

40 Rock (C)

POPULAR **Computing** WEEKLY

FREE GAMES CASSETTES

35p 29 September-5 October 1983 Vol 2 No 39

This Week

Commodore 64 games
Mike Grace looks at a variety of software for the Commodore 64 including *Shadowfax* and *Krazy Kong*. See page 14.

Satellite radio
David Kelly talks to Roger Peel about Surrey University's UOSAT programme. See page 13.

BBC graphics
Michael Batty explains how to rotate ellipses in the second of a three-part series on page 33.

New releases
All the latest software games including *The Oracles Cave* from Doric Computer Services and *3 Deep Space* from Postern. See page 53.

★ STAR
Centipede on 48K Spectrum. See page 10.
GAME ★

News Desk

Melbourne announces HURG

MELBOURNE House is announcing its *Hi-resolution User-friendly Real-time Games-designer* (HURG) program at the *Personal Computer World* show this week. The package, which costs £14.95 and was written by William Tang, performs a similar function to Software Studio's *Games Designer* (PCW 15-21 September). HURG enables

games, using a selection of pre-determined programming routines.

The program, which will contain three ready-to-play games, will be available on the 48K Spectrum in the middle of October. Versions for other machines, including the

Continued on page 5

Virgin has a change of heart

VIRGIN Games is to change its approach to the software market.

According to managing director, Nick Alexander, Virgin is in the final stages of setting up an in-house software production facility — similar to the sort of development team used by Psion, Ultimate and Melbourne House.

At the centre of the new

team will be a multi-user mini-computer, running advanced program development software capable of emulating the workings of different processors.

To begin with, three in-house programmers will be appointed — graduates drawn from the computer courses of the country's top universities. This number should rise to five by Christmas with the first programs from the team arriving in the shops in early 1984.

Says Nick: "It is obviously a colossal investment but it seems that is the way software development is going.

"It is a pity, because it means that the days when it will be possible for a single gifted amateur to develop a top selling game are numbered."

Since Virgin Games was launched in June the company has built up a range of titles all drawn from enthusiasts who replied to advertisements re-

Continued on page 5



Programmer, William Tang

Classified Classified Classified Classified

6,000 free tapes to be given away — see page 43

SHADOW FOR THE BBC 32K
Shadow will allow you to make security back-ups of your valuable tape software.
★ Any OS ★ 100% machine code ★ Basic I and Basic II ★ 1200 + 300 baud ★ "Locked" programs
★ Files ★ Any length ★ Easy to use.
Shadow works with 99% of all known programs including "locked" programs or those containing sections at 300 baud.
FREE Inspector a very useful memory viewing program which displays memory in colour coded sections for ease. Worth £8 on its own. Shadow + Inspector £8 inclusive.
Cheque to:
Clares Micro Supplies
Dept PCW, 222 Townfield Road, Winsford, Cheshire
Tel: (06065) 51374

ELKAN ELECTRONICS NEW! NEW!
HANDS "quick-reference" cards — easier to use than the manuals!
DRAGON 32 £3.95
COMMODORE 64/VIC20 £3.95
SINCLAIR ZX81 £3.50
QUICK-SHOT self-centring joysticks — improve your scores!
DRAGON 32 £14.95 (specially developed by ELKAN)
ATARI 400/800 £12.95
COMMODORE 64/VIC20 £12.95 + £1 p&p
ELKAN ELECTRONICS, FREEPOST,
11 Bury New Road,
Prestwich, Manchester, M25 6LZ.
Tel. 061-798 7613

VALHALLA

NEW. The latest and greatest Pacman game, Spooks Attack for the 16K/48K Spectrum. Only £3.95 direct from Simba Software, 39 Springett Avenue, Ringmer, E. Sussex BN8 5HD.

DRAGON 32, seven great games, an amazing look on cassette, tremendous value, £5 to A. Penrose, 20 Ponderosa, Eastmoor, Sutton-on-Forest, York YO6 1EX.

Continued on page 50

The world's first true 3D game.

Postern bring you the first fully
3 dimensional stereoscopic game.

by Mike Singleton

If you've escaped from
the Snake Pit, survived
The Siege, ridden the
mighty Shadowfax
and conquered the
fearsome Firehawks –
see if you're ready for
the ultimate experience.

POSTERN 

SPECTRUM
IC 20
COMMODORE 64
BC 'B'

7.95

Postern Ltd. P.O. Box 2, Andoversford,
Cheltenham, Glos GL54 5SW.
Tel: Northleach (04516) 666
Telex 43269 Prestel 37745

This game requires a colour television set
and the special 3D glasses provided with each game.

© FRANK MOSES

The Team

Editor

Brendon Gore

News Editor

David Kelly [01-734 2664]

Software Editor

Graham Taylor [01-734 2953]

Production Editor

Lynne Constable

Editorial Secretary

Cleo Cherry

Advertisement Manager

David Lake [01-734 0840]

Advertisement Executive

Alastair Macintosh [01-734 3443]

Classified Executive

Diane Davis [01-734 2688]

Administration

Theresa Lacy [01-734 3454]

Managing Editor

Duncan Scot

Publishing Director

Jenny Ireland

Popular Computing Weekly,

12-13 Little Newport Street,

London WC2R 3LD

Telephone: 01-734 1051

Published by Sunshine Publications Ltd.

Typesetting, origination and printing by

Chesham Press, Chesham, Bucks

Distributed by S M Distribution

London SW9. 01-274 8611. Telex: 261643

© Sunshine Publications Ltd 1983



MEMBER OF THE AUDIT
BUREAU OF CIRCULATIONS
ISSN 0265-0509

How to submit articles

Articles which are submitted for publication should not be more than 3,000 words long. The articles, and any accompanying programs, should be original. It is breaking the law of copyright to copy programs out of other magazines and submit them here — so please do not be tempted.

All submissions should be typed and a double space should be left between each line. Please leave wide margins.

Programs should, whenever possible, be computer printed.

We cannot guarantee to return every submitted article or program, so please keep a copy. If you want to have your own program returned you must include a stamped, addressed envelope.

Accuracy

Popular Computing Weekly cannot accept any responsibility for any errors in programs we publish, although we will always try our best to make sure programs work.

This Week

News 5

Commodore prices

Letters 7

Machine code helpline

Star Game 10

Centipede on 48K Spectrum

Street Life 13

David Kelly visits UOSAT



Reviews 14

Commodore 64 software

Programming 17

Vic20 gameswriting — postscript

Spectrum 22

Learning French by interrupting

Dragon 24

Geography by Ian Robertson

Commodore 64 28

Hi-res graphics — part II

BBC in education 33

Rotating ellipses by Mike Batty

Open Forum 37

Five pages of your programs

Adventure 47

Tony Bridge's corner

Peek & poke 49

Your questions answered

New releases 53

Latest software programs

Competitions 55

Puzzle, Top 10, Ziggurat

Editorial

The computer market is looking, if not shaky, at least uncertain at the moment. Following the recent troubles at NewBrain, Dragon and Texas Instruments, comes news of difficulties for Osborne and Apple.

However, four home computer manufacturers are planning to expand their activities into the personal business computer area. Acorn, Dragon, Oric and Sinclair are all working on business micros for launch at the end of this year or in the first half of 1984.

Personal business computers is an area that has been largely ignored up to now. Micros have tended to fall into one of two categories — home (ie, cheap and 'non serious') or business (ie, expensive and 'serious'). Despite the efforts of firms like Computers, there has been little crossover between the two sectors of the market.

But, the new IBM Peanut would appear to be aimed straight between these two traditional 'breeds' of micro. Details of the Peanut are scarce, but it seems to be capable of fulfilling a dual/home business role.

Whether Acorn, Dragon, Oric and Sinclair will be successful with their new machines remains to be seen. But, the fact that IBM appears to be following similar lines must be encouraging.

Next Thursday

Try and ram the saucers and aliens with your shuttlecraft, but avoid the asteroids. Asteroid Dodge — next week's star game for the BBC B by Phillip Wells.

Subscribe to Popular Computing Weekly

I would like to subscribe to *Popular Computing Weekly*.

Please start my subscription from the issue.

UK Addresses: 26 issues at £9.98 52 issues at £19.95

Overseas Addresses: 26 issues at £18.70 52 issues at £37.40

Please tick relevant box

I enclose my cheque to *Popular Computing Weekly* for

Name

Address

.....

Please send this form, and cheque, to *Popular Computing Weekly*, Subscription Dept., 12-13 Little Newport Street, London WC2R 3LD.

64

The Six-Four Supplies Company is THE specialist for the Commodore 64. Our range of products in support of this machine includes a wide range of peripherals, devices and software to cover the needs of home and business user alike. We intend to offer an unrivalled selection of products, covering every aspect of using a Commodore 64.

SOFTWARE

The software list shows, in order: the product name/producer/product type/price prefix to indicate cartridge (r) disk (d) and cassette (c). These are fully itemised in our product sheets. Producers initials here simply identify like-named products for price checking. The product types are: acct:accounts; adv:adventure; ass(3)(u): three-pass assembler (+utilities); bus:business; comp:compiler; data:datafile/base; dbu:database(code)writer; edu:educational fn:financial; hfin:home finance; intf: interface lang:language/OS; madv:mystery; adventure; mon(a)(u):monitor(+ assembler) (+utilities); refd:reference datafile; sadv:space adventure; sprd spreadsheet; stat:statistics; txd:texteditor; util:utility wp:wordprocessing; wpu:wordprocessing utility or link program. Indicated products are suitable for "serious" applications. Some prices may now be lower — credit given. Prices include p&p.

