | <input type="checkbox"/> | <input type="checkbox"/> EPSON QX-10        | <input type="checkbox"/> |
| <input type="checkbox"/> SHARP 700     | <input type="checkbox"/> | <input type="checkbox"/> NEWBRAIN           | <input type="checkbox"/> |
| <input type="checkbox"/> SHARPA        | <input type="checkbox"/> | <input type="checkbox"/> COMMODORE 64       | <input type="checkbox"/> |
| <input type="checkbox"/> SHARP 3541    | <input type="checkbox"/> | <input type="checkbox"/> ELECTRONIC MAILBOX | <input type="checkbox"/> |
| <input type="checkbox"/> SHARP PC1500  | <input type="checkbox"/> | <input type="checkbox"/> PRINTERS           | <input type="checkbox"/> |

NAME .....

ADDRESS .....

POST CODE .....

I use a ..... micro-computer.



# Just the thing for these long winter nights

<b>DRAGON 32</b>					
<b>FAMILY PROGRAMS</b>	Eight games, quizzes, utilities and educational programs	£6.95	<b>MONSTER MATHS (New)</b>	Education for 8-11 year olds	£6.95
<b>FUN AND GAMES</b>	A compendium of ten games for young and old	£6.95	<b>HOOKED! (New)</b>	Entertaining graphical fishing game for 1 or 2 players	£5.75
<b>LIVE AND LEARN</b>	Six educational programs for the older child and adult	£6.95	<b>BBC 'B'</b>		
<b>CITY DEFENCE</b>	Missile command arcade game (uses joystick)	£5.75	<b>FUN TO LEARN</b>	Education for 6-12 year olds	£6.95
<b>EMPIRE</b>	Exciting game of strategy for all ages	£6.95	<b>MONSTER MATHS</b>	Education for 8-11 year olds	£6.95
<b>PUZZLER</b>	Jigsaw puzzles generator. Four pictures and many levels	£6.95	<b>SCIENCE 1 (New)</b>	Menu driven	£6.95
<b>PETTIGREWS DIARY</b>	Epic 90K adventure for the whole family	£7.95	<b>EMPIRE (New)</b>	Physics education for 11-16 year olds	£6.95
<b>FUN TO LEARN</b>	Education for 6-12 year olds	£6.95	<b>SPECTRUM 18K</b>		
<b>QUIZ PACK</b>	Menu driven. 500-word vocabulary quiz and crossword puzzles	£3.95	<b>JERICHO ROAD (New)</b>	Full featured educational adventure set in biblical times	£5.75
<b>INFANT PACK</b>	Pre-school education. Counting and alphabet	£3.95	<b>LYNN</b>		
<b>JUNIOR PACK</b>	Learn your tables and word recognition the fun way	£3.95	<b>GRID ATTACK</b>	Survive the night! Arcade action with machine gun	£1.95



**SHARDS SOFTWARE**  
The family favourites

Available from Boots and all good stockists, or by sending cheque/P.O. to 189 Eton Road, Ilford, Essex IG1 2UQ.

(continued from page 161)

another with the replacement values. The character is compared with the values in the first list and, if found, is substituted — for use by the printer — with the value in the equivalent position in the second list.

These characters have been made easily available in lines 230 to 270 of the Basic program. Lines 230 and 240 contain the Vic-20 character values and lines 250 and 260 contain the new values. This process is also necessary to correct the Vic character set which is not a standard ASCII version. The character-per-line selection now becomes CHR\$(3) for 132 cpl., CHR\$(2) for 80 cpl., and CHR\$(1) for 40 cpl.

#### Basic program notes

Line 10 defines FNA(X) to calculate a decimal address from a two byte address.  
Line 20 defines FNB(X) to calculate the high byte of a decimal address.  
Line 30 defines FNC(X) to calculate the low byte of a decimal address.  
Line 40 lowers the top of memory to protect the machine code.  
Line 50 lowers top of string storage etc.  
Line 60 checks all data in line 180 upwards has been entered correctly. If the CHR\$ lists are altered or removed.  
Line 70 Pokes the machine code into memory.  
Lines 80 to 140 Poke values of actual jump addresses into memory.  
Lines 150 to 160 Tell you where to Sys to start and stop the printer.  
Lines 180 to 290 are the machine code data.

The machine-code program requires only 245 bytes. The Basic program calculates this amount down from the top of memory and Pokes each value in via Data statements. The program is therefore usable with any Vic-20 with any amount of memory. The top of memory pointers are also set 245 bytes down to protect the machine code from being overwritten by a Basic program. When finished the program News itself. The screen will then display the Sys locations to enable and disable the printer. Once enabled anything sent to the screen will also be sent to the printer until Sys to disable or Run/Stop and Restore are pressed. The printer can then be re-enabled at any time with a Sys to enable.

Pins 1,2,3,7,8,9,10,11,12,m,n on the user port are not used in this interface. All the other pins are connected as shown in figure 1 — for example, Vic pin 4 to printer pin 1. The function of each pin is also shown. For the user port a 12-12 way 0.156 inch pitch edge connector is required. This size is not easily available so a 15-15 way connector was cut down to size using polarising pins to prevent improper connection.

The printer requires a 36 pin amphenol connector and the two connectors are most conveniently linked using 13 ways of a 16 way length of ribbon cable. All these parts are easily available from electronics shops and by

(continued on page 165)

Figure 1. Connection details

VIC USER PORT		PRINTER	
Pin no.	Function	Pin no.	Function Description
4	PA2	1	Strobe Data is read by the printer when this line goes low.
5	PA3	13	Select A low signal indicates printer disabled.
6	PA4	11	Busy High signal indicates printer not ready to accept data.
A	Ground	19	GND Common earth line.
B	CB1	10	Acknow. A low pulse indicates data received.
C	PB0	2	Data 0
D	PB1	3	Data 1
E	PB2	4	Data 2
F	PB3	5	Data 3 Carry the ASCII code of the character to be printed
H	PB4	6	Data 4
J	PB5	7	Data 5
K	PB6	8	Data 6
L	PB7	9	Data 7

## A PRACTICAL GUIDE TO THE ART OF MICRO DESIGN

A A BERK, BSc, PhD, Managing Director of Modus Systems Ltd

*The Art of Micro Design* has been written for engineers, technicians and students looking for a practical guide to the design of microprocessor-based systems. The book begins with an in-depth study of the basic hardware and software aspects of three example MPUs — the Z-80, 6800 and 1802. The emphasis is upon giving the reader the actual data along with a familiarity with the technique which enables him to read manufacturers' data sheets, and transfer, if necessary, to other MPUs.

Bus structures, memory, input/output and interfacing are all covered in a detailed and practical manner, with design examples throughout. Later chapters introduce the use of the micro in computer systems, from simple control and data connections to local area networks. Throughout the emphasis is on hardware, and the 'cookbook' style of treatment reflects the author's many years of experience in the practical aspects of micro systems design.

Softcover 304 pages 216 x 138 mm Illustrated 0 408 01403 2 £13.95

Available from your local bookseller or by completing the coupon. If mailing from within the UK remember to use our FREEPOST facility — no stamp needed.

Please send me .....copy/copies of *The Art of Micro Design* (0 408 01403 2) @ £13.95

Name .....

Address .....

I enclose my remittance of £ .....

Please debit my credit card

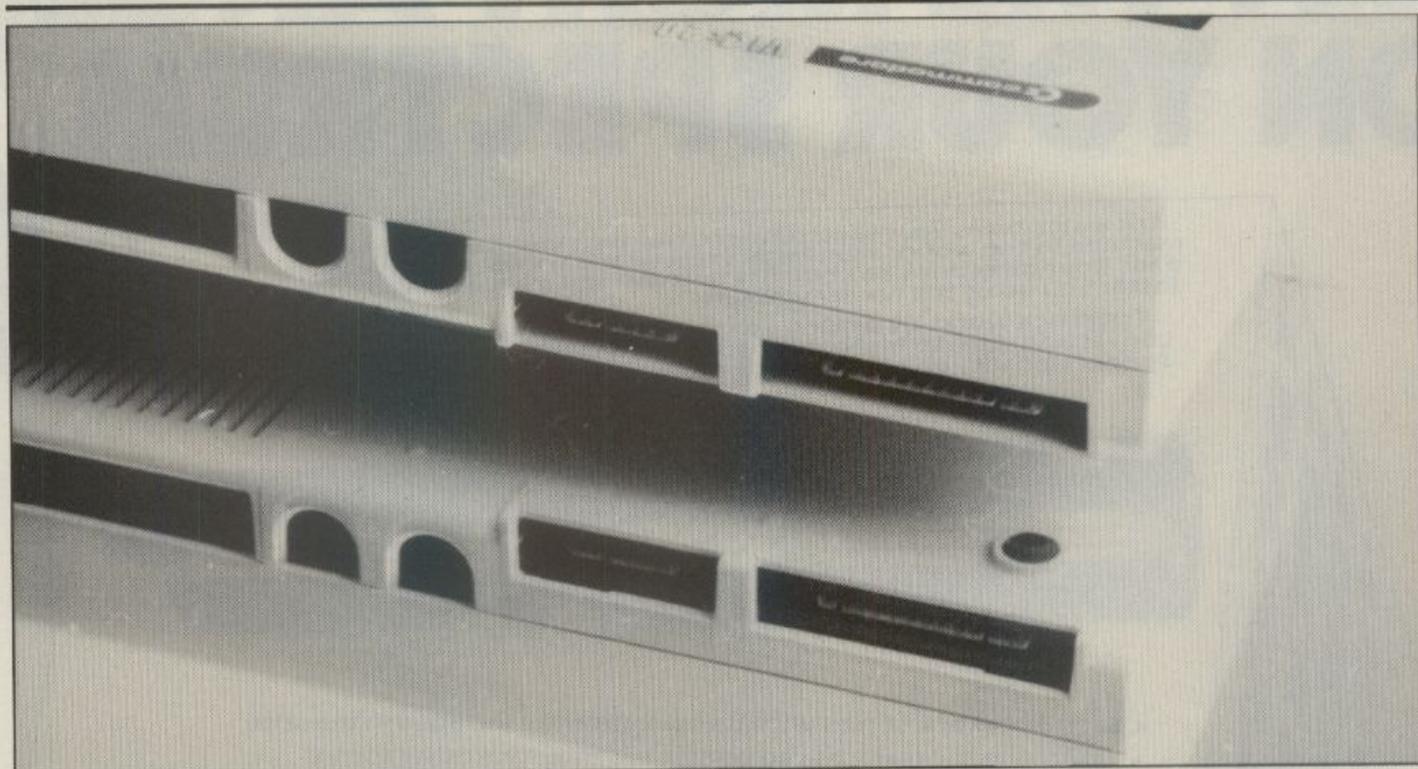
Access  Barclaycard & other   
Mastercharge  Visa Cards  American Express

Card No. .... Expiry Date .....

Return to Newnes Technical Books, FREEPOST, Borough Green, Sevenoaks, Kent TN15 8BR

**Newnes Technical Books**, FREEPOST, Borough Green, Sevenoaks, Kent TN15 8BR

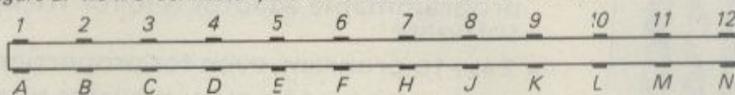




(continued from page 163)  
mail order from advertisers in magazines.

I have successfully used this program with an OKI microline 80 printer for many months now although it may be wise to test the program with a particular printer before purchase.

Figure 2. Vic I/O Connector pinout viewed from back of machine.



## The Key to Spectrum Machine Code Success.

Picturesque's MACHINE CODE SYSTEM is used and recommended by professional software writers, yet the excellent documentation and the friendly, easy-to-use programs have been highly recommended for beginners.

You will only buy one Machine Code System, so buy the best, the one the professionals use.



machine code in 7 seconds. Full error detection.  
32 page Owner's Manual.

### ASSEMBLER

Completely self-contained, with its own line editor, giving an easy-to-read 40 column tabulated listing. Auto line numbering, line renumbering and auto-tabulation make this the fastest and easiest Assembler to use. 5 character Label names. SAVE / LOAD / VERIFY both the listing and Machine Code. Accepts Dcimal or Hex numbers and ALL Z80 mnemonics. Assembler Directives:— ORG, END, DEFB, DEFW, DEFS, DEFM, EQU, DEFL. FAST ASSEMBLY:— 1K of

**£8.50**  
INCL. VAT & P&P.



32 page Owner's Manual. Can reside in memory with the Assembler (48K machines only) to give a complete system.

### MONITOR

The ideal tool to help the beginner get started, yet it contains all the commands for the experienced programmer to run and de-bug machine code programs.

Inspect and alter memory contents in Hex or ASCII characters. Breakpoints and Full Register display. Disassemble any part of memory, ROM or RAM. Dec-Hex-Dec number conversion, plus Block Move, Insert and Delete commands for general memory management.

**£7.50**  
INCL. VAT & P&P.

**The most valuable software purchase you will ever make.**

Available from the "SPECTRUM" chain of stores, branches of John Menzies and all good computer shops, or by mail order by sending cheque / PO to:

PICTURESQUE, 6 Corkscrew Hill, West Wickham, Kent, BR4 9BB. Send SAE for details.

**PICTURESQUE  
PICTURESQUE  
PICTURESQUE  
PICTURESQUE**

# GET THE RIGHT ANGLE ON YOUR SPECTRUM

Trickstick turns your Spectrum into the most sophisticated games machine in the world. Your fingers rest on the Trickstick's six sensitive pads (four directions and two fire buttons) and the harder you press the faster you go or the harder you turn.

Trickstick works by picking up mains hum from your body and converting it by an ingenious circuit design directly into digital input. Proportionality gives vast possibilities for more interesting games.



- ★ Each Trickstick comes with its own interface included in the price.
- ★ Up to eight interfaces can be stacked into each other for 1-8 simultaneous players. (Own 1-8 player game is Attaktics at £10).
- ★ Works with most Kempston compatible software, and with our new programmable adaptor (£10 for Trickstick owners) it works with ANY software.
- ★ Easy to program, even for proportional games.
- ★ In the shops soon. Now available by mail / telephone order at £34.50.

**TRICKSTICK-**  
**The revolution that**  
**Runs Rings round**  
**ordinary joysticks**

**UPGRADE YOUR ISSUE 2 OR 3 SPECTRUM FOR JUST £23 AND GET A £4.50 COPY OF BEYOND HORIZONS ABSOLUTELY FREE**

The SP48 simply plugs into the sockets provided by Sinclair in your Spectrum. Easy to fit, full instructions provided and no soldering. Fits both Issue 2 and Issue 3 machines (Issue 1 £35) and gives you a standard 48k Spectrum. And no other expansion kit allows you to upgrade later to the 80k Spectrum. Over 20,000 16k Spectrum owners have already upgraded with the SP48. Join them.

And you get a free copy of BEYOND HORIZONS, so there's yet another angle to look at.

**48/80 FORTH - £14.95**

The latest, best and most complete version of this popular language for the Spectrum FORTH runs many times faster than machine code. - a tonic if you're fed up with all those GOTOS

Each tape includes both a 48k version and an 80k version (for use on Spectrums upgraded with our SP80). SP48 owners are offered a part-exchange price of £18 if they upgrade to 80k.

The manual provides both the normal technical definitions of the language and an outstanding brief introduction for the beginner. Each tape also includes a superb EDITOR program to give you full control of the 16 (48k) or 32 (80k) disk screens.

A FORTH Toolkit (giving floating point etc) and an extension for the Microdrive will be available shortly. 48/80 FORTH uses standard FIG-FORTH definitions with extensions to exploit the special characteristics of the Spectrum, including BEEP (for real arcade quality sound), DRAW, PLOT and CIRCLE.

**BEYOND HORIZONS - £4.50**

This teaching program has already made computing less mysterious for thousands of people. It guides you through the Spectrum 48k memory, teaches you to PEEK and POKE systems variables, shows you how the display file and colour attributes work, how a BASIC program is stored byte by byte, and much much more. Outstanding value for those who get stuck on the second half of the Spectrum manual.

**THE 80k SPECTRUM - £57.50**

Upgrade your 16k Spectrum to a full 80k with the SP80 - a 64k expansion kit giving two 32k pages above address 32767. Not recommended for beginners, but ideal for the serious programmer. Pages are switched using software instructions only, and an LED indicates which page you are on. The other page is isolated from the system, but retains all its information until switched back.

The SP80 simply plugs into the sockets in the 16k Spectrum. Full fitting instructions are provided. It is easy to fit and no soldering is required.

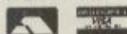
See 48/80 FORTH for another angle.

**SP80**

**48/80 FORTH**

- \_\_\_\_\_ Trickstick £34.50 \_\_\_\_\_
- \_\_\_\_\_ Attaktics £10.00 \_\_\_\_\_
- \_\_\_\_\_ SP48 (Issues 2 & 3 £23, Issue 1 £35) \_\_\_\_\_
- \_\_\_\_\_ SP80 £57.50 (Please specify which Issue) \_\_\_\_\_
- \_\_\_\_\_ 48/80 FORTH £14.95 \_\_\_\_\_
- \_\_\_\_\_ Beyond Horizons £4.50 \_\_\_\_\_
- \_\_\_\_\_ Programmable Interface £10 (with Trickstick) \_\_\_\_\_

Postage £0.65 0.65



I enclose cheque/PO for \_\_\_\_\_

My Access/Visa number is

Name \_\_\_\_\_

Address \_\_\_\_\_

East London Robotics Ltd.,  
Gate 11, Royal Albert Dock,  
London E16  
24 Hour Access and Visa  
ordering 01-474 4430

**EAST LONDON  
ROBOTICS**



## SIR RESEARCH PRESENTS: OUR RANGE OF PERIPHERALS FOR THE NEW ACORN ELECTRON

### SIR ELECTRON 12-ROM BOARD

- Provides for up to 192K of ROM space (16K of this will support either ROM or RAM).
- Fully buffered design.
- Easy to install, just plugs in, no soldering necessary.
- Allows further expansion via rear edge-connector.
- Permits use of most BBC ROM-based software (such as VIEW, PASCAL, FORTH, etc).
- Price: £40.00 + VAT.

### SIR ELECTRON PRINTER & JOYSTICKS INTERFACE

- CENTRONICS printer interface.
- Analogue-to-Digital Converter (ADC) allows use of any BBC-compatible joysticks.
- Full firmware support.
- No soldering, plug-in design.
- Built-in, versatile edge-connector provides for further expansion.
- Price: £45.00 + VAT.

AVAILABLE SOON: INPUT/OUTPUT PORT, RS423 INTERFACE, and more!



### SIR ROM BOARD

### MODEL 2

### NOW WITH RAM!

#### NEW IMPROVED FACILITIES!

- 12 extra ROM sockets complement those already provided by the micro to allow up to 256K ROM space.
- Four of these sockets can support either ROM or Static RAM (up to 16K maximum RAM).
- The Model 2 board allows switching between multiples of 2K, 4K, 8K or 16K ROM/RAM.
- Fully buffered design.

#### NOW EVEN EASIER TO FIT!

- NO soldering, plug-in design.
- Fits easily inside BBC case.
- Plugs into CPU socket via short flexible connector.
- Improved plug design allows the Model 2 board to connect securely to any type of BBC CPU socket with no harm to micro or board.
- Board is held in place by sturdy supports.
- Full instructions provided.

### SIR BBC ROM EXPANSION BOARD MODEL 2: PRICE £40.00 + VAT

We also stock a complete range of BBC Micro peripherals and software, many at unbeatable prices!  
The following are just a small sample:

#### BBC MICROCOMPUTER

BBC Model B ..... £399.00  
BBC Model BD ..... £469.00

#### MONITORS

Sanyo B/G ..... £85.00  
Microvitec RGB ..... £229.00

#### PRINTERS

**Dot Matrix:**  
Epson FX-80 ..... £399.00  
Epson RX-80 ..... £275.00  
RX-80 F/T ..... £263.35  
**Daisywheel:**  
Juki 6100 ..... £399.00

#### DISC DRIVES

Single 100K ..... £199.00  
Dual 100K ..... £349.00  
Dual 400K ..... £669.00  
TORCH Z80 DISC PACK:  
(Now with FREE £1,000 worth of software!) ..... £839.50

All our prices are inclusive of VAT unless stated otherwise.

#### Postage and Packaging:

Please add £1 P&P (small items: ROM Boards, etc.); £10 P&P (large items: Printers, Monitors, etc.).  
Access/Barclaycard Telephone orders welcome.

**SIR COMPUTERS Ltd**  
91 WHITCHURCH ROAD, CARDIFF CF4 3JP  
Telephone: CARDIFF (0222) 621813



# RESPONSE FRAME

Do you have a problem? Your manual is incomprehensible or you just cannot get the hang of that programming trick you tried — whatever it is, Tim Hartnell will do his best to answer your queries. Please include only one question per letter and mark them "Response Frame".

## PEEK AT LYNX

■ I have recently bought a Lynx computer, and am entirely satisfied with it, except for one point.

The manual gives no starting and finishing addresses for Poking into the screen. I also do not know what the Peek locations are. If the computer does not check by Peek, how do you check for such things as a car hitting a wall?

*P Greenwood,  
Southport,  
Birkdale.*

PEEKING AND Poking on the Lynx are not simple.

There are two reasons for this. First, the screen is high resolution. Therefore, to read the character in a specific location, you have to read 96 bytes. This is because characters are six pixels wide, so characters are often mapped onto more than one byte.

In addition, the high-resolution memory map is complicated by the fact that the memory is banked. Therefore, only a quarter of screen memory is available to Basic at any one time.

I suggest you use the Point function to get the colour of a single pixel. This will be considerably faster than using Peek.

## UPGRADING

■ I am the owner of an issue two 16K Spectrum which I would like to upgrade to 48K. I have read that to do this requires only eight chips, which plug into places already allocated inside the micro case. Is it possible to find out what these chips are, and where they go?

*P Blacklock,  
Didsbury,  
Manchester.*

THE CHIPS NEEDED are 32K RAM chips. The best idea is to buy a Spectrum upgrade kit which provides the chips, and instructions on how you can fit them yourself. This will cost less than twenty pounds. The chips are not generally available, so buying a kit is the best idea.

## PROGRAM FAULT?

■ During recent conversation with friends, I was discussing the power of doubling up numbers, particularly if one applies this effect on a chess-board. A few days later, I tried to write a program on my ZX-81 to print out the doubling up effect on a simulated chess board.

After some time I came up with the following program:

```
10 LET N = 1
20 FOR C = 1 TO 64
30 SCROLL
40 IF C<10 THEN PRINT "SQU NO
";C;" = ";N
50 IF C>=10 THEN PRINT "SQU NO
";C;" = ";N
60 LET N = N + N
70 NEXT C
```

Lines 40 and 50 are only to clarify and tidy the display, and of course could have been written as PRINT C;N or simply as PRINT N.

The above program works . . . up to a point. Up to square 27, the 'doubling up' is correct, and at this square it reads 67108864. Therefore, the next square — number 28 — should read 134217728. However, my ZX-81 insists it is 134217730 which of course renders the rest of the program useless.

I have even cleared the computer and entered as a direct command PRINT 67108864 + 67108864 and it still insists that the answer is 134217730. Could you advise me as to what is wrong with my program?

*P Sutton,  
Brighton.*

THERE IS NOTHING WRONG with your program. The fault lies within the computer. Like many computers — and your pocket calculator, as you will see if you try it — the ZX-81 works to a limited number of significant figures and rounds answers which demand greater precision. The simplest way around this is to work with strings, and manipulate numbers within the strings.

## ZX-81 REM

■ I need to enter a Rem statement of 2303 characters for a ZX-81 machine code program. This is around 70 lines. How can I enter this? Just typing in the lines would take hours, even in Fast.

*M Payne,  
Coventry.*

PROBLEMS ARE CAUSED by the fact that the ZX-81 display gets very agitated — translation: does not know how to handle — a line which is greater than the size of the screen. You could create a suitable line by setting up a small string, then concatenating this string to itself within a loop, checking with LEN to stop the looping when the line was long enough. The Let A\$ could be changed to Rem with a few Pokes. However, it would not be possible to List the line in this form. *Machine Language made Simple* (published by Melbourne House) and/or *Mastering*

*machine code on your ZX-81* (Interface) should help you develop your ZX-81 machine code skills further.

## SPEEDY SAVING

■ Is there any way in which the Loading and Saving can be speeded up on the ZX-81. I know there are commercial hardware and software packages available, but would like to know if a machine-code routine to do this has ever been published.

*R J Clark,  
Walthamstow,  
London E17.*

THE TWO systems I have seen in action — sold commercially as Quickload and Fastload — are in software form, and work extremely well. One of them even has built-in error checking, and allows you to actually stop the Stop during a load, wind it back a bit, and then continue the Load! The screen display also indicates whether or not the load is proceeding satisfactorily. The systems are distributed by Mindware (USA) and Gladstone (Canada). I am not aware of any suitable routines which have been published.

## CBM 64 SAVE

■ I own a Commodore 64. At the moment, I am using the Commodore cassette player, and want to be able to Save data files direct to cassette. I cannot find any articles telling me how to do this.

*Matthew Ettlin,  
Church Lawton,  
Stoke-on-Trent.*

YOU NEED TO open a file, and you do this on the Datasette with a line like OPEN 1,1,2,"NAME OF FILE"

The information you need can then be entered, via an Input — such as INPUT Z\$ — line in a program, directly from the keyboard. If you included

```
PRINT #1, Z$
```

as the next line of the program, the information you had just entered will be Saved on tape. You can go back to your input line as many times as necessary, then exit from this loop and include a CLOSE 1 line to close the file.

To get the information back, you need the line

```
OPEN 1,1,0,"NAME OF FILE"
```

with

```
INPUT #1, Z$
```

to read the item back, and PRINT Z\$ to see it on the screen. If you use GET #1, Z\$ the computer will read back the data one byte at a time.

## TWO KEY READ

■ On the ZX-81 there are two ways of reading input from the keyboard, ie. Inkey\$ and a Peek into the system variables. Inkey\$ reads only one character at a time, and the Peek's result can be interpreted as two characters, eg., "G" and "A". On the Vic-20, there are Get AS and

Peek(197) but these only read one character at a time. Is there a method of reading two keys at once on the Vic?

*David Spencer,  
Chapel-en-le-Frith  
Cheshire.*

THE EASIEST WAY to do this is include a line like

```
Z$ = ""
```

before your Get A\$, and then set Z\$ equal to the Z\$ plus the result of Get A\$. Then, if Z\$ was less than two characters long — checked with LEN — the program could go back to the Get A\$ line, and add the result of that second reading to the value already given to Z\$. This routine could be, of course, used for any length input, not just two letters.

## INPUT ITEMS

■ I own a 48K Spectrum and would like to be able to enter input items at different screen locations, to match up with the questions being asked. I find it rather annoying to program questions at different screen positions, only to find that the input always appears at the bottom of the screen. Can you help please?

*T Baker,  
Fareham,  
Hants.*

THE POSITION THE input prompt appears — at the bottom of the screen — cannot be modified. However, you could enter the question as a Print At, at any location of the screen you desired, and then just have the input within the program as Input AS or Input N. Although this would not move the actual input onto the screen, at least the questions would appear where you want them.

## SAVING SPACE

■ I am having trouble fitting a program I have written for the BBC micro into the available memory. How can I reduce it?

*N Richards,  
Stroud,  
Gloucestershire.*

IT IS EASY enough to run out of RAM on the BBC. I presume your program uses the high-res modes leaving you a mere 8K to play with. Nonetheless you should be able to save at least several hundred bytes if you take the following measures:

■ Take out as many spaces as possible including those at the end of lines. Redefining the space character can help you spot them. Enter VDU 23,32,255,255,255,255,255,255,255,255 and then change to a non-teletext mode.

■ Multi-statement lines. Cram as many statements as possible onto the same line. Be careful, however, with If Then statements.

■ Shorter variable names and use the single letter integer variables, A%, B% and so on. Basic reserves space for those below &E00 so they will not encroach on your program area.

# Flexibility for Spectrum users!



56-way I.D.C. connector and ribbon cable assembly, designed and manufactured by Vareloco in conjunction with C.P.S. Ltd., to fit the Sinclair Spectrum computer. Available in both single and double end format. Also available, paddle board to convert female connector to male plug format.

# HIRE SPECTRUM SOFTWARE

## CHOOSE FROM OUR VAST RANGE

FREE 24 page CATALOGUE with full details of our range of over 220 different programs for the ZX SPECTRUM. All hired with the consent of the publishers. Whether you prefer to ZAP aliens, get lost in an adventure game, EDUCATE your children, CALCULATE the family finances or COMPILE machine code programs WE HAVE THE RIGHT TAPES FOR YOU TO HIRE.

## FAST SERVICE

We stock several manufacturers original copies of each tape, and can normally despatch your tapes the day we receive your order, and we always use first class post.

## LOWEST PRICES

We believe our prices are the lowest of any library, yet we offer the LARGEST range of titles. TWO WEEKS HIRE OF ANY TAPE COSTS JUST 80p (plus 40p p&p).

## FREE TAPE HIRE

For a limited period, we will send your first tape (your choice) FREE, so join our library now. You can't afford NOT to!!! If you've tried another library and are wary of our claims send a stamp and we'll gladly send you a copy of our catalogue - we're confident you'll join when you see it!!!



## NATIONAL SOFTWARE LIBRARY

200 Mulgrave Road,  
Cheaton, Surrey SM2 6JT

I enclose cheque for £6.00 for LIFE MEMBERSHIP and I understand that my first tape hire will be FREE. If, within 28 days, I'm not delighted with your service you'll refund my membership fee.

Name

Address

YC2

Please send me the following:

		Insert Quantity here
6" grey cable with connector each end	£8.99 each	<input type="text"/>
9" grey cable with connector each end	£9.49 each	<input type="text"/>
9" colour coded cable with one connector	£5.99 each	<input type="text"/>
12" colour coded cable with one connector	£6.49 each	<input type="text"/>
Connector only	£4.95 each	<input type="text"/>
Paddle board for conversion to male plug format	£1.99 each	<input type="text"/>

Prices include VAT and Post & Packing

I enclose cheque/PO value £

Block capitals please

Name

Address

Town

County  Post Code



If paying by Access, enter number here

Available from:

**Hawnt Electronics Limited**

Firswood Road, Garretts Green, Birmingham B33 0TQ

Reg. in England No. 306808

campbell systems

NEW!  
with MYRMIDONS  
Micro-Print 42/51<sup>16</sup>  
up to 51 columns!

## Masterfile Spectrum 48K

### YES - Microdrive compatible!

Acclaimed as the definitive filing system for the 48K Spectrum - MASTERFILE'S machine coded flexibility gives you 32K (max) per file - 26 fields per record - up to 128 characters per field - multiple level searches for numeric or character comparisons - data presentation in any one of 36 user-defined displays which may be sequenced by any field - USER-BASIC for tailored processing. "... the most comprehensive of the data-bases ..."

Sinclair User June 1983

With example file and detailed manual £15.00

## Drawmaster Spectrum 48K

DRAWMASTER is the ultimate DRAW AND PAINT utility for the Spectrum - compose your own HI-RES pictures with 8, direction 2 speed hand draw keys - fast fill - enlarge/reduce facility for all or part of the screen plus all the Spectrum colours and attributes - over 50 commands in all.

With detailed instructions £6.95

## DLAN DISPLAY LANGUAGE Spectrum 16/48K

DLAN ('dee-lan') DISPLAY LANGUAGE is a powerful machine coded interpreter for generating DYNAMIC TEXTUAL DISPLAYS for advertising and education - all commands are single letter or symbol - with 4-way scroll of 11 type-faces through user-defined windows.

With detailed manual £7.95

All programs mailed 1st class by return.  
Prices include VAT and postage within Europe.  
SAE for full list.

Dept. (YC) 15 Rous Road, Buckhurst Hill,  
Essex, IG9 6EL England 01 504 0589



## RULES

- The winner of the competition will be the person who enters a correct solution to the crossword and, in the view of the editor, completes the unfinished sentence in the most interesting way.
- The name of the winner will be printed in the April issue of *Your Computer*.
- All entries must arrive at the *Your Computer* offices by the last working day in February 1984.
- Each person may enter the competition only once.
- Entries to the competition cannot be acknowledged.
- No employees of Business Press International or their relatives may enter the competition.
- The decision of the editor is final.
- No correspondence on the result of the competition will be entered into. Business Press International assumes no responsibility or liability for any complaints arising from this competition.

MEMOTECH'S BUSINESSLIKE new micro made a real impression when we reviewed it last November. Now you can win one for yourself with our "Win a Memotech" competition. This is what we said about the Memotech MTX 500 — this month's prize:

"When everyone else seems to be fighting to produce the cheapest computer with both colour and sound Memotech has taken a very different approach. Leaving its ZX-81 beginnings far behind it has produced a computer that would not disgrace any executive's desk. The cost is £275.

The styling of the MTX-500 is striking. In fact it looks more like a 16 bit business computer than a home micro. It has a real keyboard housed in a slim and solid black anodised aluminium cabinet. This is longer — 1'7" — then virtually any other home micro-computer since it also houses a 12-key numeric keypad and eight separate function keys to the right of the main keyboard.

The quality of the keys lives up to the general appearance. They have a professional and solid feel and a touch typist would feel at home with them. Word-processing would be a joy.

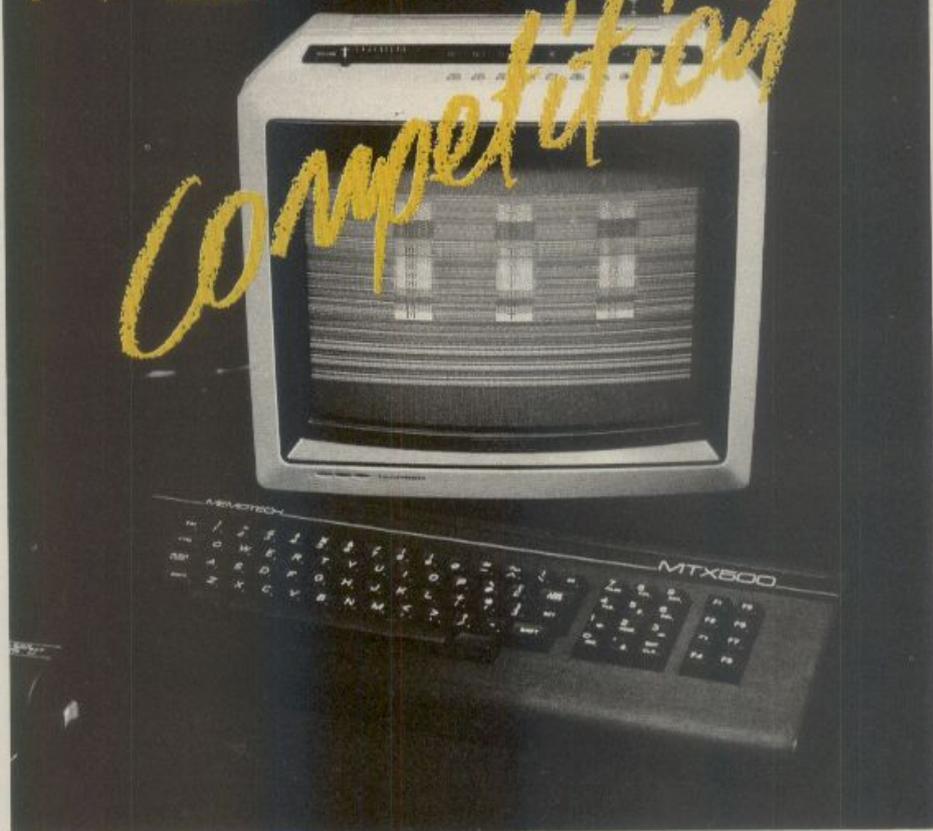
Memotech has stayed on familiar ground with the central processing unit. This is a Z-80A — running a 4MGz — as used by Sinclair in its ZX computers.

Living up to its name, Memotech, memory is not something one is likely to be short of.

The MTX-500 comes with 32K of RAM memory — the MTX-512 has 64K RAM — available for programs. An additional 16K RAM is dedicated to the video processor and thus the 32K RAM is nearly all available to the user even in high resolution." All you have to do to win the Memotech is solve the puzzle and then think of the most appropriate ending for the sentence: "At work and at play a Memotech would make my day . . .", 12 words or fewer.

# MEMOTECH

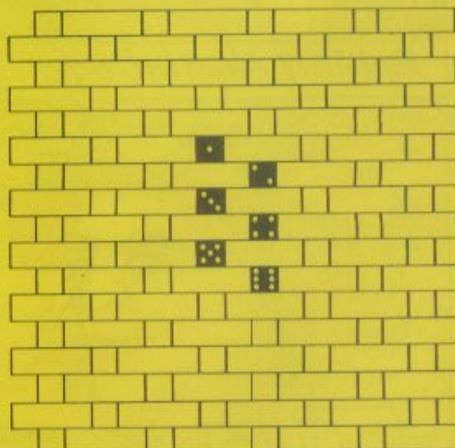
*Competition*



## WIN A MEMOTECH COMPETITION

You have to break out these six black bricks from the wall by giving each a push in a direction at 45° from the vertical: either ↗, ↘, ↙, or ↖. As it meets a brick in its way it instantly destroys that brick and bounces off exactly in the direction it would in real life. If it should hit two bricks simultaneously then both are destroyed — if it should hit another black brick then both black bricks are destroyed. In which order should you push each black brick and in which direction to get out as many black bricks as possible — while destroying as few other bricks as possible?

- First \_\_\_\_\_
- Second \_\_\_\_\_
- Third \_\_\_\_\_
- Fourth \_\_\_\_\_
- Fifth \_\_\_\_\_
- Sixth \_\_\_\_\_



Now complete this sentence in 12 words or fewer and send this coupon to *Your Computer*, Quadrant House, The Quadrant, Sutton, Surrey, SM2 5AS. "At work and at play a Memotech would make my day \_\_\_\_\_"

Name \_\_\_\_\_

Address \_\_\_\_\_

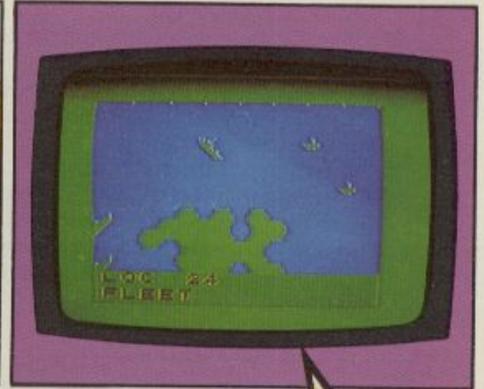
# BEYOND

CHALLENGING SOFTWARE



RUNS ON  
DRAGON 32

Death lurked under  
every wave

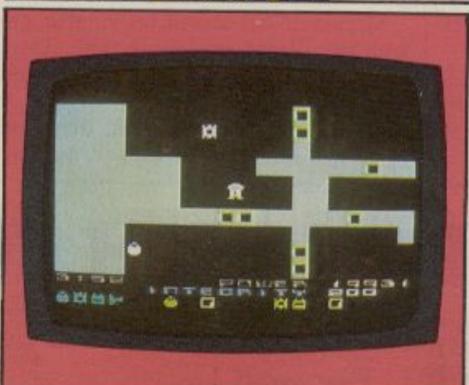


RUNS ON COMMODORE 64

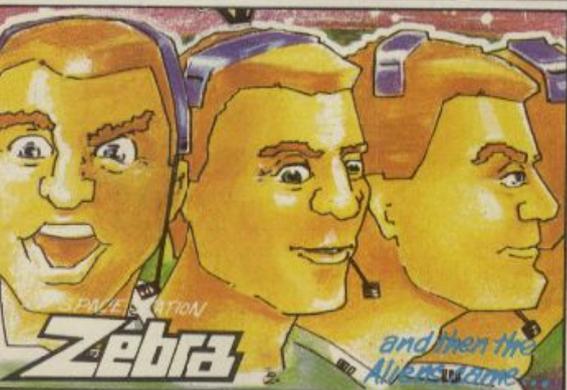


S.S. Achilles

Red Alert Alien Intruder



ATARI 400/800  
WITH 48K



RUNS ON SPECTRUM IN 48K



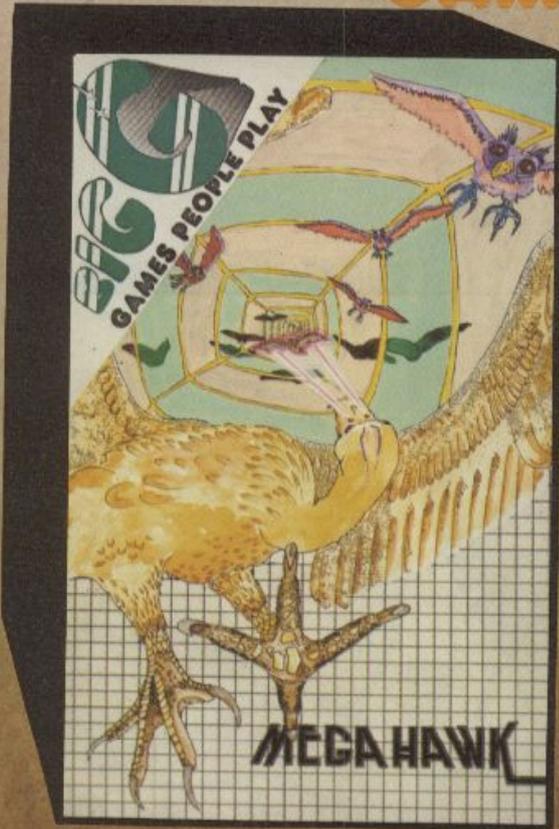
STOP Statement, 110:1



for the  
**COMMODORE 64**

# BIG G

**GAMES PEOPLE PLAY**



## MEGAHAWK

Fly the sensational MEGAHAWK through the Abyss of Time as fearful bats and ice age predators seek your destruction. Be amazed as the 4th dimension unfolds itself with awesome reality. Stretch your skill to the limit as you leave the time corridor into a new universe.



## ZYLOGON

Seek out and destroy the Android Space Platform that threatens Mankind. Break down the defense of the ZYLOGONS whose huge fortresses guard wave after wave of relentless attackers. Fast and furious Full colour Isometric Projection Machine Code; Val Franco

£6.95 inc. postage  
each

DEALER ENQUIRIES WELCOME

Post this coupon to :

# BIG G

Birchall Moss Hall, Hatherton, Nantwich, Cheshire,  
tel. 0270 811948 telex. 367311 CW5 7PJ

Please Rush me :-

- MEGAHAWK** £6.95 inc VAT
- ZYLOGON** £6.95 inc VAT

I enclose cheque/postal order payable to 'BIG G' for £\_\_\_\_\_ or please charge my Access/Barclaycard account no: \_\_\_\_\_

Name \_\_\_\_\_

Address \_\_\_\_\_

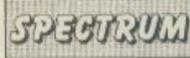
\_\_\_\_\_ Post Code \_\_\_\_\_

# SOFTWARE FILE

Software File gives you the opportunity to have your programs, ideas and discoveries published. We will accept contributions for any home computer provided they are submitted to *Your Computer* exclusively. Please double-check your programs and specify the memory they require before sending them, preferably on cassette. We pay between £6 and £36 for contributions published.

## Speech synthesis

Ian Morgan,  
Woodley,  
Berkshire.



THE MAIN PROGRAM is written in Basic and contains really only three important sub-routines. These are: Listen; Speak; Edit.

Before the Listen routine is called another machine-code routine, Clear, is called. This routine zeros a required amount of memory for the use of the listen routine.

The Basic subroutine — 3000 to 3100 — calls a machine-code routine which listens to both the Ear and Mic ports. Unlike the Talk to your Spectrum article in November 1982, my routine counts the number of times a noise is heard and then the number of times silence is heard. The period of on/off is directly

related to the frequency of the incoming sound. This routine is then repeated until the register pair DE becomes zero. Once this has occurred a return to Basic is made.

The Basic subroutine — 2000 to 2080 — calls another machine-code routine which actually produces the speech/sound. What actually happens is that the program takes the values stored and turns the Spectrum's speaker on or off for the required periods.

The routine is again repeated until the DE register pair becomes zero and a return to Basic is made.

The Edit routine allows you to change the memory allocation for data storage and also speech speeds.

For understandable speech a speed of two or three is preferable, variations will change the speed and pitch of the speech.

When altering memory allocation, remember "Start" should never go below 33,000 —

80E8H. This is to protect the machine code. The counter register DE is also alterable so a form of simple Editing of sounds is available.

I found that when I attached a microphone to the Mic/Ear port that the Listen program heard nothing. My best results have, therefore, been achieved by recording the speech on to tape and then playing this into the Spectrum at normal levels.

Sometimes it will be necessary to rewind the tape to play the sound again as the Spectrum might not have heard it first time. This will be obvious when the Spectrum does nothing after hearing your sound.

Load the machine code using any suitable machine code loader of your choice. The base address for the machine code is 32768, and the machine code is 102 bytes in length.

After loading the machine code type in the Basic program from the listing. Also add to the listing an extra line:

```
9015 GOTO 100
```

To Save the program just type Run/Goto 9000. This will save the Basic program and machine code in two separate parts.

The program is menu-driven and all inputs should be in a numerical form. If the program is broken, Run will restart it with no effect to the current sound.

The decimal machine-code dump.

```
32768 - 33 0 250 17 0 4 243 219
32776 - 254 254 255 40 250 52 219 254
32784 - 254 255 40 12 52 24 247 219
32792 - 254 254 255 32 11 52 24 247
32800 - 35 27 122 179 32 241 251 201
32808 - 35 27 122 179 32 224 251 201
32816 - 33 0 250 17 0 2 243 78
32824 - 62 16 211 254 6 3 16 254
32832 - 13 32 249 35 78 151 211 254
32840 - 6 3 16 254 13 32 249 35
32848 - 27 122 179 32 226 251 201 33
32856 - 0 250 17 0 4 54 0 27
32864 - 122 179 200 35 24 247 0 0
```

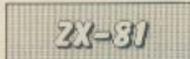
```
10 REM *****
20 REM ** **
30 REM ** Speech Synthesis **
40 REM ** I. Morgan **
50 REM ** 1983 **
60 REM ** **
70 REM *****
100 GO SUB 1000: REM MENU
110 IF C=1 THEN GO SUB 2000
120 IF C=2 THEN GO SUB 3000
130 IF C=3 THEN GO SUB 4000
140 GO TO 100
1000 REM **MENU**
1010 CLS
1020 PRINT AT 0,10;"MENU"
1030 PRINT AT 5,7;"1.....SPEAK"
1040 PRINT AT 7,7;"2.....LISTEN"
1050 PRINT AT 9,7;"3.....EDIT"
1060 INPUT C
1070 IF C<1 OR C>3 THEN GO TO 1050
1080 PAUSE 50
1090 RETURN
2000 REM **SPEAK**
2010 CLS
2020 PRINT AT 0,10;"SPEAK MODE"
2030 PRINT AT 5,3;"Press 'ENTER'
to SPEAK"
2040 LET SPEAK=32816
```

```
2050 INPUT A#
2060 RANDOMIZE USR SPEAK
2070 PAUSE 50
2080 RETURN
3000 REM **LISTEN**
3010 CLS
3020 PRINT AT 0,7;"LISTEN MODE"
3030 PRINT AT 5,5;"Hit 'ENTER' &
then press 'PLAY' on tap
e recorder."
3040 LET CLEAR=32855
3050 LET LISTEN=32768
3060 RANDOMIZE USR CLEAR
3070 INPUT A#
3080 RANDOMIZE USR LISTEN
3090 PAUSE 50
3100 RETURN
4000 REM **EDIT**
4010 CLS
4020 PRINT AT 0,10;"EDIT MODE"
4030 PRINT AT 5,5;"1..MEMORY ALL
OCATION"
4040 PRINT AT 7,5;"2.....SPEEC
H SPEED"
4050 INPUT D
4060 IF D=1 THEN GO TO 4100
4070 IF D=2 THEN GO TO 4500
4080 GO TO 4000
4100 REM *MEMORY ALLOCATION*
4110 CLS
4120 PRINT AT 0,5;"MEMORY ALLOCA
TION"
4130 PRINT AT 5,0;"CURRENT STATU
S"
4140 PRINT AT 7,0;"START >";PE
EK 32769+256*PEEK 32770
4150 PRINT AT 8,0;"COUNTER >";PE
EK 32772+256*PEEK 32773
4160 PRINT AT 10,0;"NEW STATUS"
4170 PRINT AT 12,0;"START >";
4180 INPUT S
4200 PRINT S
```

```
4210 LET X=INT (S/256)
4220 LET Y=S-(X*256)
4230 POKE 32769,Y: POKE 32770,X
4240 POKE 32817,Y: POKE 32818,X
4250 POKE 32856,Y: POKE 32857,X
4260 PRINT AT 13,0;"COUNTER >";
4270 INPUT S
4280 LET X=INT (S/256)
4290 LET Y=S-(X*256)
4300 POKE 32772,Y: POKE 32773,X
4310 POKE 32820,Y/2: POKE 32821,
X/2
4320 POKE 32859,Y: POKE 32860,X
4330 PRINT S
4340 PAUSE 50
4350 RETURN
4500 REM *SPEECH SPEED*
4510 CLS
4520 PRINT AT 0,7;"SPEECH SPEED"
4530 PRINT AT 5,0;"CURRENT SPEED
"
4540 PRINT AT 7,0;"SPEED >";PEEK
32829
4550 PRINT AT 10,0;"NEW SPEED (1
-255)"
4560 PRINT AT 12,0;"SPEED >";
4570 INPUT S
4580 POKE 32829,S: POKE 32841,S
4590 PRINT S
4600 PAUSE 50
4610 RETURN
9000 SAVE "SPEECH1" LINE 9020
9010 SAVE "SPEECH2"CODE 32768,10
2
9015 RUN
9020 CLEAR 32767
9030 BORDER 0
9040 PAPER 0
9050 INK 7
9060 CLS
9070 LOAD "SPEECH2"CODE
9080 RUN
```

## Space Mining

Alan Lee,  
Tring,  
Hertfordshire.



SPACE MINING IS A game for the expanded ZX-81. You are in a cave on an alien planet

mining a precious grey mineral which makes up the roof of the cave. The rock is brought down by shooting it. Before you can get to the precious mineral you must shoot away the worthless black rock which protects it; but this has a tendency to grow downwards towards you. If it reaches the ground your base is destroyed.

You also have the problem of a UFO

constantly patrolling the mine. When you shoot down a block of the precious mineral, it leaves a hole in the roof which the UFO may fire down at you. If you manage to clear a mine you are moved on to another, where the black rock grows faster and the UFO becomes more likely to fire at you.

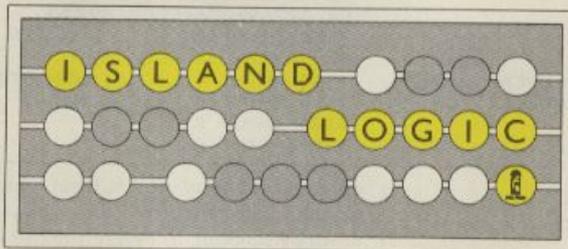
To enter Space Mining, a Rem statement of (continued on page 178)

# The Space Invasion IS over!

It was a deserved victory, the alien attacks numbing an entire generation of terrestrial brains.

ISLAND LOGIC is a new company searching for TOMORROW'S software, programs that involve much more than a simple laser-gun response. Creativity is the keyword, We are interested in imaginative new projects that can both entertain and educate. ISLAND LOGIC can make your ideas a reality. The new software generation starts here.

ISLAND LOGIC 22 ST PETERS  
SQUARE LONDON W6



**ENTERTAINING INTELLIGENCE**

# WHAT EVER THE HARDWARE...



## WE'VE GOT THE SOFTWARE (WELL ALMOST!)



**SNOOKER £8.95**  
ZX SPECTRUM VS 03 16  
BBC MODEL B VB 01 32  
VIC 20 3K VV 01 03  
COMMODORE 64 VC 01 64  
ELECTRON VE 01 32



**SHEER PANIC £5.95**  
ZX SPECTRUM VS 02 16



**PITMAN SEVEN £8.95**  
ZX SPECTRUM VS 01 48



**RAPEDES £5.95**  
ZX SPECTRUM VS 4 16



**STAR WARRIOR £6.95**  
ZX SPECTRUM VS 05 16



**DARE DEVIL DENNIS £7.95**  
BBC MODEL B VB 03 32  
ELECTRON VE 02 32



**PENGI £7.95**  
BBC MODEL B VB 04 32  
ELECTRON VE 03 32



**ARCTURUS £6.95**  
ZX SPECTRUM VS 10 48



**ARMAGEDDON £9.95**  
COMMODORE 64 VC 05 64



**1994 £9.95**  
(10 YEARS AFTER)  
ZX SPECTRUM VS 07 48



**GUSHER £9.95**  
COMMODORE 64 VC 05 64



**BAHANA DRAMA £9.95**  
COMMODORE 64 VC 06 64

FANS PLEASE NOTE! ALSO AVAILABLE MAIL ORDER  
FROM VISIONS (SOFTWARE FACTORY) LTD  
1 FELGATE MEWS, ST JUDLAND STREET, LONDON W6 9DT

*Visions*

THE NAME IN VIDEO GAMES

Visions (Software Factory) Limited software is available from: Boots Centre Soft Currys (selected stores) Ferranti and Davenport Greens Laskys  
Lightning dealers Makro Menzies Prism dealers Record Fayre Rumbelows Software City Spectrum dealers SupaSnapS (selected stores) Tesco

# SOFTWARE FILE

(continued from page 175)

792 characters must be entered. This can be done in the following way:

Enter line 1 REM @@108 characters@@; edit this for lines 2-7; type in the following lines directly. Do not attempt to recall the listing by pressing Newline between each line, as this will crash the machine:

```
POKE 16511,26
POKE 16512,3
POKE 16514,118
POKE 16515,118
POKE 16510,0
```

Now type in 5 Rem Newline and Poke 16419,5. If you now press Newline, line 5 only will be displayed.

Enter program 1, the hex loader. Run the program and enter the hex codes as listed in program 2. More than one code can be entered at once, but do not put spaces between the codes.

When the last code at 17305 has been entered the hex loader will stop. Delete lines 10 to 50 then press Edit and change line 5 to LET L=USR 17035. Save the program on tape before attempting to run it. When the program is run, there should be a line of grey

squares near the top, with columns of black squares extending downwards.

Your laser base nearer the bottom of the screen, should move right when 8 is pressed and move left when 5 is pressed. 0 should fire a bomb, which will travel upwards and should disappear when a black square is hit; one point is scored for this. If a grey square is hit, it will reappear on the line beneath your laser base; 10 points are scored for this. The UFO should be continuously moving from right to left along the top line of the screen, and it may release a bomb when flying over a gap in the roof.

If you are hit by one of these you lose one of your three lives. If a column of black rock hits the ground, the game ends regardless of how many lives you had left. If you remove all 28 grey squares, you move on to the next screen.

If all of this does not happen, and the machine crashes, reload the program and type in program 3, the hex checker, which will display the hex codes you entered; in columns similar to program 2. Compare the codes displayed with those in program 2, if a discrepancy is found, correct it by Poking the

correct code directly; hex to decimal conversions are in the back of the Sinclair manual.

To help debugging here is a list of the locations of the more important routines.

16576 to 16614: extends a column of black rock  
16615 to 16643: starts a bomb when '0' is pressed

16671 to 16750: moves this bomb  
16751 to 16800: moves the UFO  
16801 to 16843: moves UFO bombs  
16854 to 16872: prints your laser base  
16918 to 17034: sets up screen layout  
17035 to 17118: main loop

To make the black rock advance faster Poke 17063,23 or Poke 17062,0 to make them advance slower.

To make the UFO fire more often, Poke 16790,23 or Poke 16789,0 to make them fire less often.

To slow the game down generally, Poke 17109 with a high number, or a two-byte number — greater than 256 — can be Poked into 17109 and 17110 by the method shown on page 177 of the ZX-81 manual. The original contents of 17109 and 17110 are 1 and 0 respectively. The byte at 17037 is 43 hex.

## Program 1. The hex loader.

```
10 LET X$=""
15 FOR X=16514 TO 17305
20 SCROLL
25 PRINT AT 15,0;X;" ";
30 IF X$="" THEN INPUT X$
35 POKE X,16*CODE X$+CODE
   X$(2)-476
40 PRINT X$(TO 2)
45 LET X$=X$(3 TO)
50 NEXT X
```

## Program 2. The hex codes.

```
16514 : 00 00 00 00 00 00 00 01
16522 : 00 00 C5 D5 2A 0C 40 23
16530 : 16 00 59 19 11 21 00 04
16538 : 05 28 03 19 10 FD D1 C1
16546 : 22 0E 40 C9 E5 2A 8B 43
16554 : 7E 23 22 8B 43 E1 C9 00
16562 : 00 00 ED 4B 25 40 51 14
16570 : C8 CD 8D 07 7E C9 CD A6
16578 : 40 E6 1F 2A 0C 40 11 21
16586 : 00 19 16 00 5F 19 7E FE
16594 : 08 C0 11 21 00 19 7E FE
16602 : 80 20 02 18 FB FE 16 D2
16610 : 09 43 36 80 C9 3A B2 40
16618 : FE 01 C8 ED 4B 83 40 06
16626 : 0E 0C 0C ED 43 84 40 CD
16634 : 8C 40 36 15 3E 01 32 B2
16642 : 40 C9 2A 0C 40 11 5C 02
16650 : 19 7E 3C FE 26 20 05 36
16658 : 1C 2B 18 F5 77 2A 86 40
16666 : 23 22 86 40 C9 ED 4B 84
16674 : 40 CD 8C 40 36 00 05 CD
16682 : 8C 40 7E FE 80 20 0A 36
16690 : 00 AF 32 82 40 CD 04 41
16698 : C9 FE 08 20 1F 36 00 AF
16706 : 32 82 40 06 10 CD 8C 40
16714 : 36 8B 06 0A CD 04 41 10
16722 : FB 21 88 40 34 7E FE 1C
16730 : C0 C3 25 43 78 FE 00 20
16738 : 05 AF 32 82 40 C9 36 15
16746 : ED 43 84 40 C9 2A 0C 40
16754 : 23 7E F5 E5 D1 23 01 1F
16762 : 00 ED 80 2B F1 77 2A 0C
16770 : 40 23 7E FE 14 20 FA 11
```

```
16778 : 21 00 19 7E FE 0B CB 3A
16786 : 89 40 17 17 00 00 47 CD
16794 : A6 40 B8 D0 36 1B C9 2A
16802 : 0C 40 11 0F 02 19 7E FE
16810 : 12 C8 FE 1B 28 03 2B 1B
16818 : F5 3E 00 E5 11 21 00 19
16826 : 7E FE 00 20 05 36 1B E1
16834 : 18 EC FE 16 2B F9 E1 C3
16842 : 4F 43 16 81 A6 82 16 16
16850 : 17 1B 18 06 ED 4B 83 40
16858 : 06 0F CD 8C 40 11 CC 41
16866 : 01 05 00 EB ED B0 C9 B8
16874 : A8 B4 B7 AA 12 1C 1C 1C
16882 : 1C AD AE AC AD 12 00 00
16890 : 00 00 A8 A6 BB AA 12 1C
16898 : 1D B1 AA AB B9 12 1F 21
16906 : 82 40 06 07 36 00 23 10
16914 : FB 36 01 C9 01 00 12 CD
16922 : 8C 40 01 20 00 11 E9 41
16930 : EB ED B0 01 0F 12 CD 8C
16938 : 40 ED 4B BA 40 CD 9B 0A
16946 : 0E 1D CD A6 40 E6 06 3C
16954 : 47 CD 8C 40 36 B0 10 F9
16962 : 11 00 05 1B 7A B3 20 FB
16970 : 0D 79 FE 02 20 E4 2A 0C
16978 : 40 06 20 21 36 00 10 FB
16986 : 23 23 23 23 06 1C 36 08
16994 : 23 10 FB 11 B0 01 19 06
17002 : 20 36 16 23 10 FB 23 23
17010 : 23 00 06 1C 36 BD 23 10
17018 : FB 01 00 00 CD 8C 40 3E
17026 : 13 D7 3E 14 D7 3E 12 D7
17034 : C9 CD BD 43 CD 16 42 CD
17042 : D6 41 3A B2 40 FE 01 CC
17050 : 1F 41 CD 6F 41 CD A1 41
17058 : 3A B9 40 17 17 00 47 CD
17066 : A6 40 B8 DC C0 40 AF CD
17074 : B4 40 FE 1C CC E7 40 21
17082 : B3 40 FE 24 20 09 34 7E
17090 : FE 1C 20 01 35 18 0B FE
17098 : 21 20 07 35 7E FE FF 20
17106 : 01 34 11 01 00 1B 7A B3
17114 : 20 FB C3 91 42 2C 26 32
17122 : 2A 00 34 3B 2A 37 01 0B
17130 : 06 CD 8C 40 11 DF 42 01
17138 : 09 00 EB ED B0 2A 86 40
17146 : E5 ED 4B BA 40 ED 42 3B
17154 : 04 E1 22 BA 40 CF FF 0E
17162 : 14 2A 0C 40 06 1B 23 7E
17170 : FE 76 20 04 10 FB 18 05
17178 : EE B0 77 1B F1 0D 20 E9
17186 : C3 EB 42 2A 0C 40 06 10
17194 : 23 7E FE 76 20 04 10 FB
```

```
17202 : 18 04 36 00 18 F2 01 19
17210 : 12 CD 8C 40 CD 0B 41 21
17218 : 89 40 34 AF 32 8B 40 CD
17226 : 32 42 C3 91 42 ED 4B 83
17234 : 40 06 0F CD 8C 40 11 D1
17242 : 41 01 05 00 EB ED B0 11
17250 : 00 60 1B 7A B3 20 FB 01
17258 : 1F 12 CD 8C 40 7E 3D 77
17266 : FE 1C CA E8 42 01 00 0F
17274 : CD 8C 40 06 20 36 16 23
17282 : 10 FB AF 32 83 40 C3 91
17290 : 42 00 00 3A 35 40 6F 26
17298 : 00 22 8B 43 CD 09 42 C9
```

## Program 3. The hex checker.

```
10 FOR A=16514 TO 17305
15 PRINT A;" ": " ";
20 FOR B=0 TO 7
25 PRINT CHR$ INT(PEEK
   (A+B)/16+28); CHR$
   (PEEK(A+B)-INT(PEEK
   (A+B)/16)*16+28);" ";
30 NEXT B
35 PRINT
40 LET A=A+7
45 NEXT A
50 NEXT X
```

## Bertie

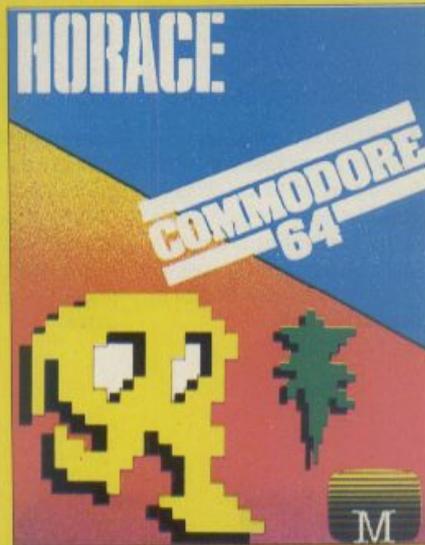
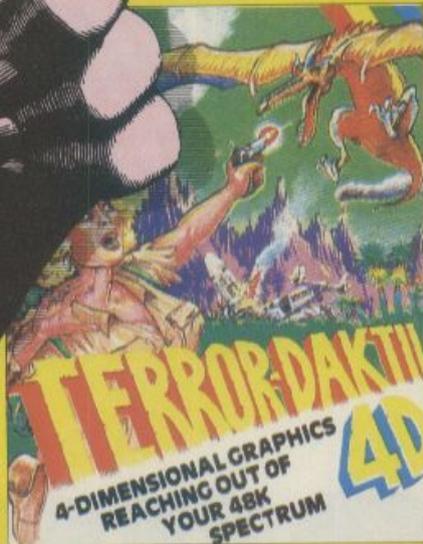
C Stops,  
Bridgwater,  
Somerset.

BBC

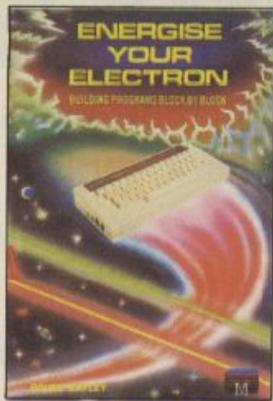
THIS IS A machine-code game for the 32K BBC computer. It is a totally original game, featuring a spider called Bertie. To enter the game, it is necessary to type in two listings. Type in the first one, Save it, and then type in the second, longer listing, and Save that too, preferably on the same cassette after the first program.

(continued on page 185)

# MELBOURNE HOUSE



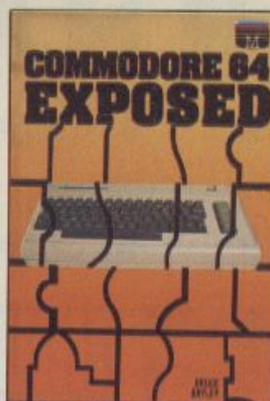
Melbourne House has the No. 1 bestsellers  
for the Spectrum, Commodore 64,  
Dragon 32, BBC Electron and Oric



**Energise Your Electron** will provide you with all the tools you need to build your own Electron programs using the ready-made building blocks provided in this book. A unique book in programming techniques and structure.



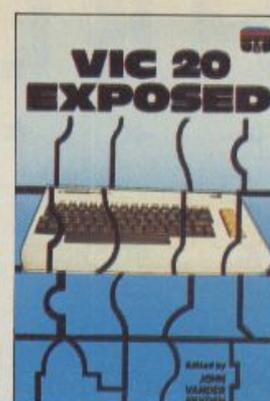
**BBC BASIC For Beginners** provides a comprehensive training system for this complex computer language, essential for every owner wishing to develop their own programming skills. An essential source book for both the BBC and Electron.



**Commodore 64 Exposed.** A complete and comprehensive guide that clearly explains every function of your Commodore 64 from BASIC to Machine Language. Includes full details on advanced programming, graphics and sound.

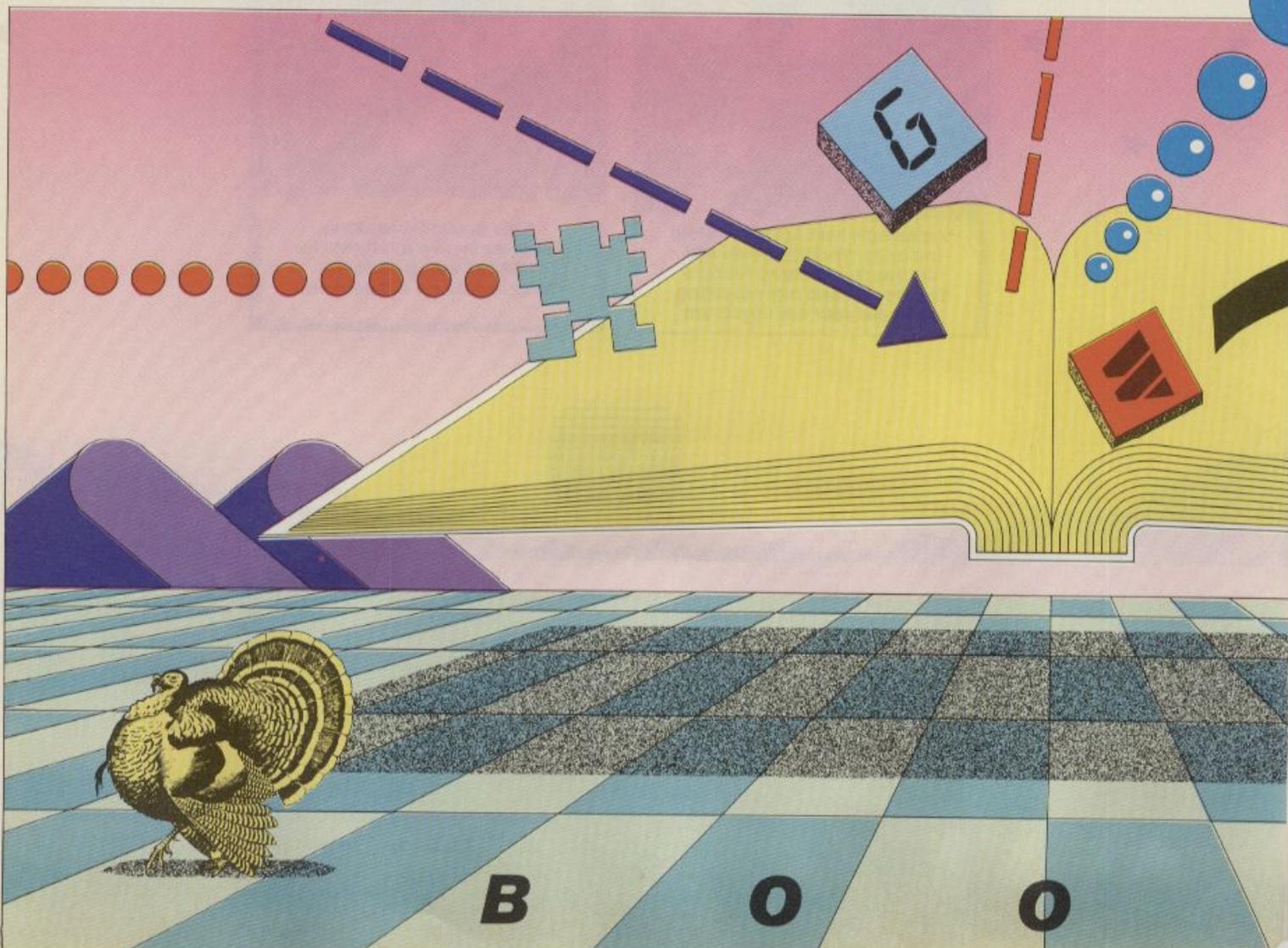


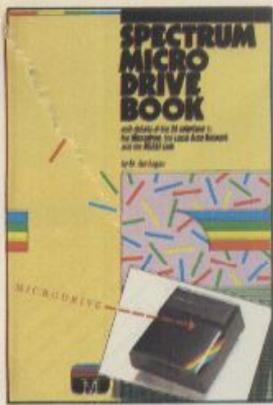
**Commodore 64 Games Book.** Teach your Commodore 64 every trick in the book. 30 programs ranging from nerve shattering space games to real life adventures. "For a Commodore 64 games enthusiast, this is a must." — Personal Computer News.



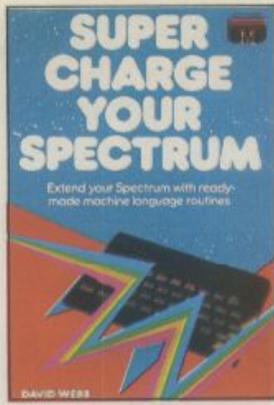
**VIC 20 Exposed.** Understand all the facilities of your VIC 20 and get the maximum potential out of your programs. VIC 20 Exposed takes you from BASIC right through to Machine Language — all in simple, straight forward language.

# MELBOURN

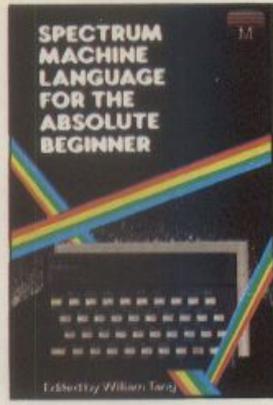




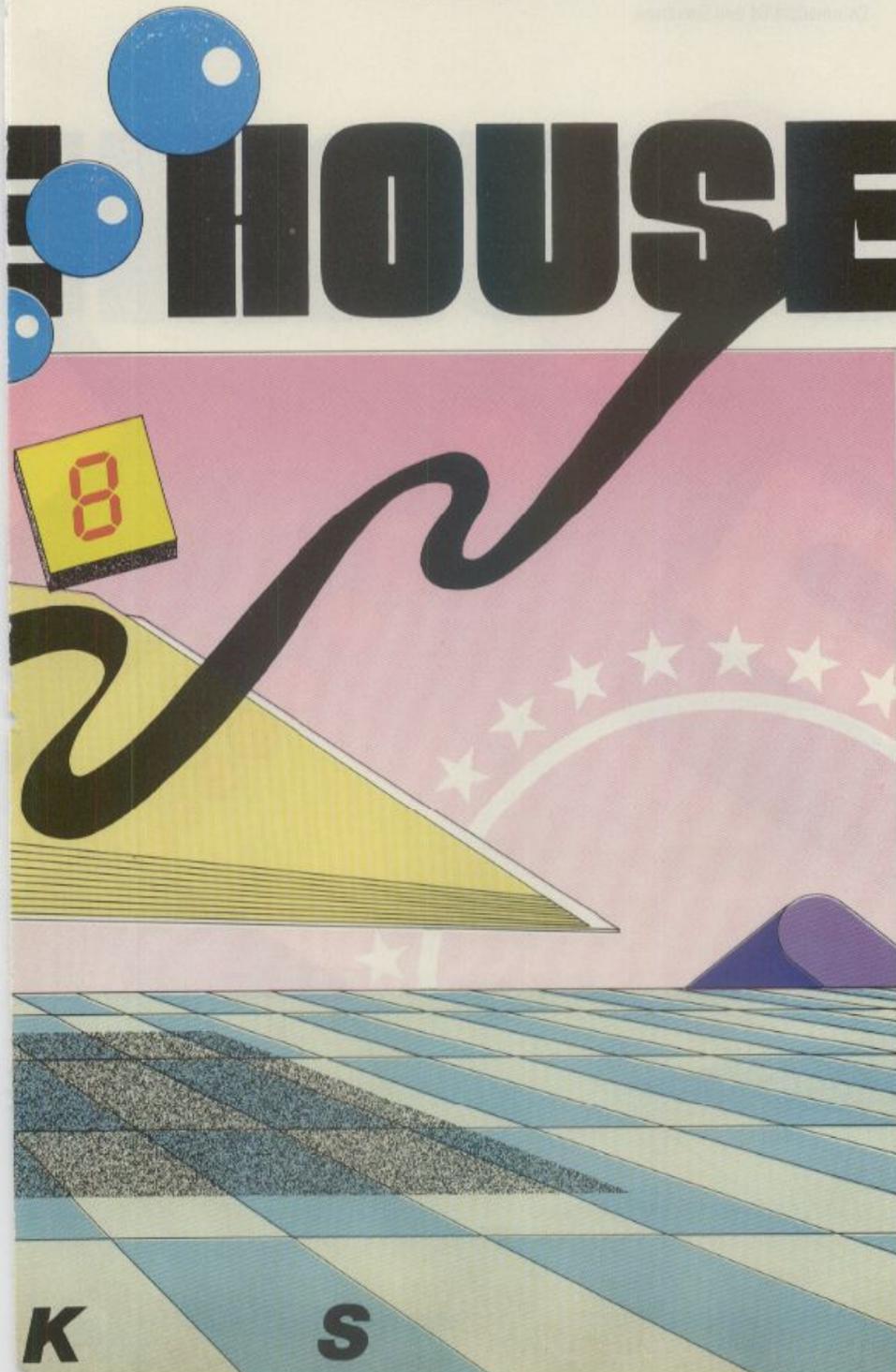
**Spectrum Microdrive.** In this book Dr. Ian Logan gives a detailed explanation of the Spectrum Microdrive — how it works, its capabilities from BASIC and Machine Language and the networking and RS232 possibilities.



**Supercharge Your Spectrum.** Extend your Spectrum with ready made Machine Language routines. Now without any additional effort you can overcome the limitations of BASIC — faster programs, more powerful graphics commands, realistic explosions, great sound.



**Spectrum Machine Language For The Absolute Beginner.** A 'no jargon' introduction to Spectrum Machine Language. "One of the best I have seen." — Popular Computing Weekly. "Very readable and excellent value for the beginner." — Sinclair Users' Annual.



**Orders to:**  
**Melbourne House Publishers**  
 131 Trafalgar Road  
 Greenwich, London SE10

Correspondence to:  
 Church Yard  
 Tring  
 Hertfordshire HP23 5LU

All Melbourne House cassette software is unconditionally guaranteed against malfunction.

Trade enquiries welcome.

Please send me your free 52 page catalogue.  
 Please send me:

**VIC20**

- Vic Innovative Computing ..... £5.95
- Vic 20 Exposed ..... £6.95

**COMMODORE 64**

- Commodore 64 Games Book ..... £5.95
- Commodore 64 Exposed ..... £6.95

**DRAGON 32**

- Dragon 32 Programmer's Reference Guide ..... £6.95
- Dragon Machine Language for the Absolute Beginner ..... £6.95

**ORIC-1**

- Meteoric Programming ..... £5.95

**BBC/ELECTRON**

- BBC Basic for Beginners ..... £7.95
- Energise Your Electron ..... £5.95

**SPECTRUM**

- Over The Spectrum ..... £4.95
- Spectrum Machine Language for the Absolute Beginner ..... £5.95
- Understanding Your Spectrum ..... £6.95
- The Complete Spectrum Rom Disassembly ..... £9.95
- Spectrum Hardware Manual ..... £5.95
- Supercharge Your Spectrum ..... £5.95
- Spectrum Microdrive Book ..... £5.95
- Spectrum Exposed ..... £6.95

£ .....

Please add 80p for post & pack £ ..... **80**

TOTAL £ .....

I enclose my  cheque  
 money order for £ .....

Please debit my Access card No .....

Expiry Date .....

Signature .....

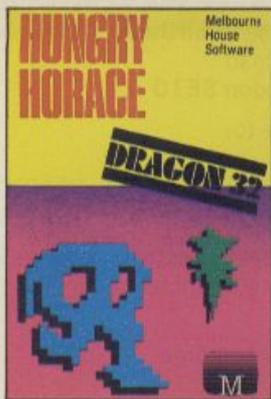
Name .....

Address .....

Postcode .....

Access orders can be telephoned through on our 24-hour ansafone (01) 858 7397. 





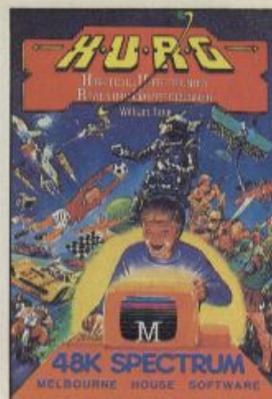
**DRAGON HUNGRY HORACE.** It has been said that Horace games are in a class of their own. In fact, Horace is almost a legend. Hungry Horace, the original Horace adventure, is now available for the Dragon 32.



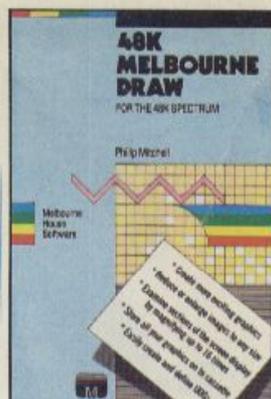
**COSMONAUT.** Written entirely in Machine Language, Cosmonaut is an exciting and challenging game of arcade strategy. Works with joystick or keyboard and features moving elevators, storm troopers, laser guns and more. A full screen game for the unexpanded VIC 20.



**THE HOBBIT.** Visit J.R.R. Tolkien's Middle Earth in the most amazing adventure yet devised. "A game by which future games will be judged." — Personal Computing Today. "Superior to any other adventure game." — Your Computer. The Hobbit is now available for the BBC, Oric, Commodore 64 and Spectrum.

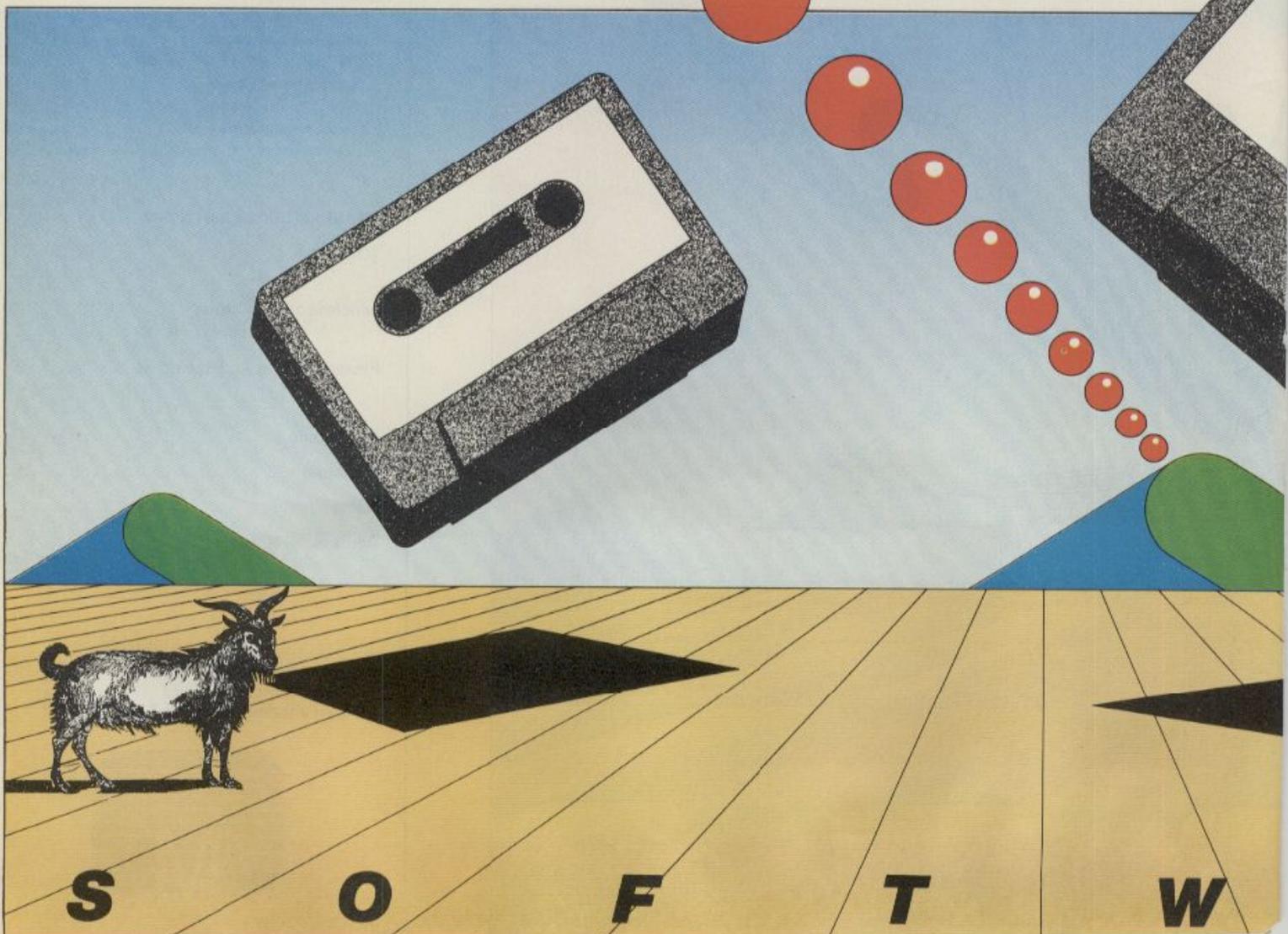


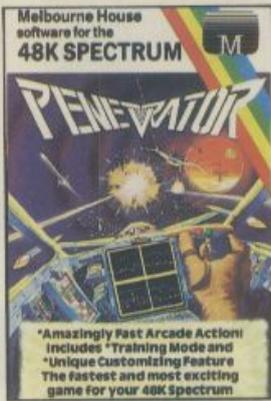
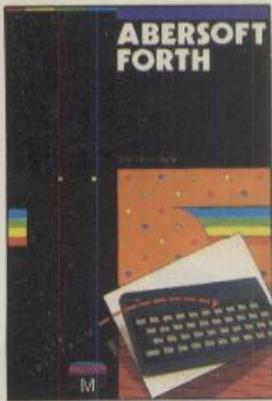
**H.U.R.G.** A revolutionary piece of software for your 48K Spectrum which allows you to develop high quality Machine Language arcade games with absolutely no programming experience. Enter the H.U.R.G. competition and win £3000.



**MELBOURNE DRAW.** Now with Melbourne Draw you can create dazzling, intricate colour graphics and pictures on your Spectrum screen without special programming skills. The most useful and powerful graphics utility program for the Spectrum.

# MELBOURNE

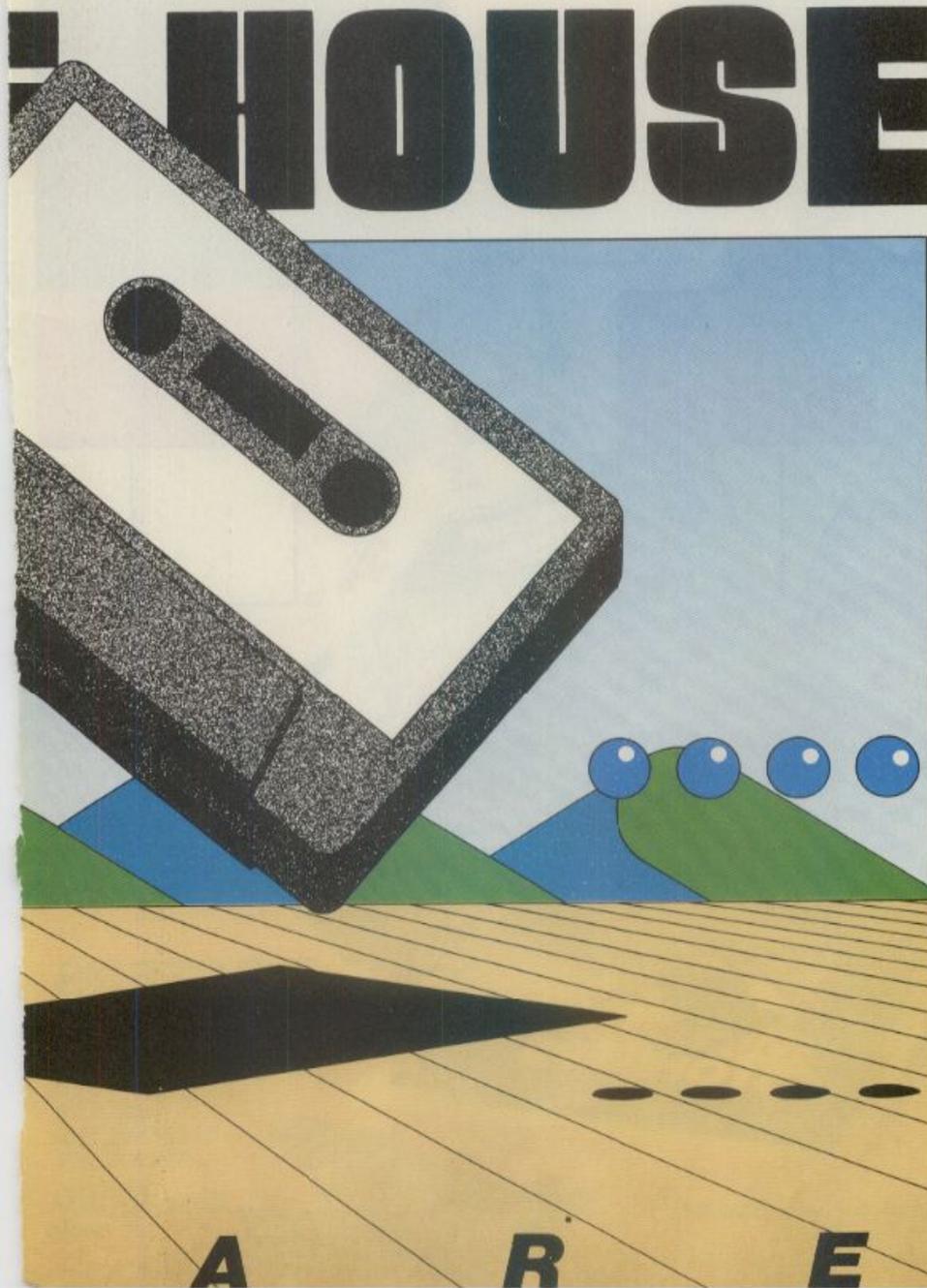




**FORTH.** Abersoft Forth is an implementation of the Forth Language for your Spectrum 48K. Forth is closer to Machine Code and more than 10 times faster than BASIC. "The only Spectrum package which has been endorsed by the Forth Interest Group" — Sinclair User.

**PENETRATOR** is one of the most challenging arcade games for the 48K Spectrum. Amazingly fast arcade action includes training mode and unique customising feature. "Penetrator is my pick — the graphics are terribly impressive . . . a most enjoyable and addictive game." — Computer and Video Games.

**COMMODORE 64 HORACE GOES SKIING** is the sequel to the very successful Hungry Horace. In this adventure our hero attempts winter sports. Skiing is complete with slalom flags, trees and moguls so watch our Horace!



**Orders to:**  
Melbourne House Publishers  
131 Trafalgar Road  
Greenwich, London SE10

Correspondence to:  
Church Yard  
Tring  
Hertfordshire HP23 5LU

All Melbourne House cassette software is unconditionally guaranteed against malfunction.

Trade enquiries welcome.

Please send me your free 52 page catalogue.  
Please send me:

**VIC20**

Vic Cosmonauts ..... £5.95

**COMMODORE 64**

Commodore 64 The Hobbit ..... £14.95  
 Commodore 64 Hungry Horace ..... £5.95  
 Commodore 64 Horace Goes Skiing ..... £5.95

**DRAGON 32**

Hungry Horace ..... £5.95

**ORIC-1**

Orc-1/48K The Hobbit ..... £14.95

**BBC**

BBC The Hobbit ..... £14.95

**SPECTRUM**

Spectrum The Hobbit 48K ..... £14.95  
 Penetrator 48K ..... £6.95  
 Terror-Daktii 40 48K ..... £6.95  
 Melbourne Draw 48K ..... £8.95  
 H.U.R.G. .... £14.95  
 Abersoft Forth ..... £14.95  
 Classic Adventure ..... £6.95

All versions of "The Hobbit" are identical with regard to the adventure program. Due to memory limitations, BBC cassette version does not include graphics.

£ .....  
Please add 80p for post & pack £ .....80  
TOTAL £ .....

I enclose my  cheque  
 money order for £ .....

Please debit my Access card No .....

Expiry Date .....

Signature .....

Name .....

Address .....

Postcode .....

Access orders can be telephoned through on our 24-hour ansafone (01) 858 7397. 

YC28

# He used to be a Teddy **BARE!**

## CAPS

And to top things off, an IMAGINE cap.  
**Only £1.50**  
 White only.

## BALLOONS

IMAGINE the party fun!  
**10p each.**

## T-SHIRTS

Cover your bear! chest with a super IMAGINE T-Shirt.  
**Adults £3.50 each**  
**Child £2.75 each**  
 White only.

## BADGES GALORE

'Cut Out' or 'Button' badges - a chest full of fun!  
**Only 30p each.**

## KEY FOBS

Real leather key fobs with gold lettering and IMAGINE logo.  
**Only 50p each.**

Post coupon now, to:  
**Imagine Software Limited,**  
 2nd Floor, Unit 4, Mulberry House,  
 Canning Place, Merseyside L1 8JB.

Please rush me:  ROUND PIN BADGES  
 CUT OUT PIN BADGES  
 CAPS  STONKERS POSTERS  
 BALLOONS  ZOOM POSTERS  
 KEY FOBS  ALCHEMIST POSTERS

T-SHIRTS AMOUNT CHILD  SIZE 22 24 26 28 30 32 Tick  
 AMOUNT ADULT  SIZE S M L

Please debit my ACCESS/BARCLAYCARD (delete as necessary)

CARD NUMBER

I enclose Cheque/PO for £

Name

Address

Imagine Software Limited,  
 2nd Floor, Unit 4,  
 Mulberry House, Canning Place,  
 Merseyside L1 8JB. Tel: 051-709 6497.

## POSTERS

IMAGINE how many cracks you can hide with these super 23 x 17 inch posters.  
**ZOOM,**  
**STONKERS** or  
**ALCHEMIST**  
**Only £1.00 each**





# Spectrum

# JUMBLY

**A brand new original all  
scrolling super colour  
animated tuneful  
multipicture  
puzzle program**

A masterpiece of ingenuity  
to keep the whole family  
amused absorbed and  
enthralled until the next blue moon.

A puzzle for all puzzle haters!  
You'll be amazed as picture after picture  
unfolds as reward for your skill,  
patience and luck.

You'll be staggered by the  
number of pictures shoe-horned  
into Spectrum, but you'll never  
know how many until Jumbly  
itself tells you and  
rewards your efforts  
with the Jumbly Code.

## COMPETITION

The Jumbly Code entitles  
you to enter the Jumbly  
Competition to design a

picture for Jumbly II, due out in 1984.  
Winners will receive over £150 and  
have their design and name included in  
the new program.

**£6.95 + 50p p&p**

Available from BOOTS, W.H. SMITH, LASKY'S, SPECTRUM, JOHN MENZIES and  
good computer software stockists throughout the UK or direct for  
only £6.95 + 50p post and packing.

# dk'tronics

DK Tronics Ltd., Unit 6, Shire Hill Industrial Estate, Saffron  
Walden, Essex CB11 3AQ. Tel: (0799) 26350 (24 hrs) 5 Lines

JUMBLY 48K Spectrum II/486 compatible

# SOFTWARE FILE

(continued from page 185)

speed, over 60 moves per second. This can be increased to over 100 moves per second, when you have mastered the game, simply by lowering the number Poked in line 390. Speed is achieved by using IRQ — interrupt request. This normally gets a key and changes TI, but by wedging machine code before the routine, the sprites are moved every time an IRQ is called.

The IRQ is triggered by a clock counting down from a value to zero. Poking 56325 sets

this value, so the lower it is, the shorter the delay time and the faster the sprites move.

A Basic routine is also used. This handles score and time printing and checks if a collision occurs. Thus, there is a limit as to how fast sprite movements can be.

To use the program, simply Run it. The routine will first Poke machine code and graphics to memory, and then start a test game. After this, games are played normally, and start when you press Y. Please note that the joystick should be plugged into port 2.

Unfortunately, the program is almost impossible to convert to other micros, as it uses so much machine code and many of the CBM-64's special features. The only sensible things that can be transferred are the principles of the game and the idea behind the speed.

As always with machine code, Save a copy of the program before trying it, as any mistake could cause a system crash, and loss of the program. This precaution may seem excessive but the resulting game is well worth the effort.

```

1 REM# DUCK SHOOT #
2 REM#BY DAVID REES#
10 V=53248:POKEV+32,6:POKEV+33,0:R=50432
15 W=51968:POKE54296,15
20 POKEV+21,255:POKE56325,255:POKEV+23,1
25 IFPEEK(49152)C169THENGOSUB100
30 S=0:0=0:SVS49675:FORN=2T05
40 POKE2040+N,253:POKEV+39+N,0
50 X=(N-2)*128:POKEV+NW2,X:AND255
60 IFINT(X/256)=1THEND=0+2*H
70 POKEV+1+NW2,100:POKE52224+NW2,1
80 NEXT
90 POKEV+29,252
95 GOTO300
99 REM#CODE GET SUBROUTINE#
100 FORN=0T02
110 FORM=0T063
120 READA:IFA=-1THEN150
130 POKE16192+NM64+A,R
140 NEXTM
150 FORP=NT063
160 POKE16192+NM64+P,0
170 NEXTP,N
180 FORN=0T05
190 FORM=0T0255
200 READB:IFB=-1THE4230
210 POKE49152+NW256+B,R
220 NEXTM
230 NEXTN
299 RETURN
300 FORH=6T07
310 POKE2040+H,253:POKEV+39+H,0
320 X=(N-6)*256:POKEV+NW2,X:AND255
330 IFINT(X/256)=1THEND=0+2*H
340 POKEV+1+NW2,60:POKE52224+NW2,2
350 NEXT
360 POKEV+16,0:SVS49664
370 SS=54272:POKESS+18,0:POKESS+14,255
380 POKESS+15,255:POKESS+18,129
389 REM#SPEED SET#
390 POKE56325,55
400 POKE2041,255:POKE2040,254
410 POKEV,255:POKEV+1,238
420 POKEV+39,5:POKEV+40,4
430 TI#="000000":L=53278
450 PRINT"HI TIME=" SCORE "
460 P=PEEK(L)
499 REM#MAIN ROUTINE#
500 SVSR:PRINT"HI"INT((1800-TI)/60)"M",S
510 IFTI>1770THENS00
520 P=PEEK(L):IFP=0THENS00
530 IFFAND2=0THENS00
599 REM#HRS A DUCK BEEN HIT?#

```

```

600 SVS49920
610 H=PEEK(N+2):B=PEEK(N+3):C=PEEK(N+16)AND2
615 IFC=2THENC=256
620 FCRC=2T07
630 V=FRND(2*H):IFY=0THEN000
640 D=PEEK(N+16)AND(2*H):IFD<0THEND=256
650 T=-PEEK(N+20X)+A-D+C
660 IFTC<0RTD<40THEN000
670 T=-PEEK(N+20X)+A-D+C
680 IFTC<0RTD<40THEN000
689 REM#YES#
690 POKE52226,0:POKEV+3,0
700 S=S+164+PEEK(N+20X+1)
705 POKEV+21,PEEK(V+21)AND(255-2*H)
710 FORH=0T03
780 NEXTH
790 GOTO500
800 NEXT
810 GOTO500
900 PRINT"XXXXXXXXXXXXXXXXXXXX"
910 PRINT"HELL DONE"
950 POKE52226,0:POKEV+3,0
960 FORN=0T03999:NEXT
970 PRINT"WOULD YOU LIKE ANOTHER GAME"
980 DETAIL:IFA#="Y"THEN20
990 IFA#<"N"THENS00
995 END
4999 REM#SPRITE GRAPHICS#
5000 DATA...1,128,,7,192,,5,192,,63,192,
5010 DATA15,224,16,63,224,32,15,255,224
5020 DATA1,255,192,1,255,192,3,255,192
5030 DATA3,255,192,3,255,192,1,255,128
5040 DATA1,255,128,254,-1
5100 DATA12,,12,,63,,63,,255,192,
5110 DATA255,192,-1
5200 DATA224,,224,,224,,224,,
5210 DATA224,,224,,224,,224,,224,-1
5249 REM#MACHINE CODE#
5250 DATA169,4,133,255,168,4,173,16,208
5260 DATA37,255,201,,240,16,185,,208,24
5270 DATA105,80,144,0,173,21,208
5280 DATA65,255,141,21,208,6,255,208,200
5290 DATA192,16,208,223
5300 DATA173,2,204,240,17,173,3,208,56
5310 DATA233,40,176,0,169,,141,2,204,141,3,208
5320 DATA24,173,,220,133,251,41,16,201,
5330 DATA200,49,173,2,204,208,44,32,,196,169,6
5340 DATA141,2,204,173,,208,141,2,208
5350 DATA169,190,141,3,208,173,16,208
5360 DATA41,1,201,,240,2,169,2,133,252
5370 DATA173,16,208,41,253,24,101,252,24
5380 DATA141,16,208,165,251,41,4,201,
5390 DATA208,51,173,,208,56,233,4

```

```

5400 DATA176,14,141,,208,173,16,208
5410 DATA73,1,141,16,208,24,144,4,24
5420 DATA141,,208,173,16,208,41,1,201,
5430 DATA240,1,96,173,,208,56,233,50
5440 DATA176,5,169,51,141,,208,24,96
5450 DATA165,251,41,8,201,
5460 DATA240,1,96,173,,208,24,105,4
5470 DATA144,15,24,141,,208,173,16,208
5480 DATA73,1,141,16,208,24,144,3
5490 DATA141,,208,173,16,208,41,1,201,
5500 DATA208,1,96,173,,208,56,233,51
5510 DATA144,6,24,169,50,141,,208,96,-1
5515 REM
5520 DATA238,,205,173,,205,205,1,205
5530 DATA200,5,169,,141,,205,169,4
5540 DATA133,255,168,4,185,,204,240,64
5550 DATA201,1,208,29,185,,208,56,233,2
5560 DATA176,14,153,,208,173,16,208
5570 DATA69,255,141,16,208,24,144,38
5575 DATA24,153,,208,24,144,31
5580 DATA201,2,208,27,185,,208,24,105,2
5590 DATA144,15,24,153,,208,173,16,208
5600 DATA69,255,141,16,208,24,144,3
5610 DATA153,,208,24,6,255,208,208
5620 DATA192,16,208,179,,73,2,204
5630 DATA240,10,173,3,208,56,233,3,24
5640 DATA141,3,208,76,49,234,-1
5700 DATA169,193,141,21,3,169,,141,20,3
5710 DATA96
5720 DATA169,234,141,21,3,169,49,141,20,3
5730 DATA96,-1
5800 DATA160,,185,,208,153,,203,200
5810 DATA192,17,208,245,96,-1
5900 DATA169,,141,4,212,169,10
5910 DATA141,5,212,169,1,141,6,212
5920 DATA169,129,141,4,212,169,50
5930 DATA141,1,212,96,-1
6000 DATA160,4,132,255,173,16,208,37,255
6010 DATA201,,240,21,185,,208,24,105,10
6020 DATA144,13,24,173,27,212,41,31,24
6030 DATA185,132,24,153,1,208,6,255,208
6040 DATA200,192,12,208,218
6050 DATA173,27,212,41,4,133,253
6060 DATA173,12,208,24,105,3,144,15,24
6070 DATA141,12,208,173,16,208,73,64
6080 DATA141,16,208,24,144,3,141,12,208
6090 DATA173,14,208,24,105,3,144,15,24
6100 DATA141,14,208,173,16,208,73,128
6110 DATA141,16,208,24,144,3,141,14,208
6120 DATA76,,192,-1

```

## Blocks

Mark Sadler,  
Reading,  
Berkshire.