- 1541 Backup SSFT util d12.50 c10.50 □ 3D Time Trek ANG game c6.00 ■ 64 FORTH HES lang c49.00 □ 64 Simon STCK game c5.75 □ 64 Sprite Editor STCK util c5.00 □ 6502 Professional System HES c21.00 ■ Abracalc ABCD sprd d27.50 c25.00 □ Adventure Quest LEV9 adv c9.50 □ Alien Panic 64 BB game c3.99 □ Andromeda Conquest AHGC c13.00 □ Annihilator RAB game c5.75 □ Apple Cider Spider SOL r24.00 □ Arcade Search T&FS c14.50 □ Arcadia 64 IMAG game c5.50 □ Armageddon OCNS game c6.75 □ Arrow SSFT util r43.00 □ Assembler Tutor CBM edu d29.92 c29.95 ■ Assembler Dev CBM util d24.95 ■ Assemblies Option DDM bus d51.75 □ Attack of the Mutant Camels LSFT game c6.75 □ Aztec DMST d29.00 □ Bandits SRSS d29.00 □ Bank Street Writer BBND d50.00 □ Bank Manager 64 CHIP hfin d9.50 c7.25 □ Benji Space Rescue HES d32.00 □ Bilestoad DMST d21.50 □ Biology CBM edu c9.99 □ Blade of Blackpoole SRSS adv d29.00 ■ Business TOTL acct d70.00 ■ BusiCalc SSFT sprd d45.00 c43.00 ■ BusiWriter SSFT wp r53.00 d43.00 □ B-1 Nuclear Bomber AHGC c11.50 ■ BACKUP + FILE CLONE CLM util c15.00 □ BBC Mastermind CBM quiz c9.99 ■ CalcResult KOBR sprd d115.00 □ Candy Bandit T&FS d21.50 c21.50 □ Cannonball Blitz SOL r27.00 □ Cavern Run 64 BB game c3.99 ■ Centronics Interface ADGC util c7.95 □ Centropods RAB game c5.75 □ Check Ease T&FS d25.00 c21.50 □ Chemistry CBM edu c9.99 □ Choplifter BBND game r33.00 □ Clowns CBM game c9.99 ■ Codewriter DYNA dbu d85.00 □ Colossal Adventure LEV9 adv c9.50 □ Combat Leader STSI d29.00 ■ Compactor SSFT util d10.50 c8.50 □ Computer Stocks & Bonds AHGC c14.50 □ Concentration STCK game c5.75 □ Cosmic Life SPNK r24.50 □ Cosmic Convoys TASK game c6.75 □ Cosmic Capers SSFT adv d10.00 c7.50 □ CoCo II HES r32.00 d29.00 □ CoCo HES r36.00d36.00 □ Crazy Kong INTM game c6.75 □ Creepy Corridors SOL r24.00 □ Critical Mass SRSS d29.00 □ Crossword Twister STCK game c5.75 □ Crush, Crumble, Chomp EPYX d20.50 □ Curse of Ra EPYX adv c13.50 □ Cyclons RAB game c5.75 ■ C64-FORTH PMP lang d70.00 c70.00 □ David's Midnight Magic BBND d25.00 □ Deadline INFO madv d36.00 □ Death in the Caribbean MLAB d25.00 □ Depth Charge CBM game c4.99 ■ Diary 64 KOBR data r40.00 □ Dicky's Diamond ROMK game c6.75 □ Dino Eggs MLAB d29.00 □ Disky ADIN d36.00 □ Dragonriders of Perth EPYX d29.00 c29.00 □ Draughts STCK game c5.75 □ Dreifs SYN game r22.00 d25.00 c25.00 □ Dungeon Adventure LEV9 adv c9.50 ■ Easy CalcResult KOBR sprd c72.00 ■ Easy Script CBM wp d75.00 ■ Easy Spell CBM wpu d50.00 ■ EasyStock CBM bus d75.00 □ English Language CBM edu c9.99 □ Escape MCP RAB game c5.75 □ Face Ache CBM game c4.99 □ Facemaker SPNK edc r24.00 d25.00 ■ Factory Manager DDM bus d138.00 □ Fast Eddie SRSS d25.00 □ Fire One EPYX d25.00 c25.00 □ Flying Ace AHGC c18.50 □ Fool's Gold ROMK game c6.75 □ Football Strategy AHGC c11.50 □ Fort Apocalypse SYN d25.00 c25.00 □ Fraction Fever SPNK r24.50 □ Frogger 64 INTM game c6.75 □ Frogger SOL game d25.00 c25.00 □ Frogun ANG game c5.75 □ Fun with Art EPYX r29.00 ■ Future Finance CBM fin d75.00 ■ FORTH 64 KOBR lang r40.00 ■ FORTH ADGC lang r29.95 □ Gateway to Ashal EPYX adv r29.00 □ Genesis DSFT d21.50 c21.50 □ Geography CBM edu c9.99 □ Geopolitique STSI d29.00 □ Globe Grabber MLAD d29.00 □ Goblin Towers SSFT adv d10.50 c9.00 □ Gortek CBM edu c12.99 □ Go STCK game c5.75 □ Grandmaster ADGC chess c17.95 □ Graphix 64 SSFT util d12.50 c10.50 □ Gridrunner HES game r29.00 □ Gridrunner 64 LSFT game c5.00 □ Gridtrap SMLK game c8.50 ■ Hesmon 64 HES mona r29.00 ■ Heswriter 64 HES wp r33.00 □ Hey Diddle Diddle SPNK edu d21.50 □ High Flyer CBM game c11.99 □ Highrise MLAB d25.00 □ History CBM edu c9.99 □ Home Manager HES hfin d35.00 □ Horace Goes Skilling MELH game c5.75 □ Hungry Horace MELH game c5.75 □ Hustler BB game c5.99 □ Intro to Basic 1 CBM edu d14.95 c14.95 □ Jawbreaker SOL d25.00 c21.50 □ Juice TRON d25.00 □ Jump Man EPYX d27.50 c27.50 □ Jumpin' Jack SMLK game c8.50 □ Jumpman Junior EPYX r29.00 □ Kaktus SSFT game d10.00 c8.00 □ Kid Grid TRON d25.00 □ Kids on Keys SPNK r24.50 □ Kindercomp SPNK edu r21.00 d21.50 □ Knights of the Desert STSI d29.00 □ Krazy Kong BB game c3.99 ■ Label Printer BB util c5.99 □ Labyrinth CBM game c4.99 □ Lazer Zone LSFT game c6.75 □ Life STCK game c5.75 □ Lobster Catcher CBM game c11.99 □ Lost in the Labyrinth STCK game c5.75 □ Lunar Outpost EPYX r29.00 □ Lunar Rescue CHIP game c5.25 □ Maggot Mania CBM game c4.99 ■ Mailpro 64 KOBR wpu d70.00 □ Mangrove SSFT game d10.50 c8.50 □ Matchmaker CBM game c9.99 □ Mathematics I CBM edu c9.99 □ Mathematics II CBM edu c9.99 □ Mating Zone DMST d21.50 □ Matrix 64 LSFT game c6.75 □ Maze Master HES r28.50 □ Memo Pad BB txd c3.99 □ Midway Campaign AHGC c11.50 ■ Mikro Assembler SSFT ass3 r53.00 □ Mission On SPFT game c7.95 □ Money Manager CBM fin c9.99 ■ Monitor ADGC monu r29.95 □ Monopole RAB game c5.75 □ Monster Smash DMST d25.00 c25.00 □ Moon Shuttle DSFT d21.50 □ Moon Patrol AHGC c18.00 □ Moral SYN d25.00 c25.00 □ Motor Mania ADGC game c8.95 □ Mr Cool SOL r24.00 □ Mr Wimpy OCNS game c6.75 □ Music Composer CBM util c9.99 ■ M/C Soft 64 CHIP assu c7.25 □ N Atlantic Convoy Raider AHGC c11.50 ■ Note Pro I ELI util d20.00 ■ Note Pro II ELI util d40.00 ■ Note Pro Bridge ELI util d25.00 □ Nukewar AHGC c11.50 □ Ocean Racer CBM game ■ Omnicalc HES sprd d70.00 ■ Oracle 64 KOBR data d100.00 □ Othello STCK game c5.75 □ Ozzy Ozone SRSS d25.00 □ O'Riley's Mine DSFT d21.50 c21.50 □ Paint Wizard DMST c36.00 □ Paint Brush HES r21.00 □ Pakacuda RAB game c5.75 ■ Pal 64 KOBR assu d72.00 □ Panic 64 INTM game c6.75 ■ PaperClip KOBR wp d90.00 □ Patrick Moore: Astronomy CBM edu c9.99 ■ PetSpeed 64 CBM comp d50.00 □ Pharaoh's Curse SYN c25.00 □ Physics CBM edu c9.99 □ Pitstop EPYX r29.00 □ Planet Miners AHGC c11.50 □ Planetfall INFO d35.00 □ Pontoon + Roulette + AceHigh CHIP game c5.25 □ Pooyan DSFT c21.50 □ Poster Printer BB util c5.99 ■ Power 64 KOBR util d72.00 ■ Printlink 64 + cable SSFT util d30.00 c30.00 □ Professional Blackjack SCPY game d47.00 ■ Programmer's Utilities CBM util d14.99 □ Protector II SYN game c25.00 ■ Purchase Accounting KOBR acct d105.00 ■ Purchase Ledger 64 AGM acct d113.85 □ Quizmaster CBM quiz c9.99 □ Quizzer BB quiz c5.99 □ R Carrier's Menu Planner CBM menu c9.99 □ Radar Ratrace CBM game c9.99 □ Rail Boss CBM game □ Renaissance ADGC game c8.95 ■ Renumber SSFT util d9.50 c7.50 □ Repton SRSS d29.00 ■ Research Assistant TOTL refd d30.00 c27.00 □ Retro Ball HES r29.00 □ Ringside Seat STSI d29.00 □ Road Toad ADGC game c8.50 □ Robot Battle USA d21.50 □ Rollerball OCNS game c6.75 □ Rom's Revenge EPYX d29.00 □ Roundabout DMST d21.50 □ REL KOBR intf r35.00 □ ROX-64 LSFT game 5.00 ■ Sales Accounting KOBR acct d105.00 ■ Sales Ledger 64 AGM acct d113.85 □ Sammy Lightfoot SOL r27.00 □ Scramble 64 INTM game c6.75 ■ Script 64 RVTC wp d70.00 □ Sea Dragon ADIN d25.00 c25.00 □ Sea Wolf CBM game c9.99 □ Sealox BBND c29.00 □ Seek and Destroy STCK game c5.75 □ Sentinel SYN d25.00 c25.00 □ Serpentine BBND r29.00 □ Shadowfax POST game c6.75 □ Shadowscorcher SRSS d25.00 □ Shamus SYN d25.00 c25.00 □ Siege POST game c6.75 □ Silicon Warrior EPYX r29.00 ■ Simons Basic CBM util r50.00 □ Simplex 64 MISI acct d172.50 □ Skramble SMLK game c8.50 □ Snake Byte SRSS d25.00 □ Snake Pit POST game c6.75 □ Snooper Troops: Case 1 SPNK madv d28.00 □ Sooper Foot CBM game c4.99 □ Space Sentinel T&FS d21.50 □ Space Commander CBM game □ Speed Racer T&FS d21.50 c21.50 □ Spirites + Snowmen CBM game c4.99 □ Sports Search T&FS c14.50 □ Sprite Man INTM game c6.75 □ Sprite Maker 64 ENGS util c6.75 □ Sprite/Graphics Editor CBM util c5.99 □ Squish'em SRSS d25.00 □ Star Trek INTM game c6.75 □ Starfire EPYX d25.00 c25.00 ■ Stat 64 KOBR stat r35.00 □ Stellar Wars CBM game c4.99 □ Stellar Triumph ROMK game c6.75 □ Starcross INFO sadv d29.00 □ Stix SSFT game c8.50 ■ Stock Control KOBR bus d105.00 ■ Stock Control DDM bus d138.00 □ Super Blitz CBM game 4.99 □ Super Skramble TERM game c9.50 □ Super Griddler TERM game c9.50 □ Super Doglight TERM game c9.50 ■ Superbase 64 PREC dbu d100.00 □ Superfont 4.0 ENGS util c6.75 ■ Supersort 64 SSFT util d25.00 c23.50 □ Survivor SYN d25.00 c25.00 □ Suspended INFO adv d36.00 □ Swashbuckler DMST d25.00 □ Swat Rescue EPYX r29.00 □ Sword of Fargoal EPYX adv d20.50 c20.50 □ Sword Point HES d25.00 ■ Tagsort 64 SSFT util d12.50 c10.50 □ Tank Atak SSFT game d10.50 c8.50 ■ Tape Merge/Append SSFT util d9.50 c7.50 □ Telengard AHGC c16.50 □ Temple of Ashal EPYX adv r20.00 d25.00 □ The Most Amazing Thing SPNK adv d21.50 ■ The Recipe Box ARM data d15.00 □ The Cracks of Fire SSFT adv d10.00 c7.50 □ The Streets of London SSFT adv d10.50 c9.00 □ The Hobbit MELH adv c14.50 □ Threshold SOL r27.00 □ Time Runner FUNS d21.50 c21.50 □ Time Money Manager HES hfin d49.00 □ Tombs of Xelops ROMK game c6.75 □ Topsee-Turves DMST d29.00 c25.00 □ Triad SMLK game c8.50 □ Turmoil SRSS d25.00 □ Turtle Graphics II HES edu r43.00 □ Turtle Tutor HES r28.00 □ Turtle Trainer HES r26.00 □ Type Attack (Reactivated) SRSS d29.00 ■ TOTL.Label TOTL wpu d19.00 c1600 ■ TOTL.Text TOTL wp d34.00 c31.00 ■ TOTL.Time Manager TOTL plan d30.00 c27.00 □ Up for Grabs SPNK r28.00 □ Upper Reaches of Ashal EPYX adv d13.50 c13.50 ■ Victree SSFT util r53.00 □ Vixplode 64 ABCO game c8.00 ■ VizaSpell VIZA wpu d55.00 ■ VizaWrite VIZA wp r69.00 d69.00 □ Way Out SRSS d29.00 □ Witness INFO madv d35.00 □ Wiz 'n Roo DMST d25.00 □ Word Search T&FS c14.50 □ Word Wizard BB txd c5.99 □ Word Feud ADGC game c8.50 ■ Wordcraft 40 ADGC wp d89.95 □ Wordrace DASK d24.50 c24.50 □ Your Personality CBM quiz c9.99 □ Zappy Zooks ROMK game c6.75 □ Zaxxon DSFT game d29.00 c29.00 ■ Zoom SSFT monu d12.50 c10.50 □ Zork I INFO adv d29.00 □ Zork II INFO adv d29.00 □ Zork III INFO adv d29.00

Please make cheques/PO's payable to The Six-Four Supplies Company; allow for clearing and post. Quote product name and choice of tape/disk/cartridge as required.

HARDWARE

Product	OUR PRICE*
(a) Commodore 64	£195.00
(b) 1530 cassette unit C2N	£40.00
(c) 1541 disk unit	£199.00
(d) 1525 printer	£199.00
(e) 1526 printer	£340.00
(f) Epson FX80	£410.00
(g) Parallel user port printer	

cable and software to connect
(f) to (a) £25.00
(h) 4-colour printer/plotter £160.00

Special Packages	OUR PRICE*
(i) standard: (a)+(b)	£230.00
(j) letter writer: (a)+(b)+(d)	£420
(k) business 1: (a)+(c)+(d)	£585
(l) business 2: (a)+(c)+(e)	£720
(m) business 3: (a)+(c)+(f)+(g)	£815.00

*ALL prices include VAT and carriage!
Write for discounts on other equipment!

The Six-Four Supplies Company

P.O. Box 19, Whitstable, Kent CT5 1TJ

Virgin software

Continued from page 1

questing programs. This approach has met with mixed success — the company has gained a name for BBC software while Nick admits some of the Spectrum titles have not sold well.



Nick Alexander

Virgin plans more releases from its roster of freelance programmers in the coming months. October will see two Commodore 64 titles — *Falcon Patrol* and *Bitmania*; four Spectrum 48K programs — *Quetzalcoatl*, *Robber*, *Lost* and *Spectrum*; four for the BBC — *Microbe*, *Chieftain*, *Owzat* and *Trench*, and two for the TI99/4A — *Robopods* and *Fun-Pac*. This will be followed in November by four more for the Spectrum, three more for the BBC and one for the Dragon.

Virgin has also dropped its prices. As from its September releases Spectrum and Vic prices come down to £5.95, and Dragon and Oric tapes come down to £6.95. BBC titles stay at £7.95.

HURG

Continued from page 1

Commodore 64 and BBC B, will follow shortly.

Games written with HURG will be eligible for a £3,000 competition. Each month, until January 1984, prizes will be awarded to the three best games written with the aid of HURG. The overall winner will then be awarded the £3,000 grand prize. Details of the competition will be included with each copy of the program.

Made in UK

AS predicted (PCW, September 1) Acorn has announced a deal with AB Electronics to manufacture 100,000 Electron machines in the UK.

Commodore try to halt trend

HAVING been partly responsible for the recent micro price war, Commodore is now apparently trying to halt the trend, by encouraging dealers to keep prices up.

One retailer upset by Commodore's actions is Mike Mehdi of Crestmatt, who has reported Commodore to the Office of Fair Trading.

Crestmatt is currently selling the Commodore 64 machine £4 under a suggested minimum price of £199.95. He alleges that Commodore has threatened to cut off his supply of machines if he doesn't raise his prices.

Hitch for Aquarius

MATTEL Inc's announcement of huge financial losses has cast doubt over the future of the Aquarius computer, recently launched in this country.

The company recently announced financial losses of \$156.1m for the quarter to July 30. The blame for the fall was put on the company's electronic division — experiencing a slump in American video game and computer sales — which lost \$166.7m for the quarter.

Mattel reacted by announcing "sharply" reduced marketing of its Aquarius home computer in the US. This means that the Aquarius will not now achieve full national distribution in the States.

This in turn has cast doubts over the computer's future in the UK. Mattel UK's managing director Mike Lunch was anxious to dispel any fears for the Aquarius in the UK: "I think the worry is misplaced," he said.

He explained that Mattel has sold marketing rights for the Aquarius in non-English-speaking countries to the machine's Far Eastern manufacturers, Radofin.

Quicksilver's Christmas list

QUICKSILVA has announced its new titles for Christmas.

Four for the Spectrum: *Soft Solid 3D Ant Attack* (48K) and *The Flea*, *Gridrunner* and *Traxx* (the latter two by Jeff Minter in conjunction with

He also claims that Commodore will only grant him a dealership if he discloses the name of the company supplying him with machines.

Mike says: "The only way we can compete with the high-street stores is on price, by cutting our own profit margins."

Commodore, on the other hand, denies that any attempts are being made to impose a £199.95 price for the Com-

modore 64 model.

A spokesman commented: "We have no quarrel with Crestmatt — it is the person he is buying from we are concerned about. It is conditional on our supplying people that they adhere to our terms of business."

Mike Mehdi is determined not to disclose the source of his Commodore 64 supply. "I have now dropped the price of the Commodore 64 to £184.95 and will be holding it at that level up to the new year."

Lynx triplets

CAMPUTERS' 96K Lynx computer is now available, priced at £299. The new machine offers 37.5K of user-Ram in Basic and high-resolution colour. This compares with the 48K Lynx's 13.7K. The 96K also features additional Rom commands contained in a 4K extension Eprom. These include printer, joystick and light-pen commands, as well as *Circle*, *Triangle* and *Rectangle Fill* graphics commands.

Owners of 48K machines will be able to up-grade to the 96K for £89.95.

Next week's *Personal Computer World Show* will see the launch of the Lynx disc drive system. A single 5¼in single-sided double-density 40-track Alps unit plus Lynx operating system will cost £343.85.

Computers also hopes to preview its 128K machine with Lynx facilities disc and CPM at the show.

Apple down

SHARES of Apple Computers fell by 25 percent on the New York stock exchange on Friday, September 23, after the company announced that fourth quarter profits would be "sharply" down.

Autumn releases from Thorn

COMPUTER WAR heads up Thorn EMI's autumn software releases — based on the hit movie *War Games*.

The title will be out on cartridge in October for the Vic20 (£19.95), Atari and Texas machines (both £29.95).



Other cartridge releases next month include *Mine Madness* for the Vic20 (£19.95) and *Carnival Masacre* for the Atari (£24.95).

In November, Thorn EMI will produce its first games on cassette for the Spectrum. No prices are available yet but the titles are: *Volcanic Planet*, *Gold Rush* and *Blockade Runner* for the 16K model and a version of *River Rescue* for the 48K.

At the Barbican

POPULAR Computing Weekly will be on stand number 444 at this week's Personal Computer World Show at the Barbican, London.

**LOOK FOR THE NAME
'ULTIMATE' NAME
'ULTIMATE' GAMES**

JET PAC for the 16/48K Spectrum.
JET PAC - The Ultimate Space game.
 Amazing smooth high resolution colour, superb graphics, the totally new addictive concept and all those extra features you expect from the ULTIMATE GAME people. Design: The ULTIMATE PLAY THE GAME Design Team.

'JET PAC'

PSSST for the 16/48K Spectrum.
PSSST - Go grow yourself a real game.
 Amazing smooth high resolution colour, superb graphics, the totally new addictive concept and all those extra features you expect from the ULTIMATE GAME people. Design: The ULTIMATE PLAY THE GAME Design Team.

'COOKIE'

COOKIE for the 16/48K Spectrum.
COOKIE - Charlie chef and the Ingredients vs Bin Monster and the Nasties.
 Amazing smooth high resolution colour, superb graphics, the totally new addictive concept and all those extra features you expect from the ULTIMATE GAME people. Design: The ULTIMATE PLAY THE GAME Design Team.



ULTIMATE PLAY THE GAME

ULTIMATE PLAY THE GAME



ULTIMATE PLAY THE GAME

'PSSST'

'TRANZAM'

TRANZAM for the 16/48K spectrum.
TRANZAM - The high speed real time rough driving pursuit race across America.
 Amazing smooth high resolution colour, superb graphics, the totally new addictive concept and all those extra features you expect from the ULTIMATE GAME people. Design: The ULTIMATE PLAY THE GAME Design Team.



ULTIMATE PLAY THE GAME

These games should be available from **W. H. SMITH, JOHN MENZIES, BOOTS, LASKYS, SPECTRUM CENTRES, OTHER LARGE DEPARTMENT STORES and ALL GOOD MAJOR SOFTWARE RETAILERS**, alternatively send the coupon to **ULTIMATE PLAY THE GAME** for immediate despatch. Subject to availability your order is normally despatched by return.

£5.50 each
 including VAT, first class postage and packing in UK.

ULTIMATE PLAY THE GAME is a trade name of Ashby Computers & Graphics Ltd. The Green Ashby de la Zouch Leics. LE6 5JU.

Dealership enquiries welcome, phone (0530) 411485.

Post this coupon now to **ULTIMATE PLAY THE GAME, The Green, Ashby de la Zouch, Leicestershire LE6 5JU.**

Please send me the following

JET PAC

TRANZAM

COOKIE

PSSST

I enclose cheque/PO for £

Name _____

Address _____

World champion?

OK you guys. So you think you're good! I challenge you to beat my friend David Willmer's score of 169,990 on Interceptor Micro's *Frogger*. Beat that if you can — it took David 40 minutes using my Commodore 64. Is David the World Champion?

Julian Courtland-Smith
Atlantis
28 Tile Kiln Lane
Hastings
East Sussex TN35 5EN

Adventure helpline

In response to Stephen Renton's letter (Vol 2 No 36), I heartily endorse his suggestion for a machine code helpline, and/or a machine code pen pal section, but cannot agree with his views on the adventure corner helpline, though a bit more solid 'info' and a little less 'in' comments or asides would be appreciated.

I'd also like to back up Mark Fussell and others in requesting a return to a m/c series for the 48K Spectrum and agree with his reasons for buying your magazine.

The problem with all the m/code articles — and books which I have read — is that there always seems to be a vast gap between a very 'beginners please' type: "don't forget to press enter" — and the heady heights (to me) of vast strings of numbers without practical information on how to use them.

R B Mote
1 Barmouth Avenue
Perivale
Greenford
Middlesex UB6 8JR

Captain Red Ken

Skipping all the 'your magazine is great, please print my letter' trash, I will get straight to the point.

I have decided to go into the software business. As I don't consider myself a second Jeff Minter, I am in need of help.

I would be very grateful if Vic20 owners with programs they consider to be commercially viable would send them to me. This will be an under 16s outfit, with 50 percent

royalties. It doesn't matter if your programs aren't in the *Astron Belt* class, there are such things as gamestapes.

I would also like to know your advertisement rates as, if I ever get this off the ground, yours is a magazine in which I would like to advertise.

Finally, Rabbit Software's *Myriad* holds no further mysteries — I have scored 1,125,000 plus, going round two times and finishing with 30 lives and something in the region of 100 shields. This, I must point out, was achieved on a tape supplied free of charge by Rabbit when I told them mine was faulty.

Captain Red Ken
42 Freshfield Road
Formby L37 3HW

PS. If anyone submitting tapes wants them back, please include a SAE.

Well, Captain Red Ken, I don't know how many of our readers will want to take up your offer, but it seems only fair to give them an opportunity to do so. Our advertising department will be happy to send you a copy of our rates.

Wrongly numbered

Regarding the extremely useful article and program on word processor for Spectrum 48K (*PCW* 15-21 September, page 20), the hex-loader (incorrectly numbered program 2) will not run as listed. I suggest the following lines will do the trick:

```
31 IF LEN X $/2<>INT(LEN X $/2)
    THEN PRINT "INCORRECT EN-
    TRY": GOTO 30
45 LET X$ = X$ (3 TO)
```

D Warner
29 Heath Farm Road
Ferndown
Dorset

Apologies to anyone who tried to enter Dale McLoughlin's word processing listing and failed. Programs one and two were numbered the wrong way round.

Sinclair user group

We have noticed recently, in several of the computer magazines, letters claiming that there is a shortage of user groups for Sinclair users. Apparently these users are not aware of our own group which

has members around the world.

The International Sinclair User Group (ISUG) was formed as a result of the demise of the former, well-respected, National ZX User Group, organised by Tim Hartnell.

We would be grateful for a plug on your letters page and club file to dispel this nasty rumour that Sinclair users are without representation. All that is needed is a letter to us at the above address, a stamp for the reply would be appreciated (not an SAE), this will

Conditional statement

I found J Coote's *Turtle* interpreter for the ZX Spectrum in a back issue of *PCW* (Vol 2 No 30). I have implemented it and had a lot of fun with it.

The author asked for suggested additions. One that I have made is a conditional statement.

The most natural syntax for such a statement would be "if cond do S1 else S2 then . . .", meaning that the numerical expression *cond* is evaluated, the program executes *S1* or *S2*, depending on the value of *cond*, with program execution continuing after *then*. However, it simplifies the programming to use the form "if cond (S1) (S2) . . .", since there is already a subroutine to locate bracketed substrings for the "rep" command. The relevant additions are:

```
320 IF T$ = "if" THEN GOTO 1500
1500 GOSUB 40: GOSUB 45: LET
    cond = VAL Z$ (i + 1 TO f - 1):
    LET P$ = Z$ (f + 1 TO e - 1):
    LET Z$ = "X" + Z$ (e + 1 TO)
1510 GOSUB 45: LET Q$ = Z$ (f + 1
    TO e - 1): LET Z$ = "X" + Z$
```

bring full details plus an application form.

We welcome applications from both seasoned veterans and newcomers alike, so let's hear no more nasty talk about non-representation.

Peter Paton and Vic Webber
ISUG
176 Todmorden Road
Burnley
Lancs

It's good to see someone attempting to fill the gap left by the closure of the National ZX User Group. ISUG has our best wishes for the future.

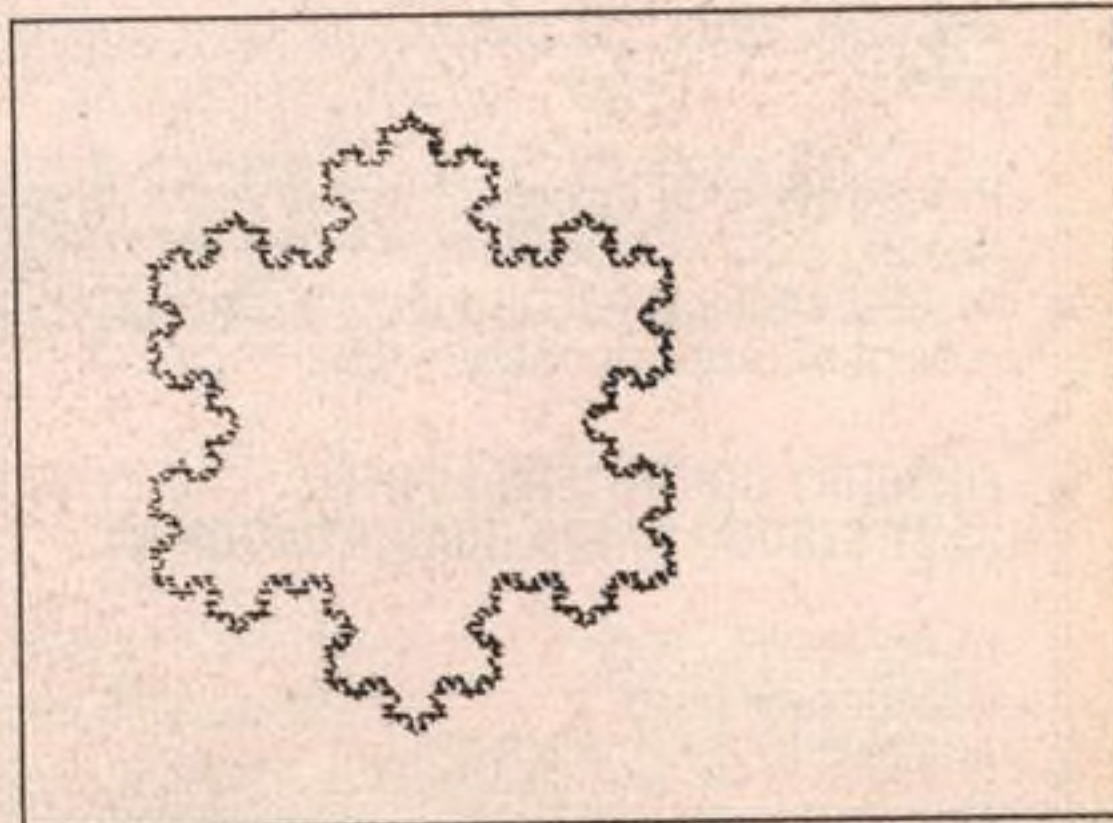
```
(e + 1 TO)
1520 IF cond THEN LET Z$ = "X" +
    P$ + Z$ (Z TO): GOTO 100
1530 LET Z$ = "X" + Q$ + Z$ (Z
    TO): GOTO 100
```

The *Turtle* accepts recursive calls to object definitions — with "if" we can ensure that the recursion "bottoms out" and thus draw famous recursive pictures like the snowflake and dragon curves.