**DRAGON**

THE AIM OF this game is to score as many points as possible by landing the blocks which fly across the screen. If when landing you crash into another block you lose one go and if you do not land the block before it goes off the end of the screen you lose five points. When you have landed 35 blocks, the screen is cleared and the speed is increased.

### Poke to speed up games

It uses this famous Poke to speed up the game.

POKE 65495,0

If your Dragon cannot use this, delete lines 390 and 870, and change line 950 to Goto 70. Please note if you want to use the cassette recorder you will have to reset the machine or type

POKE 65494,0

to get rid of the speed-up Poke.

```

10 HS$="THE COMPUTER":HS=50
20 GOTO 430
30 REM **THE GAME**
40 CLS0:T=3:S=0:Y=0
50 PRINT @ 4," SCORE ";
60 PRINT @ 19," CRASHES ";
70 H=RND(15)+10
80 C=RND(8)
90 PRINT @ 10,S;
100 PRINT @ 27,(3-T);
110 FOR F=0 TO 63
120 SET(F,H,C)
130 IF INKEY$<>" " THEN GOTO 210
140 FOR G=1 TO LP:NEXT
150 RESET(F,H)

```

(continued on page 189)

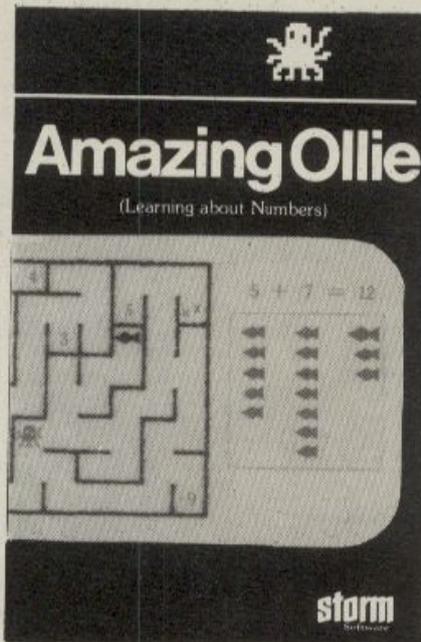
# Brainstorm!

Widely used in schools

4-8 year olds

Free Ollie Octopus badge with each program

Ollie the Octopus must be moved around different undersea mazes to catch fish for himself and his hungry children! AMAZING OLLIE introduces children to the exciting new world of numbers (with options for basic number recognition, counting and adding), whilst providing a fascinating program for the whole family to enjoy.



**Amazing Ollie**  
(Learning about Numbers)

storm software



**storm**

**OLLIE OCTOPUS' SKETCHPAD** is the program for young children and adults alike. Its easy to use manner lets you create an imaginative picture from a blank computer screen, with no trouble at all. Making full use of the colours, you can draw lines in 8 different directions, or build circles, squares or triangles, which can then be made bigger, smaller or shaded in.



**Ollie Octopus' Sketchpad**

storm software

BBC Model B 16K and 48K ZX Spectrum

## STORM Software

Trade enquiries invited.  
Contact Amanda Ralph: 0935 813528  
Storm Software, Winchester House, Sherborne, Dorset



### Are your finances driving you mad?

Do you find that working out your finances makes your head buzz? Do you see red?

Don't worry, now you can have Hilton's **Personal Banking Service** on your side, giving you a clear head start and (hopefully) putting you back into the black!

Maintain permanent records and fully detailed statements of your finances + Search facility. **Bank Reconciliation** module is included to automatically match your Bank Statement to your **PBS** account.

- \* ZX81 £9.95 (16K)
- \* ZX SPECTRUM £12.00 (48K)
- \* DRAGON £12.00 (32K)
- \* BBC £9.95 (32K) **PBS** only guaranteed after sales maintenance provided.

**NEW RELEASES**

**SPECTRUM (48K)**  
**GARDEN BIRDS** ..... £6.50  
A captivating introduction to Ornithology and entertaining **PLAY TYPE & TRANSPOSE**. £9.00  
Compose, transpose key, Play it Save it, Print it!

**DRAGON (32K)**  
**UTILITIES 1** ..... £5.00  
Including Compress, Catalogue and Copy

**DISASSEMBLER** ..... £5.00  
Prints either to screen or printer in HEX and MNEMONICS

**MEMORY MAP** ..... £5.00  
Over 9 A4 pages of Dragon Memory locations. **INVALUABLE!**

ORDER by POST (specifying machine!)  
OR at the POST OFFICE using  
TRANSCASH ACCOUNT 302 9557



Hilton Computer Services Ltd  
(Dept YC) 14 Avalon Road,  
Orpington, Kent BR6 9AX

Ask for the PBS at your local computerstore.

### Spectrum 48k

#### MAKE YOUR OWN TV FILMS!

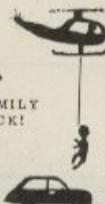
WITH **LIVE ANIMATION**  
& **MUSIC**

**SAVE them...**

& AMUSE FRIENDS AND FAMILY  
WHEN YOU PLAY THEM BACK!



"Make us walk & talk!"



ORDER: £7  
MACRO  
CONSTRUCTION  
& ANIMATION CASSETTE MCA

- SPECIAL MACRO-PROGRAMMING TECHNIQUES ALLOW YOU TO: -
- CALL-UP ANY MEMBER OF CAST, INCLUDING UFO, HELICOPTER AND A HOST OF 'PERSONNEL' IN A CHOICE OF NEARLY 30 'CALLS! MAKE EACH ANY COLOUR - LARGE ONES CAN BE IN TWO COLOURS!
- THEY WALK, RUN, CLIMB & FLY.
- BUILD HOUSES, CHURCHES ETC. IN A FLASH - & ERASE THEM UP TO 15 MINS. PER 'FILM', OR MORE IF YOU'RE A GOOD DIRECTOR
- MAKE CHAFACTERS 'SPEAK' USING ANNOTATIONS AS IN STRIPS.
- FULL COMPUTER-PROMPTING TO SAVE YOU MAKING ERRORS.
- INSTANT PLAYBACK, EDITING AND DELETING AS YOU GO ALONG!
- MOST COMMANDS ARE A SINGLE KEY-STROKE, WITHOUT 'ENTER'.
- COMPOSE YOUR OWN TUNES USING THE SPECIAL THREE-OCTAVE CHROMATIC MUSIC COMPOSER, WHICH ALLOWS YOU TO LISTEN, CORRECT AND EDIT AT EACH NOTE ... IF YOU NEED TO!
- STORE UP TO NINE 39-NOTE TUNES TO 'CALL-UP' AT ANY TIME IN A STORY ... COMPUTER GIVES EACH A NUMBER IN MEMORY.
- CHANGE TUNES AT ANY TIME, EVEN WHILST MAKING A 'FILM'.
- YOU CAN EVEN ADD PERSPECTIVE TO BUILDINGS, ROADS ETC.
- NO SPECIAL SKILLS OR COMPUTER KNOWLEDGE NEEDED ... JUST IMAGINATION!



pinehurst data studios  
IMPORTANT: FOR 48K SPECTRUM ONLY

69, PINEHURST PARK,  
WEST MOORS, WIMBORNE,  
DORSET. BH22 0BP

# SOFTWARE FILE

(continued from page 187)

```
160 NEXT F
170 REM **OFF THE SCREEN**
180 SOUND 10,4
190 IF S>4 THEN S=S-5
200 GOTO 70
210 REM **LANDING THE BLOCK**
220 RESET(F,H)
230 FOR G=H+1 TO 29
240 SET(F,G,C)
250 FOR P=1 TO 10:NEXT
260 RESET(F,G)
270 NEXT G
280 IF POINT(F,G+1)>0 THEN GOTO 350
290 SET(F,G+1,C)
300 PLAY"T255CDEFGB"
310 S=S+10
320 Y=Y+1
330 IF Y=35 THEN GOTO 930
340 GOTO 70
350 REM **USED UP ALL THE TRIES**
360 SOUND 1,5
370 T=T-1:IF T>0 THEN GOTO 70
380 PRINT @ 226,"YOUR TIME IS UP PRESS ANY KEY";
390 POKE 65494,0
400 IF INKEY$="" THEN GOTO 400
410 REM **TITLES**
420 IF S>HS THEN GOSUB 600
430 CLS
440 PRINT @ 12,"BLOCKS"
450 PRINT
460 PRINT " A NEW AND EXCITING GAME FOR THE DRAGON
 32 BY MARK SADLER"
470 PRINT
480 PRINT STRING$(32,"*")
490 PRINT " TODAY'S HIGH SCORE IS"HS
500 PRINT " BY "HS$
510 PRINT
520 PRINT "G GAME"
530 PRINT "I INSTRUCTIONS"
540 PRINT
550 PRINT "CHOOSE"
560 IN$=INKEY$
570 IF IN$="G" THEN GOTO 850
```

```
580 IF IN$="I" THEN GOTO 770
590 GOTO 560
600 REM **A NEW HIGH SCORE**
610 CLS
620 PRINT @ 12,"HIGH SCORE"
630 PRINT
640 PRINT TAB(9);"CONGRATULATIONS"
650 PRINT
660 PRINT" YOU HAVE SCORED TODAY'S HIGH SCOR
YOUR NAME AND PRESS ENTER"
670 PRINT:PRINT STRING$(32,"*");
680 PRINT
690 INPUT HS$
700 IF LEN(HS$)>12 THEN PRINT "TOO LONG ":GOTO 680
710 PRINT "IS THIS CORRECT?"
720 HS=S
730 IN$=INKEY$
740 IF IN$="N" THEN 600
750 IF IN$="Y" THEN RETURN
760 GOTO 730
770 REM **INSTRUCTIONS**
780 CLS:PRINT @10,"BLOCKS"
790 PRINT
800 PRINT "ALL YOU HAVE TO DO IS TO LAND THE FLYING
BLOCK ON THE GROUND SAFELY. YOU MUST NOT HIT ANOTHERB
LOCK WHEN YOU LAND OR YOU LOSE A TRY (YOU START WITH 3
TRIES). ALSO YOU MUST NOT GO OFF THE SCREEN OR YOU
LOSE 5 POINTS. PRESS ANY KEY TO";
810 PRINT " LAND THE BLOCKS"
820 PRINT:PRINT " PRESS ANY KEY TO START"
830 IF INKEY$="" THEN 830
840 REM**SELECT SPEED**
850 CLS:INPUT "HOW FAST DO YOU WANT IT ( 1-10 ,10 IS T
HE FASTEST ) ";S
860 IF S>10 OR S<1 THEN 850
870 IF S>5 THEN POKE 65495,0 ELSE POKE 65494,0
880 IF S>5 THEN S=S-5
890 S=S-1
900 LP=20-((S*5))
910 GOTO 30
920 REM**LANDED 35 BLOCKS**
930 Y=0:CLS0:IF LP>4 THEN LP=LP-5:GOTO 50
940 IF LP=0 THEN LP=20
950 POKE 65495,0:GOTO 70
```

## Artist

Tom Harkness,  
Voorschoten,  
Holland.

ORIC

THIS PROGRAM IS A technical drawing graphics tool for designing high-resolution pictures without writing a whole program to do it. It runs on the Oric-1 48K because 36K is used for the program and various blocks of memory.

When run, a > will appear in the text window which means that the program is ready for a new instruction. When the > disappears, , you are in the middle of an instruction.

The cursor, which appears as an inverse dot, can be moved around the screen using the four cursor control keys. For fast repeat in any direction, press Return, then the direction required. Any key will halt the repeat and the co-ordinates of the cursor will be displayed in the text window. When not in repeat mode, the co-ordinates of the cursor are constantly displayed.

To make a dot appear on the screen, press D and the cursor will disappear. This is because the dot is inverse — FB number 2 — and as soon as you move the cursor, both the dot and the cursor will appear.

When the space-bar is pressed, a line will be drawn to the current position of the cursor from either the end of the previous line or from a specified origin. The line is drawn in inverse so that it can be seen against any background. To specify a new origin, press the delete key and the current position of the

cursor will become the new origin.

If a fixed origin is required, all the lines are drawn to that position, then press 0 and specify the origin with Delete. Pressing 0 a second time will take you back to normal mode.

To draw a circle, specify your origin as the centre of the circle and move on an X-axis to specify the radius. Then press C followed by the FB number 0 — for background colour — and 1 — for foreground colour.

There are 10 separate programmable positions with allow quick, convenient movements of the cursor. To store the current position of the cursor, press backslash followed by one of the numbers 0 to 9. By pressing a key 0 to 9 on its own, the cursor will move to that predefined position. All positions are set to 0, 0 when run. Pressing K will allow you to enter a new X and Y position of the cursor from the keyboard.

To define a character in the alternative character set, first use Dot to form a 6 by 8 character location 0, 0 to 5, 7 at the top left-hand corner of the screen. Then press G followed by any non-control character on the keyboard. This can then be plotted anywhere else on the screen at the position of the cursor by pressing Q followed by the character and finally the FB number. To write a whole line on the screen, press W, enter the string and press Return.

To define one of 10 strings of character in the alternate character set, press control S, followed by the number of the string — 0 to 9 — and then the actual string. Return will end the string. To print the string either horizontally — 0 — or vertically — 1 — press Control P, the number of the string, the

direction, and then the FB number.

To invert an x by y block of the screen — origin at the cursor — enter i followed by x,y. The width x should be given in character widths — six pixels; y is in pixels.

Pressing Control L clears the screen, while pressing Escape then £ breaks the program and returns to text mode.

You can temporarily store the screen in any of three positions in memory and load them back at any time. While dealing with screens 1, 2 and 3 refer to the three memory screens. The hexadecimal addresses are:

- A000 to BFFF
- 1. 3000 TO 4FFF
- 2. 5000 TO 6FFF
- 3. 7000 TO 8FFF

The programmable positions are stored along with the screens so there are actually four sets of positions.

There are four commands in machine code used for handling of screens. The first is S which stores the actual screen into a memory screen 1, 2 or 3. For example, S 1 stores the actual screen in memory screen 1.

R recalls memory screens to the actual screen, where R is followed by the number of the memory screen.

X exchanges the actual screen with a given memory screen.

M merges a given memory screen with the actual screen.

Any of screens 1, 2 and 3 can be Saved on cassette and loaded back into their old screen positions later on. Press T — tape — followed by L — Load — or S — Saved. For Saving, the screen is specified but for loading, no screen is given and it will be loaded into the same

(continued on page 191)

South London's Largest Specialist  
Micro Computer  
Centres

# VISION STORE offer

## INTEREST FREE CREDIT

ON Micro Computers and  
Peripherals

from

BBC • Acorn • Commodore • Sinclair • Atari • Dragon •  
Texas • Oric • Epson • Seikosha • Star • Shinwa • etc ...

Call in or phone for full details.

## South London's Largest Stockists of Micro Computer Software. Continuous Demonstrations GAMES — EDUCATIONAL — BUSINESS

Just a small selection of our vast inventory of software is shown here. We carry all the popular titles of arcade games for Sinclair • Commodore • BBC • Atari • Dragon • Oric • Texas • etc ... Educational programs for children from 5 years old to 'O' level standard are kept in stock. Foreign languages, maths

and general knowledge are just a few of the subjects we cover.

Let us advise you on your Business application for your micro computer. Word Processing, Forecasting, Accounting, Stock Control, you name it we've probably got it. We always have several systems on demonstration.

### TOP SELLING SOFTWARE

Program	Supplier	Machine	Price
Atic ATAC	Ultimate	Spectrum	£5.50
Planetoids	Acomsoft	BBC	£9.95
Kong	Anirog	CBM64	£7.95
Snooker	Acomsoft	BBC	£9.95
Flight			
Zero-one-seven	A/S	VIC-20	£6.95
Jumpman	Epyx	Atari/CBM64 (Cass/Disk/ROM)	£29.95
Gridrunner	Llamasoft	Atari	£7.50
Daredevil Dennis	Vision	BBC	£7.95
Crazy Caveman	Merlin	CBM64	£7.95
Crypt	Camell	Spectrum	£4.95
Tempest		Atari	£29.95
Fort Apocalypse	Showcase	Atari/CBM64	£24.95
Shamus	Showcase	Atari/CBM64	£24.95
Zork I II III	Infocom	Atari (Disk)	£29.95
Temple of Apshai	Epyx	Atari/CBM64 (Disk/Cass)	£29.95
Cuddly Cubet	Interceptor	CBM64	£7.95
Valhalla	Legend	Spectrum	£14.95
Lunar Jetman	Ultimate	Spectrum	£5.50
Manic Miner	Bug-Byte	Spectrum	£5.50
3-D Ant Attack	Quicksilva	Spectrum	£6.95
Splat!	Incentive	Spectrum	£5.50
Kong	Ocean	Spectrum	£5.95
Jet Pac	Ultimate	VIC-20	£5.50
Hover Bowver	Llamasoft	CBM64	£7.50
Bugaboo	Quicksilva	Spectrum	£6.95
Siren City	Interceptor	CBM64	£6.95
Metagalactic Llamas at the Edge of Time	Llamasoft	VIC-20	£6.00
Transylvanian Tower	Richard Shepherd	Spectrum	£5.95
Jet Pac	Ultimate	Spectrum	£5.50
The Fabulous Wanda & the Secret of Life the Universe & Everything			
Penetrator	Games Machine	CBM64	P.O.A.
Zoom	Melbourne House	Spectrum	£6.95
Pyramid	Imagine	Spectrum	£5.50
Purple Turtles	Fantasy	Spectrum	£5.50
Vortex Raider	Quicksilva	CBM64	£7.95
Hustler	Interceptor	CBM64	£6.95
H-Expert	Bubblebus	CBM64	£7.95
Tranz Am	Anirog	CBM64	£7.95
#7 Flight	Ultimate	Spectrum	£5.50
Simulation			
Harrier Attack	Doctorsoft	BBC	£7.95
Skyhawk	Martech	Oric	£7.95
Arcadia	Quicksilva	VIC-20	£6.95
Attack of the Mutant	Imagine	Spectrum	£5.50
Camels			
Moon Buggy	Llamasoft	CBM64	£7.50
Games Designer	Anirog	CBM64	£7.95
Hungry Horace 64	Quicksilva	Spectrum	£14.95
Crazy Kong	Melbourne House	CBM64	P.O.A.
Gridrunner	Interceptor	VIC-20	£6.00
Arcadia	Quicksilva	Spectrum	£6.95
	Imagine	VIC-20	£5.50

All the above software is available on cassette unless otherwise stated.  
All Prices include VAT

## VISION STORE

**VISIONSTORE KINGSTON**  
3 Eden Walk Precinct, Kingston,  
Surrey. Tel: 01-546 8974

**VISIONSTORE CROYDON**  
96-98 North End, Croydon,  
Surrey. Tel: 01-681 7539

# SOFTWARE FILE

(continued from page 189)

screen as it was Saved in. For this reason it is best to write down 1, 2 or 3 next to the file name when filing your pictures.

If your tape recorder is not reliable with fast save, change the second zero in line 1030 to a 1 and the second zero in line 1060 to a 1. This will then use a slow save and load. The Save/Load routines are in machine code because of the bug in the Basic memory block load.

## Command summary.

Move cursor      Cursor keys

Repeat      Return, cursor key  
Keyboard entry      K, x, y co-ordinates  
Dot      D  
Line      Space bar  
Circle      C, FB number  
New origin      DEL  
Recall programmable positions      0 to 9  
Program positions      /, 0 to 9  
Fixed origin      O (toggle action)  
Define character      G, character  
Recall character at current cursor position      Q, character, FB  
Store screen      S, screen

Recall screen      R, screen  
Exchange screen with memory screen      X, screen  
Merge memory screen with screen      M, screen  
Write text      W, string, return  
Define string      Control — S, 0 to 9, string return  
Print string      Control — P, 0 to 9, direction, FB  
Inverse section of screen      l, Length, height, return  
Clear screen      Control — L  
Break      ESC, £

```

2 REM FOR E READ HASH CHARACTER
4 N=ESQEO
5 FORI=NOTD31:POKEH,I,D;NEXT
8 A(0)=EC000:A(1)=ES000:A(2)=E7000:A(3)=E9000
10 PAPER0:INK0:PRINTCHR(1)
12 RESTORE:GOSUB1000:HC
20 HIRSH:PRINTCHR(17)
30 X=0:Y=0:CURSETX,Y,1:D=X:E=Y
40 PRINT,Y;PRINT" ";:BETA:IA=ASC(A#):IFA>7AND12THEN
ONA=780SUB500
510,520,530:GOTO40
41 PRINTCHR(127);
42 N=FRE(" ")
43 IFA=32THEN200
44 IFA=12THENPINS:GOTO20
47 IFA=27THEND=X:E=Y:GOTO40
48 IFA=82THEN800
49 IFA=83THEN850
50 IF=27THEN300
51 IFA=88THEN900
52 IFA=87THEN600
53 IFA=86THENCURSETX,Y,2:GOTO40
54 IFA=87THEN50
55 IFA=13THEN100
56 IFA=84THEN2000
57 IFA=79THEND=1AND1:GOTO40
58 IFA=75THEN400
59 IFA=71THEN350
60 IFA=81THEN250
61 IFA=16THEN160
62 IFA=77THEN950
63 IFA=73THEN700
64 IFA=19THEN150
65 IFAC>92THEN70
67 BETA:POKEE:FFO+VAL(A#),X;POKEE:FFO+VAL(A#),Y:GOTO40
70 CURSETX,Y,2;X=X+PEEK(E:FFO+VAL(A#)):Y=PEEK(E:FFO+VAL(A#)):CURSETX,Y,2:GOTO40
100 BETA:IA=ASC(A#)-7:IFA<10RA>4THEN40
105 PRINT:PRINT
110 REPEAT:ID=ABS(500,510,520,530)UNTILKEY<"*":CRNDTH:IGOTO40
150 BETA:T=VAL(A#)
155 INPUTC(T):IFLEN(C#(T))>39THENPRINT"TOO LARGE":BOT
0125
157 GOTO40
160 CURSETX,Y,2;TX=X:TY=Y
162 BETA:T=VAL(A#)
163 BETA:I=VAL(A#)
164 BETA:M=VAL(A#)AND1:IFTHENJ=0:K=BELSEJ=6:K=0
165 FORI=1TOLEN(C#(T)):CURSETX,TY,3:CHARASC(I:ID#(C#(T),1,1)),1,1
170 TX=TX+J:TY=TY+K:IFTX>231ORTY>191THENI=LEN(C#(T))
175 NEXT
180 CURSETX,Y,2:GOTO40
200 CURSETX,Y,2
205 IFD>XORE<YTHENDRAW-X,E-Y,2:CURSETX,Y,3:IFD=0THE
ND=X:E=Y
207 CURSETX,Y,2
210 GOTO40
250 IFX>232ORY>192THENPRINT:PRINT"OFF SCREEN":GETK:BO
T40

```

```

252 GETB#
255 BETA:V=VAL(A#):IFV>2THEN255
257 CURSETX,Y,2
260 CHARASC(B#),1,V;CURSETX,Y,2:GOTO40
300 BETA:IFA#="_":THEXTEXT:PAPER7:INK0:PRINTCHR(6):EN
D
305 GOTO40
350 BETA:IA=ASC(A#):IFB<32OR126THEN350
360 T=3932+8*8
365 CURSETX,Y,2
370 FORI=40960T41240STEP40:POKET,PEEK(I)AND63:T=T+1:N
EXT:CURSETX,Y
2:GOTO40
400 CURSETX,Y,2:INPUTX,Y
410 IFX<0THENX=0:GOTO450
420 IFX>239THENX=239
430 IFY<0THENY=0:GOTO450
440 IFY>199THENY=199
450 CURSETX,Y,2:GOTO40
500 CURSETX,Y,2;H=(X<>Y):X=X+H:CURSETX,Y,2:RETURN
510 CURSETX,Y,2;H=(X<>239):X=X-H:CURSETX,Y,2:RETURN
520 CURSETX,Y,2;H=(Y<>199):Y=Y-H:CURSETX,Y,2:RETURN
530 CURSETX,Y,2;H=(X<>0):Y=Y+H:CURSETX,Y,2:RETURN
600 V=8B(X-D#(H-D)):IFD=0DOR0+V>239DRE-V<0DRE+V>199T
HEM40
602 BETA:N=VAL(A#)AND1
605 CURSETD,E,3:ICIRCLEV,N:CURSETX,Y,3
610 GOTO40
650 CURSETX,Y,2:INPUTM
655 FORI=1TOLEN(M#):CHARASC(MID#(M#,I,1)),0,1;X=X*7:IF
X>231THENX=X-
7:IGOTO40
660 CURSETX,Y,2:NEXT
670 CURSETX,Y,2:GOTO40
700 INPUT"DIMENSIONS ?":A,B;POKEE7,AND255:M=4959+IN
T(X/6)+Y*40
705 IFB>Y>199THEN700
707 CURSETX,Y,2
710 FORI=1TOD:DOKEE:BO,ICALLE7350:M=M+40:NEXT
715 CURSETX,Y,2
720 GOTO40
800 BETA:T=VAL(A#):IFT>30RT<1THEN800
805 DOKEE:BO,A(0):DOKEE:BO,A(1)
810 CURSETX,Y,2:CALLE7900:CURSETX,Y,2
815 CLS
820 GOTO40
850 BETA:T=VAL(A#):IFT>30RT<1THEN850
855 DOKEE:BO,A(0):DOKEE:BO,A(1)
860 CURSETX,Y,2:CALLE7900:CURSETX,Y,2
870 GOTO40
900 BETA:T=VAL(A#):IFT>30RT<1THEN900
905 DOKEE:BO,A(0):DOKEE:BO,A(1)
910 CURSETX,Y,2:CALLE7900:CURSETX,Y,2
915 CLS
920 GOTO40
950 BETA:T=VAL(A#):IFT>30RT<1THEN950
955 DOKEE:BO,A(0):DOKEE:BO,A(1)
960 CURSETX,Y,2:CALLE7900:CURSETX,Y,2
965 CLS
970 GOTO40
1000 REM LOAD HC
1005 REM SAVE
1010 FORI=0TOD19

```

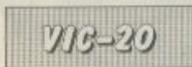
```

1020 READ:POKEE400+I,D;NEXT
1030 DATAE9,E20,E85,E35,E49,E0,E85,E36,E85,E67,E20,EC
A,E6,E20,E78
E85
1032 DATAE20,E04,E8E,E60
1035 REM LOAD
1040 FORI=0TOD19
1050 READ:POKEE450+I,D;NEXT
1060 DATAE9,E20,E85,E35,E49,E0,E85,E36,E85,E67,E20,ECA
,E6,E20,E8B,
E84
1070 DATAE20,E04,E8E,E60
1075 REM MC MOVE
1080 FORI=0TOD36
1090 READ:POKEE900+I,D;NEXT
1100 DATAE8,E81,E38,E9,E21,E85,E84,E6A,E81,E6A,E83,E
A9,E0,E85,E80,
E85,E82
1110 DATAE80,EFF,E81,E80,E91,E82,E88,E80,249,E6E,E81,E
C6,E83,E85,E8
A,E85,E81
1120 DATAE80,239,E60
1200 REM MC 'DR'
1210 FORI=0TOD2
1220 READ:POKEE9100+I,D;NEXT
1230 DATAE8,E81,E38,E9,E21,E85,E84,E6A,E81,E6A,E83,E
A9,E0,E85,E80,
E85,E82
1240 DATAE80,23F,E81,E80,E85,E7F,E81,E82,E85,E7F,E91,E
82,E88,E80,24
3,E6E,E81
1250 DATAE80,E83,E85,E84,E85,E81,E80,233,E60
1300 REM MC BMAP
1310 FORI=0TOD44
1320 READ:POKEE9200+I,D;NEXT
1330 DATAE8,E81,E38,E9,E21,E85,E84,E6A,E81,E6A,E83,E
A9,E0,E85,E80,
E85,E82
1340 DATAE80,EFF,E81,E80,E85,E7F,E81,E82,E91,E80,E85,E
7F,E91,E82,E8
8,E80,241
1350 DATAE80,E81,E6A,E83,E85,E84,E85,E81,E80,231,E60
1400 REM INVERSE
1450 FORI=0TOD11
1460 READ:POKEE9350+I,D;NEXT:RETURN
1470 DATAE84,E7F,E81,E80,E49,E80,E91,E80,E88,E80,247,E
60
2000 REM TAPE
2010 PRINT:PRINT"8 - SAVE L - LOAD"
2020 GETY:IFY#="8"THEN2100
2030 IFY#="L"THEN200ELSEGOTO2020
2100 PRINT:PRINT"SCREEN - 1,2 OR 3 ?"
2101 GETY:T=VAL(Y#):IFT>30RT<1THEN2101
2105 B#A#(T)-8192:EA#(T)=1
2110 PRINT:PRINT"PRESS RECORD ON TAPE THEN PRESS A KEY"
2115 GETY:BOVE:BO,BA:DOKEE:BO
2120 CALLE400:PRINT:PRINT"READY":GETY:GOTO40
2200 REM
2210 PRINT:PRINT"PRESS PLAY ON TAPE":CALLE450:PRINT:PR
INT"READY":SE
TY#
2220 L=0:P=0
2230 GOTO40

```

## Fly catcher

Colin Peacock,  
Braunton,  
North Devon.



FLY CATCHER is an original, short program which will run on the unexpanded Vic-20. You are a spider and the aim is to spin a web all over the screen to stop the fly reaching the left-hand wall before it eats its way through.

Unfortunately the fly eats more and more web as time goes by, and it also gets faster. As though that is not enough, there is a Demon Web Muncher who, every so often, eats random parts of your web.

The spider can be moved with the keys: 1-Down, 2-Up, 9-Left, 0-Right or it can be moved with the joystick. When the fly reaches the far wall, the computer plays a Death March and tells you your time. If it is a new best time then it will ask you to type in your initials, and whether you would like another go.

### Program notes.

- 1 to 200 Sets up graphics, prints instructions and plays tune, POKE 808,127 in line 5 disables Run/Stop Restore, and can be left out
- 200 to 500 Main Program Loop
- 221 to 255 Joystick/keyboard input
- 550 to 580 Movement subroutines
- 850 to 1000 Game end, SYS64824 in line 956 clears program so can be omitted
- 1000 to 1040 Instructions
- 1100 to 1140 Demon Web Muncher subroutine
- 2000 to 2040 Hi-res characters
- 3000 to 3100 Music data

```

1 REM**FLY CATCHER**
2 REM*COLIN PEACOCK*
3 REM*****1983*****
5 POKE808,127:POKE52,28:CLR:CL=30720:HI#="000000"
10 RESTORE:GOSUB1000:GOSUB2000:N1=0:Y=0:Z=0:S1=36876:S2=36875:D4=1:GOSUB3000:U=
7725
20 V=3:G=0:PRINT" IIT  'EY";
32 GETA#
34 IF(PEEK<37151>AND32)=00RA#<>" THEN100
35 GOTO32
100 POKE36869,255
110 POKE36879,12:PRINT"J":FORI=7702707723:POKEI,0:NEXT:FORI=8164T08185:POKEI,0:
NEXT
120 FORI=7724T08142STEP22:POKEI,1:NEXT:FORI=7745T08163STEP22:POKEI,0:NEXT
195 T1#="000000"
200 PRINT"TIME "LEFT$(T1#,2);":":MID$(T1#,3,2);":":RIGHT$(T1#,2)
210 POKEU,2:POKEU+CL,3
220 IFN1/D4<>INT(N1/D4)THEN260
221 PA=37151:POKEPA,0:PB=37152:RB=37154
222 W=PEEK(PA):POKERB,127:E1=PEEK(PB):POKERB,255
225 IF<(WAND4)=0ORPEEK(197)=56>ANDPEEK(U-22)<>0THENGOSUB550
235 IF<(WAND8)=0ORPEEK(197)=0>ANDPEEK(U+22)<>0THENGOSUB560
245 IF<(WAND16)=0ORPEEK(197)=4>ANDPEEK(U-1)<>1THENGOSUB570
255 IF<(E1AND128)=0ORPEEK(197)=60>ANDPEEK(U+1)<>0THENGOSUB580
260 FORA=1TOS:NEXT:POKES1,0:POKES2,0
270 IFZ=0THENGOSUB800
310 POKES,3
315 IFPEEK(S-1)=4THENSP=SP-1:IFSP=0THENPOKES,6:POKES-1,6:Z=0:GOSUB800
320 IFZ/V+3=INT(Z/V+3)THENPOKES,9:S=S-1:POKES2,156

```

(continued on page 193)

# J. K. GREY & ENTERPRISES LTD



**FOUR STAR**  
16/48K SPECTRUM

Includes games to suit all ages from 5 to 105

**INVASION** Our version of the classic Space Game surely one of the best around. Includes Full Colour High Res. Graphics. Sound and it's incredibly fast at the end.

**KAMIKAZE** If you like Starline, you'll love this. 16 levels long ones at that, of tortuously winding cavities. Misses. Blunders which move in between games, so it's never the same next time around. Bonus. Fuel dumps which you don't run out of fuel, and two speeds difficult and impossible. Delivers a game for those amongst you with a suicidal tendency, when playing games, because you can score even when you crash! If you can make it past level 8, well, well, well, because that's as far as we've managed!

**MINIFIELD** A totally new game, it which you have to fly three in a line! Sounds impossible? It is! But, once you start, you can't stop and there's the rub for the more exact the requirements guaranteed to get your fingers in a lather!

**UFO** Dodge the Asteroids, blast the Alien Craft and work off your aggressive instincts on the keyboard. Gets progressively more difficult the longer you wait!

All of these for only **£4.95**

**TRADE & EXPORT ENQUIRIES WELCOME**



**GAMESTAPE 1**  
1K ZX81

10 Games incl: ASTEROIDS, UFO, CODE BOMBER, GUILLOTINE, KALEIDOSCOPE, etc.

**PROBABLY THE BEST VALUE 1K TAPE AVAILABLE.** We've done it. 10 games about some of our competitors' entire 1K-tape lot!

only **£3.95**



**GAMESTAPE 2**  
16K ZX81

**STARFIGHTER** Superb machine code Space Battle: set against a background of twinkling stars, with stunning explosions. If you can't find the enemy.

**PYRAMID** Can you move the Pyramid? Make a mistake and it will collapse! A thinkers game.

**ARTIST** The ultimate Graphic Designer! 800 Graphics, 10 Menus, SAVE, COPY, RUBOUT, CLS, etc.

only **£3.95**



**GAMESTAPE 3**  
16K ZX81

**CATACOMBS** A Multi-Level Graphics Adventure. Each level can contain up to 9 Rooms, 8 Passages, 7 Monsters, Food, Gold, Traps, Monsters, an Exit to the next level, and there's an infinite number of levels.

**NOTE:** This is NOT one of the necessarily limited low Adventures as sold elsewhere.

An excellent addictive game which will keep you amused for hours! **COMPUTERS & VIDEO GAMES**

only **£4.95**



**3D VORTEX**  
16/48K SPECTRUM

After a successful warp transfer, you drop your craft below light speed, only to discover you are caught in the irresistible gravity well of a giant Neutron Star. You are dragged past the Event Horizon, and then the fun really begins: Gravitas, Total pressures, Computer codes for a while, but when these machines can withstand the awesome forces inherent in such an anomaly. Soon the Raw Corn will cease functioning, and then get caught, it's all down to you.

Are you capable of "seat of the pants" flying? It won't be easy! Not only does the vortex twist and turn, like some decremented worm, but your Tau-Sigma Shield will only withstand 10 contacts with the boundary jets. And as if that wasn't enough, you have to dodge, or laser, the Octoplasms, Orbits and Spinal Class Battlestars. Best of luck! You'll need it!

**Features:**  
Shining 3D Graphics.  
Full Sound Effects.  
High Speed Machine Code Animation.  
Full Instructions.  
Choose your own Control Keys.  
Compatible with most Joysticks.

only **£5.95**

**SOFTWARE SUCH AS DREAMS ARE MADE OF**

Send your order to:  
**J.K. GREY & ENTERPRISES LTD.**  
16 Park St. Bath BA1 2TE

Name .....

Address .....

Postcode .....

I enclose a cheque/p.o. for £.....  
made payable to **J.K. GREY & ENTERPRISES LTD.**

Please tick boxes of required tapes:

3D VORTEX	at £5.95	<input type="checkbox"/>
FOUR STAR	at £4.95	<input type="checkbox"/>
GAMESTAPE 1	at £3.95	<input type="checkbox"/>
GAMESTAPE 2	at £3.95	<input type="checkbox"/>
GAMESTAPE 3	at £4.95	<input type="checkbox"/>

All software sold subject to the condition that Hiring, Lending, Unauthorised copying or Resale is Strictly Prohibited

If you prefer to see before buying, our range of Gamestapes are stocked by W.K. Smith, John Manors and good computer stores nationwide.

**OMNICALC (48K Spectrum)**  
The best Spectrum spreadsheet you can buy. Written in machine code to be faster, to give you more space for data, and to allow more features to be included, it is guaranteed uncrashable.

- ★ 99 columns or 250 rows.
- ★ Fully prompted input.
- ★ Extensive repeat facilities.
- ★ Supports ALL Spectrum functions.
- ★ Unique iterative facility.
- ★ Totals/Sub-totals.
- + many more.

"If more programs shared the quality of OMNICALC then we might see more Spectrums in offices"  
Home Computing Weekly 3/6/83

"It is ideal for someone who has just found the spreadsheet concept, but it is also a very powerful tool for anyone who has used one previously"  
Sinclair User June 1983

Complete with comprehensive manual. **£9.95.**

## MICROSPHERE

72 ROSEBERY ROAD · LONDON N10 2LA  
TELEPHONE 01-883 9411



**WHEELIE (48K Spectrum)** Take the motorbike in your Spectrum for a burn-up. Survive humps, bumps and jumps as you seek the elusive ghost rider — and then your problems really start. Crash helmets advisable. **£5.95**

**EVOLUTION (48K Spectrum)** Tyrannosaurus Rex, Stegosaurus, Podopteryx, Brontosaurus are some of the creatures on the fascinating journey from the start of life to man. Educational and fun, this adventure took 3500 million years the first time it was played... Can you do it quicker? ... just **£6.95**

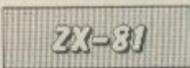
**CREVASSE/HOTFOOT (Any Spectrum)** Can you make it across the ice-cap whilst chasms open and close all around you... or help a hungry rabbit in a hostile world... 2 original games on one cassette — only **£4.95**

**THE TRAIN GAME (Any Spectrum)** The game that starts where model railways left off. Full graphics featuring passenger, goods & express trains; tunnels; stations; turntable bonus games; irate passengers; collisions; derailments; and everything else you expect from a major railway! — Superb value **£5.95**

# SOFTWARE FILE

## Zombies

D Green,  
Ashford,  
kent.



ZOMBIES FOR THE 16K ZX-81 is a machine-code version of the popular game which involves escaping from things which want to kill you. The only way to destroy these robots, zombies, or whatever you think the ZX-81 graphics look like, is to lure them into various pitfall traps, which you are able to jump over. Since the game is completely written in machine code, rather than Basic, it is extremely fast and becomes even more difficult as the game goes on. You score 100 points for each robot that falls into a hole, and move using the usual cursor keys.

To load the machine code, first type in a Rem statement at least 720 characters long. The easiest way to do this is to type in four separate Rems each with 192 characters — six full lines — numbered 1, 2, 3, 4 and then to enter as direct commands:

```
POKE 16511,20
POKE 16512,3
```

This will then produce a line 786 characters long, which gives you enough room to put in any of your own routines if you want to. Another useful command is Poke 16510,0 which will prevent you from accidentally erasing the first line. Notice that when you List the program, although lines 2, 3, and 4 appear to be separate they are in fact joined together as trying to Edit them will prove. Next you will have to type in the machine code. Any hex loader may be used for this although you must make sure that it starts at address 16570, as the first 56 bytes of the Rem statement are used for data. For example, you could use the one on page 83 of this issue.

Enter the machine code in listing 1 as normal. Save the program a few times and then — the moment of truth — enter Rand USR 16599. A screen full of robots should appear and start moving purposefully towards the X in the middle, which is you. After three explosions the game should then stop with the report code 0/0. If it does not work properly then you can either check the machine code using the table below, or switch the computer off and check it later when you feel less frustrated. If the program does work then enter the Basic program in listing 2 which displays the instructions. Save it, and then enjoy the game.

In case you have made a mistake in typing in the code, this table should help you find where the error is. For example, if the program crashes at the end of a wave then you only need to check the addresses between 17043 and 17164.

Name	Start address	Function
1. Print At	16570	Subroutine to convert x,y coordinates into a screen location.
2. Set	16599	Sets various variables.
3. Print	16641	Draws border, prints holes and robots.

(continued from page 191)

```
330 Z=Z+1:IFPEEK(S)=1THENT=TI:GOTO850
340 IFN1/200=INT(N1/200)THENV=V-1
345 IFV=0THEND4=D4+1:V=3
350 IFINT(RND(1)*100)+1=50THENGOSUB1100
500 N1=N1+1:GOTO200
550 POKEU,4:U=U-22:POKES1,200:RETURN
560 POKEU,4:U=U+22:POKES1,210:RETURN
570 POKEU,4:U=U-1:POKES1,220:RETURN
580 POKEU,4:U=U+1:POKES1,230:RETURN
800 S=7744+22*INT(RND(0)*20)
840 Y=Y+1:SP=Y:RETURN
850 C#=TI#
855 FORI=1TO10:READA,B:POKES2,195+A:FORJ=1TO8:NEXT:POKES2,0:FORJ=1TO5:NEXT:NEXT
900 POKE36869,242:IFVAL(C#)>VAL(HI#)THENHI#=C#:GOTO960
910 PRINT"THE SPIDER GOT YOU,HARD CHEESE"
915 PRINT"YOUR TIME... "LEFT$(C#,2)":"MID$(C#,3,2)":"RIGHT$(C#,2)
920 PRINT"REST TIME... "LEFT$(HI#,2)":"MID$(HI#,3,2)":"RIGHT$(HI#,2):PRINT"BY.
. . .N#
950 PRINT"ANOTHER GO? (Y/N)"
955 GETA$:IFA$=" "THEN955
956 IFA$="N"THENSYS64824
957 IFA$="Y"THEN10
958 GOTO955
960 PRINT"REAT /EW REST TIME="LEFT$(C#,2)":"MID$(C#,3,2)":"RIGHT$(C#,2)
970 PRINT"ENTER TWO INITIALS"
975 FORI=1TO10:GETA$:NEXT
980 GETA$:IFA$=" "THEN980
985 PRINTA$:" ";
990 GETB$:IFB$=" "THEN990
992 PRINTB$:" ";
995 N$=A$+" "+B$+" "
996 GOTO950
1000 POKE36869,242:POKE36879,218
1005 PRINT"
"
```

```
1010 PRINT" *TOP THE FLY GETTING PAST YOUR SPIDERS WEB."
1015 PRINT" /SE THESE KEYS:- M-P, DOWN-1, LEFT-9,RIGHT-0,TR 'OYSTICK."
1030 PRINT"THE GAME GETS HARDER AS TIME GOES ON."
1035 PRINT"ATCH OUT FOR THE 'EMON OEB \UNCHER/"
1040 RETURN
1100 PRINT"IT'S THE WEB MUNCHER":POKE36877,160
1105 FORI=1TO120STEP4
1107 POKE36876,130+I
1110 RN=INT(RND(1)*436)+7725
1120 IFPEEK(RN)=0ORPEEK(RN)=1ORPEEK(RN)=2ORPEEK(RN)=3THEN1110
1130 POKERN,5:FORA=1TO10:NEXT:NEXT
1135 PRINT"
"
1140 POKE36877,0:POKE36876,0:RETRN
2000 FORA=7168TO7679:POKEA,0:NEXT
2010 FORA=7168TO7207:READB:POKEA,B:NEXT:RETURN
2020 DATA255,255,255,255,255,255,255,255,254,253,254,253,254,253,254,253
2030 DATA129,66,126,90,255,90,126,66
2040 DATA12,30,158,127,127,158,30,12,6,16,32,16,8,4,2,4
3000 POKE36878,15
3010 READA:IFA$=" "THENPOKES1,0:POKES2,0:RETURN
3020 FORC=1TO2:POKES1,A+200:POKES2,A+200:FORB=1TO30:NEXT:POKES2,0:FORB=1TO30:NE
XT
3025 NEXT:GOTO3010
3030 DATA-5,7,15,19,21,19,15,7,-5,7,15,19,21,19,15,7,9,19,25,28
3040 DATA29,28,25,19,-5,7,15,19,21,19,15,7,15,23,28,31,32,31,28,23
3050 DATA9,19,25,28,29,28,25,19,-5,7,15,19,21,19,15,7,-5,-1
3100 DATA0,800,0,600,0,200,0,600,8,800,6,200,6,600,0,600,-4,200,0,800
```

4. Player Move	16782	Moves player, checks if hit wall or robot.	9. Kill	16989	Hi-res explosion, subtracts a life.
5. Zomset	16851	Sets data pointers for Zommove.	10. Wave	17043	Prints message, more robots, faster speed etc.
6. Zommove	16868	Moves robots, checks if hit man or hole.	11. Score	17164	Adds 100 to score.
7. Check	16951	Checks if all robots are dead.	12. Words1	17229	"Wave complete Bonus: 500" data.
8. Delay	16977	Delay loop to	13. Words2	17229	"Score: 000000 Lives: 3" data.

### Listing 1.

16570	-	C5D5F52A0C402311	=	625	16762	-	30F747CDBA407EB7	=	1130
16578	-	210078B728031910	=	420	16770	-	20E53626E1712370	=	638
16586	-	FD79B72B04412310	=	717	16778	-	23C110D9ED4B8240	=	967
16594	-	FDF1D1C1C9AF3234	=	1484	16786	-	3A8440CDBA40773E	=	890
16602	-	40210F0A2232403E	=	4120	16794	-	F7DBFECB5720010D	=	1072
16610	-	323285403E0A3287	=	5514	16802	-	3EEFDBFECB572001	=	1097
16618	-	403E1E3298400100	=	408	16810	-	0CCB67200104CB5F	=	653
16626	-	15CDBA401137431A	=	641	16818	-	200105CDBA407EFE	=	873
16634	-	72313FE1F20F801	=	730	16826	-	802003ED4B8240C0	=	879
16642	-	0000CDBA4036900C	=	730	16834	-	BA407EFE226C9D42	=	1029
16650	-	79FE2020F5181304	=	641	16842	-	328440363DED4352	=	795
16658	-	0E00CDBA4036900E	=	635	16850	-	403A874047213640	=	625
16666	-	1FCDBA4036901520	=	721	16858	-	3A35405F3A3440E6	=	674
16674	-	EE010014CDBA4036	=	758	16866	-	0F57C5E34E79FE60	=	1100
16682	-	800C79F2020F53A	=	880	16874	-	28412348CDBA4036	=	719
16690	-	8640473A35405F3A	=	890	16882	-	00131AE01200E3A	=	380
16698	-	3440E60F37C5131A	=	890	16890	-	8240B9221430030D	=	503
16706	-	E51F3CFE1F30F74F	=	930	16898	-	18010C1E0C3A8340	=	326
16714	-	131AE51F3CFE1430	=	688	16906	-	B8280530203051801	=	311
16722	-	F747CDBA407EB720	=	1114	16914	-	04CDBA407EFE3420	=	923
16730	-	E53634C110DF2188	=	936	16922	-	070E80C0C43160B	=	468
16738	-	403A874047C5E513	=	837	16930	-	FE3D2005C1C1C35D	=	1026
16746	-	1AE51F3CFE1F30F7	=	927	16938	-	423626E171237023	=	678
16754	-	4F131AE51F3CFE14	=	719	16946	-	C105C2E441218840	=	918

(continued on page 195)

# GCC are gaining respect as one of the country's leading outlets for the BBC micro and compatible peripherals



GCC (Cambridge) Limited  
66 High Street, Sawston, Cambridge CB2 4BG  
Telephone: Cambridge (0223) 835330



BBC MODEL 'A'	£299.00
BBC MODEL 'B'	£399.00
BBC DISC INTERFACE KIT	£ 78.77
BBC JOYSTICK	£ 15.00
GCC ROMEX 13 (Rom expansion)	£ 45.94
GCC EPROM PROGRAMER FOR BBC	POA
BEEBASE (Data Base Rom)	£ 45.94
WORDWISE	£ 45.94
PASCAL ROM	POA
FORTH ROM	POA
<b>TEAC Slim-line Disc Drives</b>	
GCC 55A 100K	£160.00
GCC 200K (ultra-slim)	£199.00
GCC 55F 400K	£246.00
GCC 55A2 200K (dual)	£325.00
GCC 55F2 800K (dual)	£505.00
GCC 55A2+PSU 200K (40/80 Switchable)	£345.00
GCC 55F2+PSU 800K (40/80 Switchable)	£590.00
Disc drive cables single	£ 12.00
Disc drive cables dual	£ 14.00
<b>Printers</b>	
EPSON FX80	£430.00
EPSON RX80	£339.25
SHINWA CP80	£297.85
NEC PL 8032-C	£330.00
Printer Cable for BBC	£ 9.57
JUKI 6100 (Daisy-wheel)	£437.00
STAR DP 510	£297.85
<b>Sinclair Computers</b>	
ZX Spectrum 16K	£ 99.95
ZX Spectrum 48K	£129.95
ZX Printer	£ 39.95
<b>Other Computer's in stock</b>	
JUPITER ACE	£ 69.95
DRAGON 32	£174.98
ORIC 48K	£139.95

STOCK SUBJECT TO PRIOR SALE  
ALL PRICES INCL. VAT

Trade and local authority enquiries welcome.  
Prices correct at time of going to press.