Of course, recursion raises the vexed question of local variables. In this case, the only *Turtle* variable is "siz". For most purposes, it is sufficient to ensure that, whenever a definition is called recursively, the value of "siz" on leaving is returned to its value on entering. Thus, the following lines define the snowflake curve:

```
obj side if siz<3 (dra siz) (siz siz/3 side
    tur 60 side tur-120 side tur 60
    side siz siz * 3)
obj snowflake rep 3 (side tur-120)
```

Peter Cameron
70 Godstow Rd
Wolvercote
Oxford OX2 8NY



FINSBURY COMPUTER CENTRE

25-27 STROUD GREEN ROAD
LONDON N4 TEL: 01-263 0084/4481

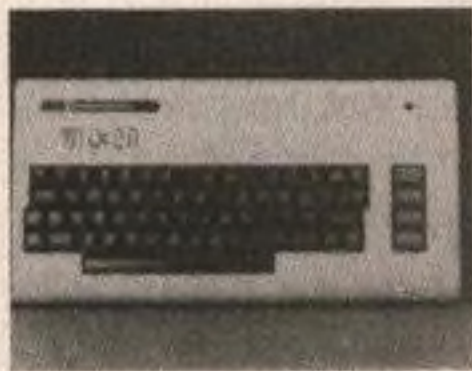
**NORTH LONDON'S
LARGEST MICROCOMPUTER
CENTRE
BUSINESS COMPUTERS!
DUET 16 in stock**



ATARI 400 £149.00
ATARI 800 £299.99



SINCLAIR ZX81 £45.00
SPECIAL OFFER
SPECTRUM 16K £99.95
SPECTRUM 48K £129.95



COMMODORE VIC20 £149.99
INCLUDING STARTERPACK
COMMODORE 64 £229.00



DRAGON 32 £175.00



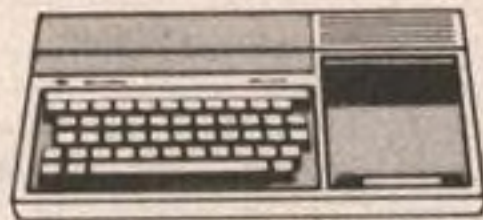
ORIC-1 48K £139.99



LYNX 48 £225.00



COLOUR GENIE 32K £168.00
SPECIAL OFFER



TEXAS TI 99-4A
£159.95



JUPITER ACE £69.95



BBC MODEL B £399.00

WE CARRY PROBABLY THE WIDEST RANGE OF SOFTWARE PROGRAMS IN STOCK. PLEASE VISIT US FOR DEMONSTRATION ON ANY OF THE ABOVE COMPUTERS DISK DRIVES, PRINTERS, CASSETTE RECORDERS, MONITORS, SPEECH SYNTHESISERS, LEADS, ETC. ALSO IN STOCK. ALL PRICES INCLUDE VAT. PRICES ARE CORRECT AT TIME OF GOING TO PRESS BUT ARE SUBJECT TO CHANGE.

We cannot list all the software we stock, so pick up the phone and ring 01-263 0084/4481 and ask. We'll be pleased to give you our prices.

Please send off the coupon or order by phone quoting your Access/Barclaycard No. Phone 01-263 0084/4481. Immediate despatch on receipt of order or cheque clearance.

FINSBURY COMPUTERS LIMITED
25/27 STROUD GREEN ROAD, LONDON N4

We open Monday, Tuesday and Saturday from 9.30 to 6.00
Wednesday 9.30 to 1.30
THURSDAY and FRIDAY 9.30 to 8.00

TO: FINSBURY COMPUTERS LTD
25/27 STROUD GREEN ROAD
LONDON N4

Please supply

Please add £3 for p&p to cost

I enclose my cheque for £.....

or charge my
Access/Barclaycard No.

NAME

ADDRESS

..... SIGNATURE

Now a business spreadsheet for home computers

Clear and easy to use

2000 cells
(600 in 16K VIC 20)

Global column width adjustment

Variable individual column width

Insertion or deletion of rows and columns

Save, load and merge capabilities.

22 mathematical and statistical functions

Formatting by cell or whole sheet

Fast alpha-numeric search

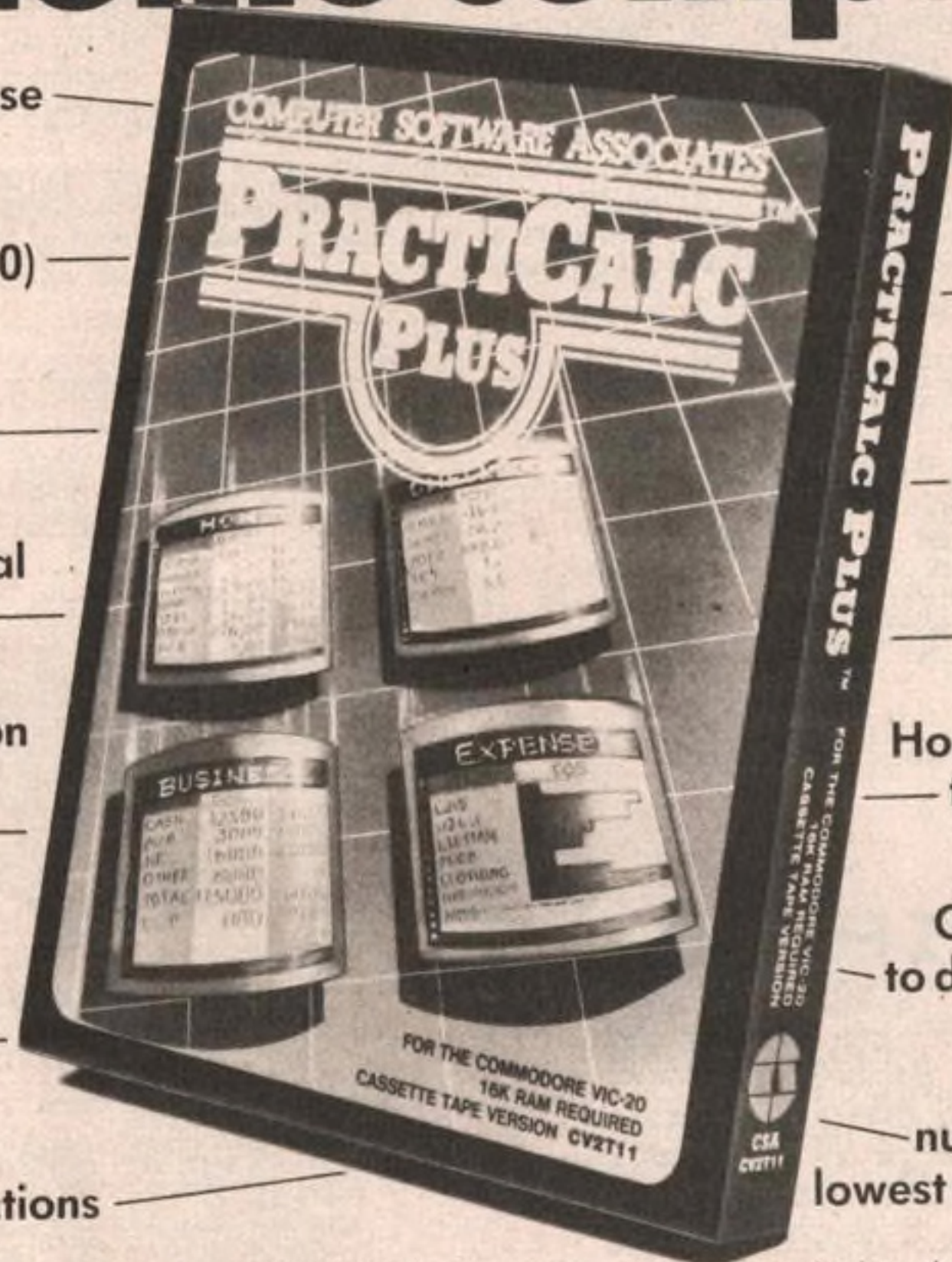
Comprehensive instruction manual

Replication across columns and rows

Horizontal and vertical titles can be fixed

Graphics facility to display your results

Powerful alpha-numeric sort, highest to lowest and lowest to highest



With Practicalc you can use your 16K VIC 20 or Commodore 64 to carry out sales forecasts, modelling, cash flow projections and much more.

Compare the professional features and power of Practicalc Plus or Practicalc 64 with other spreadsheets. Compare the price. You won't need a

spreadsheet to calculate the best buy.

Computer Software Associates' products are available from good computer stores or direct from the exclusive distributors - Marketing Micro Software Ltd., Goddard Road, Whitehouse Ind. Est., Ipswich IP1 5NP. Tel: 0473 462721 Telex 987515.

ALL THIS FROM AS LITTLE AS £29.95

Dealer Enquiries Welcome.

Another great program from



For more information send this coupon to:
Marketing Micro Software Ltd.

Name

Address

.....

.....

Personal enquiry (please tick) Dealer enquiry (please tick)

Goddard Road, Whitehouse Ind. Est., Ipswich, Suffolk IP1 5NP.

Dept PCW 29/9

Centipede

A new game for 48K Spectrum by Jim Provan

This is a version of the arcade game *Centipede*. The object is to shoot all the bugs which attack you.

The different creatures and their characteristics are listed below.

1. The Centipede: This is the long, snake-like creature which runs across the screen. 500 points are awarded if you hit the body, 1,500 if you hit the head.

2. The Spider: the spider is the yellow creature which bounces around the lower

half of the screen. It is worth 300, 600 and 900 points depending how high up it is when hit.

3. The Flea: The flea is the green bug which drops straight down the screen. When hit it does not stop, but keeps on coming until it reaches the bottom. It is worth 500 points each time it is hit.

4. The Wasp. The wasp is a red creature which 'homes in' on your base. It is worth 1,000 points when hit.

Also present are mushrooms. These appear at random, either half or whole. The bottom scores 50, the top scores 100. BEWARE: on hitting the top of a mushroom, it is turned into a rock. If this is hit, you lose 1,000 points.

An extra base is awarded every 20,000 points. You initially begin with three. A\$ in line 9500 should be typed in as "I@%&'— ↑£1 []" (or any twelve symbols you do not need). ■



CENTIPEDE

```

1 BORDER 0: PAPER 0: INK 7: C
LS : CLEAR VAL "31830": GO SUB U
AL "9500": CLEAR VAL "64999": GO
SUB VAL "9000": DIM e(10): FOR
x=2 TO 10: LET e(x)=PI-PI: NEXT
x: LET e(1)=PI/PI
2 RESTORE 3: FOR n=1 TO 17: R
EAD a,b: BEEP a,b: NEXT n
3 DATA .5,15,.2,15,.2,8,.2,15
1,15,.5,20,.5,15,1,6,.5,15,.2,1
5,.2,8,.2,15,1,15,.3,24,0,0,.2,2
2,1,22
4 DEF FN p(y,x)=CODE SCREEN$
(y,x)

```

```

5 CLS : GO TO VAL "8500"
10 LET k$=INKEY$
11 IF INT (score/20000)+1>10 T
HEN GO TO 15
12 IF e(INT (score/20000)+1)=F
I-PI THEN LET lives=lives+PI/PI:
FOR n=1 TO 5: BEEP .1,30: NEXT
n: LET e(INT (score/20000)+1)=PI
/PI
15 IF score<0 THEN LET score=P
I-PI
16 IF score>VAL "999999" THEN
LET score=PI-PI
17 LET s$=STR$ score
18 PRINT #0;AT 1,0;("0" AND sc
ore<100000)+("0" AND score<1000
0)+("0" AND score<1000)+("0" AND
score<100)+("0" AND score<10):
INVERSE 1;s$
19 PRINT #0;AT 1,10+(20-lives-
1);h$( TO lives-1)
20 IF k$=l$ AND pos>0 THEN LET
pos=pos-1
30 IF k$=r$ AND pos<31 THEN LE
T pos=pos+1
40 IF k$=f$ THEN GO SUB 100
50 IF k$=l$ THEN PRINT AT 21,p
os+1;" "
60 IF k$=r$ THEN PRINT AT 21,p
os-1;" "
70 PRINT AT 21,pos;" "
75 IF FN p(20,pos)<>32 THEN GO
TO 4000
77 GO SUB VAL "1000"
80 GO TO 10
100 FOR x=3 TO 1 STEP -1: BEEP
.01,x: NEXT x
101 FOR d=20 TO 1 STEP -1
103 PRINT AT d,pos;"↑"
105 IF FN p(d-1,pos)=32 THEN GO
TO 140
106 IF FN p(d-1,pos)=64 THEN LE
T score=score+50

```



```

108 IF FN P(d-1, pos)=33 THEN LE
T score=score+100
109 IF FN P(d-1, pos)=95 THEN LE
T score=score-VAL "1000": PRINT
AT d, pos; " "; AT d-1, pos; " ": BEE
P .1, .20: RETURN
110 IF FN P(d-1, pos)=96 THEN LE
T score=score+(300 AND n<18)+(60
0 AND n=18)+(900 AND n=19)
115 IF FN P(d-1, pos)=94 THEN LE
T score=score+1000
120 IF FN P(d-1, pos)=126 THEN L
ET score=score+500: PRINT AT d-1
, pos; " ": GO TO 2595
125 IF FN P(d-1, pos)=38 THEN LE
T score=score+500: PRINT AT n, u;
" "; AT d, pos; " ": BEEP .1, 20
: GO TO 10
130 IF FN P(d-1, pos)=39 THEN LE
T score=score+1500: PRINT AT n, u
, " "; AT d, pos; " ": BEEP .1, 2
0: GO TO 10
140 PRINT AT d, pos; " "
150 IF FN P(d-1, pos)=33 THEN PR
INT AT d-1, pos; " ": BEEP .1, 20:
RETURN
155 IF FN P(d-1, pos)=64 THEN BE
EP .1, 20: PRINT AT d-1, pos; " "; A
T d, pos; " ": RETURN
160 IF FN P(d-1, pos) <> 32 THEN P
RINT AT d-1, pos; " ": BEEP .1, 20:
GO TO 10
165 NEXT d
170 RETURN
999 GO TO 999
1000 LET k$=INKEY$
1002 IF k$=r$ AND pos<31 THEN LE
T pos=pos+1
1003 IF k$=l$ AND pos>0 THEN LET
pos=pos-1
1040 IF k$=f$ THEN GO SUB 100
1050 IF k$=l$ THEN PRINT AT 21, p
os+1; " "
1060 IF k$=r$ THEN PRINT AT 21, p
os-1; " "
1070 PRINT AT 21, pos; " "
1080 IF FN P(20, pos) <> 32 THEN GC
TO 4000
1090 LET b=INT (RND*32)
1092 LET c=INT (RND*22)
1100 IF c=21 THEN GO SUB 3000
1105 IF c=20 THEN GO SUB 3500
1106 LET u=INT (RND*32)
1107 IF c=19 THEN GO SUB 2500
1108 IF c=18 THEN GO SUB 1500
1109 IF AND<.25 THEN RETURN
1110 IF c>18 THEN LET c=INT (RND
*19)
1115 PRINT AT c, b; INK 3; "A"
1120 IF AND>.5 THEN PRINT AT c+1
, b; INK 3; "X"
1125 PRINT AT 21, pos; " "
1127 LET k=INT (RND*32)
1499 RETURN
1500 FOR n=0 TO 21
1510 LET k$=INKEY$
1520 IF k$=l$ AND pos>0 THEN LET
pos=pos-1
1530 IF k$=r$ AND pos<31 THEN LE
T pos=pos+1
1540 IF k$=l$ THEN PRINT AT 21, p
os+1; " "
1550 IF k$=r$ THEN PRINT AT 21, p
os-1; " "
1560 IF pos>u THEN LET u=u+1
1565 IF pos<u THEN LET u=u-1
1570 PRINT AT n, u; INK 2; "+"
1575 BEEP .005, n
1580 IF FN P(20, pos) <> 32 THEN GO
TO 4000
1585 IF k$=f$ THEN GO SUB 100
1590 PRINT AT 21, pos; " "
1592 IF n=21 THEN PRINT AT 21, u;
" ": GO TO 1999
1595 PRINT AT n, u; " "
1596 NEXT n
1999 RETURN
20500 FOR n=0 TO 20
20505 LET k$=INKEY$
20510 IF k$=l$ AND pos>0 THEN LET
pos=pos-1
20520 IF k$=r$ AND pos<31 THEN LE
T pos=pos+1
20550 IF k$=l$ THEN PRINT AT 21, p
os+1; " "
20560 IF k$=r$ THEN PRINT AT 21, p
os-1; " "
20564 LET s$=STR$ score
20565 PRINT #0; AT 1, 0; ("0" AND sc
ore<100000 )+("0" AND score<10000
0)+("0" AND score<1000)+("0" AND
score<100)+("0" AND score<10);
INVERSE 1; s$
20570 PRINT AT n, u; INK 4; "X"
20571 BEEP .005, n
20573 IF FN P(20, pos) <> 32 THEN GO
TO 4000
20580 IF k$=f$ THEN GO SUB 100
20584 IF n=21 THEN GO TO 2600
20590 PRINT AT 21, pos; " "; AT n, u;
" "
2595 NEXT n
2600 PRINT AT n, u; " "
2999 RETURN

```

```

3000 LET c=1: LET n=INT (RND*20)
3010 FOR u=0 TO 27
3020 LET k$=INKEY$
3030 IF k$=l$ AND pos>0 THEN LET
pos=pos-1
3040 IF k$=r$ AND pos<31 THEN LE
T pos=pos+1
3050 IF k$=l$ THEN PRINT AT 21, p
os+1; " "
3060 IF k$=r$ THEN PRINT AT 21, p
os-1; " "
3065 IF k$=f$ THEN GO SUB 100
3070 PRINT AT n, u; " "; INK 1; "00
0"; INK 6; "X"
3075 BEEP .01, 10; BEEP .01, 0
3080 PRINT AT 21, pos; " "
3090 NEXT u
3095 PRINT AT n, u; " "
3100 RETURN
3500 LET #u=INT (RND*2): LET #=-
1: LET n=17: LET u=0
3510 LET k$=INKEY$
3520 IF k$=l$ AND pos>0 THEN LET
pos=pos-1
3530 IF k$=r$ AND pos<31 THEN LE
T pos=pos+1
3540 IF k$=l$ THEN PRINT AT 21, p
os+1; " "
3550 IF k$=r$ THEN PRINT AT 21, p
os-1; " "
3560 PRINT AT n, u; INK 6; "X"; AT
21, pos; INK 7; " "
3565 BEEP .01, n
3570 IF FN P(20, pos) <> 32 THEN GO
TO 4000
3575 IF k$=f$ THEN GO SUB 100
3575 IF n=16 OR n=20 OR RND>.8 T
HEN LET #=-#; LET #u=INT (RND*2)
3580 PRINT AT n, u; " ": LET n=n+#
3585 LET u=u+#u
3590 IF u=31 THEN RETURN
3600 GO TO 3510
4000 PRINT AT 21, pos; "X"; AT 20, p
os; " "
4005 FOR x=0 TO 6: BEEP .1, x: BE
EP .1, x+1: BEEP .1, x+2: NEXT x
4010 LET lives=lives-1
4015 IF lives=0 THEN PRINT AT 10
, 11; FLASH 1; "GAME OVER": IF INK
EY$="" THEN GO TO 4015
4017 IF lives=0 THEN CLS : GO TO
3
4020 CLS : GO SUB 8700: GO TO 10
6500 LET score=0: LET lives=3: L
ET h$="000000000000000000000000": LE
T pos=15
6700 FOR n=1 TO 10
6710 LET x=INT (RND*32): LET y=I
NT (RND*18): IF FN P(y, x) <> 32 TH
EN GO TO 6710
6715 IF FN P(y+1, x) <> 32 THEN GO
TO 6710
6720 PRINT AT y, x; INK 3; "A"; AT
y+1, x; INK 3; "X"
6730 NEXT n
6999 GO TO 10
9000 LET a$="0000000000000000000000
D0000000000000000000000000000000000
9010 FOR n=32 TO 1 STEP -1: PRIN
T AT 0, 0; a$(n TO 1): BEEP .25, 0:
NEXT n
9020 PRINT AT 3, 0; "LEFT"; "z"; AT
5, 0; "RIGHT"; "x"; AT 7, 0; "FIRE"; "S
PACE"
9030 LET l$="z": LET r$="x": LET
f$=""
9050 FOR n=32 TO 1 STEP -1: PRIN
T AT 0, 32-n; a$(n TO 1): BEEP .25,
0: NEXT n
9060 CLS : PRINT AT 11, 6; INK 1;
PAPER 6; FLASH 1; "PREPARE FOR B
ATTLE"
9499 RETURN
9500 RESTORE VAL "9520": FOR a=0
TO 256*3-1: POKE a+VAL "31831",
PEEK (a+VAL "15616"): NEXT a: PO
KE VAL "23606", 87: POKE VAL "236
07", 123: LET a$="A)0000X)0000X"
9510 FOR n=1 TO LEN a$: FOR a=0
TO 7: READ b: POKE 31831+8*(CODE
a$(n)-32)+a, b: NEXT a: NEXT n
9515 RETURN
9520 DATA 0, 30, 53, 45, 53, 53, 43, 33
9530 DATA 51, 16, 22, 16, 22, 26, 18, 3
0
9540 DATA 12, 12, 30, 63, 63, 63, 30, 3
0
9550 DATA 30, 63, 63, 63, 63, 63, 63, 3
0
9560 DATA 1, 61, 54, 60, 54, 61, 1, 0
9570 DATA 4, 30, 63, 62, 62, 62, 24, 8
9580 DATA 33, 51, 12, 12, 30, 45, 33, 0
9590 DATA 8, 8, 6, 127, 62, 8, 26, 8
9500 DATA 120, 166, 254, 254, 124, 60
, 42, 41
9510 DATA 0, 0, 12, 30, 63, 63, 30, 12
9520 DATA 12, 30, 63, 12, 12, 12, 30, 1
0
9530 DATA 33, 18, 12, 29, 46, 12, 18, 3
0
9999 LPRINT "

```

DEE CENTIF

AGF

PROGRAMMABLE JOYSTICK INTERFACE for Spectrum or ZX81

ONLY
32.95
+£100pp

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.

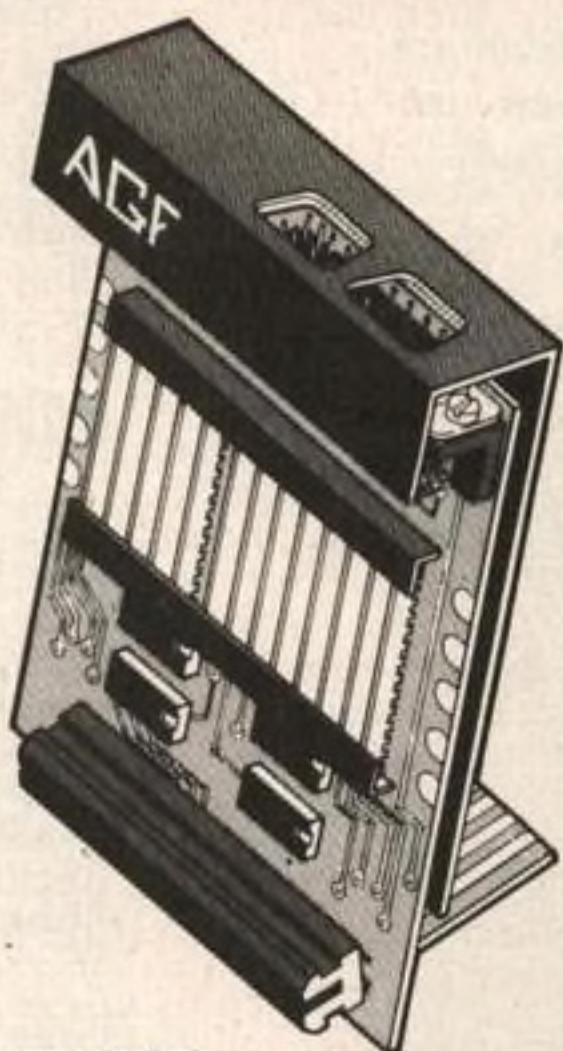
There is no need to remove the interface once fitted as the rear extension connector will accommodate further expansion, i.e. printers or RAM packs etc. This important feature avoids excessive wear to the expansion port.

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. PW,			
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	

Roger — ground control

David Kelly talks to Roger Peel about the UOSAT project

It is now beginning to look as though Britain won't get its first satellite tv networks running by 1985 as originally hoped.

No standards for direct broadcast television have yet been adopted, mainly due to internal wrangling within the various European countries. Consequently, no one is particularly keen, apart from the French, on going it alone.

In the United States, the situation is a little different. Rupert Murdoch plans to start his New America satellite channel for 1984 while Home Box Office — a film channel — has already proved a runaway success.