## BETA BASIC ENHANCED BASIC FOR THE ZX SPECTRUM 16/48K 26 NEW KEYWORDS — 10 NEW FUNCTIONS — MANY EXTRA FEATURES

### Keywords include:

- ALTER — allows extensive manipulation of the attributes file.
- AUTO — for automatic entry of line numbers.
- CLOCK — controls a digital clock with alarm and alarm-initiated GOSUB facility.
- DELETE — any block of lines.
- DO — DO...LOOP structure, with WHILE, UNTIL, and EXIT IF.
- DPOKE — double POKE.
- EDIT — a specified line number.
- ELSE — used with IF...THEN.
- GET — waits for keyboard entry; doesn't use ENTER.
- KEYWORDS — shifts between new keywords and normal graphics mode.
- ON — GOSUB or GO TO a line number from a list of line numbers.
- ON ERROR — allows trapping of most reports; has available ERROR, LINE and STAT variables.
- POP — removes data from BASIC's stack.
- PROC — named procedures, with DEF PROC and END PROC.
- RENUM — renumber part or whole program with specified start line and increment. Handles GO TO, GOSUB, ON, etc.
- ROLL — peel movement of part or whole screen in any direction, with wrap-around.
- SCROLL — as ROLL, but without wrap-around.
- SORT — sorts part or all of string or numeric arrays according to specified ascending or column. SORT REVERSE sorts in reverse order. One hundred strings can be sorted in about one-fifth of a second!
- TRACE — allows display of line and statement numbers as a program is running. Display of selected variables, single stepping, and reduced speed are also possible.
- USING — used with PRINT; formats numbers.

### Functions provide:

Conversion between decimal and hexadecimal — conversion between integers and two-character strings (allows "integer arrays") — formatting of numbers — INSTRING and STRING\$ equivalents — amount of free memory — double PEEK — current time.

### Features include:

Single-entry keywords (in graphics mode) with syntax check on entry — seven new error messages — compatibility with Spectrum BASIC — program occupies just 5.6K — cursor can move in all directions in a line being edited — flashing current line pointer — BREAK gets you out of even machine code lock-ups — PLOT lets you plot string anywhere on the screen — PLOT and DRAW scale and offset values can be set using XRG, YRG, XOS and YOS — 16K and 48K versions on same tape — comprehensive manual.

Only £11.00 inclusive!

Please send me ..... copies of Beta BASIC.  
I enclose cheque/p.o. for £.....

Name: .....

Address: .....

**BETASOFT**  
92 Oxford Road, Moseley, BIRMINGHAM B13 9SQ

**NOW 2ND GREAT YEAR!**

# HIRE

ZXB/SPECTRUM

## PROGRAM TAPES

**ADVENTURE GAMES**

**ARCADE and SIMULATION GAMES**

**BUSINESS and PRACTICAL PROGRAMS**

**UTILITIES**

**M/C COMPILERS**

**EDUCATIONAL AND MORE!**

**FREE**

ILLUSTRATED QUARTERLY MAGAZINE WITH TIPS, NEWS, REVIEWS, DISCOUNT OFFERS PLUS OUR TOP 40 TAPES CHART BASED ON THOUSANDS OF SCORES!

**JOIN OVER 2,000 DELIGHTED MEMBERS!**

**UP TO 2 WEEKS FROM ONLY 64P + P/P & VAT!**

**YOUR FIRST TAPE FREE BY RETURN**

**IF YOU JOIN WITHOUT DELAY USING THIS SPECIAL COUPON!**

**CHOOSE FROM TAPES BY 40 TOP SUPPLIERS ALL WITH PERMISSION!**

**THE ORIGINAL SINCLAIR LIBRARY!**

**TO: SINCLAIR OWNERS' SOFTWARE LIBRARY, Warren Road, Lis, Hants GU33 7DD**

NAME \_\_\_\_\_ ADDRESS \_\_\_\_\_

MACHINE: \_\_\_\_\_

MAIN INTEREST (for free tapes) \_\_\_\_\_

Enclose £9.50 for Year's membership (Spectrum) or £7.50 (ZX81); overseas (Europe only) add £2 unless with a local branch as below:

Benelux: Jacobsemitlaan 75, B-2400 MOL, Belgium (memb. fee 44 & 49 Guilders/790 & 890 Bfr);  
 Eire: Software, P.O. Box 1404, Dublin 8 (£12.50 pmt);  
 S. Africa: P.O. Box 1789, Manzini, Swaziland.

# SOFTWARE FILE

(continued from page 193)

```

169954 - 16003A8740477E23 = 811
169952 - 23FE8020011410F5 = 731
169970 - 3A8740BAC93423A = 916
169978 - 8540672B7C8520FB = 931
169986 - C38E41010032368D = 956
169994 - 0B78363DB120F706 = 708
170002 - 2078ED471100031B = 957
17010 - 7A8320F810F33E1F = 936
17018 - ED473600011515CD = 810
17026 - BA407E3D77FE1CC8 = 1038
17034 - 210F0A228240C38E = 923
17042 - 413A87403CFE1A20 = 994
17050 - 013D3287403A8640 = 957
17058 - 3DFE0920013C3286 = 701
17066 - 403A8540D605FE05 = 797
17074 - 2002C60532854011 = 501
17082 - 0143010A0ACDBA40 = 768
17090 - 060D1A77231310FA = 484
17098 - 010C0CCDBA400609 = 495
17106 - 1A77231310FA0605 = 476
17114 - CD0C4310FB011515 = 994
17122 - CDBA407E3CFE2620 = 956
17130 - 013D770100000B78 = 313

```

```

17138 - B120FB06130E1ECD = 734
17146 - BA4036000D20F810 = 513
17154 - F4210FA0228240C3 = 725
17162 - 0141C5010A15C0BA = 586
17170 - 40C17E3CFE262005 = 772
17178 - 361C2B18F577C98C = 902
17186 - A68BBA80A8848285 = 1358
17194 - B1A8B9AA78483BA = 1414
17202 - B88EA10C9C382834 = 947
17210 - 372A0E1C1C1C1C1C = 801
17218 - 1C1C0000312E382A = 862
17226 - 380E1F1C1C1C1C1C = 241

```

```

DU DOWN AND TO DESTROY YOU, NO MATTER WHAT IS IN THEIR WAY."
50 PRINT "FORTUNATELY THERE ARE A FEW HOLES AROUND WHICH YOU CAN LURE THE ROBOTS INTO, BUT WHICH YOU ARE ABLE TO JUMP OVER."
60 PRINT "BE VERY CAREFUL NOT TO TOUCH ANY OF THE ROBOTS AS THEY WILL GIVE YOU A 5000 ELECTRIC SHOCK." "BONUS LIFE FOR EVERY WAVE KILLED"
70 PRINT "USE ARROW KEYS TO MOVE (HOLD DOWN KEYS TO MOVE DIAGONALLY)."
80 FOR N=16514 TO 16569
90 POKE N,0
100 NEXT N
110 IF INKEY$="" THEN GOTO 110
120 CLS
130 LET Z=USR 16599
140 PRINT AT 10,10;"GAME OVER"
150 RUN 80
160 SAVE "ZOMBIES"
170 RUN

```

## Listing 2.

```

1 POKE 16418,0
10 PRINT TAB 9;"ZOMBIES",TAB 9
"TAB 7;"(C.I.D.GREEN"
20 LET A$=""
30 PRINT
40 PRINT "YOU ARE SURROUNDED BY SEVERAL DANGEROUS ROBOTS WHICH HAVE BEEN PROGRAMMED TO HUNT YOU

```

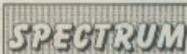
```

110 IF INKEY$="" THEN GOTO 110
120 CLS
130 LET Z=USR 16599
140 PRINT AT 10,10;"GAME OVER"
150 RUN 80
160 SAVE "ZOMBIES"
170 RUN

```

## Fast lander

D L Drummond,  
Abingdon,  
Oxfordshire.



THIS GAME IS based on the idea from Garry Owen's Saturn Lander — *Your Computer*, May 1983. It is written for the 16K Spectrum and has not been tested on a 48K machine although I hope that it will work on one.

The aim of the implementation is to achieve a smoother and faster movement by increasing the display refresh rate. A refresh rate of 16 frames per second is achieved; a slight flicker is still discernible at this rate.

A set of sprite routines was used to move the lander and to check for collisions. These were called from the main machine-code routine which also scrolls the lines of "Asteroids" and checks for x or y out of range. The main routine returns a code to indicate success, x out of range, y out of range or a collision.

Rather than make repeated tests of the return code, it is used as a vector in a computed Goto which jumps to the appropriate error routine.

A similar vectoring technique was used to read the keyboard. The system variable last-key at address 23560 contains the ASCII code of the last key to be pressed. The subroutine to handle a given key is given a line number equal to the code for the key plus 100 so that GOSUB 100+PEEK(23560) calls the appropriate subroutine.

This is only practical because Sinclair Basic does not insist that the line specified in a Goto or Gosub exists but instead will use the lowest line greater than the given number. If it were not for this feature, a subroutine would be required for each of the 256 key codes. The program should be typed in and Saved with SAVE "lander" LINE 800

Naturally it is advisable to do this before running it in case there is an error in the machine code. The lander has three levels of thrust, selected by keys 1 to 3. A thrust of 2 is just enough to balance gravity while 1 will give a downwards acceleration and 3 will give an upwards acceleration. 8 and 0 tilt the lander left and right, 9 will return it to upright.

You must land very gently to avoid a crash but the lander will bounce unharmed from the top or sides of the screen. If you find the game too easy, try breaking in and entering:

```
GOTO 3000
CONTINUE
```

```

5 GO SUB 400
10 GO SUB 100+PEEK 23560
20 LET sx=sx+ax: LET sy=sy+ay: LET x=x+sx: LET y=y+sy
24 POKE 32300,x: POKE 32301,192-y: GO TO USR 32308
147 RETURN
148 LET ax=q: POKE 32302,96: RETURN
149 LET ay=-q: RETURN
150 LET ay=0: RETURN
151 LET ay=q: RETURN
155 RETURN
156 LET ax=-q: POKE 32302,104: RETURN
157 LET ax=0: POKE 32302,88: RETURN
356 RETURN
400 CLS : LET q=.05: RESTORE 420: PLOT 0,4: FOR x=0 TO 247 STEP 8: READ y: DRAW 8,y: NEXT x: DRAW 7,-4: POK E 32304,0: POKE 32305,0: POKE 32302,88
410 LET a$="" : FOR i=6 TO 15 STEP 3 : PRINT AT i,0;a$(i+1 TO );a$( TO i): NEXT i
412 PLOT 103,3: DRAW 10,0
414 RANDOMIZE : LET x=32+200*RND: LET y=192-10*RND: LET sx=-.5*RND: LET sy=0: LET ax=sy: LET ay=sy
416 DEF FN t(a)=PEEK (a)+256*PEEK (a+1)+65576*PEEK (a +2): LET t0=FN t(23672)
418 RETURN
420 DATA 3,4,-1,-2,-3,-2,1,4,3,-1,1,-3,-4,0,2,-2,2,3, 2,4,-2,1,-3,-4,-2,2,3,2,1,-1,-4,-3
800 CLEAR 31999: POKE 23675,88: POKE 23676,127: BORDER 1: INK 7: PAPER 0: CLS : GO SUB 2000: RESTORE 1500: PRINT : PRINT "poking data"
810 READ a,a$: PRINT a: IF a=0 THEN GO TO 850
820 FOR i=1 TO LEN a$-1 STEP 2: POKE a+(i-1)/2,16*(CODE a$(i)-48-7*(CODE a$(i)>57))+CODE a$(i+1)-48-7*(CODE a$(i+1)>57): NEXT i: GO TO 810
850 PRINT "Press any key to start"
860 IF INKEY$="" THEN GO TO 860
870 CLS : BORDER 1: GO TO 5
1000 PRINT AT 0,0;
1030 IF (sy*sy+sx*sx)>.05 OR y>40 THEN POKE 32302,112: RANDOMIZE USR 32308: RANDOMIZE USR 32393: PRINT "crashed": LET score=200-INT (y): GO TO 1050
1034 IF (x>106 OR x<103) THEN PRINT "missed": FOR i=1 TO 4: FOR j=20 TO 12 STEP -2: BEEP .01,j: NEXT j: NEXT i: PLOT 107,4: DRAW 0,24: PRINT AT 17,2;"This is where you should land";AT 1,0: LET score=400-INT (ABS (x-104.5)): GO TO 1050
1038 BEEP .2,20: BEEP .3,10: LET t0=INT ((FN t(23672)-t0)/50): PRINT "down OK in ";t0;" seconds": LET score=INT (400+2000/t0): GO TO 1050
1050 PRINT "score=";score: GO TO 850
1100 IF y<8 THEN LET y=8
1110 IF y>191 THEN LET y=191
1120 LET sy=-sy: GO TO 24
1200 IF x<0 THEN LET x=0

```

(continued on page 197)

# LORDS OF TIME

Joins our range of acclaimed pure-text puzzle adventures, at £9.90, for:

**BBC 32K COMMODORE 64 SPECTRUM 48K LYNX 48K NASCOM 32K ORIC 48K ATARI 32K**

## ADVENTURE REVIEWS

"Adventures which have a fast response time, are spectacular in the amount of detail and number of locations, and are available to cassette owners... I am extremely impressed... The Level 9 Adventures are superbly designed and programmed, the contents first rate. The implementation of Colossal Cave (Adventure) is nothing short of brilliant; rush out and buy it. While you're at it, buy their others too. Simply smashing!"

- SOFT, Sept 83

"I found Dungeon exceedingly well planned and written, with a fast response. There are well over 200 locations and the descriptions are both lengthy and interesting. The objects number about 100. It could therefore take some months to explore the whole network, giving many hours of enjoyment in the process."

- C&VG, Sept 83

"The descriptions are so good that few players could fail to be ensnared by the realism of the mythical worlds where they are the hero or heroine... great fun to play."

-Which Micro?, Aug 83

"My appetite has been whetted and I intend to get my own copy (of Snowball) to play."

- What Micro?, Dec 83



## ADVENTURE REVIEWS

"This has to be the bargain of the year. If adventures are your game then this (Colossal Adventure) is your adventure."

-HCW, 5 Sept 83

"Colossal Adventure is simply superb. Anyone who wishes to use adventures in an educational setting really must use and see this program as it emulates Crowther and Wood's masterpiece so well. For those who wish to move onto another adventure of similar high quality, Dungeon Adventure is to be recommended. With more than 200 locations, 700 messages and 100 objects it will tease and delight!"

- Educational Computing, Nov 83

Colossal Adventure is included in Practical Computing's Top 10 games choice: "Poetic, moving and tough as hell."

- PC, Dec 83

"To sum up, Adventure Quest is a wonderful program, fast, exciting and challenging. If you like adventures then this one is for you"

- NILUG # 1.3

"Colossal Adventure... For once here's a program that lives up to its name... a masterful feat. Thoroughly recommended"

- Computer Choice, Dec 83

"wholly admirable"  
- Your Computer, Sept 83

## MIDDLE EARTH ADVENTURES

### 1: COLOSSAL ADVENTURE

A complete, full size version of the classic mainframe game "Adventure" with 70 bonus locations added.

### 2: ADVENTURE QUEST

Centuries have passed since the time of Colossal Adventure and evil armies have invaded The Land. The way is long and dangerous; but with cunning you can overcome all obstacles on the way to the Black Tower, source of their demonic power, and destroy it.

### 3: DUNGEON ADVENTURE

The trilogy is completed by this superb adventure, set in the Dungeons beneath the shattered Black Tower. A sense of humour is essential!

## THE FIRST SILICON DREAM ADVENTURE

### 1: SNOWBALL

The first of Pete Austin's second trilogy. The giant colony starship, Snowball 9, has been sabotaged and is heading for the sun in this massive game with 7000 locations.

## THE LORDS OF TIME SAGA

### 7: LORDS OF TIME

Our congratulations to Sue Gazzard for her super design for this new time travel adventure through the ages of world history. Chill to the Ice-age, go romin' with Caesar's legions, shed light on the Dark Ages etc. etc. We'll be selling this game mail-order from January 1st.

**Price: £9.90 each (inclusive)**

Level 9 adventures are available from good computer shops, or mail-order from us at no extra charge. Please send order, or SAE for catalogue, to:

## LEVEL 9 COMPUTING

Dept Y, 229 Hughenden Road, High Wycombe, Bucks HP13 5PG

Please describe your Computer

# SOFTWARE FILE

(continued from page 195)

```

1210 IF X>247 THEN LET X=247
1220 LET SX=-SX: GO TO 24
1500 DATA 32302,"5B7FA0A05B7F2A307EED5B327ECD3D7F2A2C7
E014C047CD6BDD001B0047BD6FBD022307EED5B2E7EED53327ED5C
DCC7ED1010A002B0301E803C5D5E521C040CDB07E21B048CDB07E2
12048CD9C7E21E048CD9C7EE1D1CD267FC1C9"
1510 DATA 32393,"0E0021C47E060010FE7ED3FE230D20F5C9"
1520 DATA 32412,"1120000E087E191706202BCB1610FB240D20F
2C9"
1530 DATA 32432,"7DF61F5F0E080620541A1FCB1E2310FB7DD62
06F240D20EEC9"
1540 DATA 32460,"ESCDE67E0E0BC5CD0A7FA620047923A62BC12
0030D20EFE1C9"
1550 DATA 32486,"D555CB3DCB3DCB3D7C4F0F0FE618477CE60
7B0C6406779B7E6E0B56F7AE60747D1C9"
1560 DATA 32522,"243E07A4200A7DC6206F3B047CC6FB67AF4FB

```

```

01A13CB1FCB1910FBC9"
1570 DATA 32550,"E5CDE67E0E0BC5CD0A7FB677237EB1772BC10
D20F1E1C9"
1580 DATA 32573,"E5CDE67E0E0BC5CD0A7FEEFFA6772379EEFFA
6772BC10D20E1E1C9"
1590 DATA 32600,"003C7E7E3C3C42C31C3E7E7E3E44C2033B7C7
E7E7C22A3C02A815A3C3C5A812A010F1F3F3F3F1F07F0BFCCFCFCF
BF8301B7C7C3C0961F060001CFFFFFEEFC0C0000C0FB70000303"
1600 DATA 0,"
2000 PRINT "1 low thrust: accelerate down"
2010 PRINT "2 this just balances gravity"
2020 PRINT "3 high thrust: accelerate upward"
2030 PRINT "8 tilt left"
2040 PRINT "9 return to upright"
2050 PRINT "0 tilt right"
2060 RETURN
3000 POKE 32442,0: POKE 32443,237: POKE 32444,103: POK
E 32419,0: POKE 32423,237: POKE 32424,111

```

## Keyboard Audio-Visual

Nalim Sharma,  
London E17.

CBM-64

KEYBOARD Audio-Visual is designed to

improve your typing and keyboard coordination.

The bulk of the program is written in machine code and because so little Basic is involved users can adapt the program to suit their needs.

On running, you will be confronted with a

menu containing two options. The first familiarises you with the keyboard and the second prints out sentences to be typed in. You can construct your own sentences simply by altering the data statements in the program. Also, pressing Return will take you back to the menu from both options.

```

10 POKE53288,3:POKE53281,1
20 POKE54272,0:POKE54273,0:PRINT"PLEASE WAIT WHILE THE M/C IS READ IN..."
30 GOSUB2000:SV549168
100 PRINT"
110 PRINT"
120 PRINT"
130 PRINT"
140 PRINT"
150 POKE198,0
160 GET# IF#=""THEN160
170 #=VAL(#):IF#<0THEN160
180 ON#GOSUB500,1000
190 RUN20
495 REM**** PRACTICE ****
500 GOSUB5000
502 PRINT"
503 PRINT"
504 PRINT"
505 PRINT"
510 POKE49156,1
520 DET# IF#<CHR$(13)THEN520
530 POKE49156,0:RETURN
1000 GOSUB5000
1010 POKE49156,1
1020 READ# IF#="Z"THEN110
1030 PRINT"
1040 POKE204,0:FOR#1TOLEN#
1050 POKE207,0:GETL:IFL#<CHR$(13)THEN110
1055 IFL#<CHR$(13)THEN1050
1060 PRINTL: NEXT POKE204,1
1070 PRINT"
1080 PRINT"
1095 GET# IF#<CHR$(13)THEN105
1100 GOTO1000
1110 #=256:POKE204,1:POKE49156,0:RETURN
1995 REM **** DATA LOADER ****
2000 READLN:IF(LN#-1)THEN2070
2010 READ# CH#
2020 FORI=1TOND
2030 READDI:CH=CH+DI
2040 NEXTI
2050 READTC:IF(TC<CH)THENPRINT"ERROR IN LINE":LN:STOP
2060 GOTO2000
2070 RESTORE
2080 READLN,ND,SR,FR,CH
2090 AD=SR:IF(ND<2)THENPRINT"ERROR IN ADDRESS HEADER":STOP
2100 READLN:IF(LN#-1)THEN2170
2110 READ#
2120 FORI=1TOND
2130 READDI:POKEAD,DI:AD=AD+1
2140 NEXTI
2150 READCH:GOTO2100
2160 IF(CD<(FR+1))THENPRINT"ERROR IN NUMBER OF DATA ITEMS":AD:FR:STOP
2170 RETURN
4995 REM**** PRINT KEYBOARD DISPLAY ****
5000 PRINT"
5010 PRINT"
5020 PRINT"
5030 PRINT"
5040 PRINT"
5050 PRINT"

```

```

20000 DATA 20000,2, 49168, 49654, 98822
20010 DATA 20010, 10, 169,42,141,5,192,169,4,141,6,192, 1061
20020 DATA 20020, 10, 169,0,141,4,212,169,0,141,3,212, 1059
20030 DATA 20030, 10, 169,0,141,5,212,169,245,141,6,212, 1060
20040 DATA 20040, 10, 169,15,141,24,212,169,200,141,1,192, 1264
20050 DATA 20050, 10, 169,13,141,3,192,169,0,141,4,192, 1024
20060 DATA 20060, 10, 120,169,79,141,20,3,169,192,141,21, 1055
20070 DATA 20070, 10, 3,80,96,72,130,72,152,72,173,4, 870
20080 DATA 20080, 10, 192,201,1,240,3,76,234,192,165,197, 1501
20090 DATA 20090, 10, 141,0,192,205,1,192,240,72,141,1, 1185
20100 DATA 20100, 10, 192,169,64,141,4,212,169,0,141,2, 1094
20110 DATA 20110, 10, 192,162,32,173,5,192,133,251,173,6, 1319
20120 DATA 20120, 10, 192,133,252,32,25,193,173,0,192,10, 1202
20130 DATA 20130, 10, 170,189,116,193,133,251,141,5,152,109, 1579
20140 DATA 20140, 10, 117,193,133,252,141,6,192,201,0,248, 1475
20150 DATA 20150, 10, 77,162,160,32,25,133,173,192,24, 1038
20160 DATA 20160, 10, 105,56,141,1,212,169,65,141,4,212, 1180
20170 DATA 20170, 10, 238,2,192,173,2,192,201,15,200,48, 1271
20180 DATA 20180, 10, 169,1,141,2,192,173,0,192,201,4, 1075
20190 DATA 20190, 10, 200,6,238,33,200,76,234,192,201,5, 1401
20200 DATA 20200, 10, 200,6,238,32,200,76,234,192,201,6, 1401
20210 DATA 20210, 10, 200,9,238,134,2,32,242,192,76,234, 1367
20220 DATA 20220, 10, 192,201,3,200,3,238,3,192,104,160, 1312
20230 DATA 20230, 10, 104,170,104,75,42,234,169,0,133,253, 1292
20240 DATA 20240, 10, 169,16,133,254,160,0,173,134,2,145, 1386
20250 DATA 20250, 10, 253,165,253,24,105,1,133,253,165,254, 1606
20260 DATA 20260, 10, 105,0,133,254,201,219,200,234,165,253, 1772
20270 DATA 20270, 10, 201,232,200,220,96,165,251,133,253,165, 1932
20280 DATA 20280, 10, 252,24,105,212,133,254,160,0,192,3, 1335
20290 DATA 20290, 10, 240,12,130,145,251,173,3,192,145,253, 1552
20300 DATA 20300, 10, 200,76,30,193,32,95,193,160,0,130, 1125
20310 DATA 20310, 10, 145,201,173,3,192,145,253,200,200,192, 1754
20320 DATA 20320, 10, 4,200,242,32,95,193,160,0,192,3, 1129
20330 DATA 20330, 10, 240,12,130,145,251,173,3,192,145,253, 1552
20340 DATA 20340, 10, 200,76,78,193,96,165,251,24,105,40, 1228
20350 DATA 20350, 10, 133,251,133,253,165,252,105,0,133,252, 1677
20360 DATA 20360, 10, 24,105,212,133,254,96,72,4,231,4, 1135
20370 DATA 20370, 10, 56,5,59,5,75,4,135,4,235,4, 602
20380 DATA 20380, 10, 54,5,40,4,127,4,205,4,50,4, 506
20390 DATA 20390, 10, 31,5,200,4,129,4,0,0,52,4, 437
20400 DATA 20400, 10, 131,4,210,4,54,4,35,5,212,4, 663
20410 DATA 20410, 10, 133,4,33,5,56,4,135,4,214,4, 592
20420 DATA 20420, 10, 50,4,39,5,216,4,137,4,37,5, 509
20430 DATA 20430, 10, 60,4,139,4,210,4,62,4,43,5, 543
20440 DATA 20440, 10, 220,4,141,4,41,5,64,4,143,4, 630
20450 DATA 20450, 10, 222,4,66,4,47,5,224,4,145,4, 725
20460 DATA 20460, 10, 45,5,68,4,147,4,226,4,70,4, 577
20470 DATA 20470, 10, 0,0,220,4,149,4,49,5,44,4, 487
20480 DATA 20480, 10, 42,4,0,0,46,4,119,5,0,0, 220
20490 DATA 20490, 6, 125,4,0,0,0,0, 129, -1
30000 DATATHE QUICK BROWN FOX JUMPED OVER THE LAZY DOG
30010 DATAThis PROGRAM IS CALLED KEYBOARD AUDIO VISUAL
30020 DATAThe PURPOSE OF THIS PROGRAM IS TO IMPROVE KEYBOARD COORDINATION
30030 DATAThEOPERULLY, K.A.V., WILL BE AN AID TO TWO FINGER TYPISTS
30040 DATAMy IS THE COMMODORE DISK DRIVE SO SLOW?
30050 DATAMy PRINTER HAS RECENTLY RECEIVED A REAL HAMMERING
30060 DATASE YOUR OWN SENTENCES BECAUSE YOU MIGHT FIND NINE UNINTERESTING
30070 DATAYOUR COMPUTER IS THE BIGGEST GELLING HOME COMPUTER MAGAZINE IN THE U.
K.
40040 DATAULTISYNTH 64 IS THE ULTIMATE SYNTHESIZER FOR YOUR COMMODORE 64.(BY O.
S.
50000 DATAZ

```

## Alas poor Oric

John Morgan,  
Mangotsfield,  
Bristol.

ORIC

USING THIS PROGRAM, your Oric will write in the style of William Shakespeare — or J R R Tolkien, or Enid Blyton — without having a clue what it is doing. The result can be fascinating.

After loading the program, you input a sample — the source text — from the writer concerned, and, say, three letters to start things off. The program finds all occurrences of that three-letter string, and selects at

random one of the immediately following letters. The process is repeated using the new three-letter string — letters two and three from the starter plus the new letter. And so on, until told to stop.

The general idea is well described in *Scientific American*, November 1983, based on work by W R Bennett Jr.

The source text — up to 5,000 characters long — can be typed straight in. It is automatically sliced into strings of length 240 characters; “#” ends the input. Ping warns if available space is nearly used up. The program will not accept an apostrophe, so backslash — redefined — has to be used.

I have described the program as basing its selection on three letters at a time, but it will

request your own choice of control — three and four give the best results.

Warning: the program is slow. Get it running just before a meal or shopping expedition. The results are worth hurrying back for.

To whet your appetite, here are some samples of Oric's literary efforts.

COOK BEFORE YOU CATCH A SOONES.  
PEOPLE WHO HESITATES NINE. HALF A  
STITCH IS ANOTHER MANY COOKS THER  
THERS NING AS NONES.

Based on a collection of English proverbs.  
AND WORLD TOWARD OF ALL THE  
JUSTICE, AND BELL OF FORMAL CUT,

(continued on page 199)



## OXFORD TECHNOLOGIES LTD.\*

is new and has something new to offer.

### CUSTOM PROGRAMMING SERVICE

As well as our high quality programs for the serious user, we offer our CUSTOM PROGRAMMING SERVICE. If you have an application which cannot be met by any commercially available product, or if you have an idea for some software but not the time or programming experience to put it into effect, then CONTACT US. If you are working with any of the following machines, we can probably help you:- ZX Spectrum, ZX81, ZX80, BBC Micro, TRS80, DEC Robin, Jupiter Ace, TI 99/4.

### CUSTOM HARDWARE SERVICE

We are also prepared to consider the construction of hardware for specific applications, using digital and/or analogue techniques.

### BBC DISC UTILITY

For 40 track drives using Acorn DFS only. This program is completely self-documenting, and includes an explanation of Disc layout.

The program allows the Display, Modification and Copying of any Disc sector, including copying to a 2nd Disc using the same drive. It also allows the Disc Directory to be read and altered. It may also be used as a bit copier, and to provide a limited degree of copy protection.

In short, this program allows unrestricted access to the contents of discs at a byte by byte level. All types of file may be worked upon, copied and altered.

Price : £22.00

### STOCK CONTROL

For the 48K Spectrum, this comprehensive machine code program allows extensive records to be maintained on more than 500 items. Information stored is:

Item Code (12 char.), Item Description (25 char.), Reorder Level (9 char.), Physical Stock Level (9 char.), Location of Item in Store (9 char.).

The data file is stored separately from the program so that different systems may be maintained concurrently. Data files may be merged and verified. The program is capable of listing either those items below reorder level, or complete files, to screen or printer.

Listings are always in alphanumeric order (determined by stock code).

Price : £15.00 (Program and user documentation).  
£5.00 (annotated disassembly).

### TRS80 MODEL I LEVEL II SCREEN EDITOR AND BASIC UTILITY

This machine code utility gives the programmer a user-friendly screen editor within BASIC.

Entry and editing of program and text is made easy. Lines may be quickly re-sequenced and corrected, and the production of many similar lines becomes trivial.

The "CLEAR" key is redefined as a "CONTROL" key, allowing "single key" entry of Basic keywords i.e. "CONTROL" and an alphabetic key pressed together will give an entire word.

The numeric keys, in conjunction with the "CONTROL" keys, may be used as function keys (from Basic only), defined as Z(key no.)\$ = "...(function)...".

All keys are also auto-repeat, with a user-definable repeat rate.

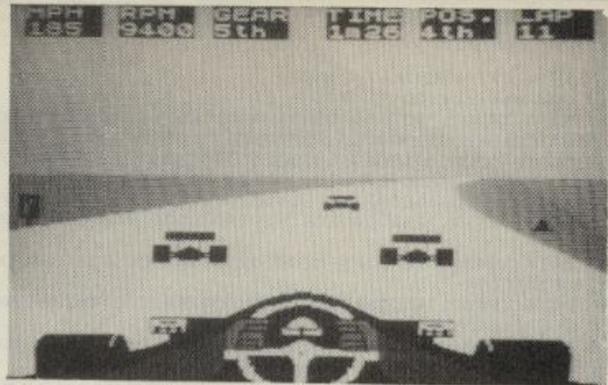
Basic programs may be renumbered, with any initial line number and line interval.

Price : £12.50 (cassette).

Please send all orders and correspondence to:  
OTL, 5 Queen Street, Eynsham, Oxfordshire, OX8 1HH. Tel: 0865 880964.

Callers by appointment only.  
All prices include postage and packing.

\* Previously known as Oxford Software Group.



## FORMULA ONE AND STEERING WHEEL

For Sinclair ZX Spectrum 16K & 48K

### THE GAME

Based on current formula one levels of acceleration, braking and roadholding, with 10 circuits to choose from (one on 16K version) including Silverstone, the world's fastest grand prix circuit, this program has been developed for the ultimate in realism with the help of The Jim Russell International Racing Drivers' School at Silverstone. It has four stages — Instruction, Practice, Qualifying, and Race — with eight cars racing against you in wet or dry conditions. Incredible sound effects and smooth 3D action graphics give you all the speed and excitement of motor racing. 100% machine code.

### THE STEERING WHEEL

Naturally you cannot steer a racing car effectively by pushing buttons or wiggling a joystick so we have developed a steering wheel that fits to the Spectrum. With one hand on the wheel (the other free for braking and accelerating) it gives the level of precision needed to steer the car on the fastest line through the corners and correct a skid when you overdo it. The wheel is strongly made and thanks to a brilliantly simple design we have been able to keep the cost down to a minimum. It will be used for many game in the future but is now only available with FORMULA ONE.

To order Formula One and Steering Wheel send cheque or P.O. for £8.95 to:

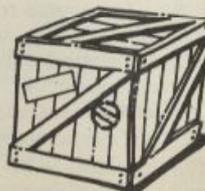
**SPIRIT SOFTWARE**

1½ **Pembroke Mews, London W.8.**

# MICRO—→X←

your  
**EXPORT**  
specialist  
for

ALL MICRO COMPUTERS - SOFTWARE &  
PERIPHERALS - INCLUDING ORIC -  
SINCLAIR - TEXAS - LYNX  
COMMODORE & MANY  
MORE !!



Please Contact:

MICRO-X LIMITED  
5 COVERDALE ROAD,  
BRONDESURRY, LONDON NW2 4DB  
TELEPHONE 01-459 1089  
TELEX 295931 UNICOM G.

# SOFTWARE FILE

(continued from page 197)

MERE OBLIVION NOSE AND BEING FACE,  
AND WOFUL BALL SANS EYEBROW.

Shakespeare — *As You Like It*.

IF AN HAPPEN FIRST THE SCREEN IS TO  
THAT YOU HAPPENS, SWITCH OFF THE  
WORST THE INITIAL SCREEN IS THE  
COMPUTER.

Chapter 3 of the Orc Manual.

```
5 REM FOR £ READ HASH CHARACTER
10 REM *** GLOSSOLALIA ***
20 :
30 REM *** J.W.M.MORGAN 1983 ***
40 :
50 HIMEM £97FF: DIM F(60): DIM A$(20)
60 FOR N=0T02: POKE46816+N,8: NEXT: FORN=3T07: POKE46816+N,0: NEXT
70 FOR N=0T07: POKE 47072+N,0: NEXT: FORN=1T05: POKE 47078-N,2~N: NEXT
80 GOTO 2030
90 CLS: PRINT
100 INPUT "CONTROL LENGTH": CL: INPUT "LENGTH OF MESSAGE": LM
110 PRINT "1ST LETTERS ( AT LEAST "CL") OF MESSAGE": IN PUT CL$
120 L$=RIGHT$(CL$,CL)
130 CLS: PRINT: PRINT CL$:
140 FOR TT=1 TO LM-CL
150 FORF=0T060: F(F)=0: NEXTF: TF=0
160 IF A=0 THEN GOTO 210
170 FOR T=0T0A-1
```

```
180 T$=A$(T): GOSUB1030
190 T$=RIGHT$(A$(T),CL)+LEFT$(A$(T+1),CL): GOSUB 1030
200 NEXT T
210 T$=A$(A): GOSUB1030
220 RN=RND(1)*TF
230 FOR F=0T060
240 IF RN<=F(F) THENPRINTCHR$(F+32): GOTO270
250 RN=RN-F(F)
260 NEXTF
270 IF F=3 THEN L$=LEFT$(A$(0),CL): PRINT " L$": GOTO290
280 L$=RIGHT$(L$,CL-1)+CHR$(F+32)
290 NEXT TT
300 PRINT: PRINT: PRINT "REPEAT WITH SAME INPUT?(Y/N)"
310 GET K$: IF K$="Y" THEN GOTO 90
999 END
1000 REM *** FREQ TABLE ***
1030 FORN=1T0LEN(T$)-CL
1040 IFMID$(T$,N,CL)=L$ THENF=ASC(MID$(T$,N+CL,1))-32:F(F)=F(F)+1: TF=-TF+1
1050 NEXTN
1060 RETURN
2000 REM *** SOURCE TEXT ***
2030 CLS: PRINT: PRINT "ENTER SOURCE TEXT": PRINT "NB USE ! FOR ' "
2040 PRINT "£ WHEN FINISHED": PRINT
2050 GET K$
2060 PRINTK$: IFASC(K$)>31ANDASC(K$)<93 THENA$(A)=A$(A)+K$: L=L+1
2070 IFASC(K$)=127 THENA$(A)=LEFT$(A$(A),LEN(A$(A))-1): L=L-1
2080 IF K$="£" THEN GOTO 90
2090 IFL=240 THENL=0: A=A+1: IFA=19 THENPING: PRINT: PRINT "ONLY 240 MORE"
PRINT
2100 GOTO2050
```

## Python

Andrew Thompson,  
Heathfield,  
East Sussex.



YOU ARE IN control of a voracious python that slithers around the screen eating food. Each time your snake grabs a mouthful, your score

increases and the reptile grows longer.

If you take too long over certain types of food they turn to poison and another block of food appears. If your serpent ever eats some of this poison, it will die.

The food is a light-blue, or cyan, coloured block and poison is dark blue. You earn the right to enter your name in the hall of fame if your score is one of the top 10.

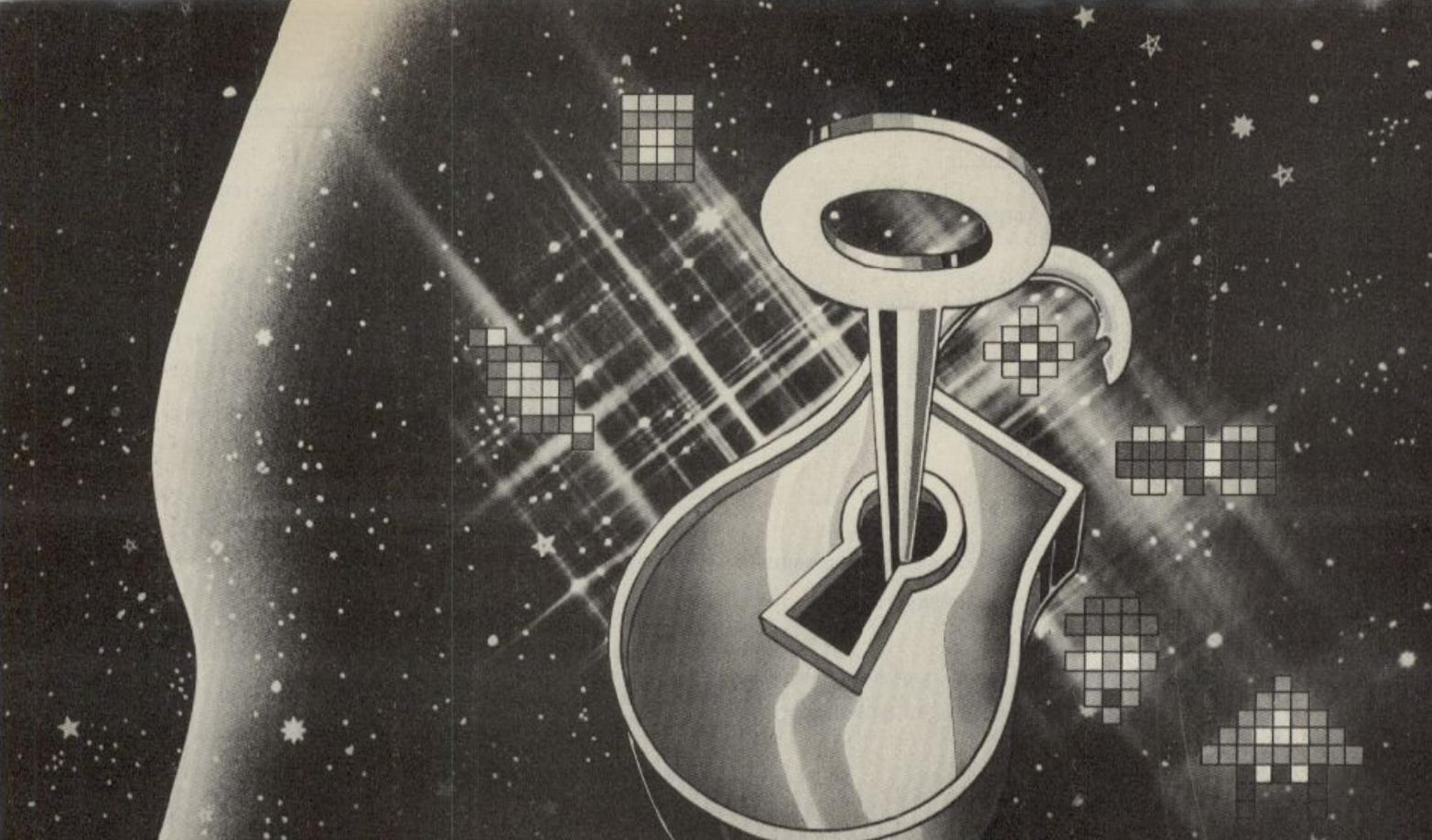
The scroll-left machine-code program is used to store the position to reset the snake's tail and will change it each time you move.

The machine-code change-colour program is responsible for turning appetising food into the lethal poison. At the start of the game you are asked whether the speed-up Poke 65495.0 works on your computer.

```
10 CLS
20 INPUT "DOES YOUR COMPUTER ACCEPT THE SPEED UP POKE (POKE65495.0)?" AS
30 IF LEFT$(AS,1)="" THENPOKE65495,0: GOTO50
40 IF LEFT$(AS,1)="" THEN10
50 CLEAR500,29999
60 PCLERR
70 FORP=1T010
80 AS(P)="THE COMPUTER"
90 S(P)=220-P*20
100 NEXT
110 PHDDE4,1
120 PCLB0
130 PHDDE4,5
140 PCLB0
150 FORP=30000T030012
160 READAS
170 AS="SH"+AS
180 POKEP,VAL(AS)
190 NEXT
200 DATABASE,06,00,06,01,07,00,0C,0F,0C,23,F7,39
210 FORP=31000T031012
220 READAS
230 AS="SH"+AS
240 POKEP,VAL(AS)
250 NEXT
260 DATABASE,1E,00,06,01,07,00,0C,0F,0E,23,F7,39
270 FORP=32000T032024
280 READAS
290 AS="SH"+AS
300 POKEP,VAL(AS)
310 NEXT
320 DATABASE,04,00,06,00,01,07,00,0C,0F,23,F5,39,8
330 FORP=32500T032524
340 READAS
350 AS="SH"+AS
360 POKEP,VAL(AS)
370 NEXT
380 DATABASE,04,00,06,00,01,07,00,0C,04,0F,23,F5,39,8
390 GOTO1240
400 H=100
410 Z=0
420 BS=""
430 POKE32764,6
440 POKE32765,1
450 POKE32766,30
460 POKE32767,1
470 CLB0
480 PRINT#10,"SCORE=";
490 PRINT#16,0;
500 FORP=1T062
510 SET(P,3,B)
520 SET(P,30,B)
530 NEXT
540 FORP=3T030
550 SET(1,P,B)
560 SET(62,P,B)
570 NEXT
580 GOSUB970
590 B1=3
600 Q2=0
610 X=1+RND(160)
```

```
620 Y=X+RND(25)
630 A=RND(3)-2
640 B=0
650 SC=0
660 IFA=0 THENB=RND(3)-2: IFB=0 THENB=60
670 X=X+A: Y=Y+B
680 IFPOINT(X,Y)=6 THENPOKE1024+0+T*32,128: Z=0: H=1: S0
HEND1,1: GOSUB970: SC=SC+1: PRINT#16,SC: Q1=Q1+1: IFQ1>25ST
690 IFK=50 THENB=50
700 IFPOINT(X,Y)<0 THENP10
710 Z=Z+1: IFZ>H THENZ=0: EXEC32000: SOUND100,1: B0SUB970
720 SET(X,Y,7)
730 Q=Q2+256+Q1
740 POKE1536+Q,X
750 POKE7680+Q,Y
760 POKE32764,6+Q2
770 POKE32766,30+Q2
780 POKE32765,Q1
790 POKE32767,Q1
800 AS=INKEY$
810 IFA="A" THENA=0: B=-1
820 IFA="?" THENA=0: B=1
830 IFA="L" THENA=-1: B=0
840 IFA="I" THENA=1: B=0
850 EXEC30000
860 EXEC1000
870 UJ=PEEK(1536)
880 VV=PEEK(7680)
890 RESET(UJ,VV)
900 GOTO70
910 AS=POINT(X,Y)
920 IFAA="S" THENI=020
930 IFAA="I" THENI=050
940 IFAA="H" THENI=080
950 POKE1024+0+T*32,128: SOUND1,1: B0SUB970: SC=SC+1: PRIN
T#16,SC: Q1=Q1+1: IFQ1>25STHEND1=0: Q2=Q2+1: IFQ2>23THEND
2=23
960 GOTO70
970 B=ND(30)
980 T=RND(114)
990 IFRIGHT$(HEX$(PEEK(1024+0+T*32)),1)<>"0" THEN970
1000 POKE1024+0+T*32,223
1010 RETURN
1020 CLS
1030 PRINT#30,"YOU ATE SOME POISON";
1040 GOTO110
1050 CLS
1060 PRINT#35,"YOU CRASHED INTO YOURSELF";
1070 GOTO110
1080 CLS
1090 PRINT#40,"YOU HIT THE SIDE";
1100 GOTO110
1110 PRINT#103,"YOUR SCORE IS";SC;
1120 FORP=15040T1535
1130 POKEP,96
1140 NEXT
1150 PRINT#80,"PRESS THE SPACEBAR";
1160 FORP=15040T1535
1170 NO=PEEK(P)
1180 IFNO<64 THENNO=NO+64: SEND=NO-64
1190 POKEP,NO
1200 NEXT
1210 AS=INKEY$
1220 IFA<>" " THENI=160
```

```
1230 IFSC>6(10) THENI=1430
1240 CLS
1250 PRINT#41,"hall of fame";
1260 EXEC32500
1270 FORP=1T010
1280 PRINT#P*32+106-LEN(STR$(B(P))),B(P) TAB(11)AS(P);
1290 NEXT
1300 PRINT#40,"PRESS THE SPACEBAR";
1310 FORP=15040T1535
1320 NO=PEEK(P)
1330 IFNO<64 THENNO=NO+64: SEND=NO-64
1340 POKEP,NO
1350 NEXT
1360 AS=INKEY$
1370 IFA<>" " THENI=310
1380 PHDDE4,1
1390 PCLB0
1400 PHDDE4,5
1410 PCLB0
1420 GOTO400
1430 FORP=9T01STEP-1
1440 IFSC>6(P) THENM=P+1: P=1
1450 NEXT
1460 IFSC(1) THENU=1
1470 FORP=9T0U STEP-1
1480 S(P+1)=B(P)
1490 AS(P+1)=AS(P)
1500 NEXT
1510 S(U)=SC
1520 AS(U)=" "
1530 CLS
1540 PRINT#40,"enter your name";
1550 EXEC32500
1560 FORP=1T010
1570 PRINT#P*32+106-LEN(STR$(B(P))),B(P) TAB(11)AS(P);
1580 NEXT
1590 V=107+U*32
1600 Q=0
1610 AS=INKEY$
1620 FORN=1T02
1630 NO=PEEK(1024+V+Q)
1640 IFNO<64 THENNO=NO+64: SEND=NO-64
1650 POKE1024+V+Q,NO
1660 NEXT
1670 IFA=CHR$(13) THENI=770
1680 IFA="A" ANDAS="Z" THENA=CHR$(ASC(AS)-64): GOTO170
1690 IFA="0" ANDAS="9" THENA=730
1700 IFA=" " THENI=730
1710 IFA=CHR$(B) ANDO=0 THENI=O: ITHEND=O-1: POKE1024+Q+V,96: SEND=PEEK(1024+Q+V,96): Q=Q-1: POKE1024+Q+V,96
1720 GOTO1610
1730 POKE1024+Q+V,ASC(AS)+64
1740 Q=Q+1
1750 IFQ>19 THENQ=19: SOUND1,1
1760 GOTO1610
1770 FORP=1024+V T01024+Q+V
1780 A=PEEK(P)-64
1790 IFA<27 THENB=B+CHR$(A+64): NEXT: GOTO1820
1800 IFA=32 THENB=B+CHR$(A) : NEXT: GOTO1820
1810 IFA<96 THENB=B+CHR$(A) : NEXT
1820 IFL=LEN(B$)-2: ITHEND=LEFT$(B$,20)
1830 AS(U)=B$
1840 GOTO1240
```



# Unlock Your Imagination

## SCOPE

Computer Graphics Language

- ★ A VERY POWERFUL, TRUE MULTITASK LANGUAGE
- ★ AS FAST AS MACHINE CODE
- ★ SIMPLER THAN BASIC

Write Machine Code in a fraction of the time currently required

SCOPE is available from most good quality dealers and selected branches of

**WHSMITH**

For details of how to get your games published commercially contact ISP Marketing

### TECHNICAL DETAILS

SCOPE is a fully structured multitask language specifically for writing *graphics, animation and sound*.

Being fully compatible with BASIC it is ideal for writing both arcade and adventure style games. Additionally, with SCOPE present in high memory it can be used as an assembler with SCOPE words as plain language mnemonics. Therefore no knowledge of machine code is required. The language is extremely easy to comprehend and is very powerful indeed providing many features not available from BASIC.

**SCOPE HAS TO BE USED TO BE BELIEVED**

**48K SPECTRUM**



CLIP THE COUPON NOW AND UNLOCK YOUR IMAGINATION  
 Post to: ISP Marketing Ltd, Crown House, 38b High Street, Godalming, Surrey  
 Tel: Godalming (04868) 24151 Please rush me ..... copies of the SCOPE computer  
 graphics language tape and instruction manual at £11.95 (o&p free).  
 (Cheques payable to ISP Marketing Ltd)

Block capitals please

PRICE

**£11.95**

Enquiries  
 come

# COMPETITION CORNER

If you want to set a competition for Competition Corner, remember that the simplest solution should be calculable by a short program rather than by any other form of reckoning.