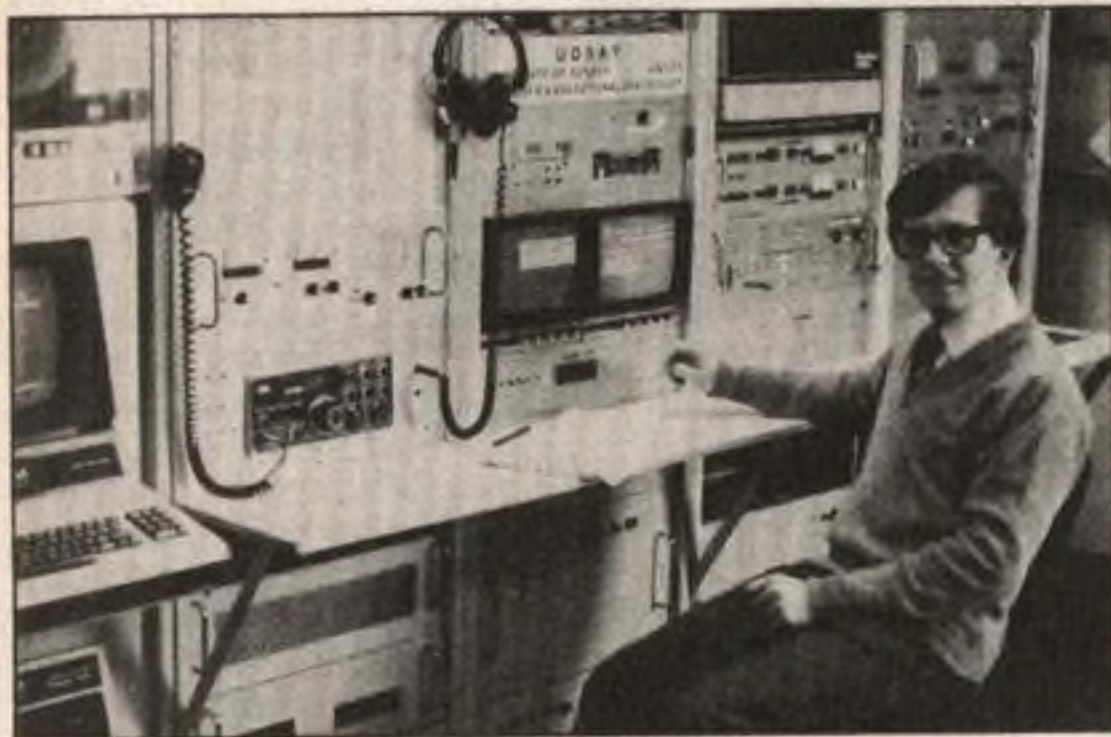
Satellites, everyone is convinced, are going to become very important. Not just for broadcasting tv, but also for interactive communication, telebanking, armchair selling and all the other things that home computers will make possible.

Putting up a satellite is an expensive business. To get a complex direct broadcast satellite up there is going to set you back at least £20m.

Although communication with the bigger satellites will be strictly controlled, it is possible for any interested person to get in touch with one of the amateur satellites.

Amateur satellites, of which there have been 16 so far, send out signals which can be picked up by any radio amateur.

One such orbiting radio beacon is UOSAT. This satellite — standing about three feet tall — was launched as a secondary payload on a Nasa Delta launcher in October 1981. It cost Surrey University a mere £120,000 — as an educational craft it was launched free of charge.



Roger Peel is one of the ground support team for UOSAT. He explains: "The time from beginning work on the project to its launch was only 2½ years — very tight in space terms."

The core of UOSAT is a computer, of course. But not quite the megabyte marvel one imagines a satellite ought to possess. UOSAT contains only two small processors, an RCA 1802 and a Ferranti F100L, and 16K of memory.

The main use of the computer is for data storage. Information on, say, the strength of the earth's magnetic field, is collected by the computer and then broadcast in fairly concentrated bursts.

The data is comparatively simple to decode — being an amateur radio satellite. In fact, it is the first satellite ever to contain a simple speech synthesiser. Data transmitted on some weekends is sent as 'spoken' data.

"We only 'see' the craft for 15 minutes six times a day — when I say see, I mean see its radio transmissions. I don't know of anyone who has actually seen it. It's very small.

"The computer can store information from one orbit and transmit it in sections for the next 10 hours — giving us information about the field strength and radiation count."

Roger is responsible for writing almost all of the computer's software. To save space — 16K is not much — programs are written in assembler code. For every new program up-loaded to the craft for a new experiment, a whole suite of programs has to be written for the ground-station to handle the data transmitted back.

"Each program has to be very thoroughly tested to be as bug-free as we can make it," says Roger. The university uses a duplicate of the spacecraft's computer on the ground to test programs before they are up-loaded.

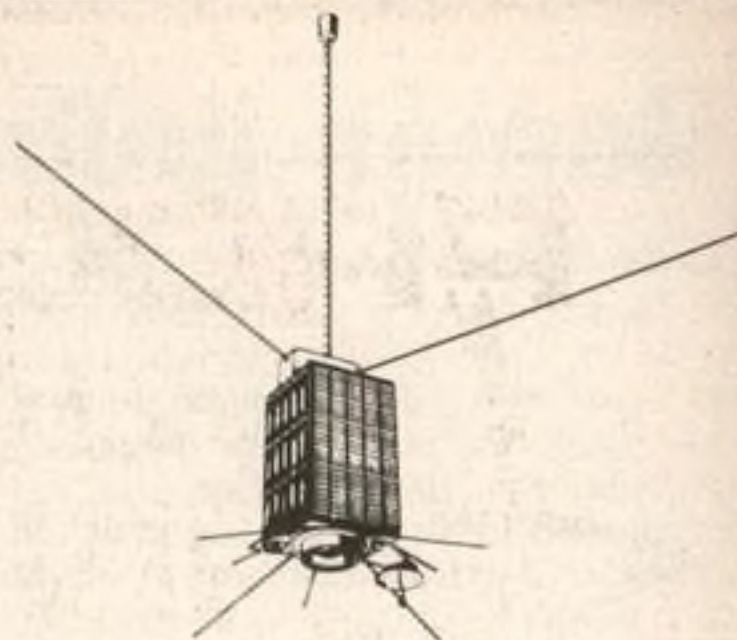
"For writing programs, 16K has not proved to be that much of a problem — 16K of assembler program takes quite a lot of writing.

"But for data storage, 16K is quite a serious restriction. Obviously, we do as much as we can to store things as economically as possible, but there is a limit to how far you can compress the information — for experimental data there is a lot less opportunity for compression than in English text, for example."

UOSAT is fairly densely packed com-

pared with a commercial craft. It also has none of the elaborate stabilisation mechanisms — spinning gyros and gas jets — needed to keep a broadcast satellite pointing always at the same point on the globe.

"It is an amateur satellite — not in the same league as the Voyager series, for example, which are orders of magnitude bigger. UOSAT weighs about 60kg. Many large communications satellites could



weigh about the same as a car."

UOSAT is only a broadcast satellite. It does not 'transpond'. In space jargon, there are no publicly available up-lines. Only UOSAT control can send information and new software programs up to load into the on-board computer.

UOSAT transmits on 145.825 MHz and the signals can be picked up by an ordinary narrow-band fm hand-held receiver with a whip antenna — typically costing around £50.

"Listen on that frequency and you will hear the tones (called telemetry) — often at the weekends we use the on-board Digitalker to speak the data."

The ordinary telemetry signal can be decoded quite simply. A very crude device can be made for about £7 from about three integrated circuits. A design for one such circuit appeared in the May 1983 issue of *Wireless World*.

Basic information on orbital patterns is given on an answerphone service on Guildford 61202 and an accompanying computer program was printed in *Popular Computing Weekly*, April 21. A news sheet, giving more details of how to get data down from UOSAT and analyse it, is available — if you send a stamped addressed envelope — from the Department of Electronic and Electrical Engineering, University of Surrey, Guildford.

The data sent back from the satellite — the basic telemetry frame — contains 45 status numbers which show what equipment is turned on or off. There are also 60 analogue channels which give information on temperature, rotation, radiation count and magnetic field strength.

All of this information can be collected by any amateur with an appropriate receiver and decoder.

It is possible to see how the radiation count varies over the earth's poles or how the battery voltage is affected by sunlight on the craft's solar panels.

Anyone wanting to experiment by taking data off the spacecraft should think about doing it reasonably soon, though. Says Roger: "All orbits decay — the craft gets pulled down towards the earth — and, one can never be certain, but, we reckon that UOSAT has only an orbital lifetime of about another three years.

"Then the craft will re-enter and burn up in the earth's atmosphere." ■

Games unlimited

Mike Grace attacks the mutant camels in a round-up of games software for the Commodore 64

If you went to the Commodore Show in June you must have seen a revolution in graphics for games of the future, and if the press releases are to be believed (which most of us find trouble in doing!) then it'll be in the not-too-distant future as well. I'm talking about a football game which has out-of-this-world graphics — green field, terrific depiction of the players, crowds, etc. The game looks just like a cartoon — not a typical high-resolution picture. But if you think that's good — then another demonstration on the Audiogenic Stand of a game called *Alice in Wonderland* puts even Commodore's efforts in the shade when it comes to graphics.

The fact that many of the Vic20 games are now coming out on the 64 (and vice versa) convinced me that I ought to concentrate more on the 64 this time around. But don't worry, Vic owners — I still have my faithful Vic to keep bashing away at the new releases.

Let's start with a couple of games from a company new to me, Postern Limited, who call their range of software Imagination Unlimited. The two games are called *Snake-Pit* and *Shadowfax* and are available on cassette (at £7.99) and — hooray, hooray — on disk (at £9.99). I had the cassettes to review, and they were packaged in a largish box (as in *Rabbit* and some Commodore cassettes) — but unlike others I've seen at least Postern retained the cassette box for you to keep the tape in (in a cassette rack if you own one). The artwork for both games was a little amateurish, but the instruction sheet on the reverse of the covers is excellent.

I loaded *Snake-Pit* first into the 64. After a short loading time the screen filled with little green dots (eggs!) and small neatly placed rectangles containing writhing snakes which were trapped inside their little rectangle. On closer examination one of the little eggs was seen to be a grinning face with a mouth that kept opening and closing reminiscent of a goldfish (the gobbler!). The idea of the game is for the gobbler to eat all the eggs up (Pacman-style) before a snake eats *him* up. As the eggs surrounding one of the trapped snakes are removed so it can escape, chase and eat up the gobbler.

Obviously the more eggs the gobbler eats the higher the chance of being eaten himself — and just to keep him alert there is a nasty red snake who is also going around eating all the eggs, thereby releasing the other snakes as well. If you do survive to eat all the eggs then you enter phase 2, where the gobbler can now eat up the snakes (tail first, I might add).

So how did I rate it? Well, the first problem was the gobbler was rather slow

(as the game is machine code I assume this is intentional), but I wanted him to get on and eat up the eggs faster. Secondly, it is quite a hard game as the snakes are soon writhing around all over the place, so a little trick I tried was not to move the gobbler straight away, but allow the red snake to eat up a lot of eggs first.

The game was quite nicely presented, the graphics were adequate (I've been spoilt by *Alice in Wonderland*) and it wasn't too hard to play. A sort of blend of *Pacman* and *Serpentine*, I suppose. It struck me as being of good value at £7.99.



Judging by the success of *The Hobbit* for the Spectrum, I should think more computer enthusiasts at least know about Tolkien's *Lord of the Rings*, even if they haven't read it. Well, *Shadowfax* is taken from the book, and is the sequence where Gandalf (alone in the computer game) is riding his horse Shadowfax against the Black Riders of Sauron, armed with only his wits and a handy supply of thunderbolts. At last I saw a beginning to some of the extra capabilities of the 64, for in this game the borders of the screen have trees lining the path which it is possible to ride behind (here we witness the sprite capabilities of the 64 in action) and the graphics really capture some of the feeling of both the book.

Gandalf (all in white) gallops his horse from right to left whilst a horde of Black Riders gallop towards him. One touch of any part of an enemy horse or rider will kill Gandalf (no extra lives in this game) so he must either dodge the enemy by moving the joystick up or down (no sideways movement is necessary as the background moves along at quite a pace simulating the horses movement) or des-

trophy the rider with a thunderbolt.

The game is good, compulsive and quite difficult. If you do manage to keep alive, you then meet the purple-coloured Sauron (I assume) and that's a whole new ball-game, but I won't spoil it for those dedicated enough to get there. The graphics are the best I've seen in the games I've reviewed for the 64 (and the Vic), and a soundtrack of galloping hooves (extremely effective) plus quite good zapping thunderbolts makes this my favourite game of the bunch. I'd say £7.99 is a good price for value. A final word of warning about this game — watch out when the thunderbolt makes a zooming noise!

Not so long ago there seemed to be only one game available for the 64 — a game with the most convoluted title. I'm talking, of course, about *Attack of the Mutant Camels* from Llamasoft. On cassette this game comes with fairly average packaging and is described as a 'hyperfast blast for Commodore 64' (not my words, I assure you) and gives you 31 levels of skill! I find it pretty difficult playing most games on Level 1 — the thought of 31 levels is pretty 'awesome' (to use another Llamasoft phrase), but it's sensible and satisfying to see programmers building playing-extension time into their games.

There is the usual loading time (the screen blacks out, then the logo AMC (*Attack of Mutant Camels*) appears, plus a series of options which you can control with the Function keys. Possibilities include one or two players, where you wish to start, and whether you want to have a collision option.

On to the game itself. It seems some aliens have taken off our camels and mutated them into 90-foot walking laser-spitting death beasts, so we have to pilot our little spacer and kill them off (Luke Skywalker style as in *Empire Strikes Back* against the Walkers). It's a sort of *Skramble* with camels to attack instead of enemy fighters, and to make it harder the camels aren't killed in one blow, but need several shots (during which they change colour with added realism). Along the top of the screen is a score plus a section telling you how many camels you have to beat and where you are in relation to them.

The game is noisy and fast (as are many of Jeff Minter's games) and although the camel graphics lack a little in sophistication they are good enough. As most of the time you are dodging the laser bolts that the camels 'spit' at you, there isn't really time to appreciate the finer points of the graphics anyway. It's another difficult game and even on the simplest level lots of skill is needed to weaken the camels enough to destroy them before you're blown to smithereens. At £8.50 it is good value and should keep dedicated gamers going for quite a long time.

Star Trek is an old favourite with games players, or at least with games software houses. In case anyone is still out there who doesn't know how to play it — a brief



resume. You are in control of the Starship Enterprise (going boldly where no man has gone before) and looking for the Klingons in space. You have various screens to help you (a Galactic Map which tells you where you are in space), a Sector Map (which tells you what is in your sector of space) and the ability to warp into another Sector and do battle with the Klingons. During the battle you may be damaged and so find your ship unable to fire torpedo bolts or phasers, or even to warp away to safety. Usually you also have Star Bases where you can refuel and restock. If you do not destroy all the Klingons — you're doomed!

I have always found this game enjoyable, so it was with a hope of increased facilities that I loaded Interceptor Software's version into the 64. Loading completed, a very impressive title section appeared with stars winking into existence and the words *Star* and *Trek* appearing from the top and bottom of the screen and scrolling towards each other. I was then given the choice (on a small and slightly off-balance menu) of instructions, or various modes of play. I chose instructions, and received about a dozen pages of complex and interesting instructions, none of which I could remember once the page had gone (but not to worry as I was told I could call back the instructions at any time).

I tried very hard to like this game — but I couldn't. There's no doubt that someone has worked extremely hard and long to produce an epic which does justice to the increased memory facility, but at the expense of the understanding of the player I suspect. It may have been an off-day, but I'm familiar with *Star Trek* and have played several versions on the Vic. This time I couldn't fathom how I was supposed to find the Klingons, or what was going on most of the time. It seemed as though the screen was filling with masses of information about planet types, energy supplies,

warp drives, etc. Each time I pressed a Function Key I got a screenfull of information, which I was supposed to remember — I couldn't. It seems a great shame, because surely the fascinating possibilities of the game on the 64 are greatly extended . . . but I think the programmer knew his own game too well and has just made it too complex.

For the *Star Trek* fanatic who is really into the intricacies of War Games this is possibly a winner — for you ordinary mortals I feel this is not the one. And if you do get into a really exciting game and find time running out there's no capability to save to tape or disk — a criminal omission. It felt as though it had been rushed out for the 64 too early, and at £7.00 is too expensive.

Interceptor have also produced a 64 version of *Krazy Kong*, also priced at £7.00. The main difference in this version is that there are multi-screen levels to work through. The graphics are poor, but I still found myself playing the game for rather a long time — so it must have been addictive. It's a particularly infuriating game, because besides the barrels and hammers, there are a number of randomly placed diamonds on the girders that your little man has to jump up and collect, otherwise when he gets to the girl at the top (who isn't pictured in the first screen) he won't get the prize. Unfortunately the jump key didn't always make him jump on my joystick — adding to the infuriation. But I began to get the hang of how much to jump and the distance as I got used to this version.

I think the main disappointment was the poor graphics. Kong is a poorly-outlined silhouette, the man is just a stick-like symbol, and the diamonds and hammers are very simple symbols. Although these graphics don't really spoil enjoyment of the game, with the increasing competition nowadays I suspect this will detract from the arcade copies unless there is a reduction in price.

Let's move to Anirog Software for the

final review. It's the 64 version of *Froggun*, and regular readers may remember that when I reviewed this game for the Vic I not only enthused strongly, but I can still say it's one of my favourites. Well, the 64 version is very much the same, except that a little musical tune is played when you get the frog home, and this time we have crocodiles in the river from level one (and a crocodile or two lurking in some of the homes as well to make it harder). But, for some inexplicable reason, I didn't like the graphics as much on the 64 version as I did on the Vic.

All the good points of the Vic version are present: the incredibly responsive joystick control, the fast-moving traffic, the lady frogs, the snakes on the river bank. . . . When compared with some versions of *Frogger* I've seen I'm still amazed that other versions sell at all. However, there is one point that I'd like to make at this stage — and that is the ease or difficulty of games in general. I know it's hard catering for the real enthusiast — but I do feel that games are becoming harder and harder and this is not necessarily a good thing. It is probably because the programmers are themselves real enthusiasts who not only spend almost every waking hour playing, but think many of us do as well.

It seems to me possible to have several skill levels which allows the casual player to win reasonably easily and then he can move up a notch, whilst the true gamer can move on to a higher level from the word go. Anyway, *Froggun* is £6.00 from Anirog Software and if you haven't a Vic then the 64 version is a good alternative.

So there we are, the 64 is getting a good share of Software at last. What I feel is that, apart from *Shadowfax* none of the games I reviewed this time are really using the full capabilities of the machine. Commodore's own games are being released, and they do show promise, but I cannot help but feel that some of the others are being rushed onto the market to fill a gap too quickly, and without proper thought for the customers or the extra facilities. ■

Supplier	Program	Price
Anirog Computers 26 Balcombe Gardens Horley Surrey	<i>Froggun</i>	£6.00
Llamasoft Software 49 Mount Pleasant Tadley Hants	<i>Attack of the Mutant Camels</i>	£8.50
Interceptor Software Lindon House The Green Hadley Hants	<i>Startrek</i> <i>Krazy Kong</i>	£7.00 £7.00
Postern Imaginations Unlimited PO Box 2 Andoversford Cheltenham Glos	<i>Snake Pit</i> <i>Shadowfax</i>	£7.99 £7.99

THE FABULOUS CASSETTE

50

FROM **cascade**

50 GAMES ON ONE GREAT CASSETTE

**ONLY
£9.95**

DON'T MISS THIS
INCREDIBLE OFFER

50 FANTASTIC
GAMES ON
ONE CASSETTE

ONLY £9.95 (INC. P&P and VAT)



EXPRESS DELIVERY - ORDER NOW

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. £

Name

Address

Post Code

Country

Dealers & Stockists enquiries welcome.

Please send me (tick appropriate box)

Spectrum VIC



Cascade Games,
Suite 4, 1-3 Haywra Crescent,
Harrogate, N. Yorkshire, HG1 5BG.
England.
Telephone: (0423) 504526

An alien intelligence

Peter Bartley adds a postscript to his series on gameswriting for the Vic20

Over the past six weeks I have introduced a few ideas, explained a few details and demonstrated a few tricks to beginners in Vic computing. The area we've concentrated on is what I call the "X-zaps-Y-zaps-X"-type arcade games.

As I've mentioned before, these games on the Vic are dependant on the fact that the screen memory locations in front of any moving graphic missile or spaceship can be peeked to see if they've hit anything, as well as providing fine opportunities to use graphic and sound effects. Although these are the easiest to simulate, they aren't, as the video freaks among you will know, the end of the story.

There are the Maze/Chase games: A certain Atari game springs to mind, as do variants such as *Rally-X*. Commodore's *Jelly Monsters* and *Rat Race* cartridges are typical conversions to the Vic, as was the ill-fated *Vicmen* on tape. Programming here is different. The problem is to give the meanies, be they ghosts, rats, or alien beings from an unknown planet, some kind of intelligence. Here again screen peeks are paramount in determining where exactly the ghosts are in the maze. The players screen position can also be used to give them some kind of direction rather than the aimless wanderings of a random-direction generator.

This brings us to the question of giving the computer some brains. Most people shy away from programming the Vic to play against the user as being too difficult. But when it comes down to it, whenever two humans play a game they're following a set of unconscious/unwritten rules. All you need to do to convert it to the Vic is to think very carefully about all the rules.

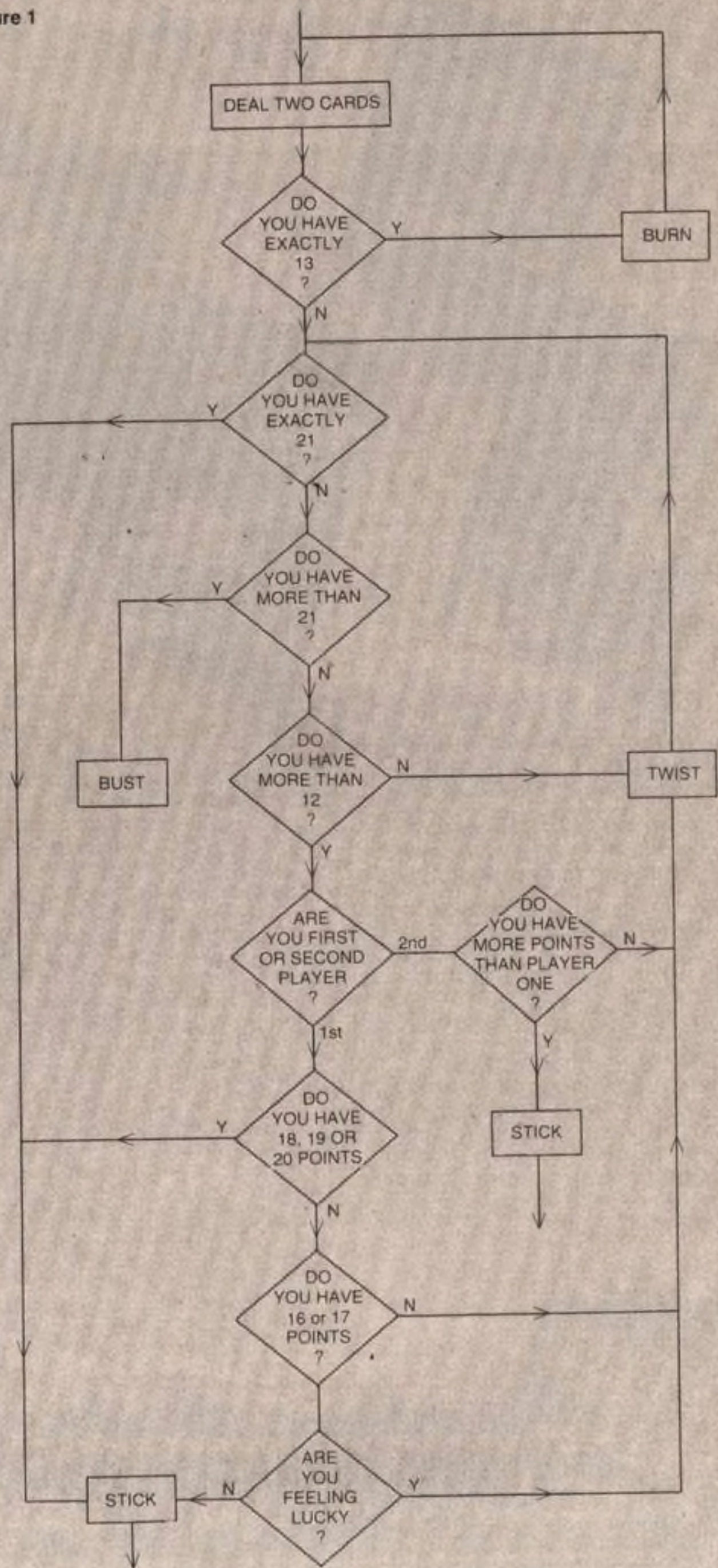
Pontoon is a prime example. Object: to get as many points above 12 and below 22 as possible. Even without making Vic the banker there's very little problem here (if it were the banker, it would then "know" when to stick or twist on every occasion). You'll find that most two player games (especially cards) can be "translated" into a set of rules suited to computer conversion.

After all, Othello, backgammon and even chess have been converted — though obviously you can't be expected to write a chess program immediately! However, don't be daunted by the prospect of giving your Vic "a bit o' sense".

If you haven't done this sort of thing before, the best thing to do is to choose a fairly simple card or dice game for two players and use what I call a "structured routine" as the backbone of the program. That is, have a series of "If... Then's and

Continued on page 19

Figure 1



Dragon & Dungeon

6 exciting new programs
for the D32



MIDAS MAZE

All that glitters in the Midas Maze is not gold! With Magic Holes to fall in and a Devil's Kitchen full of Power Pies to contend with, you may not find the direct route safest. You may even be teleported!

TREASURE TOMBE

Although the castle on Glastonbury Mound has crumbled, the vast dungeon complex below remains intact. Before his death, Merlin placed Arthur's treasure in the vaults and conjured up a coven of his donjon-spawn to stand guard. For all eternity they prowl the pitch-black chambers, dedicated to kill foolhardy intruders.

The year is 1086 and a party of Normans have unearthed the collapsed entrance vault. You squeeze through the jumble of shattered blocks and find yourself in a chamber where only the last glimmer of daylight penetrates.

Screw up your courage and prepare to explore...

THE CRYSTAL CHALICE OF QUOROM

The Dark Forces of Klartz were held at bay from Quorom by the power of the Crystal Chalice, but when (finally) they broke through, the Chalice was shattered. Now its fragments are scattered to the four corners of the Kingdom, darkness reigns supreme and a thorn-spiked Tanglewood has overgrown the Meadowplain. As an Apprentice Adventurer of the Second Order, you have been selected to quest for the lost shards of the Chalice and, through death and danger, to return them to the Palace. Then (and only then) will peace and light return to the stricken Kingdom.

MATHS-TREK

To bring the 'Enterprise' back to Starbase, through the Black Holes, Asteroids and Klingon Gunships, you'll have to prove that a Space Captain can handle his maths. Suitable for children aged 6-12, 'Maths-Trek' can be set for any one of six branches of mathematics with 50 different levels of difficulty. Too many wrong answers and you may run out of fuel! Too much damage and the 'Enterprise' may break up!