## BRAINTEASER AND COMPETITION RESULTS

THE RESULT of November's brainteaser, 39 Steps over the Buchan River, has been held over from last month's report. So for those of you who racked their brains over the puzzle here is the missing report.

### 39 steps winner

The problem did not lend itself to a program solution — or at least not on a home computer. With over a hundred nodes to pick a route from the number of possible permutations is astronomical. A more feasible approach was to look for short pieces of route that were worth taking. These would include stones with 9, 8 and 7 crystals on them. Connecting them involved hunting out associated 6s and 5s.

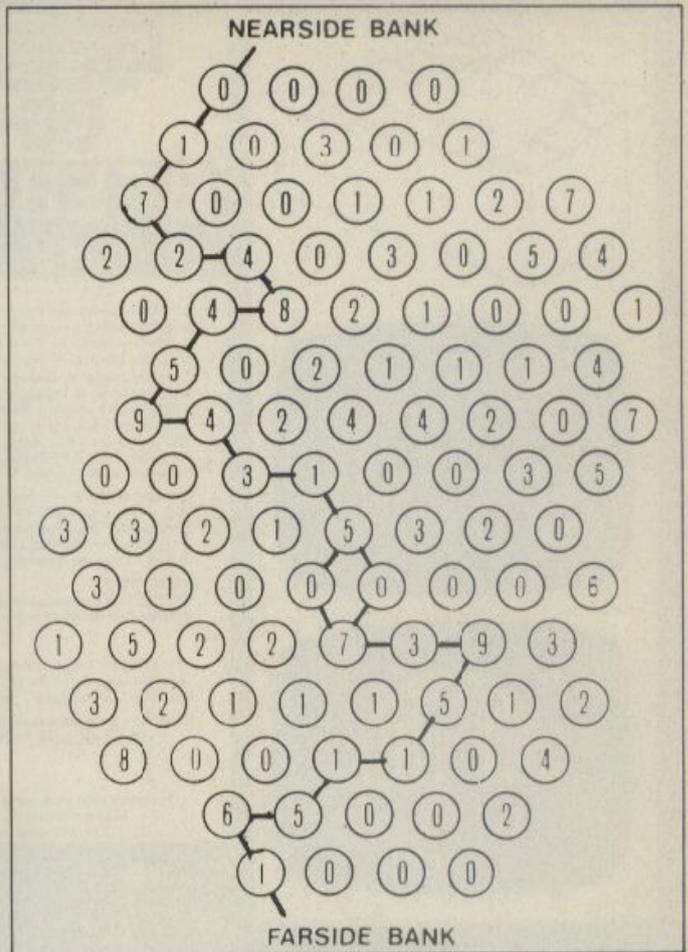
J Barker, 6 Amadis Road, Keepers Lodge Estate, Beaumont Leys, Leicester, wins the £15 book token for a route

which brought in 84 crystals. His route, shown below, picks up the following sequence of stones: 7,4,8,4,5,9,4,3,5,7,3,9,5,5,6. 24 steps are taken and 15 pickups are made. Each pickup is equivalent to an extra step giving 39 steps in all.

Several entries claimed higher totals but were flawed because they neglected to include the step from the last stone to the farside bank.

### Microdrive winner

The winner of the second Microdrive in November can now be named. Two drives and not one were on offer. This is good news for P Howells, 57 Yarnells Hill, Oxford OX2 9BE. His entry, "Load time will dive, from 50 seconds to five, thanks to Sir Clive", previously a runner-up now wins him a Microdrive.



# WE HAVE PLANS....

## orion format 4

The first fully compact A4 ringbinder graphics planning system specially designed for SPECTRUM owners who like to keep a tidy work base. These comprehensive kits contain everything you really need to get the most out of your programming. And if you have a 14" or 16" TV you can link hard copy plan to screen de-bugging using TELEPLAN. This unique TV screen overlay is matched to format 4 print plans and gives a guide to PRINT co-ordinates literally 'onscreen'. format 4 & TELEPLAN are available direct from us, or send a stamped addressed envelope for full details and current list of stockists.

FORMAT 4 KIT SP/1 @ £16.95 plus £2.50 P&P

Please tick  orion TELEPLAN 14" 16" @ £1.25 plus 50p P&P

I am enclosing my (delete as necessary) cheque/ Postal Order/ International Money Order made payable to ORION SOFTWARE

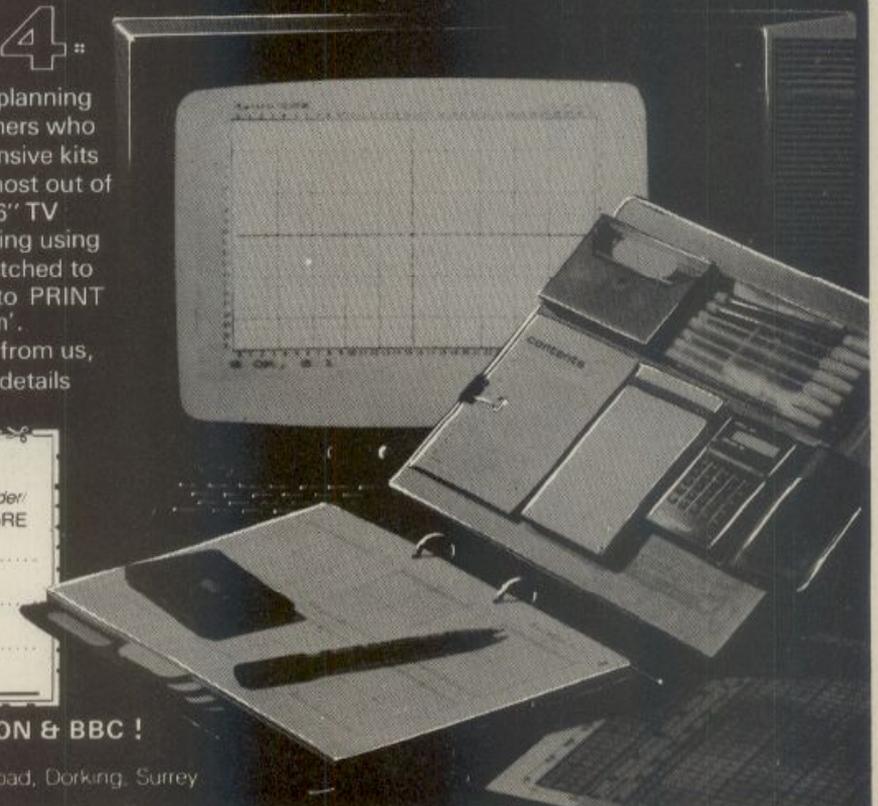
NAME .....

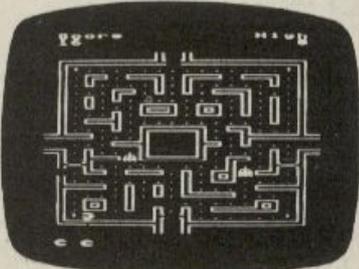
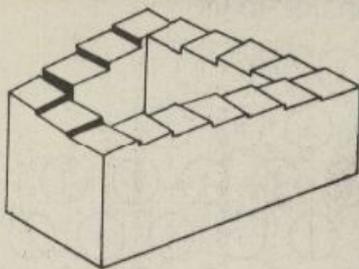
ADDRESS .....

POSTCODE .....

On their way... kits for ELECTRON & BBC!

orion Pippbrook Mill, London Road, Dorking, Surrey





# BBC MICRO

REGISTERED REFERRAL CENTRE FOR THE BBC PROJECT

## BEEBUG FOR THE BBC MICRO

### BRITAIN'S LARGEST SINGLE-MICRO USER GROUP

#### MEMBERSHIP NOW EXCEEDS 20,000

20,000 members can't be wrong — BEEBUG provides the best support for the BBC Micro. BEEBUG Magazine — now 64 pages including new product guide supplement — devoted exclusively to the BBC Micro, Programs — Hints & Tips — Major Articles — News — Reviews — Commentary. PLUS members discount scheme with National Retailers. PLUS members Software Library. 10 Magazines a Year. First issue April 1982. Reprints of all issues available to members.

**October Issue** — GAMES — Munch-Man, a Snapper type game with super graphics. Illusions graphics and sound you won't believe. A Versatile Renumber program for Basic, Fabric Patterns, an invisible Alarm Clock, Disc Sector String Search and a program for drawing 3D Surfaces. Articles on the Teletext Mode for beginners, Compilers and Interpreters, using Joysticks, using the Speech Synthesizer and more. Reviews of two Cassette Recorders (Marantz Superscope C190 and Asom Data Recorder), three Printers (NEC pc8023B, Star DP840 and CP-80), and lots of new games software (and we've arranged SPECIAL OFFERS for members). Plus a review of the new Acorn Electron and news of our new magazine for Electron users called ORBIT. Plus all our usual features like Hints and Tips, Postbag, and a new Brainteaser.

**December Issue** — Program Features: Killer Dice game, Galactic Invasion, a fast moving space invasion game, LINK, a very useful disc utility for program development, ASTAAD, a really excellent program for Computer Aided Design, the Percussion Machine, moving Chequer Board display, Screen Freezer, a routine to freeze your favourite game in mid-play, and a musical rendering of the Twelve Days of Christmas to add a seasonal flavour. Plus articles on the Teletext Mode (part 3) and Fitting an External Speaker. Plus Disc Drive Reviews, Book Reviews, Hints and Tips.

#### STOP PRESS

BEEBUG has negotiated a deal with ACORN over the new 1.2 OPERATING SYSTEM ROM. BEEBUG members are offered the ROM at around half-price. See BEEBUG Feb. Issue for details.

#### SOFTWARE DETAILS

##### BEEBUGSOFT: BEEBUG SOFTWARE LIBRARY

offers members a growing range of software from £3.50 per cassette. 1. Starfile (32K). 2. Moonlander (16K). 3D Noughts and Crosses (32K). 3. Shape Match (18K). Mindbinder (16K). 4. Magic Eel (32K). 5. Cylon Attack (32K). 6. Astro-Tracker (32K). Utilities: 1. Dissembler (16K). Redefine (16K). Mini Text Ed (32K). Applications: 1. Superplot (32K). 2. Masterfile (32K).

Magazine programs now available on cassette to members at £3.50 inc: VAT & p+p — see April/May issue for details.

13% DISCOUNT TO MEMBERS ON THE EXCELLENT WORDWISE WORD PROCESSING PACKAGE — THIS REPRESENTS A SAVING OF OVER £5.00.

Send £1.00 for SAE for Sample

membership: UK £5.40 for six months, £9.90 for one year.

Overseas one year only: Europe £16.00, Middle East £19.00, Americas & Africa £21.00, Other Countries £23.00

Make cheque to BEEBUG, Dept 4, PO Box 109, Baker Street, High Wycombe Bucks. HP11 2TD

For editorial material send to The Editor, BEEBUG, PO Box 50, St Albans, Herts AL1 2AR

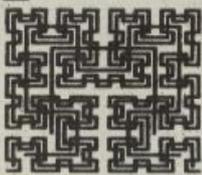
Send £1.00 for SAE for Sample

membership: UK £5.40 for six months, £9.90 for one year.

Overseas one year only: Europe £16.00, Middle East £19.00, Americas & Africa £21.00, Other Countries £23.00

Make cheque to BEEBUG Dept 4, 374 Wandsworth Rd, London SW3 4TW

For editorial material send to The Editor, BEEBUG, PO Box 50, St Albans, Herts AL1 2AR



# HISOFT PASCAL DEV PAC



## Quality ZX SPECTRUM\* Software

### HISOFT PASCAL 4T

"... I haven't seen any other compiler that could match Hisoft's Pascal!" ... Using the Spectrum Micro — Autumn 1983

"This is a very impressive product ... of benefit to any Spectrum programmer ..." David Bolton ZX COMPUTING Aug/Sept 1983

Just two comments from full length reviews of our powerful and virtually full implementation of Standard Pascal. The advantages of using Pascal are well-known — fast, self-documenting, and above all, structured programs and now, with Hisoft Pascal, you can reap all these benefits on a wide range of home computers, including the 48K Sinclair Spectrum!

Hisoft Pascal produces programs that run typically 40 times faster than equivalent ZX BASIC programs and, sometimes, up to 1,000 times faster!

Hisoft Pascal supports FOR ... DO, WHILE ... UNTIL, CASE ... OF, INTEGERS, REALS, CHARACTERS, RECORDS, POINTERS, SETS, ARRAYS etc. etc. — it is not a Tiny Pascal but a

virtually full implementation of the language allowing the user to develop true high-level language skills while attaining execution speed close to that of machine code. Complete with a

70-page manual.

Hisoft Pascal is also available in a variety of disk formats, including sequential FILE handling.

### HISOFT DEV PAC 3

"... DEV PAC is most highly recommended. The documentation is first class." Your Computer May 1983

"... if you write programs in machine code, buy DEV PAC — it is the best currently on the market." Adam Denning, ZX SOFT in Which Micro September 1983

Two comments from reviews of earlier versions of DEV PAC — now we have DEV PAC 3 available: a powerful Z80 assembler with conditional assembly, assembly from tape (to enable

generation of very large code files), ORG, EQU, DEFB, DEFS, DEFW, DEFM, labels of any length — in fact all you need for fast (3,000 line per minute) and powerful assembly

programming. But it doesn't stop there: DEV PAC 3 also includes an incredible debugger/dis-assembler giving you a 'front panel' display of the Z80 system and allowing extensive

debugging of your machine-code program, including single-stepping programs EVEN IN ROM!! Open up the secrets of low-level programming with DEV PAC 3.

#### Prices:

Hisoft Pascal 4T (ZX SPECTRUM) £25 inclusive

(NewBrain, SHARP MZ700 etc) £35 plus VAT

Hisoft Pascal 4D, many disk formats £46 inc.

Hisoft DEV PAC 3 (ZX SPECTRUM) £14 inclusive

(NewBrain) £25 inclusive

\*\*\*STOP PRESS\*\*\* Hisoft Pascal for the SPECTRUM now comes complete with a Turtle Graphics package allowing fast and easy production of complex graphic displays.

Hisoft Pascal and Hisoft Devpac also available on ZX Microdrive please write for details



**HISOFT**  
13 Gooseacre, Cheddington  
Leighton Buzzard, Beds. LU7 0SR  
Tel: (0296) 668995



\*and others

# The dream makers



CRL brings a whole new world of excitement right into your living room!

Games that test your skills to the ultimate – whether it's zapping down invaders or playing a whole game of cricket.

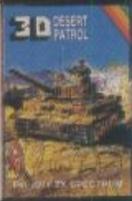
Only CRL offers such a wide choice of computer programs for the world's most popular micros.

Catch one today at Menzies, Boots, W. H. Smiths, Spectrum Group and all good computer shops or send direct to CRL.

Never has so much excitement been contained in a cassette.

# CRL

CRL House, 9 Kings Yard,  
Carpenters Road, LONDON E15 2HD.  
Tel: 01-533 2918



# If I gave your son a BBC Micro for Christmas,

# it was the best present you've ever had!



**Because you could run your business for little more than the cost of his games!**

**STOCK CONTROL, INVOICING SALES & PURCHASE LEDGERS** all at an incredible **£30\*** each—on disk\*—and we guarantee them to work.

Software For All's first-class range of Business Programs will do all your paperwork chores efficiently and cost-effectively—because they have been thoroughly tested before release so

you can be sure they won't let you down. And at prices realistic enough to interest any businessman, however small. Briefly, here's what they'll do:

▷ **Stock Control:** Gives full control of your stock lines. Issues, Receipts, Adjustments, Stock Updates, Stock Valuation, Reorder Reports and full Stock Listings.

▷ **Invoicing:** Integrates with stock—calls up items automatically. Rapid, simple to use, high-quality Invoice print. Many useful features including Credit Notes.

▷ **Sales Ledger:** Full updating of clients' accounts. Aged Debtors' Analysis—aids credit control. Statements, VAT Summary, Ledger Cards, Daybooks, Invoices, Credit Notes, Receipts and Journals.

▷ **Purchase Ledger:** Full updating of suppliers' accounts. Creditors' Schedule, Remittance Advices, VAT Summary, Daybooks, Invoices, Credit Notes, Payments and Journals.

Software For All Business Programs are widely available at reputable BBC and Acorn Dealers throughout the country. But if you have any difficulty obtaining them, please contact us direct and we'll be pleased to advise you.

\* £30 on disk, £20 on cassette. Prices exclusive of VAT.

**SOFTWARE  
FOR ALL**

**BUSINESS PROGRAMS**

**SOFTWARE FOR ALL**

72 North Street, Romford RM1 1DA  
Telephone 0708 60725 Dealer enquiries welcome.

# Top of the pile.



## **SPEED DUEL** 48K Spectrum (Joystick compatible) **£5.95**

Many have tried, but most have failed to capture the visual excitement of a truly competitive 3D race game. Speed Duel, with its choice of 3D circuits, swinging perspective scenery, levels of difficulty and realism of its movement must take the chequered flag for compelling visual excitement.

## **APPLE JAM** 48K Spectrum **£5.95**

The ZANIEST game of 1983, hilarious, compulsive and infuriating. Here are the RULES of PLAM: Eat as much jam as you can and as many apples as you can without getting too fat otherwise you'll have a fit and lose one of your pills but you haven't got many so jump in the sauna to slim off but while you're in there the tiny rat will eat the jam and the apples you miss and get big and bold and come up to bite you dead but you can jump in the lift to go up and down so if you timings right you can squash the rat and get on with eating to increase your score to release rat but to keep the rat tiny, but beware the hornet zooming past to be avoided at all costs by jumping into the sauna otherwise it will sting you dead and the ambulance will come to take you away.

(DK Tronics admit no liability for split sides or broken Spectrums incurred whilst playing this game.)

## **JUMBL Y** 48K Spectrum (Joystick compatible) **£6.95**

A brand new original, all scrolling supercolour, animated funtural multipicture puzzle program. A puzzle for all puzzle haters! You'll be amazed as picture after picture unfolds as reward for your skill, patience and luck. You'll be staggered by the number of pictures shoehorned into Spectrum, but you'll never know how many until Jumbly itself tells you, and rewards your efforts with the Jumbly Code. This enables you to enter the Jumbly Competition to design a picture for Jumbly II, due out in 1984. Winners will receive over £150 and have their entry and name in the new program. All entries will receive a prize.

## **TROM** Spectrum 16K **£5.95**

A completely novel game for Spectrum featuring bounding bytes, nasty nibbles, poisonous pixels and a fearful furnace! Speed your bits together around screen memory for a bit search and destroy mission that's both taxing and hilarious, with a pace that gets more frantic with success.

## **SLICKER** Spectrum 16K **£6.95**

Only in a month or Sunday's does a puzzle program come along which is so simple and brilliantly original as to merit programming for four of the most popular micros. Formations of coloured triangles are mixed into a kaleidoscope challenge for you to solve. Eight levels of difficulty. Solve Level Eight, join the Slicker Champions Club and win FREE software. Details come with program.

## **MAZIACS** 48K Spectrum (Joystick compatible) **£6.95**

**HAIL THE HERO.** The most ingeniously animated little fellow ever seen on a Spectrum screen. Running in all directions, fighting, blinking, tapping his feet and sitting down for a well earned rest.

**MEET THE MAZIACS.** Correction! DON'T meet the Maziacs. Hordes of nasty, spidery, beasty things with long hairy legs and lethal jaws.

**MANAGE THE MAZE.** And what a maze — Full of Maziacs, Flocks, Swords, Prisoners and an endless succession of dead ends and false trails. But don't despair — you have lots of help in your search for a single box of treasure buried deep in the maze of the evil, defended, passageways.

**NORRLE THE NASTIES.** A top Hollywood stunt man will specially throw in to stage the numerous fight sequences needed to defeat the evil guardians of the treasure.

**HEAD FOR HOME.** Face a return journey with a bundle of treasure and unable to carry a sword.

Available from selected branches of BOOTS, W.H. SMITH, LASKY'S, SPECTRUM, JOHN MENZIES and good computer software stockists throughout the UK, or direct, S/P post and packing.

# dktronics

DK Tronics Ltd., Unit 6, Shire Hill Industrial Estate,  
Saffron Walden, Essex CB11 3AQ.  
Telephone: (0799) 26350 (24hrs) 5 lines

# Success Breeds Success



Sponsored by  
**Practical Computing**  
**Your Computer**  
**Micro Business**

## National Exhibition Centre, Birmingham. May 4-7, 1984.

After one show the Midland Computer Fair has already established itself as an outright winner. Not only is it the leading exhibition in the Midlands for microcomputers and related products, but it stands in its own right as a major national event.

In recognition of this, and the need to accommodate thousands of expected visitors the venue for the 1984 Midland Computer Fair is to be Britain's premier showcase – the National Exhibition Centre, Birmingham. The NEC with its superb facilities for exhibitors and visitors alike will

be the fitting site for this major event which attracted over 17,000 people for the first show.

Whether you are interested in microcomputer enthusiasts or would prefer to take space in the Business Section to meet small business micro-users, the Midland Computer Fair is definitely for you.

So why not let a little of the Midland Computer Fair's success rub off on your company by reserving a stand at the next show.

The road to success starts by filling in the coupon below:

**THE Midland**  
**Computer**  
**Fair** *Personal computers*  
*Home computing*  
*Small business systems*

Return to the: Exhibition Manager, Reed Exhibitions,  
Surrey House, 1 Throwley Way, Sutton, Surrey SM1 4QQ  
Tel: 01 643 8040 Telex: 946564 BISPRS.G

Name \_\_\_\_\_

Position \_\_\_\_\_

Company \_\_\_\_\_

Address \_\_\_\_\_

ADVENTURES INTO IMAGINATION  
ADVENTURES INTO IMAGINATION

# "ADVENTURES INTO IMAGINATION"

Selected titles available from  
**W. H. SMITH, BOOTS, MENZIES  
AND ALL LEADING COMPUTER STORES**

**Spectrum 48K**

## Invincible Island

by Peter Cooke

Exhaust your ingenuity in the quest to find The Seven Parchments of Xaro and their meaning! Will they lead you to undreamt of treasures or eternal doom? Explore the mysteries of the stockade and puzzle within the Pagoda! A spectacular split screen graphic and text adventure to braintease you for weeks!

Adventurous graphics for every location.  
Save routine. **£6.50**

**RICHARD SHEPHERD  
SOFTWARE**

**Spectrum 48K  
Commodore 64**



## Ship of the Line

**RICHARD SHEPHERD  
SOFTWARE**

### Ship of the Line

Command a sailing ship, juggle your supplies, crew and firepower. Fearlessly battle your way up the admiralty ladder, bribe Sea Lords as necessary until you make First Sea Lord! **£6.50**

**Spectrum 48K  
Commodore 64**

## EVEREST ASCENT

**RICHARD SHEPHERD  
SOFTWARE**

### Everest Ascent

Conquer the world's highest peak in defiance of all the obstacles, man and nature can throw at you. Survive avalanches, cross bottomless crevasses, cope with wayward Sherpas — but don't run out of supplies! **£6.50**

**CREDIT CARD HOTLINE  
06286 63531 (24 HOURS)**

**RICHARD SHEPHERD  
SOFTWARE**

ELM HOUSE, 23-25 ELM SHOTT LANE, CIPPENHAM, SLOUGH, BERKSHIRE.

All programs are sold subject to the condition that they may not, by way of trade or otherwise, be lent, hired out, resold or otherwise circulated without the written permission of Richard Shepherd.

**The Lightning Oric Assembler. £9.90\***

There are other assembler/editors available for the ORIC but none combine the same features and ease of use that we have obtained with this comprehensive utility program for the ORIC 48K. The manual which accompanies the assembler gives a brief insight into machine code and the use of assemblers to enable anyone to write in assembly language after just a little study. Full specifications of the assembler cannot be fitted into the small space available here and so they may be obtained from your local dealer or direct from Mr. Micro.

\*Includes comprehensive instructions/booklet.

**Crazy Golf 48K Spectrum £6.90**

Crazy golf is a new program for the 48K Spectrum you are required to clear the course avoiding and circumventing the many strange obstacles finally putting your ball in the hole. The par for each hole is displayed and a novel direction indicator combined with a force indicator enable you to send the golf ball in the direction you feel is the best one to clear the course. Crazy golf really is crazy but most of all it is fun and will be found to be very enjoyable by all members of the family.

For use with Joystick and Keyboard.

**Bengo Vic 20 £6.90**

An exciting program for the unexpanded Vic 20, which combines fast moving strategy and reflex skills. You must control Bengo the super Eskimo against the dreadful snow Yeti - Half blind and half witted the Yeti can smell a good Eskimo lunch - the only protection Bengo has is to hurl huge blocks of ice across the frozen waste at the Yeti.

- Don't get distracted - or you'll be personally responsible for the demise of an Eskimo!

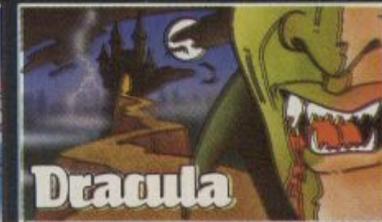
For use with Joystick.

**Dracula 48K ORIC £6.90**

A superb adventure for the 48K ORIC. This adventure is written in the good old style! No silly graphics, no gratuitous drawings, no distractions from pure mental images of horrendous realism. This evocative text adventure of the old genre will have Oric owners shivering with anticipation and perhaps fear.

Dare you load DRACULA into your ORIC 48.7!!

By keyboard.



# No shocks - Plenty of surprises!

Mr. Micro means programs you can trust. Programs that are as exciting when you load them as they look at your dealer. Programs that come proven and refined. Programs that bring you the breathtaking excitement of arcade games with the special extra dimension of real mental challenges - all at the right price. Plus accessories and utilities which extend the value of your computer. Ask for Mr. Micro by name at your local dealer. Or order your games direct, post-free, from: Mr. Micro Ltd, 69 Partington Lane, Swinton, Manchester M27 3AL. Cheques should be made payable to Mr. Micro Limited. Ring our 24 hour hot-line for payment by Access or Visa on: 061-728 2282.



**Amigo £6.90**  
Vic 20 8K or 16K expansion.

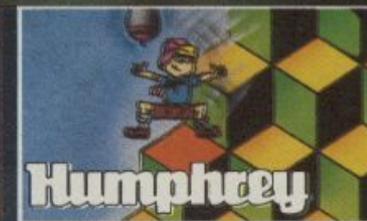
Hey Amigo you gotta run fast an. The banditos they are a chasing you and they will a geta you ifa you do nota escapa OK. You musta runa rounda the blocka, when you run round de corners ofa de city the banditos they are frightened to go there and you score de points. Pity you have nota gota gun but a joystick can be fun.

For use with Joystick.



**Digger £6.90**  
Vic 20 8K or 16K expansion

Your remote viewer shows the path of the professors devilish digging apparatus. Using your computer linked remote control you must guide the digger beneath the earth to collect the rare micronite gems. Unfortunately the micronite is protected by the micronits who will plague your machine in order to attempt to stop its progress. You may be able to kill the micronits by skillfully manoeuvring your digger beneath a subterranean stalactite which will then fall killing any micronit in its path. This is a novel implementation of a popular arcade game. For use with Joystick.



**Humphrey £6.90**  
Vic 20 BBC Model B

This new game for the BBC Model B or for the VIC 20 (8K or 16K expansion) and also for C.B.M. 64 involves some tricky decision taking. Object of game is to make Humphrey land on all the cubes thus changing their colour. Unfortunately Humphrey is being chased by a bouncing ATOMIC BOMB! You will soon learn that this deceptively simple game has tremendous addictive properties and quite a high degree of tactical skill.

For use with keyboard or Joystick.



**Mysterious Island £9.90**  
Vic 20 16K

Escape from prison in a hot air balloon - try to land it on Mysterious Island, then the fun really begins. • Booby Trapped Fields • Killer Bees • Hostile Natives • Hidden Clues • Force Fields • Capture the Nautilus • Full Graphic Display • Several Games lead to Exciting Climax • Separate Practice Program • Includes Blank Data Tape to store the game to play later.

All successful adventures can claim a unique personalised award by sending Mr. Micro their final position at the end of the game - By Joystick or keyboard.



**RAMDAM £13.90**  
Vic 20

This accessory enables programs which would normally only work with 5K expansion to work with 8K or 16K expansion. RAMDAM saves having to buy a 5K pack if you already own an 8K or 16K. With RAMDAM and a Commodore 16K expansion all known tape games will run on your Vic 20. • Includes Memory Test Program • Free 6 5K game - MICROADERS for use with joysticks.



**Punchy £6.90**  
Spectrum 484

Punch has taken Judy for his evil purposes and locked her away. Judy has called upon the forces of goodness to escape, so with the help of our hero Bobby the policeman and you the purchaser of this fine program you must guide brave Bobby across the stage to rescue poor Judy. Leap the gaps. Jump over the dogs. Leap the alligator pit. Dodge the tomatoes. Rock the crib. Collect the sausages and finally rescue



**Dragon Tamer £9.90**  
Dragon 32

Allows Atari type and other digital joysticks to be used with the Dragon - giving better response and more control. For the first time your Dragon will be able to reflect your true skills. • Achieve higher games scores • Less Frustration.

Plus To ensure maximum value, Dragon Tamer includes two original games for use with digital Joysticks.



**GoldRush £6.90**  
Vic 20 3-5k

This graphic adventure program was the first in the world to offer real gold for the successful adventurer. An idea which has been much copied but never equalled. • Fun • Educational • Challenging • Clues • Puzzles • Searches • Fast Reaction Game. For use with keyboard.



Order Code: 15040 **Atac Atac** £5.50 (Arcade Adventure) (Atari) Joystick option, Spectrum  
 Order Code: 15250 **Lunar Jetman** £5.50 (Arcade) (Atari) Joystick option, Spectrum  
 Order Code: 15080 **Armageddon** £5.95 (Arcade) (118/404) Joystick option, Spectrum  
 Order Code: 15070 **Horace Goes Skiing** £5.95 (Arcade) (115/449) Spectrum  
 Order Code: 15080 **Airliner** £8.95 (Flight Simulator) (116/461) Joystick option, Spectrum  
 Order Code: 45810 **Dragonfly** £8.95 (Flight Simulator) (Atari) Joystick option, Dragon 32  
 Order Code: 45120 **Transylvanian Tower** £8.95 (Simulation) (Adventure) (Atari) Dragon 32  
 Order Code: 41000 **Vultures** £8.95 (Arcade) (Atari) requires 1 Joystick, Dragon 32  
 Order Code: 45040 **Benka** £7.95 (Arcade) (Atari) Dragon 32  
 Order Code: 20010 **Everest** £7.95 (Adventure) (Atari) Dragon 32  
 Order Code: 20010 **Cosmic Gauntlet** £3.95 (Arcade) (Atari) ZX 81  
 Order Code: 20020 **Scramble** £4.95 (Arcade) (118) ZX 81  
 Order Code: 20030 **Galaxians & Gloop** £3.95 (Arcade) (118) ZX 81  
 Order Code: 20040 **3D Black Star** £4.95 (Arcade) (118) ZX 81  
 Order Code: 20050 **Invaders** £3.95 (Arcade) (118) ZX 81  
 Order Code: 30010 **Attack of the Mutant Camels** £7.95 (Arcade) (Atari) requires joystick, Commodore 64  
 Order Code: 30020 **Assamblar** £4.95 (Atari) (Atari) Commodore 64  
 Order Code: 30030 **Hever Beaver** £8.50 (Arcade) (Atari) requires joystick, Commodore 64

JOIN THE SOFTWARE CLUB AND SAVE **£££** ON YOUR TAPES ...

# Home Computer Software

**SPECIAL INTRODUCTORY OFFER!**

Buy any 3 Tapes  
 Save up to £18.43 on retail prices and get further Software at Big Savings

Join the Software Club and enjoy the better way to buy your software by simply returning the coupon below - select any three of the introductory software from the large selection illustrated on this page at the amazing price of only £2.99 each. Sending for the introductory offer does not bind you in any way to the Club and we don't require any money until you have had time to judge the quality of the tapes, in your own home. When you have played them, and appreciated the high quality you will be taking the first step towards enjoying all the 'plusses' of your membership in the Software Club

**The Software Club, Salisbury Square, Old Hatfield, Herts AL9 5AD.**

**Free Monthly Colour Brochure**  
 Each month you will receive a copy of The Software Review, packed with all the very best software and the best of pre-releases - all that we request of you is that you purchase a minimum of six tapes from the many hundreds you will be offered during your first year as a member of The Software Club. When you see the vast range, at the heavily discounted prices you will probably want a lot more, but that's up to you.

\*All prices quoted are manufacturer's recommended prices.

CHOOSE ANY

# 3

FOR ONLY **£2.99** EACH PLUS P&P

**All you have to do**  
 Fill in the coupon, marking carefully the Code Nos of the 3 Introductory Tapes you require. Do not enclose any money now - we offer only genuine tapes - from all the leading manufacturers backed by our no quibble replacement service should you have any problems with our software.



Order Code: 30040 **Swan City** £8.95 (Arcade) (Atari) requires joystick, Commodore 64  
 Order Code: 30050 **Appaloosa** £7.95 (Arcade) (Atari) requires joystick, Commodore 64  
 Order Code: 30010 **Jet Pack** £5.50 (Arcade) (Atari) Joystick option, VIC 20  
 Order Code: 30020 **Galactic Abductor** £7.95 (Arcade) (Atari) requires joystick, VIC 20  
 Order Code: 35030 **Bowthatch** £5.50 (Arcade) (Atari) requires joystick, VIC 20  
 Order Code: 35040 **Crazy King** £8.95 (Arcade) (Atari) requires joystick, VIC 20  
 Order Code: 35050 **Grid Runner** £5.95 (Arcade) (Atari) requires joystick, VIC 20  
 Order Code: 41002 **Starflight** £8.95 (Arcade) (Atari) ORIC  
 Order Code: 40065 **Dreadler's Revenge** £8.95 (Arcade) (Atari) ORIC  
 Order Code: 40060 **The Ultra** £8.95 (Arcade) (118/404) ORIC  
 Order Code: 40065 **Games Compendium** £7.95 (Arcade) (118/404) ORIC  
 Order Code: 40017 **Invaders** £7.95 (Arcade) (118) ORIC  
 Order Code: 25030 **Cyber Attack** £7.95 (Arcade) (Atari) ORIC II  
 Order Code: 25035 **Logo 2** £7.95 (Atari) (Atari) BBC 2  
 Order Code: 25040 **Attack on Alpha Centauri** £7.95 (Arcade) (Atari)  
 Order Code: 25045 **Gunsmoke** £7.95 (Arcade) (Atari) Joystick  
 Order Code: 25050 **747 Flight Simulation** £7.95 (Flight)

## INTRODUCTORY DISCOUNT COUPON

To: The Software Club, Salisbury Square, Old Hatfield, Herts AL9 5AD.

Please accept my application and enrol me as a member of The Software Club and send me the introductory tapes whose numbers I have written in the boxes below, for which you shall charge me in due course, should I decide to keep the software (plus a total of £1.03 for postage and packing\*). If I am not completely satisfied, however, I may return the tapes intact within ten days, my membership will be cancelled and I will owe nothing. As a member, I need not take a tape every month (or if I want no tape at all), I can say so on the form provided. I will, however, choose at least six tapes in the first year. All software is described in advance in the free monthly "Software Club Review" and is offered at a discounted price. I am over 18 years of age. (This application must be from your parent or guardian if you are under 18 years of age).

My 3 selections are (order code)

--	--	--

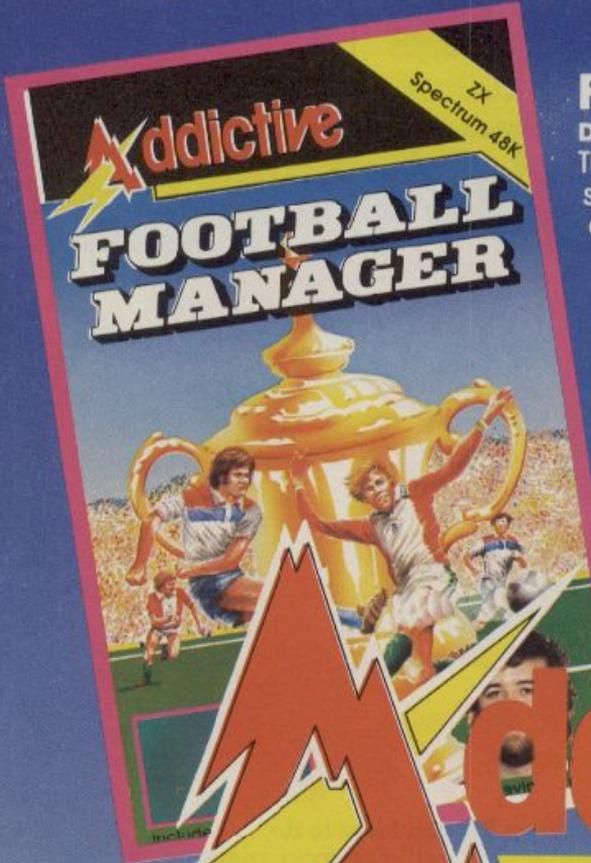
Machine \_\_\_\_\_ Memory size \_\_\_\_\_  
 Mr/Mrs/Miss \_\_\_\_\_  
 Address \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 Postcode \_\_\_\_\_  
 Signature \_\_\_\_\_

**REMEMBER: SEND NO MONEY NOW**

POST TODAY AND SAVE UP TO £18.43

# The No.1\* Football Game

ZX81 16K,  
ZX Spectrum 48K  
BBC and Cric versions coming soon!



## Football Manager

Designed by Kevin Toms  
This outstanding game of skill and strategy is now widely available and you can join the many thousands of satisfied customers who have purchased the game. This is no five minute wonder – you will be playing this game for hours over many weeks (we know – our customers tell us!).



Kevin Toms

Some of the features of the game:–

- ★ Matches in 3D graphics
- ★ Transfer market
- ★ Promotion and relegation
- ★ F.A. Cup matches
- ★ Injury problems
- ★ Full league tables
- ★ Four Divisions
- ★ Pick your own team for each match
- ★ As many seasons as you like
- ★ Managerial rating
- ★ 7 skill levels
- ★ Save game facility

# Addictive

\*ZX81 Chart, Home Computing Weekly 16.8.83

Comments about the game from press and our customers

"FOOTBALL MANAGER is the best game I have yet seen on the Spectrum and my personal favourite of all the games on any micro ... To the ordinary person it is an excellent view of what can be done in the field of computer games ... The crowning glory of this game is the short set pieces of match highlights which show little stick men running around a pitch, shooting, defending and scoring ... It is a compulsive game but people who cannot take game sessions of 9 hours or so, which happened on one happy Sunday, will be grateful to know that there is a 'save to tape' option. FOOTBALL MANAGER has everything it could ... The

originator, Addictive Games, certainly deserve the name." Rating: 19/20 (Practical Computing – August 1983).

"When I first received this game I spent the best part of the weekend playing it. Since then I have returned to it more often than any other. The truly addictive quality of this game is the remarkable way it mirrors the real football manager's problems ..."  
(Personal Computer Games – Summer 1983)

"It's my own fault you *did* warn me – I am totally and completely hooked on FOOTBALL MANAGER." (Mr. A. Wright – Lancashire.)

"It is by far the best software game that I have seen for the Spectrum." (Mr. N. Lincoln – Surrey.)

"I congratulate you for a marvellous game which keeps the player enthralled." (Mr. N. Creasey – Gerrard's Cross.)

"I am writing to say what a great game it is. I have spent over 45 hours on it." (Mr. D. Fearn – Gloucestershire.)

"Your FOOTBALL MANAGER game is terrific." (Mr. N. Cumming – West Bromwich.)

### Programmers

We want your software. Send us a sample. If accepted, we will supply generous royalties plus free cash advances plus free advice from Kevin himself!



Action from the Spectrum version

Available from computer software stockists nationwide, including **Boat** & **WHSMITH**

Prices: Spectrum 48K £6.95  
ZX81 16K £5.95

(N.B. 3D GRAPHICS ARE NOT INCLUDED IN THE ZX81 VERSION).

To order by mail (p&p free) send cheques or postal orders to:

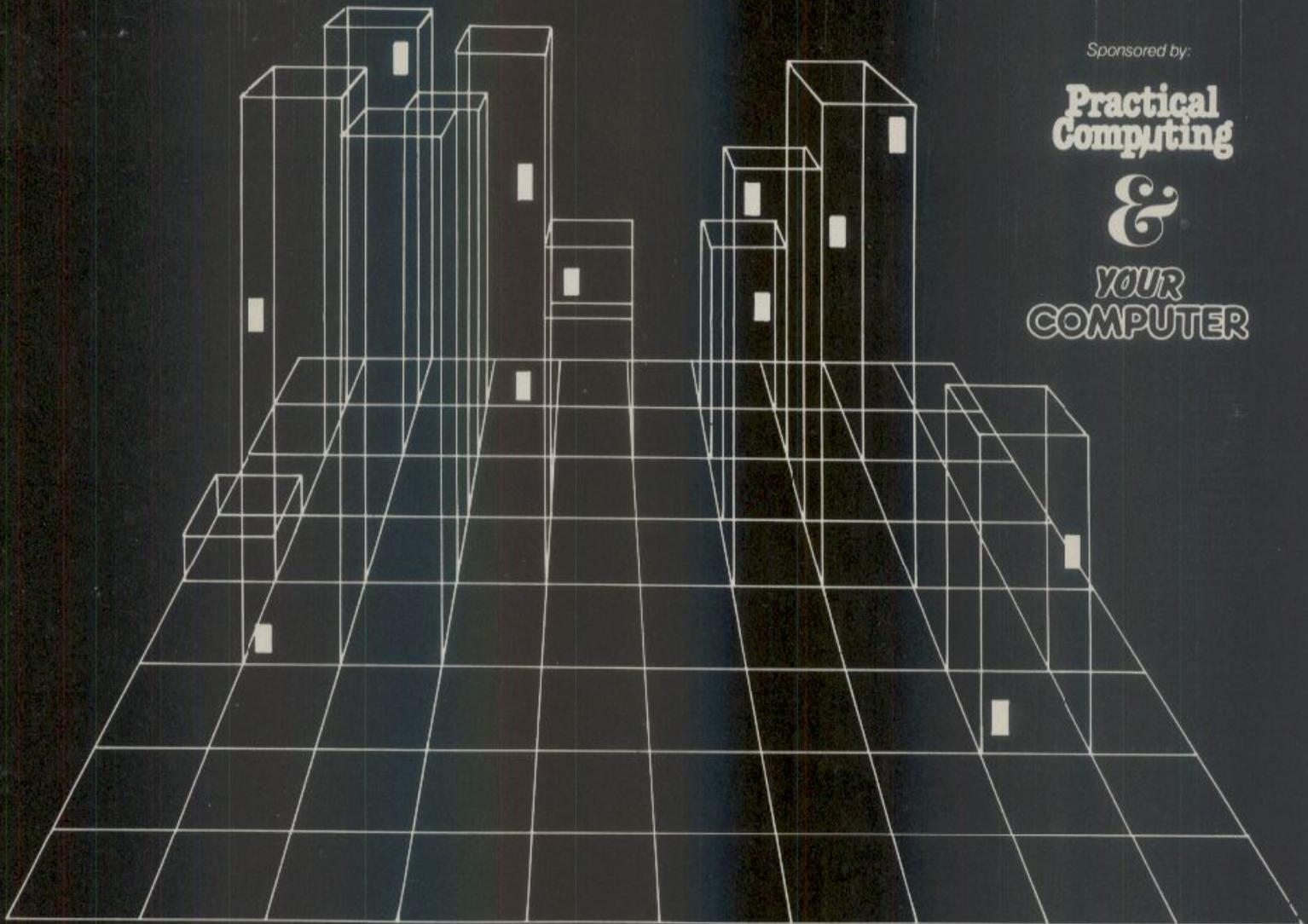
**Addictive Games**

Albert House, Albert Road, Bournemouth BH4 4BZ

† Spectrum version only

Dealers! For urgent stocks send your headed notepaper direct to our address

# 1984 On Course For Record Computer Sales



Sponsored by:

**Practical  
Computing**  
&  
**YOUR  
COMPUTER**

There can be few – if any – comparable exhibitions capable of generating such intense public interest as The Computer Fair series.

As expected, the 1983 Computer Fair, held at Earls Court, has consolidated its position as the major showcase for home and small business computers, to the extent that it became necessary for the original exhibition area to be doubled to a record 2,300 square metres. And all the signs are emerging to support our belief that 1984 will see further growth in an exhibition which provides an unrivalled opportunity for promoting personal computer systems of all kinds.

Sponsored by 'Practical Computing' and 'Your Computer' and organised by Reed Exhibitions, the 1984 London Computer Fair will again be backed by a massive publicity campaign using radio, television and press media. Advance stand reservations are understandably already well up on 1983. If you want to ensure that you do not miss out on a preferential site, you really must fill in the coupon below NOW, and return to the

Exhibitions Manager, The Computer Fair,  
Reed Exhibitions, Surrey House, Throwley Way,  
Sutton, Surrey. SM1 4QQ

THE  
**Computer  
Fair** *Personal computers  
Home computing  
Small business systems*  
Earls Court, London. June 14-17 1984

I am interested in exhibiting at The Computer Fair, Earls Court, London. June 14-17 1984.

Please send full information to

Name \_\_\_\_\_

Position in Company \_\_\_\_\_

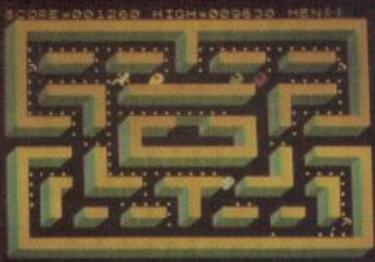
Company \_\_\_\_\_

Address \_\_\_\_\_

Telephone No. \_\_\_\_\_ Telex \_\_\_\_\_



**LUNA CRABS**  
By M.J. ESTCOURT



**HAUNTED HEDGES**  
By DEREK BREWSTER



**DEATH CHASE**  
By M.J. ESTCOURT  
Kempston Joystick Compatible



**For any Spectrum**

ALL TITLES £6.95 INC VAT.  
SELECTED MICROMEGA PRODUCTS  
THROUGH: BOOTS, GREENS, ASDA,  
JOHN MENZIES, LASKYS, WIGFALLS,  
RUMBELOWS, HMV, SELFRIDGES,  
WH SMITHS, SPECTRUM SHOPS  
EVERYWHERE AND ALL OTHER GOOD  
SOFTWARE STOCKISTS

**Trade Enquires**

PRISM 01 253 2277  
WEBSTERS SOFTWARE 0486 84152  
LIGHTNING RECORDS AND VIDEO 01 969 5255  
MICRO DEALER UK - ST ALBANS 34351



**STARCLASH**  
By DEREK BREWSTER  
Kempston Joystick Compatible

**NEW SOFTWARE FOR A NEW DIMENSION**

Micromega - Personal Computer Division - Quantec Systems and  
Software Ltd 230 Lavender Hill London SW11 1LE

# More than fun and games!

## FIRST STEPS with the Mr. Men

by Primer Educational Software

The ever-popular Mr. Men help prepare young children for reading with four simple and absorbing games designed to exercise essential skills as well as entertain.

An easy-to-use, colour-coded key guide is included with an illustrated introductory book, featuring the Mr. Men. For ages 4 to 8 years. Available now on cassette for the BBC B, Spectrum 48K and Electron. **£8.95**



## QUICK THINKING!

by Wigit Software

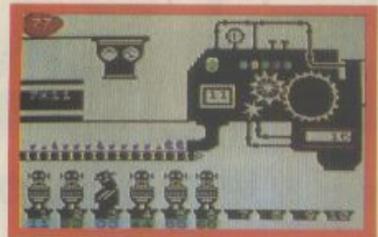
Two mind-stretching, space-age games to test mental arithmetic and nimble fingers.

In **Sum Vaders** alien robots invade the earth. Only quick thinking and fast reactions can prevent them. Several levels of difficulty and a two-player game with a handicap option make Sum Vaders equally testing for all family members, from 8 years to adult.

**Robot Tables** challenges the young player to make a series of perfect robots.

Knowing your multiplication tables is the key to controlling the robot-making machine. With a learning mode and a testing mode, Robot Tables is a fun way

for early learners, and more advanced children, to master an important and often neglected skill.



Available now on cassette for the Spectrum 48K, Commodore 64, BBC B and Electron. **£6.95**

## CAESAR THE CAT

by Andromeda Software

Meet Caesar, a cheeky young cat on duty in a well-stocked larder. He's kept busy chasing a gang of hungry mice eating the family's food. Playing against the clock, you guide Caesar along crowded shelves to pounce on the mice.

A fast, colourful, all-action, arcade-style game with catchy music and a best-score record. Challenging for high-scoring arcade addicts as well as great fun to play for the novice.

Available on cassette for the Commodore 64 **£8.95**



Prices include VAT and post and packaging. MIRRORSOFT programs are available from selected branches of W.H. Smith and Boots, and other leading software stockists. Trade enquiries welcome: phone 01-822 3580.

# MIRRORSOFT

## SOFTWARE FOR ALL THE FAMILY

To MIRRORSOFT, PO Box 50, Bromley, Kent, BR2 9TT

Please send me the following (enter number required of each item in the space provided):

	Price	Spectrum 48K (01)	BBC B (03)	Electron (04)	CBM 64 (05)
First Steps with the Mr. Men (MM01)	£8.95				
Quick Thinking (QT01)	£6.95				
Caesar the Cat (CC01)	£6.95				

I enclose a cheque/PO for £..... made payable to "Readers' Account: Mirror Group Newspapers Ltd".

Or please debit my ACCESS/BARCLAYCARD for the sum of £..... card no. ....

YC2

I understand that my remittance will be held on my behalf in the bank account named above until the goods are despatched.

Signature .....  
Name .....  
Address .....  
Postcode .....

Offer applies to Great Britain and Euro only. Please allow up to 28 days for delivery in the UK. MIRRORSOFT is a registered trade mark of Mirror Group Newspapers Ltd., Co. Reg No. 168660. Reg. Office: Holborn Circus, London EC1.

# SPECTRUM

January SUPER-DEAL Offer!

## SEIKOSHA GPI00A MKII

- Printing speed 50 C.P.S.
- Full Graphics capability
- Double width character output under software control
- Centronics type parallel interface
- Paper width is adjustable up to 10 inches



**£199.95** Incredible Value for money!

SPECTRUM  
LOW  
PRICE

### Other Printer Bargains

SEIKOSHA GP100VC	£214.95
SEIKOSHA GP100AS	£214.95
SEIKOSHA GP-250X	£249.95
EPSON FX-80	£495.95
EPSON RX-80	£314.95
EPSON RX-80 F/T	£366.85
ALPHACOM 42 for VIC-20, Commodore 64, Dragon, Atari, BBC with required interface	£59.90
ALPHACOM 3C for ZX Spectrum	£59.95

	MICROLINE	
	Special Price	Normal Price
82A with RS-232	£199.95	£349.95
82A with Graphics	£199.95	£411.70
Model 92	£450	£495
Model 83A	£499.95	£641.70

The exciting new  
**QUENDATA**  
60CPS Printer  
**£229.00**  
Bit Print 24 for the BBC  
**£89.95**

## SOFTWARE

The Top sellers from leading British Software houses.

### Micro Dealer UK

#### ZX SPECTRUM

Legend "Valhalla"	£14.95
Ultimate "Lunar Jet Man"	£5.50
Ultimate "Atic man"	£5.50
Bug Byte "Manic Miner"	£5.95
Quicksilva "3-D Ant Attack"	£6.95
A&F "Chuckie Egg"	£6.90
CDS "Pool"	£7.50
Crystal "Hall of the Things"	£7.50
Ocean "Kong"	£5.90
Quicksilva "Games Designer"	£14.95
Imagine "Zoom"	£5.50
Incentive "Splatt"	£5.50
New Generation "Corridors of Genon"	£5.95
Quicksilva "Bugaboo"	£6.95
Ultimate "Jet Pac"	£5.50
Artic "Dimension Destructors"	£5.95
Protek "Hunter Killer"	£7.95
Red Shift "Apocalypse"	£9.95
Ocean "Transversion"	£5.50
Ultimate "Tranz Am"	£5.50
Addictive Games "Football Manager"	£6.95
Quicksilva "Aquaplane"	£6.95
Doric "Oracles Cave"	£7.95
Artic "3-D Combat Zone"	£5.95
Hewson "3-D Space Wars"	£5.95

#### COMMODORE 64

Llamasoft "Hover Bover"	£7.50
Llamasoft "Attack of the Mutant Camels"	£7.50

Melbourne House "Hungry Horace 64"	£5.95
Interceptor "Siren City"	£7.00
Games machine "The fabulous Wanda and the secret of Life, the Universe and everything"	£7.95
Bubblebus "Exterminator"	£5.99
Quicksilva "Purple Turtles"	£7.95
Ocean "Armagadden 64"	£6.90
Melbourne House "The Hobbit 64"	£14.95
Interceptor "Vautex Raider"	£7.00
Llamasoft "Matrix 64"	£7.50
Anirog "H-expert"	£7.95
Quicksilva "Quintic Warrior"	£7.95

#### VIC-20

Ultimate "Jet Pac"	£5.50
Llamasoft "Meta Galactic Llamas battle at the edge of time"	£6.00
Imagine "Bewitched"	£5.50
Quicksilva "Skyhawk"	£7.95
Llamasoft "Matrix"	£6.00
Interceptor "Crazy Kong"	£6.00
Imagine "Arcadia"	£5.50

#### BBC

Software Invasion "Attack on Alpha Centauri"	£7.95
Pision "Saloon Sally"	£7.95
DoctorSoft "Flight Simulator"	£7.95
Amcom "Space Highway"	£7.95
Alligator "Bug Blaster"	£7.95

#### ORIC

Softtek "Dracula's Revenge"	£6.95
UK Software "Zorgon's Revenge"	£8.50
Martech "Harrier Attack"	£6.95

#### DRAGON 32

Softtek "Ugh!"	£8.95
J Maurice Micros "Maurice Minor"	£7.95

#### SUNSHINE

Cruising (Dragon 32)	£6.95
Cruising (ZX Spectrum)	£4.95
Blind Alley (ZX Spectrum)	£4.95
Androids (ZX Spectrum)	£5.95
Galaxy Attack (ZX Spectrum 48K)	£5.95
Sword Fight (ZX Spectrum)	£5.95

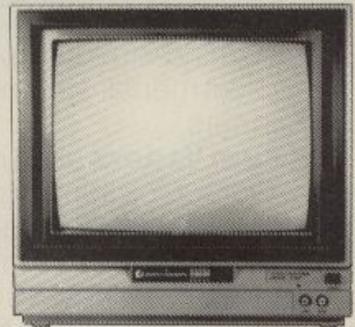
#### MICRODEAL

DRAGON	
The King	£8.00
Space War	£8.00
Defence	£8.00
Alcatraz	£8.00
Katerpillar Attack	£8.00
Space Monopoly	£8.00
Mansion Adventure	£8.00

#### SALAMANDER

Franklin's Tomb (Dragon, BBC, Oric)	£9.95
Lost in Space (Dragon, BBC, Oric)	£9.95
737 Flight Simulator (BBC B)	£9.95
Grid Runner (Dragon)	£7.95
Night Flight (Dragon)	£7.95
Dragon Trek (Dragon)	£9.95
Grand Prix (Dragon)	£7.95
Salamander Graphics System (Dragon)	£9.95
Golf (Dragon)	£7.95
Wizard War (Dragon)	£7.95

## MONITORS



**PHOENIX Amber (Normally £126.50) . £82.95**  
**COMMODORE 1701 with sound. . . . . £130.00**  
**SANYO 14" Colour TV (ideal as a monitor) . . . . . £229.95**  
**SANYO CDD 3125NB Colour Monitor. £285.35**  
**SANYO 12" Green Monitor . . . . . £99.95**

## BOOKS

<b>GRANADA PERSONAL COMPUTING TITLES</b>			
The ZX Spectrum and how to get the most from it	£5.95	The Dragon 32 book of games	£5.95
The Spectrum Programmer	£5.95	Computer Languages and their uses	£5.95
The Spectrum Book of Games	£5.95	Lynn Computing	£6.95
Introducing Spectrum Machine Code	£7.95	21 Games for the BBC Micro	£5.95
The Apple II Programmer's Handbook	£10.95	Choosing a Microcomputer	£4.95
Programming with Graphics	£5.95	Databases for fun & profit	£5.95
The Dragon & how to make the most of it	£5.95	Introducing the BBC Micro	£5.95
Computing for the Hobbyist & small Business	£6.95	<b>SUNSHINE</b>	
Simple Interfacing Projects	£6.95	The Working Spectrum	£5.95
The BBC Micro: An expert guide	£6.95	Functional Forth for the BBC	£5.95
Commodore 64 Computing	£5.95	The Working Dragon 32	£5.95
The Oric-1 and how to get the most from it	£5.95	Dragon 32 Games Master	£5.95
		The Working Commodore 64	£5.95
		Commodore 64 Machine Code Master	£6.95
		The Working Dragon	£5.95
		The Working Spectrum	£5.95
		The Working CBM 64	£5.95
		Dragon 32 Games Master	£5.95
		and many more!	

# Sensational COMMODORE VIC-20

Offers from Spectrum!



**VIC-20**  
ONLY  
**£99<sup>95</sup>**

Including:  
**4 FREE GAMES**  
Worth **£9.95**

## SOFTWARE SALE

**Multipack 1 £19.98**  
Omega Race, Voodoo  
Castle, Cosmic Crunch  
Avenger

**Multipack 2 £19.98**  
Gorf, Adventureland,  
Raid on Fort Knox,  
Mole Attack

**Multipack 3 £19.98**  
Sargon Chess, The Count,  
Mission Impossible,  
Cosmic Cruncher

**Multipack 4 £19.98**  
Sargon Chess, Pirate  
Cove, Rat Race,  
Super Lander

**Multipack 5 £19.98**  
Omega Race, The Count,  
Menagerie, Mole Attack  
While stocks last.

Viscount Cassette  
Interface ..... £12.95  
Alphacom 42 Printer with Vic  
20 Interface ..... £99.90  
Stack Light Pen ..... £28.75  
Plus 80 16K RAM. .... £37.99  
Viscount 64K RAM ... £69.95  
4 Slot Motherboard. £24.95  
Adman Chatterbox ... £49.95  
Zeta Joystick. .... £10.95

## COMMODORE 1520 PRINTER PLOTTER

ONLY  
**£99<sup>99</sup>** Limited Offer

## STACK LIGHT RIFLE



For Commodore  
64, VIC-20 &  
ZX Spectrum

Available for the SPECTRUM, VIC-20, and the COMMODORE 64 (Arriving Now!), comes complete with 12 feet of cable and three exciting action software games including "HIGH NOON SHOOTOUT" with full sound effects.

Spectrum  
Price **£29.95** Including 3  
FREE Games

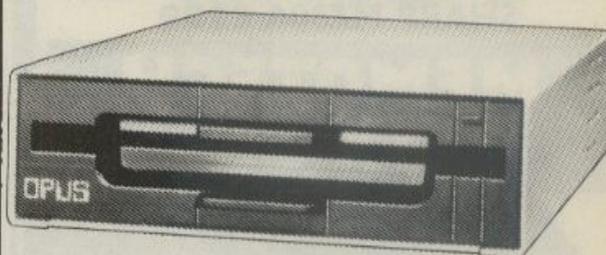
# BBC



**Model B Micro**  
SPECTRUM PRICE **£399**

Sensational Offer for BBC Owners!  
OPUS

## DISK DRIVE for BBC Model 'B'



Now from SPECTRUM - a DISK DRIVE for the BBC at under £180. Compare this price with any other Disk Drive for the BBC and we're sure you'll agree that this really is terrific value for money - But **HURRY!** stocks are limited and are sure to sell fast - so get to your local SPECTRUM dealer NOW!

**£189** Including:  
MANUAL &  
UTILITIES  
DISC.  
SPECTRUM  
LOW PRICE

## Other equipment for the BBC

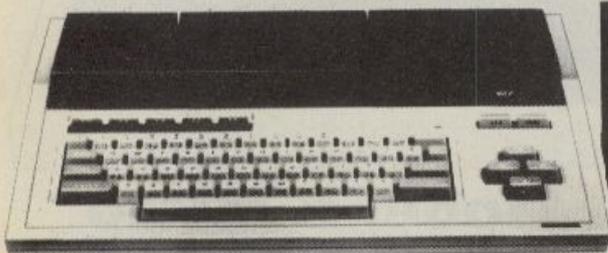
Limited Offer!  
**BBC Dual Disk  
Drive**  
SAVE £53.85  
**ONLY £750.00**  
Normal Price **£803.85**

**BBC  
BUGGY**  
**£189.00**  
Now available:  
RC DIGITAL TRACER  
for the BBC  
**£55.50**

GRAF PAD Graphics Tablet .....	£143.75
PROLINK Joystick Interface .....	£9.95
BIT-PRINT ZX Printer .....	£89.95
BBC Single Disk Drive .....	£265.00
BBC Disk Interface Kit (inc. fitting) .....	£97.00
Acorn Software Cassette-Based from .....	£9.95
Acorn Disk-Based software .....	£11.50
BBC Disk-Based software from .....	£9.95
BBC BUGGY Spectrum Price .....	£189.00
BBC Disk Manual & Utilities Disc .....	£34.50
QUICK-SHOT JOYSTICK Especially for the BBC - Spectrum Price .....	£19.95

Turn the page for more super  
offers from Spectrum . . .

# SPECTRUM



## SHARP MZ-711 (MZ-700 Series Computer)

FREE! 10 CASSETTE BASED GAMES

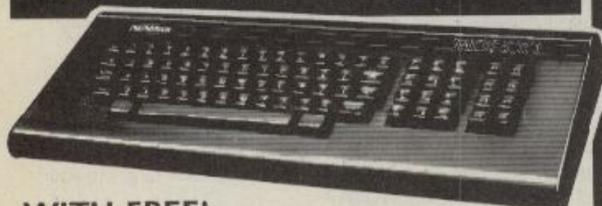
The super new colour computer from SHARP. Now available in limited quantities - including 10 FREE CASSETTE BASED GAMES from SPECTRUM

SPECTRUM PRICE  
**£249<sup>95</sup>**

SHARP PRINTER..... £129.95 CASSETTE RECORDER..... £39.95

SHARP MZ80A **£399**

## MEMOTECH MTX 512



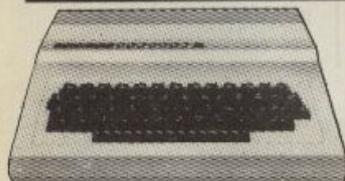
WITH FREE!  
BLANK DATA CASSETTE  
2 GAMES, HEAD CLEANER,  
DEMONSTRATION  
CASSETTE.

SPECTRUM PRICE  
**£315**

Also available MTX 500 **£275**  
SOFTWARE

- SUPER MINEFIELD ● CONTINENTAL INVADERS ● KILOPEDE ● MATHS 1 ● PHYSICS 1 ● FLIGHT SIMULATOR ● CHESS ● OTHELLO

## DRAGON 32 OFFER



**DRAGON PACK**  
Including:  
DRAGON 32, Computer  
Cassette Recorder, Joys-  
ticks and Dragon Games  
Pack.

ALL  
FOR  
ONLY **£199<sup>99</sup>**

Check with your local SPECTRUM dealer for price of separate items.

DRAGON 64 **£225.00**

## ATARI 600XL

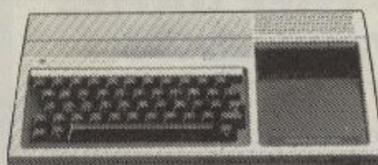


● 16K RAM expandable to 48K ● Full-stroke keyboard ● Full sound with 3½ octave range ● 11 Graphic Display modes ● Full colour (256 Colours - 128 colours can be displayed at one time) Ask to see this super new micro at your local SPECTRUM dealer NOW!

SPECTRUM PRICE  
**£159<sup>99</sup>**

TOUCH TABLET, TRACK BALL..... £39.99  
SOFTWARE..... £29.99  
DIG DUG..... £29.99  
LONE RAIDER..... £14.99

## TEXAS



### TI-99/4A

Exceptional value from SPECTRUM and representing probably the finest home micro computer value on the market today! - The TEXAS TI-99/4A is built to an extremely high standard and is highly recommended by SPECTRUM for its utter reliability.

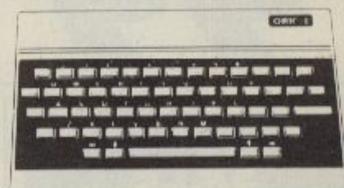
CHECK WITH YOUR  
LOCAL SPECTRUM  
DEALER FOR OUR  
SUPER LOW PRICE

Wide range of software available for TEXAS from your local SPECTRUM dealer.

## ACCESSORIES

C12 DATA CASSETTES..... £0.50  
C15 DATA CASSETTES..... £0.58  
VISCOUNT SINGLE SIDED, DOUBLE DENSITY (10) (FOR APPLE, COMMODORE, ATARI, TANDY)..... £21.25  
VISCOUNT SINGLE SIDED, SINGLE DENSITY (10)..... £21.25  
VISCOUNT DOUBLE SIDED, DOUBLE DENSITY (10) (FOR SHARP SUPERBRAIN, etc.)..... £33.81  
VISCOUNT SINGLE SIDED DOUBLE DENSITY 96 TRACK (10) (FOR NASCOM, COMMODORE 8050, etc.)..... £51.36  
EMPTY DISK CASES (FOR 5¼" DISKETTES)..... £1.95  
DISK HEAD CLEANER KIT..... £16.10  
TELEVISIONS  
12" T80 B&W PORTABLE..... £59.95  
CTP3131 14" COLOUR PORTABLE..... £229.95  
COMPUTER CASSETTE RECORDERS..... from £27.50  
ZETA Joystick for ATARI, COMMODORE, VIC-20 & 64, SPECTRUM & ORIC..... ONLY £10.95

## ORIC-I



### ORIC-I 48K Model

SPECTRUM PRICE

**£139<sup>95</sup>**

### ORIC-I 16K **£99.95** HALF PRICE OFFER!

Bring a copy of this ad to your local SPECTRUM dealer when you purchase an ORIC-4 48K or 16K and it will entitle you to purchase the following 4 titles of Software in a starter pack.

#### SOFTWARE

HOBBIT..... £14.95  
ULTIMATE..... £8.50  
DEFENCE FORCE..... £7.95  
RATSPAT..... £7.95  
HOUSE OF DEATH..... £9.99  
ORIC MUNCH..... £7.95  
FLIGHT..... £7.95  
CHESS..... £9.99

## CUMANA DISK DRIVES

FOR BBC  
CS100E..... £217.35  
CS100..... £244.95  
CS200E..... £254.15  
CS200..... £881.75  
FOR DRAGON  
CDS250..... £365.95  
CDS500..... £401.80  
CDS1000..... £503.95  
CDD500..... £557.60

# Everything you've ever wanted for your ZX SPECTRUM

Superb ZX add-on's from your local Spectrum dealer

New & exclusive to Spectrum!

## INDESCOMP

Superb quality add-on's for the ZX SPECTRUM



**INDESCOMP  
KEYBOARD**  
WITH FULLY  
ADJUSTABLE SOUND

**£59<sup>95</sup>**

**INDESCOMP  
SOUND AMPLIFIER**



**ONLY £10.95**

**INDESCOMP  
JOY  
STICK  
INTER-  
FACE**



**£14.95**

**INDESCOMP  
32K  
RAM  
PACK**



**£39.95**

**INDESCOMP  
DOMESTIC  
CONTROL-  
LER**



**£49.95**

**INDESCOMP RS232 & CENTRONICS  
PRINTER INTERFACE ..... £49.95**

**ALPHACOM Thermal Printer for ZX  
SPECTRUM - NOW DOWN TO £59.95**

## DIGITAL TRACER

From RD Labs  
for the ZX  
Spectrum

**£55.50**



**ZX SPECTRUM  
16K**

**£99.95**

**ZX SPECTRUM  
48K**

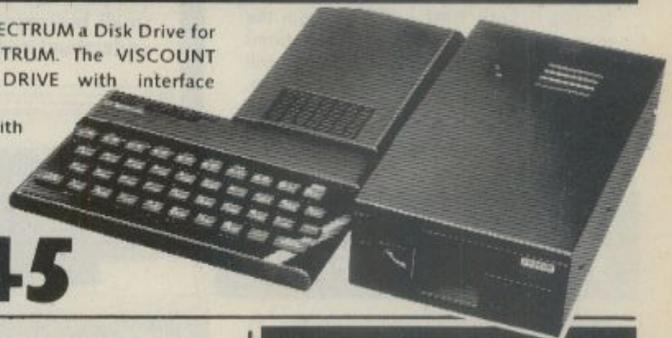
**£129.95**

Spectrum Computer Centres have no corner bin  
whatsoever with the ZX-Spectrum Computer  
manufactured by Sinclair Research Ltd.

## VISCOUNT DISK DRIVE

Now from SPECTRUM a Disk Drive for  
the ZX SPECTRUM. The VISCOUNT  
5¼" DISK DRIVE with interface  
system and  
complete with  
all leads.

**ONLY  
£245**



**DK TRONICS  
Dual Port Joystick Interface**

**£14.95**

**KEMPSTON  
Joystick  
Interface**

(Joysticks opt. extra)

**£15**

Joysticks with interface ..... £24.95  
Centronics Interface. .... £45.00



**CURRAH  
Speech  
Synthesiser  
£29.95**

**CHEETAH  
32K RAM  
Pack  
£39.95**



DK'TRONICS Keyboard ..... £45.00  
DK'TRONICS Lightpen. .... £19.95  
STACKLIGHT Rifle with  
3 FREE GAMES ..... £29.95

## PRISM VTX 5000 MODEM



Now, your ZX SPECTRUM is your key to  
the world with the incredible PRISM  
VTX 5000 MODEM

■ Versatile modem for ZX Spectrum (16K  
or 48K) versions ■ Slim design fits easily,  
matches your micro ■ Instant access to  
Prestel™ & Micronet 800 information ser-  
vices ■ Instant communication with other  
ZX Spectrum users ■ Use the Prism VTX  
5000 with a Sinclair printer - and print Pre-  
stel frames. Ask your local SPECTRUM dealer  
for further details - NOW!

**SPECTRUM PRICE**

**£99<sup>95</sup>**

**Sinclair ZX INTERFACE 2**

The new ROM Cartridge/Joystick interface.  
Loads programs instantly! Takes two joysticks!  
Just plug in and play.

**ONLY £19.95**

Plus! New ROM cartridge software.

**Turn the page for more super  
offers from Spectrum . . .**

# SPECTRUM

## NEWS from SPECTRUM

### January is SALE time!

January is SALE TIME and apart from the many January SUPER-DEAL offers featured in these ads most SPECTRUM dealers will be holding their own individual sales too, with big savings on a wide range of products. So for the best deal in HOME COMPUTERS - see your local SPECTRUM dealer NOW!

### Sensational PRINTER OFFER

Amazing Value! SEIKOSHA GR100 Mk. 11 plus FREE! box of paper (2000 sheets) and all for under £200, see our ad for details.

### Just arriving! COMMODORE 64 PORTABLE

with built-in monitor, single disk drive. Plus! FREE! Future Finance & Easy script programs. Very limited supplies at only £899.00 See your local SPECTRUM dealer now!

### DISK DRIVE for ZX SPECTRUM

Now from SPECTRUM a Disk Drive for the ZX SPECTRUM exclusive to SPECTRUM stores see our ad for full details.

### LATEST NEWS

● For up-to-date news, information & offers from SPECTRUM - see PRESTEL page 600181 for full details.

### COMPUTER DEALERS

(or prospective Computer dealers!) If you would like to know more about becoming a SPECTRUM APPOINTED DEALER on an exclusive area basis, please write to MIKE STERN, Spectrum (UK) Ltd., Burrowfield, Welwyn Garden City, Herts. or telephone (07073) 34761

## January SUPER DEAL Offer! COMMODORE 64

SAVE  
£350!

### BUSINESS PACKAGE

A complete business package based on the successful Commodore 64, including Sales/Invoicing and purchase ledger programs. All you need for a small business system that's extremely easy to understand and ready to run.



#### Includes

- COMMODORE 64
- DISK DRIVE
- COLOUR MONITOR
- COMMODORE PRINTER
- PURCHASE LEDGER PROGRAM
- SALES LEDGER PROGRAM
- EASY SCRIPT PROGRAM

#### Plus!

- FREE! GAMES DISK WITH SIX GAMES

FOR THE SMALL BUSINESSMAN... this has to be the business computer opportunity of a lifetime! This superb, top-value package includes everything you need to set up your own powerful small business/home Micro system.

There's the high-power Commodore 64 computer with its huge 64K RAM memory built-in and brilliant graphics capability, with full colour. The system's completed with a Commodore disk drive - store your entire filing system, accounts, sales records, etc. - plus tractor-feed printer, and a 1701 colour monitor.

It really is tremendous package - at SPECTRUM'S incredible low price, it's unbeatable!

ALL THIS FOR ONLY  
**£899<sup>95</sup>**

All items can be purchased separately - ask your local SPECTRUM dealer for price.

### FOR THE COMMODORE 64 HOME USER

- VIC 1452 Printer Plotter - Special January Offer... £99.99
- COMMODORE 64 with 4 FREE GAMES ..... £199.99
- SINGLE DISK DRIVE with FREE Easy Script  
and Future Finance programs ..... £230.00
- AZTEC Centronics Interface ..... £29.90
- VISCOUNT Cassette Interface ..... £12.95
- Plus! 100's of Software Titles now available.

# There's a Spectrum Centre near you . .

## AVON

Bath Software Plus, 12 York St  
Tel: (0225) 61676  
Bristol Brenal Computers Ltd,  
24 Park Row Tel: (0272) 294188  
Weston-Super-Mare K & K Computers,  
32 Alfred St Tel: (0934)419324

## BEDFORDSHIRE

Bedford Stanad Ltd.,  
115 Midland Rd. Tel: (0234) 49341  
Dunstable Dormans 7-11 Broad Walk  
Tel: (0582) 65515  
Leighton Buzzard The Computer Centre  
at Milton Keynes Music, 17 Bridge St  
Tel: (0252)376622  
Luton Terry-More, 49 George St  
Tel: (0562) 23391/2

## BERKSHIRE

Reading David Saunders, 8 Yield Hall  
Place Tel: (0734) 580719

## BUCKINGHAMSHIRE

Bletchley Rams Computer Centre,  
117 Queensway, Tel: (0908) 647744  
Chesham Reed Photography & Computers,  
113 High St. Tel: (0494) 783373

## CAMBRIDGESHIRE

Cambridge K P Computers Ltd.  
19/20 Market St. Tel: (0223) 312240  
Peterborough Peterborough Communica-  
tions, 91 Midland Rd. Tel: (0333) 41007

## CHANNEL ISLANDS

Guernsey Gruts, 3-5 The Pollett,  
St Peter Port. Tel: (0481) 24682  
Jersey Audio & Computer Centre,  
7 Peter St. St Helier. Tel: (0534) 74000

## CHESHIRE

Altrincham Mr Micro 28 High St.  
Tel: (061) 941 6213  
Chester Oakleaf Computers Ltd.  
100 Boughton Tel: (0244) 310099  
Crewe Microman Unit 2,  
128 Nantwich Rd. Tel: (0270) 216014  
Macclesfield Camera & Computer Centre  
118 Mill St. Tel: (0625) 27468  
Northwich Camera & Computer Centre,  
3 Town Square Tel: (0606) 45629  
Stockport Wilding Ltd.  
1 Little Underbank Tel: (061) 480 3435  
Warrington Wildings, 111 Bridge St.  
Tel: (0925) 38290  
Widnes Computer City, 78 Victoria Road.  
Tel: (051) 420 3333  
Wilmslow Swift of Wilmslow, 4-6 St  
Annes Parade. Tel: (0625) 526213

## CLEVELAND

Middlesborough McKenna & Brown,  
206 Linthorpe Rd. Tel: (0642) 222368

## CORNWALL

St Austell A B & C Computers, Duchy  
House, 6 Lower Aylmer Sq.  
Tel: (0726) 67337

## CUMBRIA

Barrow-in-Furness Barrow Computer  
Centre, 96 Church St. Tel: (0229) 38353  
Carlisle The Computer Shop, 56-58  
Lowther St. Tel: (0228) 27710  
Penrith Penrith Communications,  
14 Castlegate. Tel: (0768) 67146  
Open Mon-Fri till 8pm  
Whitehaven P D Hendren 15, King St.  
Tel: (0946) 2063

## DERBYSHIRE

Alfreton Gordon Harwood 69-71 High  
St. Tel: (0773) 832078  
Chesterfield The Computer Centre,  
14 Stephenson Place Tel: (0246) 208802  
Derby C T Electronics, at Camera Thorpe,  
The Spot Tel: (0332) 360456

## DEVON

Exeter Seven Counties (Computers) Ltd., 7  
Paris Street. Tel: (0392) 211212  
Exmouth Open Channel, 30 The Strand.  
Tel: (0395) 264408  
Plymouth Syntax Ltd, 76 Cornwall  
St. Tel: (0752) 28705  
Tiverton Actron Micro Computers,  
37 Hampton St. Tel: (0884) 252854  
Torquay Devon Computers, 8 Torhill Rd.,  
Castle Circus. Tel: (0803) 526303

## DORSET

Bournemouth Lansdowne Computer Centre  
1 Lansdowne Crescent. Tel: (0202) 20165

## DURHAM

Darlington McKenna & Brown,  
102 Bondgate. Tel: (0325) 459744

## ESSEX

Basildon Godfrey's 28-32 East Walk,  
Tel: (0268) 289379  
Basildon Godfrey's Computer Centre, 5  
Laindon Main Centre Laindon, Tel: (0268)  
416747  
Chelmsford Maxton Hayman Ltd.,  
5 Broomfield Rd. Tel: (0245) 354595  
Colchester Colchester Computer Centre,  
16 St. Botolphs St. Tel: (0206) 47242  
Grays H Reynolds, 79 Orsett Rd.  
Tel: (0375) 5948  
Ilford Woolfmans, 76 Ilford Lane.  
Tel: (01) 478 1307  
Loughton Micro & Movie Channel  
309 High Rd. Tel: (01) 508 1216

## GLOUCESTERSHIRE

Gloucester The Model Shop, 79-81  
Northgate St. Tel: (0452) 410693

## HAMPSHIRE

Aldershot David Saunders, 51 Station  
Rd. Tel: (0252) 20130  
Andover Andover Audio, 105 High St.  
Tel: (0264) 58251  
Basingstoke Fisher's, 2-3 Market  
Place Tel: (0256) 22079  
Portsmouth Cygnus Computers Ltd,  
261 Commercial Rd. Tel: (0705) 833938  
Portsmouth (Waterloo) 6 B  
Microland, 7 Queens Parade.  
Tel: (07014) 59911  
Southampton RJ Parker & Son Ltd.,  
11 West End Rd., Bitterne.  
Tel: (0703) 445926  
Winchester Winchester Camera &  
Computer Centre, 75 Parchment St.  
Tel: (0962) 53982

## HEREFORD

Hereford Melgray Hi-Tech Ltd.,  
49 Broad St. Tel: (0432) 275737

## HERTFORDSHIRE

Borehamwood Master Micro,  
36 Shenley Rd. Tel: (01) 953 6368  
Hitchin Camera Arts (Micro Computer  
Division), 68A Hermitage Rd.,  
Tel: (0462) 59285  
Potters Bar The Computer Shop,  
197 High St. Tel: (0707) 44417  
St Albans (Herts) Clarks Computer  
Centre 14-16 Hollywell Hill  
Tel: (0727) 52991  
Stevenage D J Computers, 11 Town  
Square. Tel: (0438) 65501  
Watford SRS Microsystems Ltd., 94 The  
Parade, High St. Tel: (0923) 26602  
Welwyn Garden City D J Computers, 40  
Frertherne Rd. Tel: (07073) 28435/28444

## HUMBERSIDE

Beverley Computing World, 10 Swaby's  
Yard Dyer Lane. Tel: (0482) 881831  
Grimsby AC Johnson Ltd., 22 Fringate,  
Riverhead Centre. Tel: (0472) 42031  
Hull The Computer Centre,  
26 Anlaby Rd. Tel: (0482) 26297

## ISLE OF MAN

Douglas T H Coleburn Ltd,  
57-61 Victoria St. Tel: (0624) 3482  
(Just Opening)

## ISLE OF WIGHT

Cowes Beken & Son, 15 Bath Rd. Tel:  
(0983) 297181

## KENT

Canterbury Kent Micro Systems, Conquest  
House, 17 Palace St. Tel: (0227) 50200  
Dover Kent Photos & Computers, 4 King St.  
Tel: (0304) 202020  
Orpington Ellis Marketing Ltd., 25 Station  
Sq, Pellets Wood. Tel: (0689) 39476  
Rainham Microway Computers Ltd., 39  
High St. Medway Towns  
Tel: (0634) 376702  
Sevenoaks Ernest Fielder Computers,  
Dorset St. Tel: (0732) 456800  
Sittingbourne Computers Plus, 65 High St.  
Tel: (0795) 25677  
Tunbridge Wells Modata Computers Ltd.  
28-30 St Johns Rd. Tel: (0892) 41555

## LANCASHIRE

Accrington PV Computers,  
38A Water St. Tel: (0254) 36521/32611  
Blackburn Tempo Computers, 9 Railway  
Rd. Tel: (0254) 691333  
Buryley IMO Computer Centre, 39/43  
Standish St. BB11 1AP Tel: (0282) 54299  
Bury (Lancs) Micro-North, 7 Broad St.  
Tel: (061) 797 5764  
Preston Wilding's, 49 Fishergate.  
Tel: (0772) 556250

## LEICESTERSHIRE

Leicester Youngs, 40/42 Belvoir St.  
Tel: (0533) 544774  
Market Harborough Harborough Home  
Computers, 7 Church St.  
Tel: (0858) 63056

## LINCOLNSHIRE

Grantham Oakleaf Computers Ltd, 121  
Dudley Rd. Tel: (0476) 76994/60000  
Lincoln MKD Computers, 24 Newlands,  
Tel: (0522) 25907

## LONDON

E6 Percivals, 85 High St. North, East Ham.  
Tel: (01) 472 8941  
E8 McGowans, 244 Graham Rd., Hackney.  
Tel: (01) 533 0935  
E11 Sidney Levy, 17-19 Leather Lane.  
Tel: (01) 242 3456  
EC2 Devron Computer Centre, 155 Moorgate  
Tel: (01) 638 3339/1830  
N14 Logic Sales, 19 Broadway, The Bourne,  
Southgate. Tel: (01) 882 4942  
N20 Castlehurst Ltd, 1291 High Rd.  
Tel: (01) 446 2280  
NW4 Da Vinci Computer Store, 112 Brent  
Pl. Hendon Tel: (01) 202 2272  
SE1 Vic Odden's 6 London Bridge Walk.  
Tel: (01) 403 1988  
SE9 Square-Deal, 373-375 Footscray Rd.  
New Eltham. Tel: (01) 859 1516  
SE11 Gatwick Computers, 328 Kennington  
Park Rd. Tel: (01) 587 0336  
Adjacent to Oval Tube  
SE15 Castlehurst Ltd., 152 Rye Lane,  
Peckham. Tel: (01) 639 2205  
SE25 Ellis Marketing, 79 High St., South  
Norwood. Tel: (01) 653 4224  
SW6 Chelsea Micros Ltd., 14 Jordan Place.  
Next to Fulham Bway.  
Tel: (01) 385 8494  
SW16 Buffer Micro Shop, 310 Streatham  
High Rd. Tel: (01) 769 2887  
SW19 Emcom, 31 High St., Wimbledon. Tel:  
(01) 947 7678  
W1 Computers of Wigmore St., 87 Wigmore  
St. Tel: (01) 486 0373  
W1 GK Photo & Computers, 92-94 Wardour  
St. Tel: (01) 437 0182  
W1 Devron, 4 Edgware Rd.  
Tel: (01) 724 2373  
W1 Sonic Photo & Micro Centre, 256  
Tottenham Court Rd. Tel: (01) 580 5826  
W1 Computer Plus, 219 Regent St.  
Tel: (01) 437 10714  
W7 TK Electronics, 11/13 Boston Rd.,  
Hansell. Tel: (01) 579 2842  
WC2 City Camera Exchange, 115 Kingsway  
Tel: (01) 405 0446

## MANCHESTER GREATER

Bolton Wilding Ltd., 23 Deansgate.  
Tel: (0204)33512  
Hyde Pase, 213-215 Market St.  
Tel: (061) 366 5935  
Manchester Lumax Ltd., 8 Exchange St  
St Ann's Square. Tel: (061) 832 6167  
Oldham Home & Business Computers Ltd.,  
54 Yorkshire St. Tel: (061) 6331608  
Rochdale Home & Business Computers, 75  
Yorkshire St. Tel: (0706) 344654  
Swinton Mr Micro Ltd., 69 Partington Lane.  
Tel: (061) 728 2282  
Late Night Friday  
Wigan Wilding Ltd., 11 Mesnes St.  
Tel: (0942) 44382

## MERSEYSIDE

Birkenhead Fairs Cameras & Hi-Fi, Dacre  
Hill, Rock Ferry. Tel: (051) 645 5000  
Heswall Thornguard Computer Systems,  
46 Penryn Rd. Tel: (051) 342 7516  
Huyton Ian Houghton 5 Huyton Hey Rd. Tel:  
(051) 489 5785  
Liverpool Beaver Radio, 20-22 White-  
chapel Tel: (051) 709 9898  
Liverpool (Aintree) Hargreaves, 31-37  
Warbreck Moor. Tel: (051) 525 1782  
Southport Central Computers, 575 Lord St.  
Tel: (0704) 31881  
St Helens Studio 55, 55 Ormskirk St.  
Tel: (0744) 39496

## MIDDLESEX

Edgware Breker 1-4, 130 High St.  
Tel: (01) 952 7488/8660  
Narrow Camera Arts, (Micro Computer  
Division) 24 St Annes Rd.  
Tel: (01) 427 5469

Hayes Chipstop, 1000 Uxbridge Rd.  
Tel: (01) 573 2511 (Just Opening)  
Teddington Andrews, Broad St.  
Tel: (01) 977 4716  
Uxbridge J K L Computers, 7 Windsor St.  
Tel: (0895) 51815

## NORFOLK

Fakenham Fastview, 12 Norwich Rd.  
Tel: (0328) 51319  
Norwich Sound Marketing, 52 St  
Benedicts St. Tel: (0603) 66725  
Thetford C B & Micros, 21 Guildhall St.  
Tel: (0842) 61645

## NORTHAMPTONSHIRE

Northampton Dormans, 22 Princes Walk  
Grosvenor Centre. Tel: (0604) 37031

## NOTTINGHAMSHIRE

Nottingham Cameo Computer, 6/9/10  
Trinity Walk. Tel: (0602) 742912  
Nottingham Jacobs Computers, 13  
Middlegate Newark. Tel: (0636) 704873  
(Just Opening)  
Worksop Computergraphix, 132 Bridge St.  
Tel: (0909) 472248

## NORTHERN IRELAND

Belfast Arthur Hobson Ltd., 37 Great Vic-  
toria St. Tel: (0232) 246336  
Co Armagh Pedlows, 16 Market St.  
Portadown Craigavon. Tel: (0762) 332265  
Londonderry Foyle Computer Systems, 3  
Bishop St. Tel: (0504) 268337  
Newry Newry Computer Centre, 34  
Monaghan St. Tel: (0693) 66545

## OXFORDSHIRE

Abingdon Ivor Fields Computers, 21 Sturt  
St. Tel: (0235) 21207  
Banbury Computer Plus, 2 Church Lane.  
Tel: (0295) 55890  
Henley-on-Thames Family Computers  
Ltd, 40A Bell St. Tel: (0491) 575744  
Oxford Ivor Fields, 7 St Ebbes St.  
Tel: (0235) 21207

## SCOTLAND

Aberdeen North East Computers, 1-3 Ellis  
St, Peterhead. Tel: (0779) 79900  
Ayr Vennals, 6A New Bridge St.  
Tel: (0292) 264124  
Dumfries Vennals, 71 English St.  
Tel: (0387) 54547  
Edinburgh The Silicon Centre, 6-7 Antigua  
St. Tel: (031) 557 4546  
Glasgow Victor Morris Ltd., 340 Argyle St.  
Tel: (041) 221 8598  
Hamilton Tom Dickson Computers, 8-12  
Caldow St. Tel: (0698) 283193  
Kilmarnock Vennals, 49 Foregate.  
Tel: (0563) 32175  
Kirkcaldy Kirkaldy Photographic Services,  
254E High St, Fife. Tel: (0592) 204734  
Stirling R Kilpatrick, 58 Port St.  
Tel: (0786) 5532

## SHROPSHIRE

Shrewsbury Computerama, 13 Castlegate.  
Tel: TBA  
Telford Computer Village, 4 Hazeldine  
House Telford Town Centre. Tel: (0952)  
504666

## SOMERSET

Taunton Grays, 1 St James St.  
Tel: (0823) 72986

## S IRELAND

Dublin Edtek Computer Co Ltd., Unit 6  
Powerscourt Town House Centre South  
William St. Tel: Dublin 719934

## STAFFORDSHIRE

Stafford Computerama, 59 Forgate St.  
Tel: (0785) 41899  
Stoke-on-Trent Computerama, 11 Market  
Square Arcade Hanley.  
Tel: (0782) 268620

## SUFFOLK

Bury St Edmunds Bury Computer  
Centre, 11 Guildhall St.  
Tel: (0284) 705772  
Felkistows KM Communications Ltd, 4  
Manning Rd. Tel: (0394) 271113/273459  
Ipswich Brainwave, 24 Crown St.  
Tel: (0476) 50965  
Lowestoft John Wells, 44 London Rd North.  
Tel: (0502) 3742

## SURREY

Camberley Camera Arts (Micro Computer  
Division), 36 High St. Tel: (0276) 65848  
Chertsey Chertsey Computer Centre, 1  
Windsor St. Tel: (09328) 64663  
Croydon Classic Cameras 16 St. Georges  
Walk. Tel: (01) 686 2012  
Frimley Micro & Telex Services Ltd, 105  
Mythcett Rd. Tel: (0252) 513282/513215  
Guildford The Model Shop, 23 Swan Lane  
Tel: (00772) 39115  
Haslemere Haslemere Computers, 25  
Junction Pl. (Adj. Rex Cinema)  
Tel: (0428) 54428  
New Malden Surrey Micro Systems, 31  
High St. Tel: (01) 942 0478  
Richmond Crest Computer Services, 8 Hill  
St. Tel: (01) 940 8635  
Wallington Surrey Micro Systems Ltd, 53  
Woodcote Rd. Tel: (01) 647 5636  
Woking Harpers, 71-73 Commercial Way.  
Tel: (04862) 25857

## SUSSEX

Sexhill-on-Sea Computerware, 22 St  
Leonards Rd. Tel: (0424) 223340  
Crawley Gatwick Computer Services, 62  
Boulevard. Tel: (0293) 37842  
Littlehampton Allan Chase Ltd., 39 High  
St. Tel: (09064) 5674/4545

## TYNE & WEAR

Newcastle-on-Tyne Newcastle Camera &  
Computer Mart, 16 Northumberland Court.  
Tel: (0632) 327461

## WALES

Aberdare Inkey Computer Services Ltd., 70  
Mill St. The Square Treycynon.  
Tel: (0685) 861828  
Aberystwyth AberData at Galloways, 23  
Fier St. Tel: (0970) 615522  
Cardiff Randall Cox, 18-22 High St Arcade.  
Tel: (02923) 31960  
Llandudno (Gwynedd) Computer Plus Dis-  
count, 15 Clonwy St. Tel: (0492) 79943  
Newport (Gwent) Randall Cox, 118  
Commercial St. Tel: (0633) 67378  
Fembrake Randall Cox, 19 Main St.  
Tel: (0641) 682876  
Port Talbot Micro Gen, 6 Royal Buildings  
Talbot Rd. Tel: (0639) 887300  
Wrexham T E Roberts, 26 King St.  
Tel: (0978) 364404/364527

## WARWICKSHIRE

Leamington Spa IC Computers, 43 Russell  
St. Tel: (0926) 36244  
Rugby The Rugby Micro Centre, 9-11  
Regent St. Tel: (0788) 70522

## WEST MIDLANDS

Birmingham Sherwoods, 61 Western  
Arcade. Tel: (021) 236 7211  
Coventry Greens, 22 Market Way  
Tel: (0203) 28342  
Dudley Central Computers, 35 Church Hill  
Precinct. Tel: (0384) 238169  
Edlington The Gamekeeper Grand Fare,  
High St. Tel: (021) 384 6108  
West Bromwich Bell & Jones, 39 Queens  
Square. Tel: (021) 553 0920

## WILTSHIRE

Salisbury Whymark Computer Centre, 20  
Milford St. Tel: (0722) 26688

## WORCESTER

Kidderminster Central Computers, 20-21  
Backwell St. Tel: T.B.A.  
Worcester David Waring Ltd., 1 Marmion  
House High St. Tel: (0905) 27551

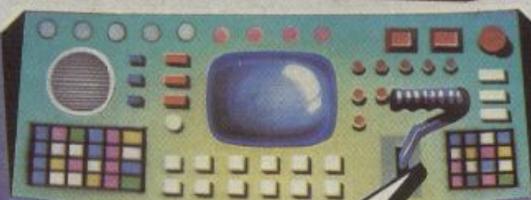
## YORKSHIRE

Bradford Ericks, Fotosonic House Rawson  
Square. Tel: (0274) 309266  
Dewsbury Home & Business Computers,  
59 Daisy Hill. Tel: (0241) 455300  
Doncaster The Soft Centre 8 Queensgate  
Waterdale Centre Tel: (0302) 20088  
Huddersfield Richards (Formerly Lauries)  
12 Queen St. Tel: (0484) 25334  
Leeds Bass & Bligh, 4 Lower Briggate.  
Tel: (0532) 454451  
Sheffield Superior Systems Ltd., 178 West  
St. Tel: (0742) 755005  
Skipton Look & See, 45 Belmont Bridge.  
Tel: (0756) 60078  
York York Computer Centre 7 Stonegate  
Arcade. Tel: (0904) 641862

**"ATTENTION, EARTHLINGS...**



**...Beam us down to A&F Software."**



	BBC	ELECTRON	DRAGON	SPECTRUM
CHUCKIE EGG	✓	✓	✓	✓
CYLON ATTACK	✓	✓		
JUNGLE FEVER				✓
PHARAOHS TOMB	✓	✓		✓



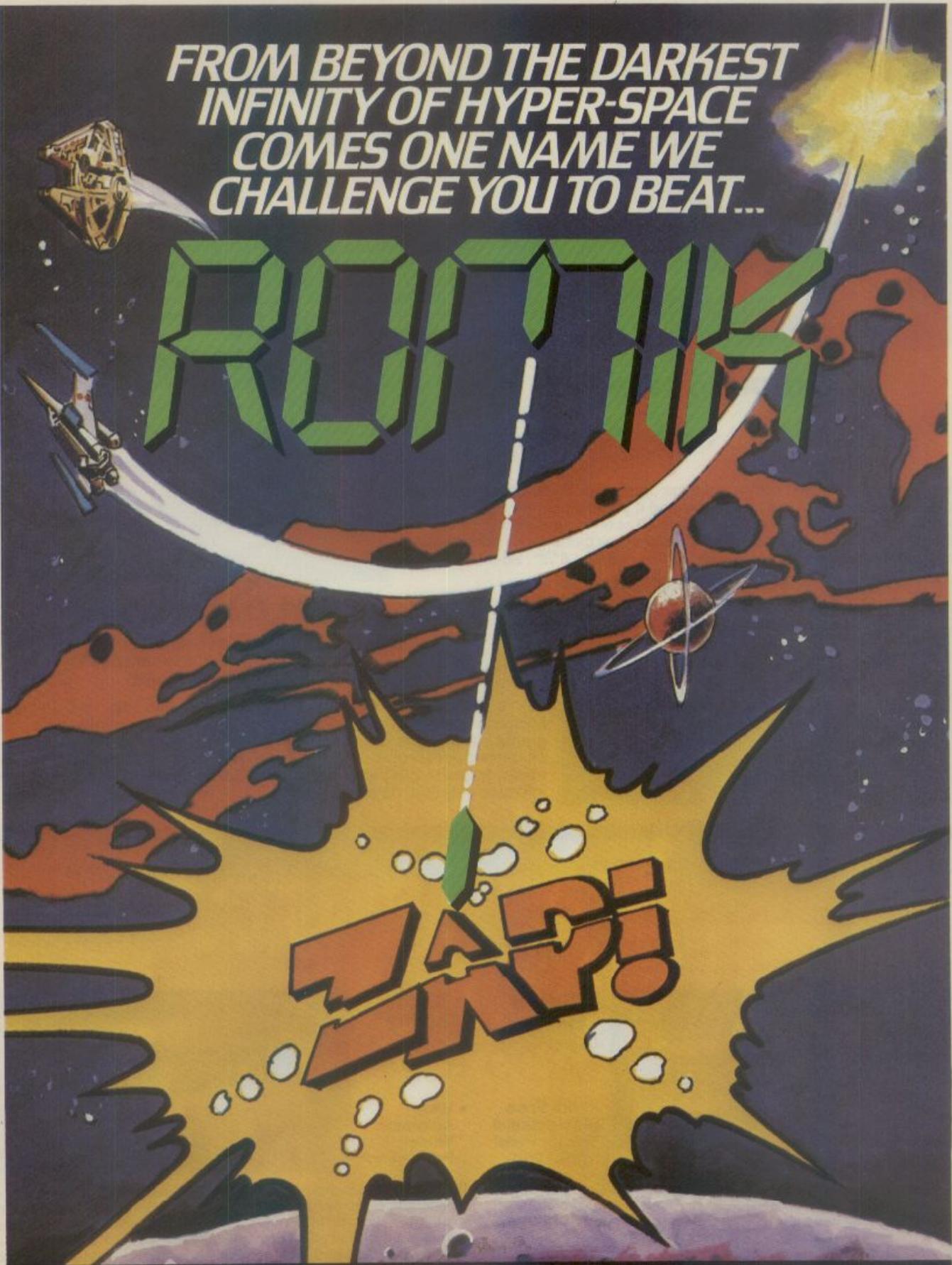
**A&F Software**

Available from W.H. Smiths,  John Menzies and all leading computer stores.

Unit 8, Canalside Industrial Estate,  
Woodbine Street East, Rochdale, Lancs.  
OL16 5LB. Tel: 0706 341111

*FROM BEYOND THE DARKEST  
INFINITY OF HYPER-SPACE  
COMES ONE NAME WE  
CHALLENGE YOU TO BEAT...*

# RODNIK



Games we challenge you to beat...on the 64, Vic 20, Spectrum, ZX81, BBC, Electron, Dragon, Oric, Lynx and Atari. See your local dealer for details.

# Tandy<sup>®</sup> TRS-80: Setting The Standard<sup>™</sup>

## With Dot Matrix Printers...



### 9 1/2" Dot-Matrix

**£399**

- With Colour Computer and Parallel Interfaces

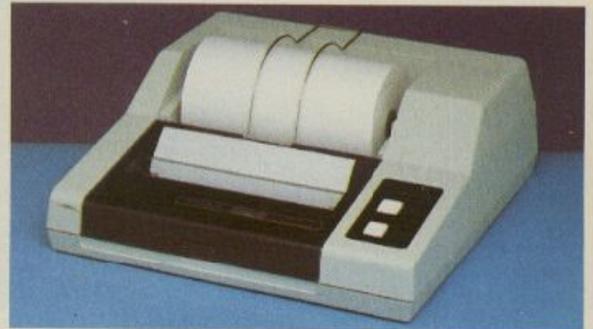
**DMP-120.** This versatile 9 1/2" dot-matrix printer has high speed data processing and graphics modes, that makes light work of many many tasks. It prints ten and 16.7 characters per inch, or elongated five and 8.3 characters per inch at up to 125 characters per second. A very compact printer it uses fanfold, single sheet or roll paper and has built in parallel and colour computer compatible serial interfaces. **26-1255**

### Colour Graphics

**£149**

- Uses Easily Replaceable Ink Cartridges

**CGP-115.** Ultra-compact colour graphics printer helps you create beautiful graphics in red, green, blue and black, and it prints alphanumerics. Built-in commands make it easy! Text mode prints 40 or 80 characters per line at 12 characters per second. Uses easily replaceable ink cartridges. A selection of colour pens is available. Set measures 2<sup>15/16</sup> x 8<sup>1/4</sup> x 8<sup>1/2</sup>". **26-1192**



### Low Cost Dot-Matrix

**£79<sup>95</sup>**

- Print Graphics and Alphanumerics
- Whisper Quiet!

**TP-10 Thermal Printer.** Perfect for use with the MC-10 Colour Microcomputer, and our other colour computers. You can print both screen graphics and alphanumerics. Textmode prints 32 characters per line at 30 characters per second on 4<sup>1/8</sup>" wide thermal paper. Special repeat function to make graphics programming easier. Colour computer-compatible serial interface only (600 baud). **26-1261**



## ..Or Choose The Daisy Wheel Printer That Best Suits Your Needs.



"Letter Perfect"

**£1199**

With Free Bi-Directional Tractor Feed (26-1459)

"Letter Quality"

**£599**

• With Automatic Wheel Positioning



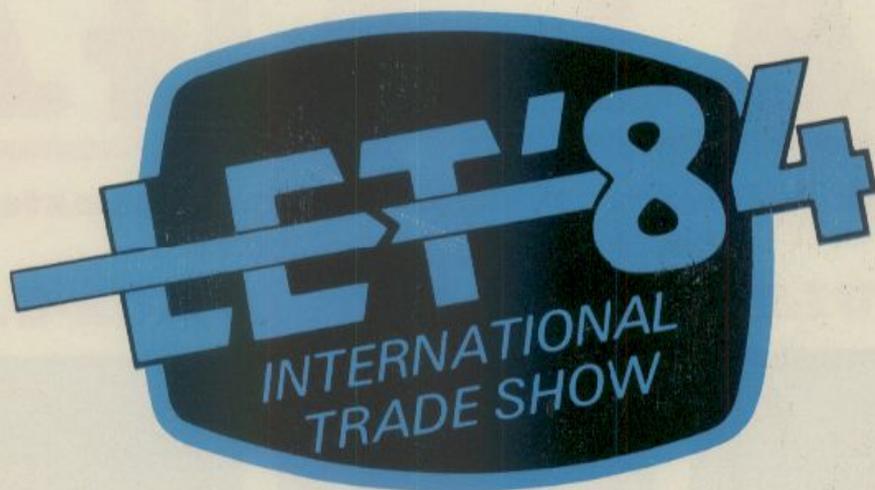
**DWP-410.** Ideal for SCRIPSIT<sup>™</sup> word processing! Select ten or 12 characters per inch, or proportional pitch. Forward and reverse paper feed and 1/2 line feed, underline and programmable backspace. Includes 1/120" space and 1/48" line feed. Automatic paper set makes paper insertion easy. Uses interchangeable print wheels for type selection. EPM mode for special wheels. **26-1250**

**DWP-210.** A low-cost printer for that "professional look"! Select ten or 12 characters per inch, or proportional pitch. Prints over 200 words per minute (18 characters per second) at ten characters per inch. Easily handles an original plus two copies, features 1/200" space and 1/48" line feed, ribbon end, cover open and paper empty sensing. With carbon ribbon and Courier 10 print wheel. **26-1257**

# Tandy

Tandy<sup>®</sup> The Largest Electronics Retailer In The World With Over 350 Stores Nationwide We're Near You.

# The Key to your Future Success



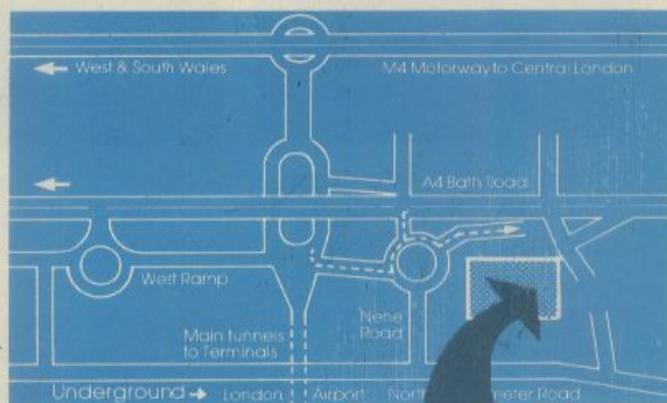
HOME COMPUTERS,  
SOFTWARE,  
LEISURE ELECTRONICS.

## Looking at the Leisure Electronics Market together

The Leisure Electronics Market has expanded rapidly over the last twelve months. Retail profit has increased accordingly and there are few who are presently unaware of the great future potential for this area.

LET '84 is your opportunity to come along and find out at first hand what the trade is doing right now, and their ideas for the future.

Sponsored by 'LET', the trade journal and by the Computer Trade Association, this trade — only exhibition provides a platform from which all aspects of this boom industry can get together to build new, and strengthen existing contacts, and plan for the years ahead.



**HEATHROW PENTA HOTEL**

**FREE TICKET**

For Free Entry to the LET '84 International Trade Show

Please send me ..... tickets

**FREE TICKET**

Name.....

**FREE TICKET**

Job Title.....

**FREE TICKET**

Company.....

**FREE TICKET**

Address.....

**FREE TICKET**



HOME COMPUTERS,  
SOFTWARE,  
LEISURE ELECTRONICS.

Heathrow Penta Hotel,  
13th, 14th, 15th February 1984.  
10.00 — 6.00pm

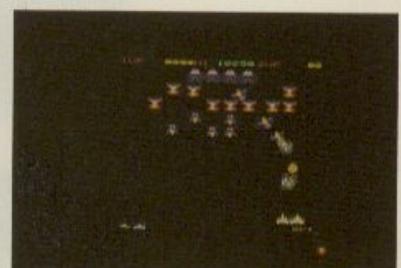
Send to: LET '84, Wheeland Journals, Penn House, Penn Place, Rickmansworth, Hertfordshire, WD3 1SN. Tel: 0923 774262

**ORLANDO'S BACK!**

# ZALAGA

**Aardvark Software, creators of the Ultimate Atom Games, bring you NOW**

**THE ULTIMATE BBC SPACE-GAME**



Seated at your computer, streams of multi-coloured aliens swirl past your laser-base into formation. The first squadron appears harmless, but later waves will avenge the deaths of their comrades with increasing ferocity. To combat the swooping bomb dropping meanies, you may try to link up a pair of laser-bases and **double your fire power!** Your progress through successive phases will be rewarded by challenge stages, where large bonuses may be earned. The game builds up to a dizzying crescendo of high speed motion where instant reflexes and pure technique are your only hope of survival. . .

One or two player game • Keyboard or joystick • Sound on or off • Escape facility  
• Works on all OS's and Tubes • Ten name Hi-score table • Mode 2 full colour graphics • Continuous rolling twinkling stars • Multiple missiles • Full screen action • Attractively packaged in a collectable library case • High quality cassette • Full instructions • For BBC model B or A + 32K •

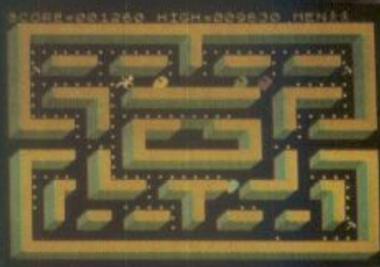
Send cheques/P.O.s for £6.90 to

**Aardvark Software,  
100 Ardleigh Green Road,  
HORNCHURCH, Essex.**

**FRAK coming soon . . .**



**LUNA CRABS**  
By M.J. ESTCOURT



**HAUNTED HEDGES**  
By DEREK BREWSTER



**DEATH CHASE**  
By M.J. ESTCOURT

Kempston Joystick Compatible

# MICROMEGA

## For any Spectrum

ALL TITLES £6.95 INC VAT.  
SELECTED MICROMEGA PRODUCTS  
THROUGH: BOOTS, GREENS, ASDA,  
JOHN MENZIES, LASKYS, WIGFALLS,  
RUMBELOWS, HMV, SELFRIDGES,  
WH SMITHS, SPECTRUM SHOPS  
EVERYWHERE AND ALL OTHER GOOD  
SOFTWARE STOCKISTS

## Trade Enquires

PRISM 01 253 2277  
WEBSTERS SOFTWARE 0486 84152  
LIGHTNING RECORDS AND VIDEO 01 969 5255  
MICRO DEALER UK - ST ALBANS 04351



**STARCLASH**  
By DEREK BREWSTER

Kempston Joystick Compatible

# NEW SOFTWARE FOR A NEW DIMENSION

Micromega - Personal Computer Division - Quantec Systems and

If you're selling at  
The Computer Trade Show,  
you should be seen in

# Micro Business

Micro Business is the magazine read by retailers and dealers for trade information on microcomputer products.

Each issue carries news of the latest hardware and software available for retail sale, with information on the terms of trade, technical support and promotion - plus a whole range of reports and comments designed to keep the retailer and dealer up to

date with what suppliers are offering and what the market is buying.

The March issue will preview The Computer Trade Show, Britain's premier exhibition for dealers and retailers, **and will carry the official catalogue.** If you're exhibiting at the show, or need to be seen by an audience of thousands of dealer visitors, you need to advertise in this issue.

Phone Ken Walford on **01-661 3139** or clip the coupon

In am interested in advertising in your March issue. Please let me have details.

Name \_\_\_\_\_

Job Title \_\_\_\_\_

Company \_\_\_\_\_

Address \_\_\_\_\_

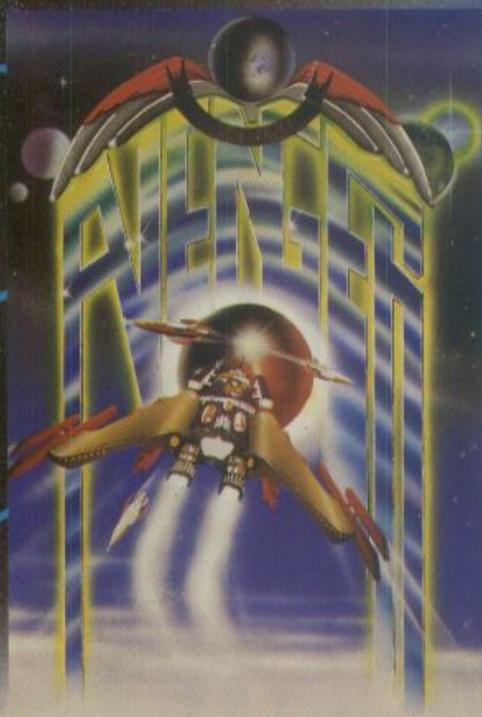
Tel \_\_\_\_\_

Telex \_\_\_\_\_

YCOM

Mail this coupon to Ken Walford, Advertising Manager, Micro Business,  
Quadrant House, The Quadrant, Sutton, Surrey SM2 5AS, UK

We're not quite sure whether the World's ready for these games... but we've released them just the same.



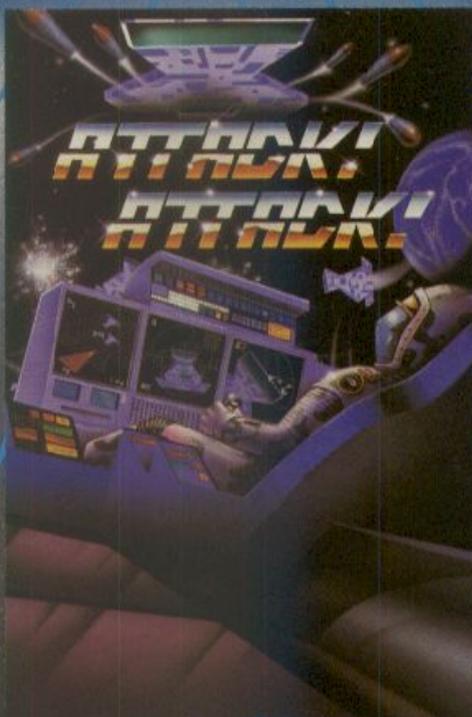
The Marcon Empire have invaded Earth and enslaved the population. An endless stream of stellafreighters now plunder the earth's mineral wealth, draining the very lifeblood of the planet.

A small band of freedom fighters are still operating from an abandoned mining station on the Moon, one of them is you.

As you set out from your secret base your first objective is to manoeuvre through the barrier of lethal space mines to one of the enemy re-charging stations to re-charge your neodinium lasers; then you will be able to carry on with your mission of destroying the marauding stellafreighters.

There is rumour of a Marcon munition station near by, heavily defended by missiles. If only you could locate and plunder it; your heroic band of avengers would then have enough fire power to strike a massive blow for freedom... or die in the attempt...

Avenger is for the Dragon 32.



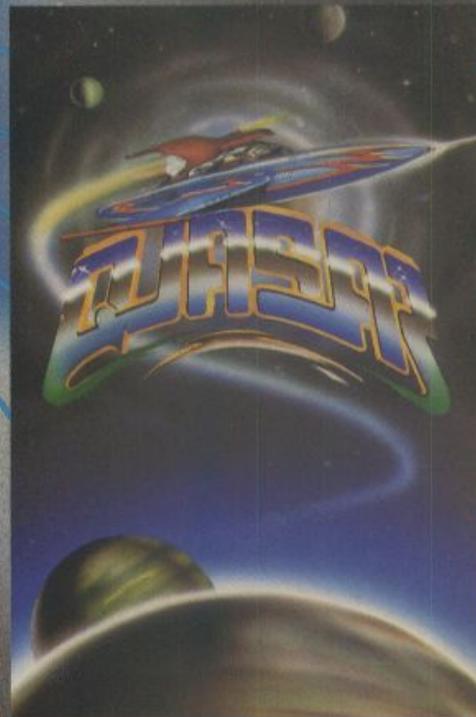
Available soon

Tension mounts as your Stratofighter enters the patrol area. Enemy Skyfreight Convoys are increasing as their need for Irridon Ore grows in the arms race against you.

Your raydon missile sight picks up an enemy convoy entering your quadrant. You select hyperdrive and are slammed back in your seat. Fighters hover over firing buttons as enemy fighters peel away from the convoy to engage you. As your epic battle begins the enemy Skyfreighters unleash wave after wave of air to air missiles against you. The battle rages on and your will to survive and determination to win increases. The convoy must be destroyed; your people are depending on you.

Night falls and glaring explosions fill the sky; don't let your concentration wander, if the convoy gets through your people are doomed, you must succeed, you must.

Attack Attack is for the Commodore 64.



Your mission: destroy the Etron rocket base on the planet Hagon.

Piloting the most sophisticated space fighting yet conceived you know that if your mission fails the awesome Etron rocket attacks will destroy your galaxy.

Entering the fearsome space tunnel, the first of Hagon's many sophisticated defence systems, every fibre of your being is filled with dread.

The Hagon fleet have been alerted and wave after wave of Astrofighters come hurtling toward you. As you battle your way to the end of the tunnel you begin to realise just how suicidal this mission could be.

Zooming through Hagon's defensive asteroid belt your concentration intensifies; you have only a fraction of a second to differentiate between asteroids, space mines and Etron rockets as they flash toward you.

Hugging the planet's surface, dodging defence poles and trying to deal with everything else the Hagon's throw at you, you remind yourself that the fate of an entire galaxy rests on the outcome of your mission; you must succeed... Quasar is for the Commodore 64.

Any of these games for just

**£5.99** including a lifetime guarantee and dispatch back to you by return of post each

Trade enquiries welcome, ring Roy Butler on 051-647 8616 NOW!!

Please supply the following games:

	No. of copies	I enclose a cheque/ P.O. payable to: Voyager Software
Avenger	<input type="checkbox"/>	for £.....
Quasar	<input type="checkbox"/>	
Attack Attack	<input type="checkbox"/>	

Name .....

Address .....

Voyager Software, Business Centre, Claughton Road, Birkenhead, Merseyside, L41 6ES. Tel: 051-647 8616.

Voyager Software, Business Centre, Claughton Road, Birkenhead, Merseyside, L41 6ES. Telephone: 051-647 8616.



SINCE THE LAUNCH OF THE SPECTRUM, THERE HAS BEEN MUCH TALK OF 'ARCADE PERFECT' GAMES, BUT THE IDEAL HAD NOT APPEARED, UNTIL.....

# STARBLITZ

'THE DEFINITIVE VERSION'



**SOFTTEK**  
**MASTERS OF THE GAME**

## STARBLITZ - £6.95

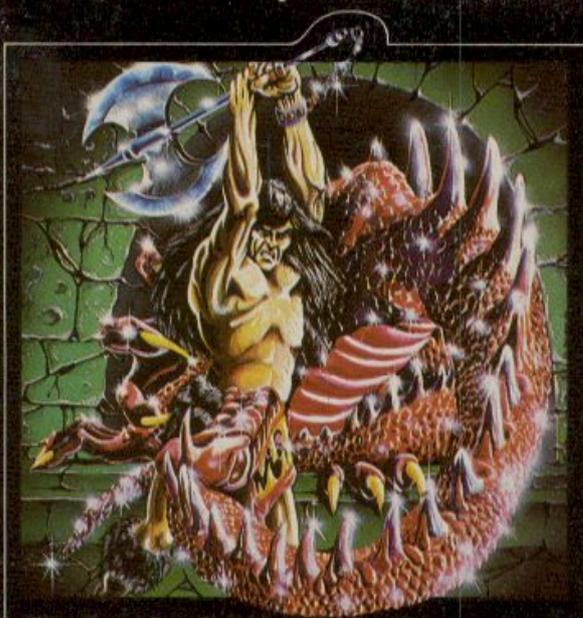
At last a true 'Arcade Perfect' game for the ZX Spectrum. Swarms, Aliens, Mutants, Full Colour Laser Fire and Explosions.....It's all there!. Smooth Hi-Resolution Graphic Movement of a quality and speed unattained on any similar Spectrum program before. If you are a hardened Vid Kid then your wait is over for a game which is truly a match for your skills.

Available from most major outlets nationwide. Mail Order: Send your Cheques to Softek House, Tranquil Passage, London SE3 0BJ. Dealers Contact: EMI Distribution or Phone us directly on 01-318 5424.

SOFTTEK INTERNATIONAL LTD. 12/13 Henrietta Street, London, WC2E 8LH.

# SPOT THE DIFFERENCE!

Choosing which game to buy from the mountain available is a difficult job, especially when everyone claims to produce the best on the market. But how can you tell the best from the rest?. To help you decide, read on. . .



## THE DUNGEON MASTER

Let your Spectrum be your guide in a totally new dimension in adventures in the true spirit of traditional role playing games where YOU design the scenario.

"I have been a Dungeons and Dragons fan for several years...The package provides excellent entertainment for all fans of the cults and should prove a good introduction to the game".

...Sinclair User.

"Highly recommended for its versatility, originality and quality. Definitely well worth obtaining".

...ZX Computing.

ZX Spectrum 48K

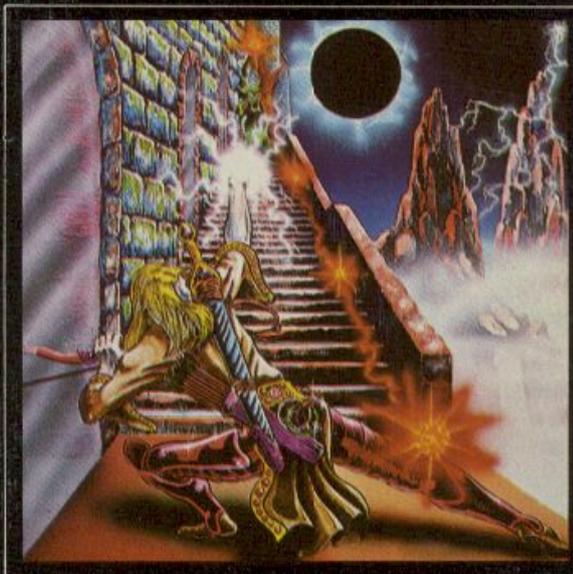
£7.50

Written by Graham Stafford.

What the real critics say. . .

Very rarely have software titles produced such universal acclaim as 'Halls of the Things' and 'The Dungeon Master'. Now, with three brand new programs, Crystal continues to set the standard of software excellence. The difference is obvious - the choice is yours:

The Best or The Rest.



## HALLS OF THE THINGS

A stunning multi-level maze 'arcade' adventure. "Excellent and dangerously addictive - could change the Spectrum games scene overnight".

...Sinclair User.

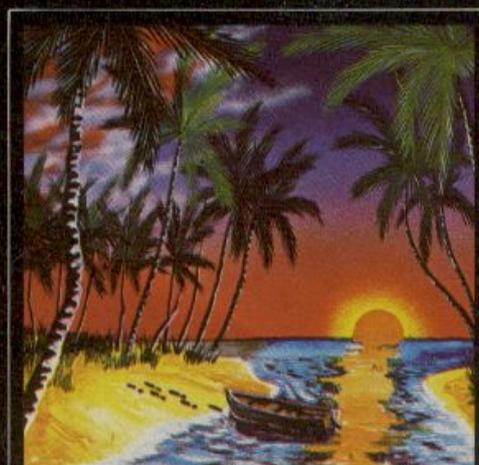
"Spectacular - One of the best games I've seen, finely balanced between simplicity and addictiveness - superb graphics and colour - I CAN'T RECOMMEND IT HIGHLY ENOUGH".

...Popular Computing Weekly.

ZX Spectrum 48K

£7.50

Written by Neil Mottershead, Simon Brattel and Martin Horsley.



## THE ISLAND

The ultimate test of logic and deduction! Can you solve the hidden mysteries of the South Pacific Island on which you have been stranded - and escape alive! A brilliant classic style adventure game to fascinate and frustrate you for months!

ZX Spectrum 48K

£7.50

Written by Martin H. Smith.



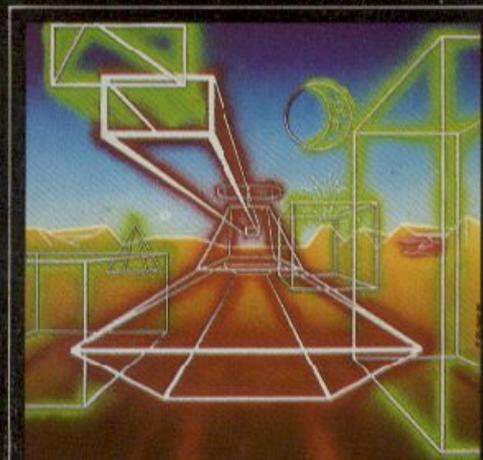
## INVASION OF THE BODY SNATCHAS!

At last! a version as fast and furious and as frustratingly addictive as the arcade original. Landers, Mutants, Bombers, Pods, Swarms and much much more combine to produce the ultimate space game!

ZX Spectrum 48K

£6.50

Written by Simon Brattel and Neil Mottershead.



## ROMMEL'S REVENGE

A brilliant interpretation of the most visually stunning arcade game of all time. Superb high resolution 3D graphics with full perspective plus a host of new and exciting features make Rommel's Revenge the most spectacular game ever produced for your Spectrum!

ZX Spectrum 48K

£6.50

Written by Martin Horsley.



Please Supply:

- Invasion of the Body Snatchas
- Rommel's Revenge  The Island
- Halls of the Things  The Dungeon Master
- Catalogue (please enclose SAE 6in. x 9in.)

I enclose cheque/PO for.....

NAME.....

ADDRESS

Please send SAE for our latest catalogue and details of our forthcoming software. Catalogue FREE with every order. P&P included. Please add £0.50 per item for overseas orders.

Please make cheques/PO's payable to:

CRYSTAL COMPUTING  
2 ASHTON WAY  
EAST HERRINGTON  
SUNDERLAND SR3 3RX

DEALERS! For details of our excellent dealer discounts (including export) ring Chris Clarke on 061-205 6603.

PROGRAMMERS! Written any good software? send it to us for evaluation and details of our excellent royalty scheme.



software

# Spectrum Programs

## SUPERCHESS 3.0

ABSOLUTELY GUARANTEED ABLE TO BEAT ALL OTHER SPECTRUM CHESS PROGRAMS

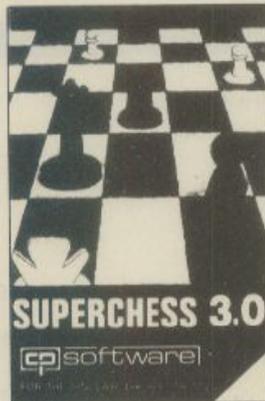
Superchess 3.0 has been developed to bring you the strongest chess program yet for the Spectrum computer.

At the tournament level Superchess 3.0 has a look-ahead of five to seven ply (moves) in the middle game, and ten to twelve ply in the end game. This gives Superchess 3.0 a substantial advantage against other chess programs and promises the experienced player an interesting and challenging game of chess.

Unlike other chess programs, Superchess 3.0 is not just a brute-force calculator, but employs artificial intelligence techniques to allow deeper searching along the main lines of play.

### FEATURES:

- 10 levels—all play within tournament time limits.
- First level made especially easy for beginners.
- Easy to use—help menus provided.
- Recommended move option.
- Change sides and level during game.
- Self play mode.
- Set up/change position.
- Technical information—how the program 'thinks'.
- Program's internal score for position displayed.
- Number of evaluated positions displayed.
- Library of opening moves.
- Select your own colour scheme for graphic board display.
- Solve mating problems—up to mate in four.



48K SPECTRUM—Price £8.95

## PINBALL WIZARD —For any Spectrum

Superb, colourful fast-action graphics and sound give this game the feel of a real arcade pin-table.

With realistic launch, flippers, bumpers, high-score, bonus scores and freeball features.

Be a Wizard!

FOR ANY SPECTRUM  
£5.95



## BRIDGE PLAYER

PLAY AN ENTIRE GAME OF BRIDGE AGAINST YOUR SPECTRUM  
—WITHOUT GETTING IN THREE FRIENDS FOR THE PURPOSE

**Dealing**—the program shuffles, deals and sorts the cards to produce randomly dealt hands. An almost infinite number of hands are therefore possible, with all kinds of distributions.

**Bidding**—is in the familiar ACOL system, including Stayman and Blackwood conventions. You bid your hand while the Spectrum bids the other three hands.

**Card Play**—you play from your own and dummy's hands, which are displayed as they would be at the bridge table, with the program playing the other two hands.

**Scoring**—at the end of each hand the score is calculated, including honours, slam and rubber points. Both the old and new scores are displayed in the usual manner.

**Replay**—at the end of each hand, all four hands can be displayed and, if desired, the hand replayed.

48K SPECTRUM  
BRIDGE PLAYER—£8.95

An ideal complement to the Bridge Player Program:

Bridge Tutor (Beginners)—£5.95  
Bridge Tutor (Advanced)—£5.95

### SPECIAL OFFER:

Bridge Player and both  
Bridge Tutors—£18.95



## SUPERCODE —for 16K and 48K Spectrum

100+ ROUTINES

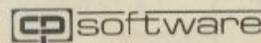
This is a superior machine code tool kit with one hundred machine code routines that are relocatable for use in your own BASIC and/or machine code programs, the combined user friendly BASIC program, 48K Spectrum only, gives easy access to all routines: • Index of routines. • Call up details of each routine including all information required to tailor the routine to your needs. • Demonstration of how the routine works under software control, the demonstration is repeatable. • Save and verify individual routines. • Comprehensive user guide.

- |                           |                          |                             |
|---------------------------|--------------------------|-----------------------------|
| 1. Block Memory Insert    | 24. Sci-Fi Character Set | 47. Wait-Key                |
| 2. Block Line Delete      | 25. Memory Available     | 48. Strings to Upper Case   |
| 3. Chr\$ Swap             | 26. Line Renumber        | 49. Strings to Lower Case   |
| 4. Chr\$ Scramble         | 27. Uni-Note Sound-Gen   | 50. Program to Upper Case   |
| 5. Super-Renumber         | 28. Dual-Note Sound-Gen  | 51. Program to Lower Case   |
| 6. 2 Byte Converter       | 29. Uni-Beep Simulator   | 52. Confuse                 |
| 7. Dec->Hex Converter     | 30. Multi-Beep Simulator | 53. Clarify                 |
| 8. Hex->Dec Converter     | 31. Screen Fill          | 54. Space Saver             |
| 9. Remult Concener        | 32. Screen Store         | 55. Screen Overprint        |
| 10. On Error Goto         | 33. Screen Exchange      | 56. Screen Invert           |
| 11. On Break Goto         | 34. Protect Program      | 57. Clear All               |
| 12. Free-Scroller         | 35. Block Copy           | 58. Ink Change              |
| 13. Non-Deletable Lines   | 36. Contract             | 59. Paper Change            |
| 14. Border Effects        | 37. Expand               | 60. Flash On                |
| 15. Screen Search         | 38. Expand Rem           | 61. Flash Off               |
| 16. Variables Search/List | 39. Append               | 62. Bright On               |
| 17. 24-Line Printing      | 40. Count Program        | 63. Bright Off              |
| 18. Star Draw             | 41. Tape Header Reader   | 64. Screen-Print            |
| 19. Flash Switch          | 42. Address              | 65. Random Number Generator |
| 20. Bright Switch         | 43. Checker-Board        |                             |
| 21. Paint Shape           | 44. Remove Colours       |                             |
| 22. Record Sound          | 45. Display Memory       |                             |
| 23. Replay Sound          | 46. Hex Loader           |                             |

Routines 66-100: Screen routines

SUPERCODE £9.95

Also available at Boots, W.H. Smith and all good computer shops.  
DELIVERY: Send SAE for Catalogue.  
UK—prices include VAT and postage & packing.  
EUROPE—add 80p per program  
ALL OTHER PLACES—for air mail add £2 for the first program and 50p for each subsequent program. Surface delivery add 80p per program.



Send Cheque, Postal Order or Access No. to:  
CP SOFTWARE, Dept W1A  
17 Orchard Lane, Prestwood,  
Bucks HP16 0NN



Plus for 48K Spectrum unless otherwise stated:

PLUS for 48K Spectrum:

FLOATING POINT FORTH with EDITOR	£13.95	DRAUGHTS	£5.95
INTEGER FORTH	£9.95	BACKGAMMON	£5.95
SUPERCHESS II	£7.95	SNAIL LOGO (Turtle Graphics)	£9.95
SUPERCHESS I (16K ZX81)	£4.95		
16K SUPERCHESS (16K Spectrum)	£6.95	GOLFING WORLD	£5.95
REVERSI	£6.95		

# Q.E.D. Systems

experts in business systems now bringing professionalism into the home market for the SPECTRUM, ORIC, DRAGON and APPLE II micro-computers.

**GAMES**  
**THE VIDEO CHALLENGE SUITE**  
 These are not just any games but Q.E.D. quality action packed programs. Award yourself the VCI!

Spectrum VCI - Photon, Aces & Ladders, Microthello and Phantoms ..... £6.95  
 Spectrum VCI - Towers of Logic, Bugblaster, Link-four and Awar! ..... £6.95

ORIC VCI - Photon, Link-four, Microthello and Phantoms ..... £6.95  
 Apple II VCI - Grand National, Star Trek, Link-four and Microthello ..... £6.95

Dragon VCI - Photon, Link-four, Microthello and Phantoms ..... £6.95  
 Dragon VCI - Dragons Domain, Cards, Draxt and Awar! ..... £6.95

**NEW FOR THE DRAGON - ATLANTIS**  
 An exciting and challenging game where your mission is to destroy the city of ATLANTIS. But beware, as the game progresses your mission becomes increasingly more complex ..... £5.95

**THE VARIETY PACK** 25 specially selected programs to realise the potential of your new micro. The best value around today!  
 Spectrum, ORIC, Dragon, Apple II ..... £5.95  
 (LESS THAN 25p per program!)

**NEW UTILITY FOR THE SPECTRUM**  
**ORIC and DRAGON**  
 \*\*\*\*\*  
**Q.E.D. TOOLKIT**  
 \*\*\*\*\*

A MUST FOR EVERY SERIOUS DESIGNER. THE TOOLKIT CONTAINS A HOST OF INVALUABLE MACHINE CODE ROUTINES TO ASSIST YOU WITH YOUR PROGRAM DEVELOPMENTS ..... £5.95

**NEW GAME FOR THE SPECTRUM**  
**100% MACHINE CODE**  
 \*\*\*\*\*  
**MILLIPEDE**  
 \*\*\*\*\*

THE BEST VERSION OF THIS EVER POPULAR ARCADE GAME. SOFTWARE YOU WILL NOT BE DISAPPOINTED WITH!! ..... £6.95

**HOME MANAGEMENT**  
**HOME ACCOUNTS MANAGEMENT**  
 Plan all your financial affairs with this Q.E.D. quality system. Features include budget creation, maintenance and balance of all accounts (including credit cards). Full monitoring of expenses against budget and complete expense reporting. The system is supplied with full documentation and operating instructions.  
 Spectrum, ORIC, Dragon ..... £10.95  
 Apple II ..... £14.95

**UTILITIES**  
 \*\*\*\*\*  
**THE DRAGON 6800 ASSEMBLER/EDITOR**  
 With this powerful software realise the full potential of this splendid micro by writing your own machine code programs and routines. Full operating instructions are included ..... £7.95

**THE ORIC 6802 ASSEMBLER/EDITOR**  
 Probably the best ORIC program on the market. With this powerful software the full potential of the ORIC can be realised by writing your own machine code programs and routines. Full operating instructions are included ..... £7.95

(All programs are supplied on quality cassette, unless otherwise stated)

Please send me on cassette/disc .....

for my ..... MICRO with ..... memory.

I enclose my cheque/postal order for £. .... payable to Q.E.D Systems.

Name ..... Telephone No. ....

Address .....

**Q.E.D. SYSTEMS, LIVER HOUSE, 96 BOLD ST., LIVERPOOL, ENGLAND.**

**OVERSEAS**  
 please add  
**OFFER - BUY ANY TWO AND GET £1 OFF!**  
 £1.00 carriage

DESPATCH WITHIN  
**48 HOURS**

**ARROWSOFT**



**PONTOON**  
**Gamble with £1000!**  
**STICK! TWIST!**  
**BURN!**

**Two levels of Difficulty**  
**Win £30,000 to break the Bank.**  
**ALL THE CHARACTERISTICS OF THE POPULAR CARD GAME.** Author: Martyn Woodcock.

presents  
**NEW GAMES**  
**for the BBC Micro**  
**"ZOMBIES REVENGE"** "FIGHTER"  
**UP TO 20% ROYALTIES FOR ORIGINAL GAMES**

**"ZOMBIES REVENGE"**  
 Play against time to capture your prisoners. Evade the Relentlessly chasing Zombies. 12 Levels. 12 Screens. **A difficult game!**  
 Author: David Hughes

**"FIGHTER"**  
 Dog-fight action, from the cockpit of your jet fighter. Up to 5 bandits at a time attacking you. Defend with laser canon and heat seeking missiles. In-flight re-fueling. An action packed game.  
 Author: Andrew Porter

- PONTOON ..... £5.75
  - ZOMBIES REVENGE ..... £5.75
  - FIGHTER ..... £5.75
  - ABACUS - EDUCATIONAL PACK  
 6 to 12 YEAR OLDS ..... £8.50
- Tick as required  
 Please allow 14 days for delivery

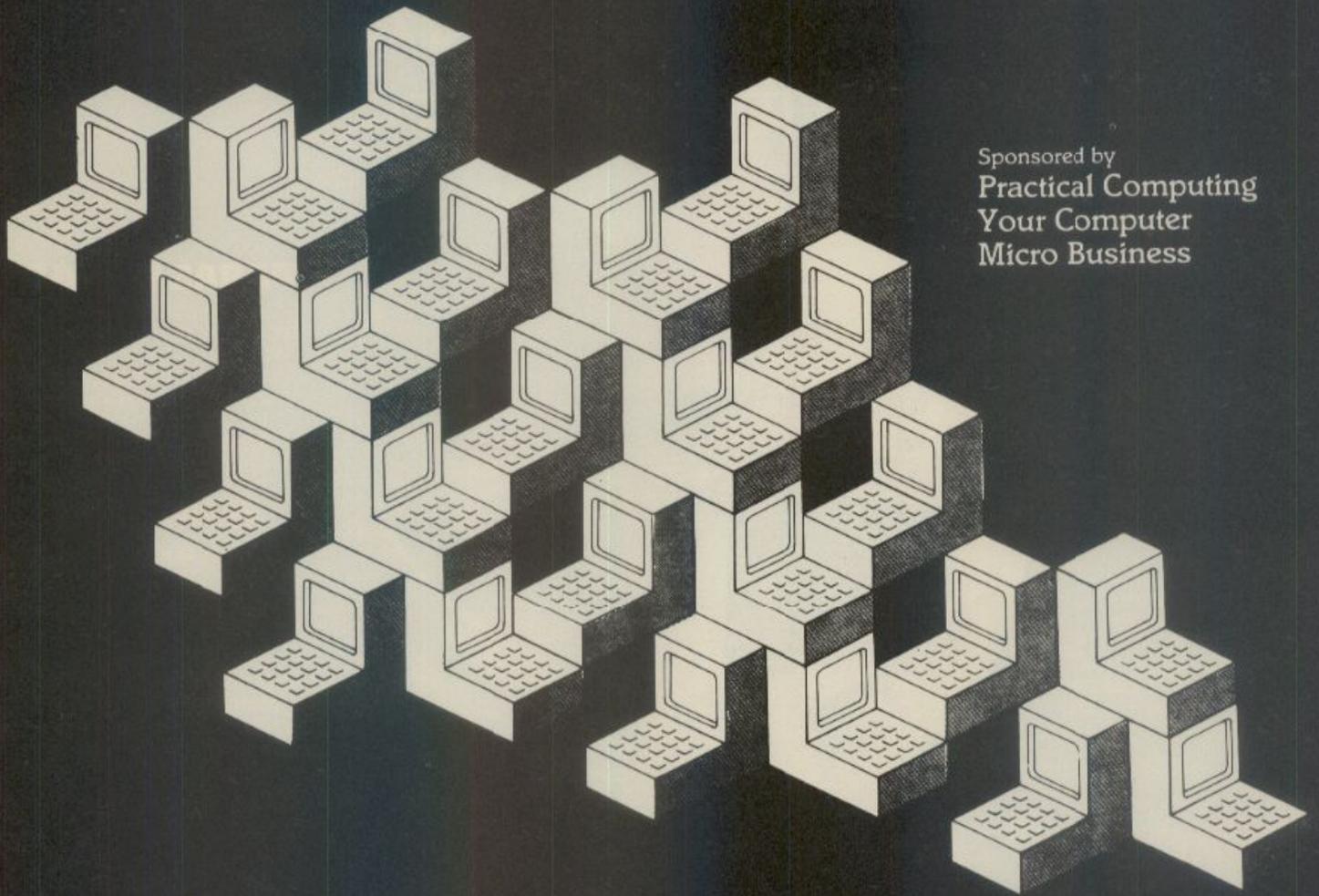
**To: ARROWSOFT, 9 OXFORD STREET, SOUTHAMPTON, HANTS SO1 1DJ**

NAME .....

ADDRESS .....

I enclose cheque/P.O for the TOTAL OF £ .....

# Success Breeds Success



Sponsored by  
Practical Computing  
Your Computer  
Micro Business

National Exhibition Centre, Birmingham. May 4-7, 1984.

After one show the Midland Computer Fair has already established itself as an outright winner. Not only is it the leading exhibition in the Midlands for microcomputers and related products, but it stands in its own right as a major national event.

In recognition of this, and the need to accommodate thousands of expected visitors the venue for the 1984 Midland Computer Fair is to be Britain's premier showcase – the National Exhibition Centre, Birmingham. The NEC with its superb facilities for exhibitors and visitors alike will

be the fitting site for this major event which attracted over 17,000 people for the first show.

Whether you are interested in microcomputer enthusiasts or would prefer to take space in the Business Section to meet small business micro-users, the Midland Computer Fair is definitely for you.

So why not let a little of the Midland Computer Fair's success rub off on your company by reserving a stand at the next show.

The road to success starts by filling in the coupon below:

**THE Midland**  
**Computer**  
**Fair** *Personal computers*  
*Home computing*  
*Small business systems*

Return to the: Exhibition Manager, Reed Exhibitions,  
Surrey House, 1 Throwley Way, Sutton, Surrey SM1 4QQ  
Tel: 01 643 8040 Telex: 946564 BISPRS.G

Name \_\_\_\_\_

Position \_\_\_\_\_

Company \_\_\_\_\_

Address \_\_\_\_\_

\_\_\_\_\_

# LOTHLORIEN

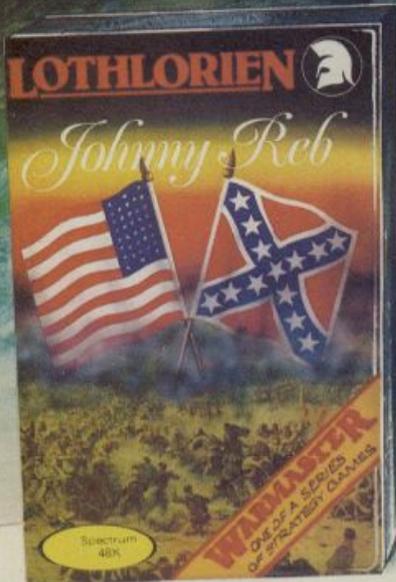
WARMASTER SERIES

## THE WINNING NAME IN WAR GAMES

3 NEW STRATEGY GAMES FROM THE FAMOUS WARMASTER SERIES

### Johnny Reb (1861)

There's still plenty of fight left in the Confederate South as each side selects forces to manoeuvre on a full-graphics battle field. Use the 'save game' facility to perfect your tactics and re-write American History. 1 or 2 players.



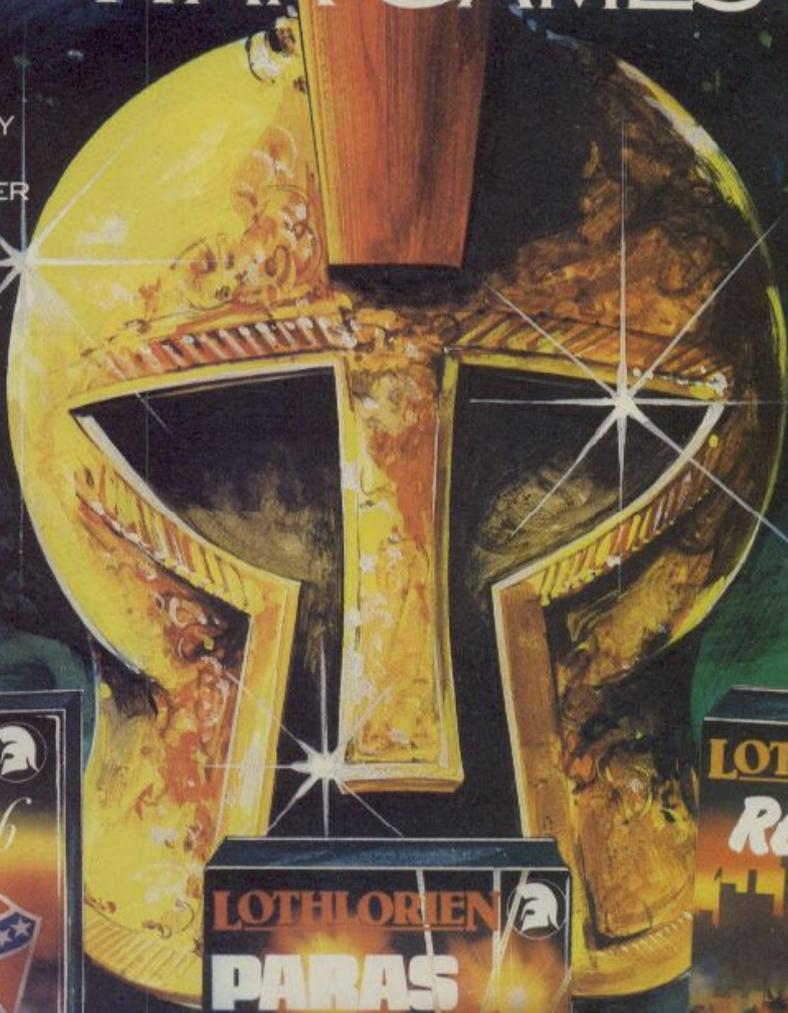
Spectrum 48K £5.50. BBC-B £6.95 and Oric 48K £6.95

Two new two-player titles.  
**DREADNOUGHTS** Suspense-filled high seas drama as the pride of the German Grand Fleet is locked in battle with the Royal Navy. Secret orders, battle graphics, torpedoes, guns etc.  
**CONFRONTATION** Build-on battle game gives a basic format for any modern, non-nuclear conflict. Master tape contains modern European scenario and you can create others of your choice using both air and land forces.

### More superb strategy games.

WARMMASTER TITLES	
Warlord	48K Spectrum/Dragon 32 Tandy Color 32K/ZX 81 16K
Roman Empire	16K Spectrum/BBC-B/Dragon 32 Tandy Color 32K/ZX 81 16K Atari 400/800 48K
Peloponnesian War	ZX 81 16K
Battlezone 2000	BBC-B

**NEW RED BARON**—great tactical WW1 aerial combat game.

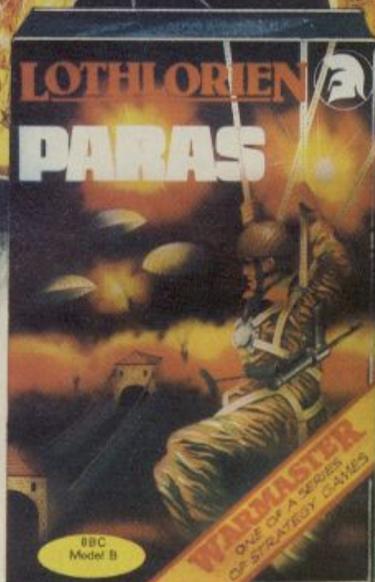


### PARAS (1944)

Dramatic all-graphics reconstruction of a famous World War II Campaign. Your hand-picked force has dropped behind enemy lines to capture a strategic river crossing. 2 versions of the game with ten levels of play.

### REDWEED (1995)

The Martians are coming in this superb all-graphics battle. You're in command of land forces defending London when an outbreak of semi-sentient Redweed threatens to immobilize your forces. Fifteen levels of play.



OTHER GAMES BBC-B £6.95 New-Spectrum 48K £5.95.

Tyrant of Athens	16K Spectrum/Dragon 32/Tandy Color 32K/ZX 81 16K
Samurai Warrior	16K Spectrum/Dragon 32/ZX 81 16K
Privateer	48K Spectrum/ZX 81 16K combined cassette £4.50

Prices: ZX81 £4.50 Spectrum £5.50 (except Paras) £5.95 Dragon 32/BBC-B £6.95 Tandy £7.95 Atari £12.50

Lothlorien games are available from most leading software specialists or direct by post at no extra cost. Why not really put your computer through its paces today?



Spectrum 48K £5.50.

## LOTHLORIEN

the mind stretcher

DREADNOUGHTS	Spectrum 48K	£5.95	<input type="checkbox"/>
CONFRONTATION	Spectrum 48K	£7.95	<input type="checkbox"/>
RED BARON	Spectrum 48K	£5.95	<input type="checkbox"/>
REDWEED	Spectrum 48K	£5.50	<input type="checkbox"/>
PARAS	Spectrum 48K	£5.95	<input type="checkbox"/>
	BBC-B	£6.95	<input type="checkbox"/>
JOHNNY REB	Spectrum 48K	£5.50	<input type="checkbox"/>
	BBC-B	£6.95	<input type="checkbox"/>
	Oric 48K	£6.95	<input type="checkbox"/>

Others (please specify) \_\_\_\_\_

I enclose a cheque/PO for £ \_\_\_\_\_ made payable to M. C. Lothlorien

Please debit my Access A/C No. \_\_\_\_\_ / \_\_\_\_\_ / \_\_\_\_\_

SIGNED \_\_\_\_\_

ADDRESS \_\_\_\_\_

Send to: M C Lothlorien, Dept. YC/2/84, 56a Park Lane, Poynton, Cheshire SK12 1AE Telephone: Poynton 876642





# DO YOU WANT A WORD PROCESSOR FOR YOUR BBC OR A WORD PROCESSOR FOR YOUR BBC ?

Yes there is a difference between word processors and we can offer the best because it's the FIRST PROFESSIONAL DISC BASED WORD PROCESSOR FOR THE BBC COMPUTER.

The MERLIN SCRIBE uses the disc on your computer the same way that professional systems costing many hundreds of pounds do.

Until now any document you wished to create has been limited to the few pages which could be squeezed into your computer memory. This means the computer is really using the disc as if it were a cassette! The SCRIBE can create documents far greater in size than the computer memory, and really uses the disc as it was intended to be used. SCRIBE automatically loads and offloads pages between disc and memory without you even knowing it's happening!

Amongst the many super features available are:

- \* Optional 40 & 80 column screen format selection.
- \* On screen formatting - you see it as it's printed INCLUDING UNDERLINING.
- \* Right justify, word wrap, insert, delete, move copy & centre.
- \* Document merge (will merge two documents into one from disc).
- \* Addresses all four drive units allowed by your BBC disc system.

Plus many more professional features.

SCRIBE comes in ROM with five minute fitting instructions, printer utilities on disc and a comprehensive manual.

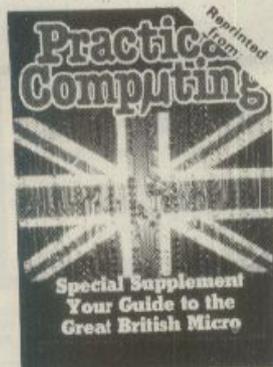
PRICE £59.95

Also MERLIN SCRIBE in ROM for cassette machines £29.95, and on tape £19.95. All prices include VAT. Post and Packaging 60p.

MERLIN COMPUTER PRODUCTS (BUCON LIMITED)  
18 MANSEL STREET, SWANSEA, SA1 5SG. TEL (0792) 467980



## REPRINTS a ready made sales aid



If you are interested in a particular article or advertisement in this publication why not take advantage of our reprint service. We offer an excellent, reasonably priced service. For further details and a quotation

Ring Michael Rogers on 01-661 3457

# YOUR COMPUTER CLASSIFIED

# 01- 661 3036

Contact: Claire Notley

## ADVERTISEMENT RATES

**Linage:** 40p per word  
(Min. 15 words)  
**Box No:** £4.00 extra  
Linage advertisements are  
prepayable and the order form  
published in this section should  
be completed and returned  
with remittance. Credit Card  
facilities are available.

**Display** — rates per scc (Min. 2scc)

One insertion	£8.50
Three insertions	£8.20
Six insertions	£8.00
Twelve insertions	£7.50

Display advertisers should preferably reserve space by phone.

**Copy Date**

Closing date for Classified advertisements is the 21st December.

**Post to**  
Your Computer, Classified  
Department, Room H211,  
Quadrant House, The Quadrant,  
Sutton, Surrey SM2 5AS.

## Britain's Biggest Selling Home Computer Magazine

### T199/4A Owners:

STAINLESS SOFTWARE has a large catalogue of good quality programs for the T199/4A, with over 80 programs! For a copy, please send a large SAE to:  
Dept Y, 10 Alstone Road,  
STOCKPORT, Cheshire SK4 5AH  
(Mail Order Only) 6

PET 3032 v.g.c. plus £200. Games, books, soundbox, toolkit, cassette recorder, bargain £400 ono. Tel: Bolton 40131 after Six p.m. 21

### VIC IMITATOR

Copies virtually all VIC-20 cassette based programs including basic machine code, multipart programs and programs using various protection techniques including changing IRQ vector on loading and using screen RAM. Two versions are supplied because it is impossible to copy all VIC-20 cassette programs with just one copier. Written in machine code. Works on any memory size. Easy to use. Full instructions are included in the program. For a quick delivery send cheques/P.O.s for £6 to Ian Waite, Dept. YC, 11 Hazlewood Road, Sheffield S4 8AU. 58110

48K Spectrum adventure. Send now for this excellent all graphics program. This game is unique! Great value, only £4.50. Send cheque/P.O. to Ian Nussey, 33 Marleborough Road, Mansfield, Notts. 38

### SHARP

Wide range of sensibly priced programs on cassette for MZ-700 MA-80A MZ-80K Business, games, education, utilities  
SAE for catalogue  
DCS, 38 SOUTH PARADE  
BRAMHALL, STOCKPORT 1/42

Spectrum Arcade excellence. 48K Machine code Mole Man by R.F.B. Software. Send £5.50 to R. F. Bradford, 1 Dryden Close, Canterbury, Kent CT1 1XW. 18

### BBC 'B' and LYNX

KEYTEK TOUCH TYPING TUTOR is a complete planned course. It can teach you and your family to touch type in easy stages. Your computer becomes an interactive teaching machine, making learning more fun than playing some games. For the complete course on cassette with full explanatory leaflet, send only £5.50 inclusive (stating BBC or LYNX) to—  
DALETEK  
8, Smithfield Close, Ripon, N. Yorks. 1/52

Oric-2 Clone 100% M/C, copies both M/C and Basic software, cassette £3.50 including Blitz, C. Duff, 1 Ulceby Road, Riddings, Scunthorpe, S. Humberside. 16

### SPECTRUM TEACHER DATA

Teacher? Use your micro and let it do the work.  
Put your classlists and marks on cassette. It sorts, ranks, grades, prints lists, graphs and statistics.  
"Gold Star . . . A-plus" S.U. Sept 83. £5.20.  
Brian Farris, 8 Thompson Rd, Bolton 7

Software exchange club for Atari/Intelevison & TRS-80. SAE details. Vidacom (YCI), 95 King Street, Ramsgate, Kent. 23

We are a Software Publishing House with extensive international contacts and are looking for original finished software designers for the Commodore 64 and Spectrum. We also need programmers able to write in high level language and machine code to work to specification royalties and possible cash advances to be agreed.  
TIMEDRIVE  
25 Rathbone Street, London W1P 1AG 44

BBC (B) Masterplan, calculates any astronomical chart with aspects 1750 to 2000. Tropical or Sidereal. No ephemerides or tables required. Full documentation £6.95.  
Mark Bostel,  
16 College Gardens, Wandsworth  
London SW17. 1/39

Rhythm Synthesiser for 48K Spectrum. Autochord, drumsound, piano and metro-mome facilities. £5.00. Scott Massie, No. 1 Bungalow, Firlands, Burghfield Common, Berks. 19

### SPECTRUM AUTOKOPY 4

Make backup copies of ANY Spectrum tape, now still more powerful! THE MOST ADVANCED COPIER YET PRODUCED.  
Copies Basic, Machine Code, Headerless Auto Verifiers, and Auto Abort on tape loading error.  
NO PROTECTION DEVICE TOO DIFFICULT. THE ONLY COPIER REALLY CAPABLE OF COPYING PROGRAMS.  
THE FULL 76K or 48K LONG UK COST ONLY £3.00. EUROPE £4.00  
Use Autokopy for programs the other Copiers will not copy.  
Earlier versions up-coded if you return the tape with slip.

R and B Tidd  
160 Howlands, Welwyn Garden City,  
Herts AL7 4RG 34

Software exchange — swap your home written software and information internationally through our extensive library. Most Micros! S.A.E., Office 7, 53 Cavendish, Hazelgrove, Stockport. 22

## TRS-80 VIDEO GENIE

NEWDOS-80  
APL-80  
PASCAL-80  
FORTH (MMS)

Details of these and over 200 other programs are contained in our new loose leaf catalogue price £1.00 (refundable) from:



**MICROCOMPUTER  
APPLICATIONS**

41 QUEEN'S ROAD  
BLANDFORD FORUM  
DORSET DT11 7LA

TEL: (0258) 55100 10

## BUS-TECH LYNX NEW RELEASES

### YNXVADERS 100% machine code

Arcade game for the Lynx. Good implementation of Space Invaders with fast, smooth graphics. £7.00.

### 2. ROBORUN

This game has 7 levels which you have to progress through with the hazard of radio active barrels, guards etc. Each level is harder until eventually, if you are good enough, you have to face XP2.  
Great entertainment with a built in hall of fame. £6.00.

### 3. WORD SEARCH

This program is based on a very popular game of the same name with a built in library of words or your own words can be used. £6.00.

### 4. JUMPING JOHN

Control John's simple follow movements to retrieve the Emeralds. Your king has sent you a lowly peasant to the castle of the Evil Baron Dog-breath.  
Each stage of your quest becoming harder as you leap the ramparts. When the bell rings you move to a higher level.  
Five levels of play with many varied obstacles becoming harder as you progress. £7.00.

### 5. MINE FIELD

Get Bertie The Bug Eyed Beastie, through the mine field to collect enough UFOs to get home. Multi-Level. £4.50.

NAME \_\_\_\_\_

ADDRESS \_\_\_\_\_

Cheques or P/O made payable to:

**BUS-TECH**  
19 Landport Terrace,  
Portsmouth, Hants.  
PO7 2RG. 29

# cable software

## URGENTLY REQUIRE

ORIGINAL MACHINE CODE GAMES FOR THE FOLLOWING MICRO'S.

COMMODORE 64 — ZX SPECTRUM — ORIC —  
VIC 20 — DRAGON — BBC & ACORN  
ELECTRON

Write in confidence to the:

Software Development Director  
CABLE SOFTWARE LTD  
Cape House, 52 Limbury Road, Luton, Beds.  
or Telephone 0582 591493

9

**£3.00 OFF**

**VALHALLA  
HOBBIT + BOOK  
ONLY £11.95 inc.**

State Computer  
Cheques/POs to Telequip  
Victory House, Somers Rd  
North, Portsmouth, Hants  
(0705) 750011

32

BBC, Electron Datafile, the program everybody needs, the most valuable and versatile in any collection. Written to have the features of more expensive systems. Essential for lists of all kinds including, mailing list, name/addresses etc., uses disk, ape, printer. Only £6.95. Limitsoft, 34 Stoke Lane, Gedling, Nottingham. Tel: 06021 619169.

20

### SPRINT BASIC COMPILER IMPORTANT NOTICE

The Sprint Basic Compiler Advertisement in this magazine has an omission which was discovered too late to be corrected. The missing paragraph should read:

"SPRINT COMPILERS a sub-set of standard Dragon BASIC which covers arrays, Strings, FOR-NEXT, loops. In fact virtually everything except floating point arithmetic & associated commands. All arithmetic is integer and the Dragon Sound and graphic commands are fully floating point commands.

Not supported are Print # -2 (which can be substituted)  
PRINT # -1, OPEN, CLOSE, MOTOR,  
INPUT # -1  
AUDIO, PRINT TAB AND PRINT USING"

Some small changes may also be requested to the BASIC Syntax

All these Commands will be supported in Version 1.1 and customers who have ordered version 1.0 will be offered an upgrade by return of post for under £2.00.

If you have ordered before reading this notice & require a refund, we will do so without question.

**OASIS SOFTWARE**

1/49

### DISCOUNT SOFTWARE

Huge Discount off all Computers.  
12 Page Catalogue including

	R.S.P.	OUR PRICE
<b>SPECTRUM</b>		
HOBBIT (Melbourne)	14.95	11.99
MANIC MINER (Bug Byte)	5.95	4.95
<b>COMMODORE 64</b>		
EVEREST ASCENT (Shepherd)	6.50	5.00
SKI RUN (Boom)	5.50	4.50
<b>BBC</b>		
SLICKER PUZZLE (D.K.Trionics)	6.95	5.95
<b>ORIC</b>		
ASTEROID (Artic)	5.95	4.95
<b>DRAGON</b>		
CHESS (J Morrison)	7.95	6.95

C.W.O. P+P 55p 1 Tape, 2 or more post free  
S.A.E. for 12 page catalogue of software.

For Most Computers to:  
**DISCOUNT SOFTWARE**  
45, Drunswick, Bracknell, Berks.

1/53

VIC 20 + 8K/16K & CBM 64 Soccer Club Boss. 88 teams, divisions, scoreboard, commentary, promotion, relegation & more! £2.99. (also on Spec 48K). D. Spencer, 230 Lowgrange Avenue, Billingham, Cleveland.

12

### GAMES WANTED

Record company with world outlets starting three software labels. Send presentation to:

13 Mountview  
Northwood, Middx.

1/51

Spectrum Software £150, inc: Hobit, Jet Pack, Flight Simulation. Must sel for £25. Ben Fry, 69 Cadogan Place, London SW1.

27

### JOYSTICKS

DRAGON  
JOYSTICKS  
DRAGON  
Fully Proportional  
ONLY

£12.95 per pair

PERITRON

21 Woodhouse Road, London  
N12 9EN.

30

### PLAYING THE HOBBIT

At last — a complete 36 page guide to playing the famous adventure game. Develop strategies in play or follow suggested routes — all locations and commands fully detailed and explained. Only £1.95 inc. first class post and packing from:

TEMPLESOFT

13 Temple Gardens, London NW11 0LP

17

Lynx Software Library. Two weeks hire £1.20. Annual membership £6.00. Stamp for list. Les Wilson, Penallick, Tintagel, Cornwall.

26

### YOUR FORTUNE IN THE CARDS

Fortune telling package of cards, mystical chart, software & instructions. Banish invading monsters for a while this Christmas & New Year!

Family entertainment for Texas, BBC, Spectrum 16 & 48K, Lynx istate which! for £7.99 plus 50p P&P from

Black Cat Software, Dept YC,  
57 Folly Lane, Warrington, Cheshire 11



**ZX SPECTRUM  
48K  
DON'T PANIK**

A Hi-res Full colour 100% machine-code version of the arcade game.

**MONSTERS**

SEND **£4.95** TO

16 Warrenwood Drive  
High Wycombe  
Bucks  
HP11 1DZ

5

## SPRAKEFIELD LIMITED

137 High Street South  
Dunstable Bcs Tel (0582) 608818



ALL PRICES INCLUDE VAT & CARRIAGE

LOTS OF GAMES AT LOW LOW PRICES!

PLUS SUPER BONUS VOUCHURES — ONE WITH EACH GAME.  
SAVE 5% ON YOUR NEXT BUY!

	RRP	OUR PRICE
<b>SPECTRUM</b>		
Maniac Miner	5.95	5.65
Rommel's Revenge	6.50	6.18
The Hobbit	14.95	14.20
Hunchback	5.90	5.61
Atic Atac	5.50	5.23
<b>VIC 20</b>		
Crazy Kong	5.95	5.65
3D Time Trek	5.95	5.65
Jet Pac	5.50	5.23
<b>ZX-81</b>		
Black Crystal	7.50	7.13
'49er	5.95	5.65
Krazy Kong	3.95	3.75
<b>BBC</b>		
Flight Simulator	7.95	7.55
Gorf	7.95	7.55
Vortex	7.95	7.55
<b>ORIC</b>		
Sea Harrier Attack	6.95	6.60
Xenon	8.50	8.08
Dracula Revenge	6.95	6.60
<b>COMMODORE 64</b>		
Hover Bovver	7.50	7.13
Falcon Patrol	6.95	6.60
Revenge of the Mutant Camels	7.50	7.13

OVER 250 GAMES TO CHOOSE FROM  
SAE FOR FULL LIST.

1/35

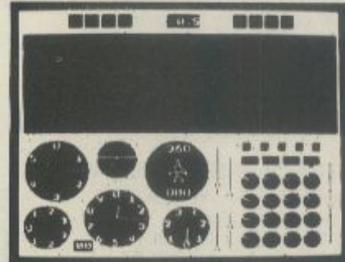
DRAGON 32 BBC MODE/B TR880/C/32K

### 747 FLIGHT SIMULATOR

Superbly realistic instrumentation and pilot's view in stereo simulation which includes emergencies such as engine fire and systems failure. This program uses high resolution graphics to the full to produce the most realistic flight-deck display yet seen on a home computer. There are 21 real dials and 25 other indicators (see diagram). Your controls operate throttle, ailerons, elevators, flaps, aileron spoilers, landing gear, reverse thrust, brake, etc. You see the runway in true perspective. Use joystick and include options to start with take-off or random landing approach. "A real simulation, not just another game." (Your Computer Apr. 83)

Cassette £5.95 (P&P inc. VAT included)

D.A.C.C. Ltd (Dept. YC)  
23 Weaverley Road, Hindley,  
Gtr. Manchester W92 3BN



ACTUAL SCREEN PHOTOGRAPH 154/4

### FREE

DO YOU HAVE  
ZX81 SAVE/LOAD PROBLEMS

Then simply send a sample cassette recorded using your computer together with the type, name of your tape recorder. You will receive your cassette by return of post informing you of the cure to your problem.

M.E.A.C. DESIGNS  
P.O. Box 145 Dept YC,  
Camberley, Surrey GU17 7EB  
S.A.E. with any enquiries

33

SPECTRUM. Kempston Centronic Printer Interface as new, metre cable, all software £30. Atkinson 0482 953369.

28

### MATHS 48K SPECTRUM

Covers all aspects of maths from basic addition to fractions and decimal multiplication. Various levels of difficulty and timed exercises. Suitable both home or school use. £4.95

**EDUCATIONAL SOFTWARE**  
20 Beaufort Road,  
Camberley, GU15 1NF.

1/37

\*\*\*\*\*TAPE COPIER (H)\*\*\*\*\*

You need a **BACK-UP** copier to protect YOUR valuable SPECTRUM tapes. Our package copies all types of programs easily with many unique features. **MICRODRIVE COMPATIBLE**, we are so convinced of the professional quality of our product we offer a **FULL MONEY BACK GUARANTEE** if you are not satisfied.

- **LOADS** in all program parts (no limit) CONTINUOUSLY — even without pressing a key. Other copiers require many loadings — MASSIVELY saving you time and trouble!
- Copies ALL programs that we are aware of. (headerless/mc/etc)
- Break at any time — just copy a "header" if you like!
- 1st class post + updates at £1.50.
- Verifies. Repeat copies. Abort (change your mind). STOPS programs.
- Maxbytes makes a working copy of the full 16K or 48K! Gives program name.
- FULL user instructions but the package is VERY SIMPLE to use.

Cost £4.50

LERM, DEPT YC,  
16 STONEPIT DRIVE, COTTINGHAM, MKT. HARBOROUGH, LEICS.  
680/12

**LAS VEGAS  
IN YOUR LIVING ROOM!**

Our 48K Spectrum fruit machine has everything — holds, nudges, gamble, freerplay, jackpot, even simulated "coin" payout! Together with "play your cards right" and snakes & ladders — 3 new original programs on one cassette only £5.95 incl. p&p.

**H.O. PROGRAMS**  
2 Nelson Place, Chapeltown,  
Sheffield S30 4WG. 25

**Be a  
Dragon Adventurer**

Play the arcade, be educated, have fun. 153K of data for only £15.00. NOT to be confused with inferior offers.

Alton  
17 Nabwood Road, Shipley  
BD18 4AG. 46

**TECTEL ROBOTICS  
CONTROL BOARDS FOR HOME COMPUTERS**

**ORIC**  
ORIC DUUBRY — £24  
1 of 16 channel controller  
ORIC ADC . . . £34  
Superfast 8 channel analog  
— digital scanner, 8 bit  
resolution  
ORIC I/O port . . . £39  
16 programmable channels  
ORIC PRINTER . . . £95  
26 col, matrix, graphics  
double sized print, ink &  
ribbons.

**ZX81**  
ZX81 DUUBRY — £22.50  
1 of 16 channel controller  
ZX81 ADC . . . £34  
Superfast 8 channel analog  
— digital scanner, 8 bit  
resolution  
ZX81 I/O port . . . £34  
16 programmable channels  
ZX81 HI-RESOLUTION  
GRAPHICS . . . £28  
stunning results.

ITEXT SOFTWARE a new range of educational programs.

**TODDLERS (pre school)**  
LEARN your ALPHABET  
LEARN to COUNT  
LEARN your COLOURS  
LEARN your SHAPES  
ABOUT the HOUSE  
ABOUT the KITCHEN  
ABOUT CLOTHES  
£3.95 each

**MUMS & DADS**  
ITEXT cookbook (English)  
ITEXT cookbook (Chinese)  
ITEXT cookbook (Italian)  
ITEXT cookbook (Indian)  
ITEXT Wine & Beer Making  
ITEXT Cookbook Desserts  
ITEXT Cookbook Confection  
£5.65 each

Send cheque or Postal Order to:

**TECTEL**  
Telford Opportunities Centre  
Halesfield 14, Telford, Shropshire  
Tel 0952-581738

P&P £1.50 for control boards £1 for tapes

651/12

Boomer Software presents its exciting range of software: for ZX81 (16K) and Spectrum (48K) "Prisoner" — can you evade the deadly spheres and escape £3.50. Also for Vic 20 (unex) "Bif Bat" £3.00 send cheques/P.O.'s to Boomer Software, 1 Weavers Walk, Dunfermline, Fife. 43

**MATHS  
48K SPECTRUM**

Covers all aspects of Maths from basic addition to fractions and decimal multiplication various levels of difficulty and timed exercises.

Suitable both home or school use.

£4.95

EDUCATIONAL SOFTWARE

20 Buafront Road,  
Camberley GU15 1NF

1/54

**SPECTRUM ZX81  
£25 KEYBOARDS £25**

Full size typewriter style keyboards 42 fast action full travel reed magnet keys 2 shift, space bar, sturdy 12" x 9" x 3" case quick easy fitting. Phone 0602 474973.

**SPECTRUM ZX81  
£25 KEYBOARDS £25**

1/55

Spectrum mathematical application programs. Graph of a function. Roots. Integrals. Linear Regression. Normal Distribution. £4.75 each. All with graphics. Cheques/P.O.'s to Paul Seward, Thurdon Cross, Kilkhampton, Bude, Cornwall EX23 9RZ. 48

**FRENCH EXAMS?**

Learn the easy way with your 48K Spectrum.  
**FRENCH VOCAB TUTOR**  
Multiple choice or direct testing from the hundreds of words on tape, or type in your own word lists. £5.50.  
**FRENCH VERB TUTOR**  
50 common verbs in 6 tenses. A full tutor/teacher. £5.50.  
Both suitable up to 'O' level.  
\*Order the two programs for only £7.50  
also **TEACHER'S MARKBOOK**  
Holds all your classes; automatic totals, percentiles, mean & S.D., graphs etc.  
£5.50 with manual and demo.  
**MENTOR SOFTWARE**  
69 Beech Rd, Halton, Lancaster 8

Spectrum 16/48K Five Basic games including Spectrublitz Sker Tape £2.50 Cheque/P.O. S. Davis, 1 Jubilee Crescent, Middle Road, Thrupp, Stroud, Glos. GL5 2DP. 15

**ZX81/Z80  
MACHINE CODE**

Programming tutor. 158 sides of A4, each instruction carefully explained with examples, exercises and solutions. £7.50 + £1.00 pp. or S.A.E. for descriptive leaflet and FREE cassette loading tips for ZX81 to:

C.L. Business Services, Dept ZX  
842 Ecclesall Road, Sheffield S11 8TD. 638/12

**TIDY UP THAT MICRO**

Buy direct from the manufacturer and save pounds.  
a STAND for your Home Computer (as illustrated)  
strong metal construction, c/w undershelf & swivel castors, supplied with fittings.  
Packed flat — easy assembly instructions.

Price only £39.95  
(incl. Carriage & VAT)  
Allow 28 days for delivery.  
Send cheques/PO's with order to:

G.K. Land Eng. Co. Ltd.  
25 Industrial Estate  
The Airport  
EXETER EX5 2LJ.  
Tel: 0392-68351. 36

**SPECTRUM  
CHESS**

**Dare you face  
The Turk**

The original Turk was an eighteenth century automation, a life-size mechanical figure resplendent in Turkish costume and seated behind a wooden cabinet on which a chess board and pieces were placed.

OCP now offer you the twentieth century equivalent of that Turk — a chess-playing computer program. **The Turk challenges you to a game of chess!**



**MANY  
OPTIONS  
INCLUDE:**

- 6 Levels of Difficulty
- Demonstration Mode
- Board Editor
- Games Printout Facility
- Blitz Chess Against the Clock
- Two Player Mode
- Unfinished Games can be Stored
- Recommended Move

**FULL INSTRUCTIONS  
PROVIDED**

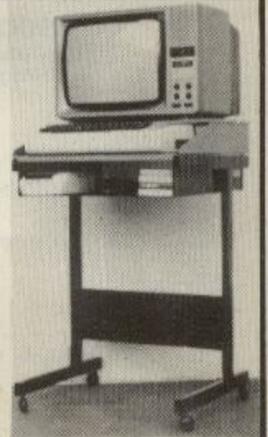
**CHESS THE TURK  
ONLY £8.95**

Post order to  
Oxford Computer  
Publishing,  
P.O. Box 99, Oxford. 134/4

**SPECTRUM  
Joystick adaptor lead**

Abtron adaptor lead for use with Interface 2, enables a joystick to simulate cursor control keys (Keys 5 to 8, 0 fire)  
Only £7.99 inc. p&p.

**ABTRON**  
38 Rudens Avenue,  
Walton-on-Thames, Surrey, KT12 2JP. 1/40



## VIC-20 & CBM-64 OWNERS

614/12

Are you fed up with continually looking in the Handbook for all those Control Symbols which appear in Magazine Listings. If so, Send for our Self-Adhesive Plastic Label which makes Programming easier. State which Computer. £1-95 ea. (Inc VAT & P/P), +50p Outside U.K. C. D. S. - 13, HIGHLAND ROAD - WIMBORNE - DORSET - BH21 2QL

### TAPE COPIER

SUITABLE FOR ALL COMPUTERS

A special lead that allows cassette recorder to cassette recorder copying of your precious M/C software. PLUS A FREE phase inverter lead for those difficult or impossible to load programs. A must for all LYNX users, but suitable for all other micros £3.50 inc. p&p. **AUTRAC COMPUTING**  
1 Fox Road, Mashbury,  
ESSEX CM1 4TJ 636/12

Spectrum software — for our list of practical programs for home and business use send SAE to SD Systems (Y), PO box 24, Hitchin, Herts

636/12

### INSIGHT

#### PHYSICS

FOR 48K SPECTRUM. 'O' level revision pack, multiple choice, hints, 'O' level standard questions, diagrams and structured answers.

#### FRENCH

Revise verbs, vocab and multiple choice. Ideal for 'O' level revision. Includes sound and accents.

#### LETTER INVADERS

FOR 16K ATARI 400. Arcade spelling test. Fun to play and adaptable for all ages. (Joystick needed!) All programs only £4 each. Send Cheque/P.O. payable to Insight Software to:

INSIGHT SOFTWARE

Vichy House, 15 St Marys Street, Canterbury, Kent

Oric-1 catalogue/copy your programs relocatable m/c program occupies only 1/2 K. Tape + full instructions £3.50. S. Green, 15 Hazelwells Road, Highley, Bridgnorth, Shropshire, WV16 6EA.

630/12

## BACK-UP TAPE COPIERS

New and unique machine code programs that can provide security back-up copies of most software currently available. Supplied on cassette with simple instructions for the following machines.

COMMODORE 64 ..... £5.95  
VIC 20 ..... £5.95  
BBC MODEL A/B ..... £5.95  
ORIC 1 ..... £5.95  
SPECTRUM 16/48K ..... £4.95

Price includes VAT, post, and packing. Send cheques and P.O.s to:

**WALLTONE LTD.**

Crown Courtyard, Bridge Street, Evesham, Worcestershire

### PROM SERVICES

Eprom Programmer

£54.95p

C/W Software for ZX81 or ZX Spectrum. SAE for details of this and many other Spectrum/81 add-ons. Edge connectors £2.50p. Edge cards 75p.

**EPROM SERVICES**  
3 Wedgewood Drive,  
Leeds LS8 1EF  
(0532) 667183

Have you got a garden ?

## 'GREEN FINGERS'

No book can match this !

What climbers would suit that damp north wall?  
What ground cover for that bare dry patch?  
Do you fancy something yellow, scented, and six feet high for the back of the border?

'Green Fingers' has details of over 350 different outdoor flowers and shrubs. You can choose the plants you need according to 17 different features! (Height, spread, hardiness, light requirements, dampness of soil, flower colour, time of flowering, etc).

You can select plants by several features at the same time (e.g. search for plants that have pink flowers and bloom in September and are evergreen and like shade—all in one go!) No book can do that—it would take hours! 'Green Fingers' scans all the details of 350 plants in only a few minutes.

Save £££'s and months by choosing exactly the right plants to thrive in your garden—with 'Green Fingers' (for the 48k Spectrum)!

TO ORDER 'GREEN FINGERS' ON CASSETTE JUST SEND A CHEQUE OR POSTAL ORDER FOR £8.95 TO 'PRACTICAL SOFTWARE' BOX No. 0024/24

# YOUR MICRO COULD TEACH YOU A THING OR TWO ABOUT THE FRENCH... ...OR THE GERMANS...OR THE SPANISH

A home computer is an expensive toy; and, if playing games is all you do with it, a toy is all it is.

Now, using the New Personal Computer Superlearning System (PCSS) you can have fun with your micro and learn something at the same time.

PCSS language courses comprise 12 lessons on 3 audio cassettes used in conjunction with a fourth software cassette, to add a new dimension to learning.

Initially the software package enables you to see the words you're learning; then, as your vocabulary develops, it will test your skill in your new language.

Anyone can learn this way — no previous knowledge of the language is required. The unique PCSS method develops your overall learning and memory skills in a way that's both relaxing and enjoyable.

Each PCSS language pack — French, German or Spanish — contains a comprehensive booklet detailing

the 12 audio lessons and the function of the interactive software. Additionally the booklet expands on the broader benefits of the PCSS method.

At only £29.95 per pack PCSS costs less than other home language courses yet it offers much more in terms of education and enjoyment.

Complete the coupon below and try PCSS for yourself — you'll be amazed what your micro can teach you.

Send your cheque or Postal Order for £29.95 made payable to:  
**MDA Modon Associates Limited, 561 Upper Richmond Road West, London SW14 7ED.** (ZX81 users £26.95)

or, alternatively phone **Teledata 01 200 0200** now, lines open 24 hours and quote your Visa, Diners Club, Access or American Express number.

Tick which Audio/software package you require. (Prices include VAT. Add £1.45 for postage and packing on each order.)

Please supply the following Audio/software Packages

FRENCH  GERMAN  SPANISH

Name: \_\_\_\_\_

Address: \_\_\_\_\_

Machine Type: \_\_\_\_\_ Memory Size: \_\_\_\_\_

574/11

# MDA

COMPUTERISED EDUCATION SYSTEMS

(PCSS software is compatible with the ZX81 (16K), ZX Spectrum, BBC Micro, Acorn Electron Micros.)

Each pack comes with a full money back guarantee if not completely satisfied.

# VIDEO GALAXY

## NO. 1 FOR HOME COMPUTERS AND SOFTWARE

Commodore 64	£199.95
Dragon	£164.95
VIC 20	£133.95
Spectrum	£98.95
Spectrum 48K	£127.95

100's of Games, Books and Accessories available for all popular home computers. Authorised dealer for all major software houses.

All Hardware and Software available tax-free for export.

All goods guaranteed.

All equipment on demonstration at:-

**VIDEO GALAXY**  
293 CHISWICK HIGH RD.  
LONDON W.4  
TEL: 01-994 4947

454/9



48K

## WIN THE POOLS?

### SPECTADRAW 2 — THE BEST SELLING POOLS PREDICTION PROGRAM FOR THE 48K ZX SPECTRUM

The program looks at the recent form of the teams playing in each week's English and Scottish football league matches and then refers to a large database to see what has happened in the past when teams with similar form met. By combining the lessons learnt from the past with the teams' current league position, the program generates a draw probability factor for each match. It can then identify the matches which are likely to yield draws and output suitable predictions. It will also output the least likely draws for the benefit of those who prefer the fixed odds lines on coupons.

Program, 8000 match database (both on high quality cassette) and instruction manual £12.95 inclusive.

### NEW!!! SPECTASORT — THE PERM GENERATION PROGRAM

Spectasort takes the 14 most likely and 10 least likely draw predictions and produces ten 8 from 10 full over perms, enabling you to complete your pools coupon directly from the screen. The program will run on its own in 16K, using your own predictions, or has the unique feature of being able to merge with SPECTADRAW 2 to provide a complete Pools Prediction package!!

Spectasort program on high quality cassette £4.95 inclusive.

(Cheques / POs payable to B.S. McAlley)

**SPECTADRAW**  
1 Cowleaze, Chinnor, Oxford OX9 4TD

## MAYDAY FULL COLOUR Inlay Cards



Sell your programs with colour inlay cards from as little as £28 per 1,000. Full colour inlays add quality and professional sales appeal. A.W.P. are the specialists and trade colour printers for both Audio and computer cassette inlay cards. They are produced in two types, a deluxe finish (min. 1,000) and the standard finish (min. 8,000).

Details and samples from:  
A.W.P. Ltd., 5 Bexley Square, Salford,  
Manchester. M3 6DB. 061-832 4533.

614/12

## The Trade Colour Printers

### BUFFER MICRO SHOP

SINCLAIR — VIC 20 —  
BBC MICRO

### SOFTWARE GIFT VOUCHERS

AVAILABLE NOW £1 TO £50  
DRAGON 32 —  
COMMODORE 64

310 STREATHAM HIGH RD.  
LONDON SW16. 532 10

Manic Miner. Use the keyboard to select and play any screen. Send £1.50 and SAE. Microman, 16 Chippendale Rise, Bradford, BD8 0NB.

56

### SUPERIOR TAPE COPIER

We are convinced that the new 007 SPY is the very best Spectrum tape copier available on cassette. Find a better one & TWICE your money will be refunded.

- Can copy complete programs all in one-go.
- Can make copies of programs upto 80K long. (Yes. I did say 80K long).
- Very simple to use.
- Has copied all programs we know of.

a. Microdrive Compatible AND includes a program to copy tapes to microdrive.  
WARNING: You can buy a cheaper 'Mickey Mouse' copier which copies only one section at a time & has to be reloaded after each. 007 SPY stays in Spectrum till told to go.  
007 SPY is just £3.95

5/58

ZX-GUARANTEED (YC)  
29 Chadderton Drive, Unsworth,  
Bury, Lancs.  
Tel: 061-786 5712

Blank C15 tape with list of games send 50p and SAE, 13 Mountview, Northwood, Middlesex. We are always looking for new games. Record company with world wide outlets. Send presentation.

59

### SPECTRUM SOFTWARE

48K	
Steve Silver adventure games.	
Adventure 1	£5.95
Adventure 2	£5.95
Moolander	£4.50
16K	
Blitz + Code Breaker	£4.50
Robotic Capers	£4.50
48K Spectrum	
Prices include p&pp	
Send Cheque/PO to:	
W B Software	
192 Seamer Rd, Scarborough	
North Yorkshire YO12 4HG	
Tel: 0723 70074	

462/9

Fantastic Value! 48K Spectrum word processor with documentation, only £4.95 inc P&P from Martinsoft, 33 Hawthorn Road, Wallington, Surrey. Copyright sought by major computer magazine.

14

## ADVANCED COMPUTING HOLIDAYS

### For Teenagers 12-18

Expand your knowledge and quiz our experts at 2 modern computer centres.

- Advanced BASIC software development
- Introduction to high-level languages
- Main frame and microcomputers

Please send me your Adventure Holiday brochure for 6-18's

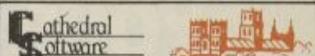
Name: \_\_\_\_\_

Address: \_\_\_\_\_

Postcode: \_\_\_\_\_

Tel: \_\_\_\_\_ Age: \_\_\_\_\_

Free colour brochure.  
Tel: (0989)  
63511 or 64211  
24 hr ansaphone  
PGL Young Adventure Ltd. 31  
691 Station Street, Ross on Wye HR9 7AH.



"THE LODGE", Brandon Lane, Brandon,  
Durham DN7 8SJ

SPECTRUM (£5.95 each)  
SUPER SLAMMER Hi-Res machine code version of "Door Slammer"  
SPACE LANES - A family space, board game. Lots of fun for 1 to 4 players.  
STRINGY THINGS - A fun design program for string pictures: many features: hours of fun.  
(20) (£4.95 each)  
DOOR SLAMMER - A novel, brain teaser. Can you beat the ghost and complete the game?  
BIDDYAX - Fun: Fortune, Zodiac and Horoscope predictions - Ideal for family, fêtes and fairs.  
SPY TRAINER PART 1 (Morse with sound/synchro trainer).  
SPY TRAINER PART 2 (Spymaze-3D/ Code Word).  
(BUY BOTH PARTS 1 and 2 only £8)  
DEALER ENQUIRIES WELCOME

4

## DISCOUNT CARD

Join our Discount Club. Generous discounts on hardware, special offers on software. Hardware stocked: Sinclair, Commodore, Dragon, BBC, Apple and much more.

SAE for details  
BUSINESS MICRO CENTRE  
16-18 Theobald Street,  
Borehamwood, Herts. 433/9

## SPECTRUM SOFTWARE

HOBBIT £14.80, ARCADIA — £5.35, JETPAC — £5.35, COOKIE £5.35, FORTH — £14.80, M/CODER — £9.80, MANIC MINER — £5.80. MANY MORE TITLES IN STOCK, BARGAIN PACKS REGULARLY. AUTO DISCOUNT SYSTEM, P&PP? NO, WE PAY. NO EXTRAS. 16p STAMP SECURES DETAILS ETC.

To: C.P.U., P.O. BOX 13, HERNE BAY, KENT CT6 5UR.  
TIRED OF THE REST?  
THEN TRY THE BEST! C.P.U.

BBC disc software. 'INDEXIT' - Random access files for magazine, photo, stamp indexing etc. 'GRAPHIX' - draw circles, etc. fill with 15 shades on mode 1 screen. £15 each. Cheques to D. Williams, 5 Belmont Avenue, Edmonton, London N9 7JL. Tel. 01-804 0697 5-9pm.

659/12

## Kompsort

### ORIC-1

NEW! ORIC-1 COMPOSER. Any music can be brought to your fingertips with the aid of this synthesiser program. Includes a full editor to alter your recorded masterpiece. Colour graphics. 48k ORIC only £4.95.

ORIC-1 BLITZ. Super graphics and sound effects colour, high-score. 16k and 48k ORIC-1 only £4.95.

ORIC-1 SPACE DOCKER. Colour graphics, sound and high-score. Great addictive game. 16k and 48k ORIC-1 only £4.95.

ORIC-1 FORTH. Teach yourself forth, includes manual. 48k ORIC only £6.95.

### SINCLAIR SPECTRUM

NEW SPECTRUM WORM. Superb arcade style game. Can you ensure the survival of the worm throughout this multiple screen game. 16k and 48k Spectrum only £4.95.

SPECTRUM FRUIT MACHINE. Authentic one-armed bandit which features hold and gamble. HIRES Graphics. 16k. and 48k. Spectrum. only £4.95.

SPECTRUM NIGHT RAID. Addictive BLITZ style game with full colour graphics and sound. High-score etc. 16k and 48k SPECTRUM only £4.95.

CASH WITH ORDER - Add 55p Post/Pack Trade enquiries invited.

All programs available in Sweden from CBI.

Box 503, 631, 06 SKILSTUNA.

SPRINGFIELD, UPPER CHURCH VILLAGE, Nr. PONTYPRIDD, MID GLAMORGAN, CF38 1EE.

## AQUARIUS USERS

Games Cassette 1, 5 games including:  
City Lander & Zombies: £4.50  
Tape Interface for any cassette player to Aquarius: £12.95  
Cassette leads for normal cassette player to Aquarius £5.95

## ORIC USERS

Got loading problems at high speed (1200 baud)?  
Buy our tape loader (No internal connections reqd) £12.95

## SPECTRUM USERS

TAPE BREAKER  
+ Free Tape Headereader  
mult. copies, verify, headerless etc £3.95

JEDHI CHASE  
very fast m/code, difficult £3.95

All by return post.  
Cheques/POs/cash to

SPECTRASOFT  
Capital House, Market Place  
London W3 6AL 654/12

Dust covers of strong cream reinforced vinyl piped in red, brown or black, personalised with your initials. Matching BBC, Dragon, Vic 20/64, Texas, Sharp 711 £2.95. BBD covers. 39 Manse Avenue, Wroughton W96 9RP. 13

## IMPORTANT to all RETAILERS

Now you can buy all your top selling software from a single source, greatly reducing the cost and efforts involved with the multi-ordering and this, combined with our very competitive prices, makes us leaders in software wholesaling. We stock software for the Spectrum, ZX81, Dragon 32, Vic 20, BBC, Oric 1 e.t.c., from all the leading software houses including Artic Computing, Melbourne House, Bug-Byte, Imagine, Quicksilver, and many more. For our very comprehensive price lists write or phone

SOFTWARE DISTRIBUTION SERVICES (DEPT YC)  
135 CLEEVE DRIVE, IVYBRIDGE, S DEVON, PL21 9DB  
Telephone: Ivybridge (07564) 4863 (24 hours)  
Computer Association Member.

408/8

## AT LAST . . . PLAYING THE HOBBIT

A complete 36 page guide to playing and solving the adventure game.

Only £2.25 including 1st class postage and packing from:

TEMPLESOFT  
13 Temple Gardens  
London NW11 0LP 645/12

## BBC GAMES

\*DEEPSPACE AGENT - You are sent into enemy territory to discover the secret of their new superweapon. Arcade action amazing graphics and sound. Model B only £6.95 inc. Also available - £5.95 each. Model A or B. Sid the Snake, Spider Invasion, Androids.

MORLEY ELECTRONICS  
1 Morley Place, Earsdon Road  
Shiremoore, Tyne & Wear

620/12

## COMMODORE 64 FLIGHT SIMULATOR

Pilot your own aircraft to a wide choice of airports in U.K. Magnificent graphics. Requires joystick. Cassette game £9.95

## CBM 64 ASSEMBLER

Write, read and copy your own machine code programs. £6.95

## JUST RELEASED CBM 64 GOLF

Play golf on this 18 hole par 72 course. Challenging game for all levels. Improve your handicap at home £7.50.

Lifetime replacement guarantee  
Mail order only to:  
Anger Productions  
14 The Oval, Broxbourne Herts  
EN10 6DQ. 621/12

## SELL IT WITH YOUR COMPUTER

## CLASSIFIED ORDER FORM

### Classified Rates

Lineage: 40p per word (Min 15 words) - prepayable

Lineage advertisers should complete the form provided in BLOCK CAPITALS. Phone number counts as 2 words. Name and address to be paid for if used in advertisement. Box Number if required is £4.00 extra.

### Display - rates per sec (Min 2sec)

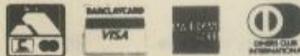
One insertion : £8.50  
Three insertions : £8.20  
Six insertions : £8.00  
Twelve insertions : £7.50

Display advertisers should provide separate copy and preferably reserve space by phone (01-661 3036).

### Method of Payment

Cheques etc, should be made payable to Business Press International Ltd, and crossed. I enclose herewith cheque/PO for

£ . . . . .  
Please debit my Access/Visa/Barclay Card/American Express/Diners Club Int'l as below



SIGNATURE

Post to:

Cut out the order form and return together with your remittance to: Classified Department, Your Computer, Room H211, Quadrant House, The Quadrant, Sutton, Surrey SM2 5AS. (01) 661 3036

Please insert the following advertisement in Your Computer Classified Section

				LINAGE
				£6.00
				£8.00
				£10.00
				£12.00
				£14.00
				£16.00
				£18.00
				£20.00

No. of insertions required  Box No. required YES/NO

NAME (Please include initials) . . . . .

ADDRESS . . . . .

Payment by credit card please state address card is registered

Daytime tel. no . . . . .

THIS FORM SHOULD BE RETURNED BY JAN 21 FOR MARCH ISSUE PUBLICATION

Company Registered Number: 151537 (England) Registered Office: Quadrant House, The Quadrant, Sutton, Surrey SM2 5AS.

# Hot★ lines

Acorn Computer  
Telephone: Cambridge 0223-245200

Atari  
Telephone: Slough 75-33344

Computers  
Telephone: Cambridge 0223-315063

Commodore CBM  
Telephone: Slough 75-74111

Dragon Data  
Telephone: Bridgend 0656-744725

Sharp  
Telephone: Manchester 061-2052333

Sinclair  
Telephone: Cambridge 0276-681666

Sord  
Telephone: London 01-930 4214

Tandy Corporation  
Telephone: Birmingham 021-5566101

Texas Instruments  
Telephone: Bedford 0234-63211

# DATEBASE

*February*

Local, national and international micro events are updated here. To publicise your event, phone Paul Bond on 01-661 3472.

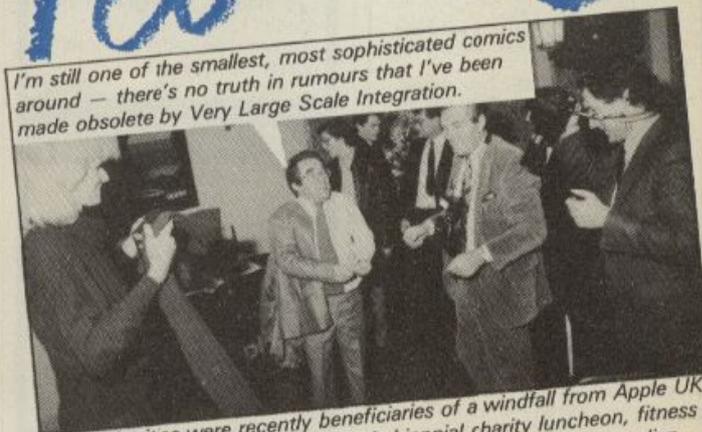
## Acorn Education Show

In a month of pretty exclusive exhibitions, here's one for teacher. It is by invitation only, but inside Central Hall Westminster between January 25-27, there will be over 60 companies dealing in Acorn-related services and peripherals, with an educational bias. The show is organised by Computer Market Place Exhibitions Ltd, who can be contacted on 01-930 1612. Apparently Sinclair will be doing something along the same lines in March.

## Computer Seminar and Exhibition

Aimed at learned societies, trade

*I'm still one of the smallest, most sophisticated comics around — there's no truth in rumours that I've been made obsolete by Very Large Scale Integration.*



Three charities were recently beneficiaries of a windfall from Apple UK Computers — and at the company's biennial charity luncheon, fitness expert Diane Moran, the Green Goddess, prepares to put comedian Ronnie Corbett through his paces.

associations and clubs who want to learn about using micros for membership records, word processing and financial packages. There will be some discussion of

minicomputers. The 14th of February is primarily for learned societies and professional institutions, the 15th is dedicated to trade associations and clubs. It will be held at the International Press Centre. Contact 01-839 4901.

# INDEX TO ADVERTISERS

<b>A</b>		<b>D</b>		<b>M</b>		<b>S</b>	
A & F Software	220	DK Tronics	31, 186, 205	MC Lothlorion	98, 234	Salamander	78
AGF Hardware	105	Datel	50	Martech	141	Severn Software	109
ASE	128	Dean Electronics	96	Melbourne House	179, 183	Shards Software	162
Aardvark	224			Memotech	40, 42	Silverlind	128
Acorn Programs	16, 17	<b>E</b>		Micro X	198	Silversoft	23
Acornsoft	26	East London Robotics	166, 167	Microbusiness	226	Sir Computers	168
Addictive Games	210	Euromax	164	Microgame Simulation	27	Softcell	20, 21
Adventure International	125			Microgen	119	Softek	228, 229
Alien	27, 77	<b>F</b>		Micromega	212, 225	Software Library	194
Anik	28, 29	Fox Electronics	52	Microperipherals	Inside Back Cover	Software Projects	24, 25, 157
Anirog	114			Micropower	18, 19	Software for All	204
Application Software Library	77	<b>G</b>		Microsphere	192	Spectre	80, 27
Arrow Soft	12	GCC Computers	194	Microstyle	84	Spectrum Group	214, 219
Atari International	66, 132	Galaset	58	Midland Computer Fair	206	Spirit Software	198
		Galatrek	54	Mirrorsoft	213	Stell	54
		Games Machine	134	Mr Micro	208	Storm Software	188
		Gilsoft	80			Sunshine Publications	154
<b>B</b>				<b>N</b>		Swanley Electronics	136
Beebug	202	<b>H</b>		National Software Library	170		
Betasoft	194	Hewson	35, 37	New Generation Software	74	<b>T</b>	
Beyond Software	172, 173	Hilton	188	Newnes Technical Books	163	Tandy	222
Big G Software	174	Hisoft	202	Nomad Box Co	43	Tansoft	15
Bridgemaster	50			<b>O</b>		Terminal Software	34
Bubble Bus Software	11	<b>I</b>		Oasis Software	38, 39	Timescape	138
Bucon	235	Imagine	6, 60, 184	Ocean Publishing	Inside Front Cover	Tomorrows World	58
Bugbyte	Back Cover	Incentive Software	77	Orion	201	Tremiver	10
		Incentive Software People	200	Oxford Technical Group	198		
<b>C</b>		Industrial Process	128			<b>U</b>	
CDS Microsystems	122, 123	Interface	30, 106	<b>P</b>		Ultimate Play the Game	150
CP Software	231	Island Logic	176	Paradox	54		
Cambridge Micro Electronics	136	<b>J</b>		Picturesque	165	<b>V</b>	
Campbell Systems	170	J Morrison	108	Pinehurst	188	Varelco	170
Carnell Software	148, 149	JCB	106	Practical Electronics	144	Visions	22, 177
Cascade Games	92	JK Greye	192	Protek	97, 142	Visionstore	190
Chromasonic	156	Jamar	70			Voyager	227
Commodore	112, 113	Joe The Lion	90	<b>Q</b>			
Composound	80	John Wiley	93	QED	12	<b>W</b>	
Computapix	13	<b>K</b>		Quicksilva	88, 89	WH Smiths	8, 9
Computer Club International	58	Kempston Micro	153			Widgit	50
Computer Discount Centre	209	Kuma Computers	160	<b>R</b>		William Stuart	88
Computer Fair	211			RD Laboratories	46		
Computer Rentals Ltd	56, 203	<b>L</b>		Rabbit Software	36	<b>Z</b>	
Computerlink	106	LCL	136	Richard Shepherd	207	ZX Microfair	102, 103
Computers For All	4, 5	Let 84	223	Romik	221	Zero	144
Computertown	32, 33	Level 9	196				
Crash Microgames	7	Level Ltd	144				
Crystal Computing	230	Llamosoft	14				
Currah Computers	158						

# Look to the **stair**<sup>✶</sup> for the best in printing

120 CPS  
**£219**  
+ VAT



160 CPS  
**£359**  
+ VAT

*GEMINI and DELTA, a new range of Star Performers – the ideal complement to any computer system. At prices starting from £219 + VAT, the GEMINI and DELTA open up a new world of printing power – quiet, fast printing in a range of different character types, print pitches and print densities and ultra high resolution graphics and programmable downloadable characters for good measure.*

*GEMINI and DELTA – professional solutions to the printer problem.*

#### KEY FEATURES:

- ★ 120 CPS (Gemini), 160 CPS + 8K buffer (Delta)
- ★ Friction, tractor and roll feed
- ★ Ultra high resolution graphics
- ★ Normal, expanded and condensed print
- ★ Emphasized and double strike print
- ★ Superscripts and subscripts
- ★ True underlining
- ★ Italics and international characters
- ★ Downloadable character set
- ★ Interface – Gemini (parallel), Delta (parallel & RS232)
- ★ Full one year parts and labour warranty

*Call your local dealer now for full information on the GEMINI and DELTA printers or clip this coupon and we'll send you brochures and print samples.*

Name.....

Address.....

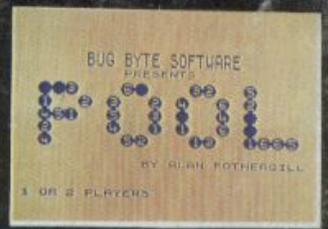
..... Tel. No. ....

**MP** **Micro  
Peripherals Ltd**

**'THE POWER BEHIND THE PRINTED WORD'**

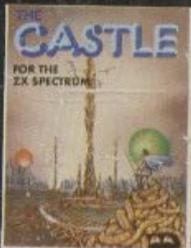
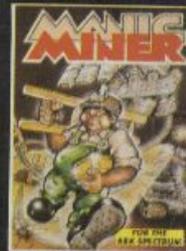
69 The Street, Basing, Basingstoke, Hants. RG24 0BY  
Tel: 0256 3232 (12 lines)      Telex: 859669 MICROP G

# BUG-BYTE SOFTWARE



The pool table you always wanted – brought to life in vivid colour on your ZX SPECTRUM. Just like the real thing – you and your partner shooting pool in the true American style! Or you can play SOLO POOL, in which you have three lives, and lose one each time you pot the cue ball or miss. Practise hard, and in a few days become Computer Pool champion on your street.

## OTHER BEST SELLERS FOR YOUR SPECTRUM



For the  
16K/48K  
ZX SPECTRUM  
**£5.95**

**Bug-Byte Limited**  
Mulberry House,  
Canning Place, Liverpool L1 8JB  
Dealers contact Matthew Thomas  
on 051-709 7071  
Registered Dealers can order  
direct from CBS Distribution  
on 01-960 2155