TEMPLE OF ZOREN

Terran Security classed it as a suicide mission - and then chose you! Now, after fighting your way through the Zoreen guardships, out of fuel and with a damaged computer, your survival prospects look even slimmer. With Guard Robots and Secret Police ringing the outworld capital, even penetrating the Ringwall will be bad enough. Only Agent 6809 would stand a chance, but, with the shipboard Reincarnation Unit on the blink, even YOUR survival looks questionable. So, grit your teeth, hit the retros and prepare for the mission that could end the Rimwars!

GIANT'S CASTLE

Somewhere within the castle a fair maiden has been imprisoned by the wicked giant. Are you brave enough to explore the halls and dungeons to rescue her?

To claim a hero's reward you'll have to prove yourself smarter than the creatures who guard her!

P.O. Box 4, Ashbourne, Derbyshire, DE6 1AQ.

PROGRAMMING

"On ... Goto/Sub's gradually "filtering out" duff moves and finally deciding on an "action".

Flow-charting is very useful in this context — see Figure 1 for a sample of a "pontoon" routine. As you can see, all the questions can be replaced by BASIC equivalents ("If SC >= 18 Then Print "Stick On "SC"; etc. Even the "Feeling lucky?" question can be simulated by the Rnd function.

In other types of "thought" games it is often preferable to assign "priorities" to various positions or situations. In the case of board/strategy games, each opponent's piece (or position, depending on the game) would have a different "desirability" rating according to its relative strengths and weaknesses. (Just a simple numerical value; so that when the computer assimilates the data it knows to go for the highest priority move or capture).

For example, in certain commercial chess programs, "taking the queen" is the highest priority move, even at the loss of one's own queen. And again, if we were to write our own Othello program, we would assign highest move priority to the four corners (giving them 9, say), and lowest priority to the central squares (possibly 1 or 2), since as every Othello player knows, the four corners of the board

are by far the most important.

These are just a couple of ways of producing "artificial intelligence". They're useful programming practice and hopefully more mentally stimulating than blasting aliens, and have the added interest that as your programming improves, so can the Vic's playing ability.

Of course there are other types of games to work on if cards/dice don't take your fancy; such as *Surround* (an old Pet game recently resurrected in the light-cycle sequence of the film *Tron*) or *Battleships* (I've still to see a Vic *Battleships* that really plays and isn't just a vamped up guessing game using the random number generator ...). Then you can start inventing your own strategy games.

The thing about games of this sort is that they're so well-suited to BASIC. *Pokeing* 50 Space Invaders on and off the screen, as well as scanning for hits/misses and key presses is going to take a very long time — which doesn't make for a very exciting game. That doesn't mean that all arcade games are out: ones with just a few characters adapt well, especially "oldies" like *Dogfight*, for example.

Other games include adventures; but with only 3.5K there's very little room to produce a game with any real variation. The technique is to first define your

playing area — caverns, planets, etc, and more importantly, how they are connected. Scatter a few monsters about, and a few things to collect, and let someone else loose on it (after all, you'll know its ins and outs already!).

Going back to the point about memory: try and keep all your programs as streamlined as possible. Apart from obvious techniques such as keeping excess characters to a minimum, there's the not-so-obvious, like sound effects subroutines whose parameters are defined before *Gosubbing*. Even just a simple delay loop as a sub-routine saves a tremendous amount of memory in longer programs.

A final word about gameswriting: To be frank, Vic games in magazines have dropped dramatically in number recently. They haven't got any worse; in fact, the quality has markedly improved, but the problem seems to be a lack of topics. If you're stuck for something to write about, just look around you! Look at a few books for inspiration (but mind the copyright!) — there's everything from the entire animal, vegetable and mineral kingdoms to sports and simulations, machinery and monarchies, racing and reflexes ... the list is endless. Use your brains (if too much Vic computing hasn't caused them to atrophy): after all, who thought up all those arcade games in the first place? ■

NEW Another winner from CDS!

SPECTRUM


POOL

THE LATEST GAME IN A GREAT RANGE OF SPECTRUM AND ORIC SOFTWARE INCLUDING REVERSI · LEAPFROG · BOZY BOA · GOBBLE A GHOST · CATERPILLAR · 3-D PAINTER
(U.K. Rec. Price £5.95 each)

Available from W. H. Smith, Boots, John Menzies and other leading computer stores

CDS Micro Systems
P.O. Box 93, Doncaster, South Yorks DN4 5LX
TRADE ENQUIRIES WELCOME

SEE US ON STAND F201 HALL A UPPER LEVEL PERSONAL COMPUTER WORLD SHOW



SPECTRUM BOOKS BOOKS BOOKS

Bored with Playing Games? Ready to Write Your Own Programs? Learn how far you can go with Spectrum with these LATEST publications from the experts! You could be selling your own software before you know it!

Tick

- | | |
|--|---|
| MELBOURNE HOUSE | |
| <input type="checkbox"/> | ** Spectrum Microdrive Book ** NEW £5.95 |
| <input type="checkbox"/> | ** Supercharge Your Spectrum ** NEW £5.95 |
| <input type="checkbox"/> | The Complete Spectrum ROM Disassembly £9.95 |
| <input type="checkbox"/> | Understanding Your Spectrum NEW LOW PRICE £6.95 |
| <input type="checkbox"/> | Over The Spectrum NEW LOW PRICE £4.95 |
| <input type="checkbox"/> | Spectrum Hardware Manual £5.95 |
| <input type="checkbox"/> | Spectrum Machine Language for the Absolute Beginner NEW LOW PRICE £5.95 |
| GRANADA PERSONAL COMPUTING TITLES | |
| <input type="checkbox"/> | The ZX Spectrum and How to Get the Most From It £5.95 |
| <input type="checkbox"/> | The Spectrum Programmer £5.95 |
| <input type="checkbox"/> | The Spectrum Book of Games £5.95 |
| <input type="checkbox"/> | Introducing Spectrum Machine Code £7.95 |

Send to: MFM DATA SERVICES LTD, Dept PCWK1, Ightham, Sevenoaks, Kent.

Please rush me the book(s) I have indicated above. I enclose my cheque/money order for £..... payable to MFM Data Services Ltd. I have added postage and packing charges (see below).

Name Address

..... Postcode

Postage and Packing UK — Add only 70p per order
Europe — Add £1 per book
Outside Europe — Add £1.70 per book (Airmail)

ORDERS DESPATCHED WITHIN 24 HOURS WHEREVER POSSIBLE

m.f.m. data services ltd.

YEP FOLKS — IT'S HERE

AVAILABLE NOW

Spectrum 48K
Dragon
Com. 64

CALIFORNIA

GOLD RUSH



HOWDE DO PARDNERS

This here's Prospector Jake, I sure am havin' one helluva time tryin' to peg ma claim with those damned Injuns a hootin' an 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 hornery 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

SPECIAL OFFER

SPECIAL OFFER

SPECIAL OFFER

Order CALIFORNIA GOLD RUSH before August 14 and get a 10-game Cassette of terrific games . . .

FREE

COMING SOON

LEAPIN' LANCELOT: Medieval Machine Magic to enthral you
GALACTIC SURVIVAL PAK: Every Astro-Traveller *must* have this!



We always need Dynamic Dealers
and Imaginative Writers

Please rush me CGR for (m/c)

TOTAL SUM INCLUDED £
Please make cheques and POs
payable to ANIK MICROSYSTEMS
30 KINGSCROFT COURT
BELLINGE, NORTHAMPTON

Name.....

Address.....

.....

.....

At last... A joystick that works!

The
intelligent
Joystick

Cambridge Computing bring you the first **programmable** joystick ~ at a price you can afford.

£29⁹⁰
JOYSTICK, INTERFACE
AND TAPE COMPLETE

Interface

- 1k on board memory
- Own rear edge connector — for printers etc.,
- Compatible with all standard joysticks



Joystick

- Self centring
- 8 Directional microswitched action
- 2 independent fire buttons



Tape

- Easy to use program enables the interface to work on ALL software
- Keeps a record of all your games — so you only need to tell it about each game once!

**CAMBRIDGE
COMPUTING**

1 Benson Street, Cambridge CB4 3QJ
Telephone 0223 322905

Please send me:-

Joystick, Interface and Tape at £29.90

Interface and Tape at £24.00

Joystick only at £7.00

For Spectrum

I enclose cheque / postal order* for £.....
made payable to Cambridge Computing Limited.

*delete as necessary.

Interrupted lesson

Guy Dobinson explains how to teach French in the classroom — by interrupting

The following interrupt routines were developed to be used in programs intended for the teaching of French in classrooms. The main programs had to be written in Basic for reasons of easy adaptation, but two serious problems could not be solved using this language.

Firstly, letters with accents had to be entered as user defined graphics, without constant fiddling with the graphics key. Secondly, the *Break* key had to be disabled. True, the *Break* key can be disabled by *Poking* the lower part of the screen down to zero lines, but then any attempt to *Break* causes a crash and the program has to be reloaded from scratch.

In both cases, interrupt routines provided the answer. Furthermore, interrupt routines are an ideal place for the inexperienced machine code programmer to start, as once the basic principle of an interrupt has been grasped, even a very short program can produce very impressive results. I hope to demonstrate this, and show how the reader can use the same techniques to his own advantage.

In normal operation, the Spectrum Rom uses "Interrupt Mode 1" to scan the keyboard every 20ms. We want to divert these interrupts to our own routines, so need short machine programs to switch between the two modes. By simply loading the I for Interrupt register with 9 (40 for 16K machines) and turning to "Interrupt Mode

2" the interrupts are diverted to location 65129 (16K 32348), where we place our routine.

In order to return control to the Rom program, all interrupt routines must follow a similar pattern: (i) We must call the keyboard scanning routine, as we have diverted the normal interrupts away from this — *RST 56*. (ii) The interrupts must then be disabled for the duration of our routine, to prevent it being called while it is already in operation — *DI*. (iii) The registers used by our routine must be *Pushed* (saved) then *Popped* (restored) after use to prevent a crash. (iv) The interrupts must be re-enabled — *EI* — ready for next time before finally *Returning* to the Basic system. See Figure 3.

Now, to solve our first problem. The idea is to use an interrupt routine to constantly check the value representing the last key pressed and stored by the Rom program in the system variable *Lastk* (location 23560). We store this value in register *A* and compare it with 48, the character code for "0". If the actual value is less, all is well and we return to Basic. If it is greater than 48, it is then checked against an upper limit of 58 ("9"+1).

If the value passes the second test, control is returned to the Rom. But, should it fail both tests, then 96 is added to the value in register *A*, to give the code for the appropriate udg. This is then copied into

Lastk before returning. In short, whenever the user types in a character between "0" and "9" this is snatched away and replaced before the Rom even has a chance to print it in an input line.

The Basic program in Figure 1 demonstrates this routine after setting up as udgs the different letter/accent combinations used in French. With this routine you can write or adapt any word game to work in French, or any other accented language.

To solve the second problem, we need to use *Lastk* again, and two more systems variables. *Errnr*, which holds the number of the current report code minus one, and *Flags*, bit 5 of which indicates to the Rom program that a new key has been pressed. We will also use our own variable *Key*. See Figure 4.

The principle is this — *Errnr* is checked to see if it holds 255 for -1, Report "0 OK". If not, load 232 for "Continue" into *Lastk*, Set bit 5 of *Flags* to 'fool' the Rom into thinking this is a new key press, then Set bit 0 of our own *Key* to show that this has been done. On the next interrupt, the routine checks *Errnr* then *Key*, loads 13 for "Enter" into *Lastk* and again Sets bit 5 of *Flags*, finally resetting bit 0 of *Key* ready for the next time that the *Break* key is used. In effect, every time an error occurs, the system thinks that the user has promptly pressed *Continue* and then *Enter*.

This is demonstrated by the Basic Program in Figure 2. Run it and, once numbers appear in the top left-hand corner of the screen, try holding down *Capshift* and *Break* — you will see the *Break* report code and the *Continue* command superim-

Figure 1

```

10 CLEAR 65100: REM 16K = 32329
20 GO SUB 3000
30 RANDOMIZE USA 65110: REM
16K = 32330
40 FOR n=0 TO 1000: PRINT AT 0
0,n: NEXT n
50 RANDOMIZE USA 65120: REM
16K = 32340
60 STOP
6060 LET code=65110: REM for 16K
read 32330
6010 LET b=0: FOR n=code TO code
+70: READ a: POKE n,a: LET b=b+a
NEXT n
6020 IF b<>4637 THEN PRINT "Error
n in code data": STOP: REM 16K
= 4638
6030 DATA 62,9: REM 16K = DATA
62,40
6040 DATA 237,71,237,94,201,0,0,
0,82,62,237,86,237,71,201,0,0,25
5,240
6050 DATA 245,58,8,92,254,48,56,
9,254,58,48,5,198,26,56,0,92,241
9,251,201
6060 LET b=0: FOR n=USA "a" TO U
SA "j":+7: READ a: POKE n,a: LET
b=b+a: NEXT n
6065 IF b<>3304 THEN PRINT "Error
n in UDG data": STOP
6010 DATA 48,0,0,68,68,68,56,0
6020 DATA 24,36,0,60,60,68,62,0
6030 DATA 24,4,0,60,68,68,62,0
6040 DATA 0,0,60,64,64,68,8,24
6050 DATA 48,64,56,68,120,64,60,
6060 DATA 48,72,56,68,120,64,60,
6070 DATA 24,4,56,68,120,64,60,0
6080 DATA 16,40,0,16,16,16,16,0
6090 DATA 16,40,0,56,68,68,56,0
6100 DATA 16,40,0,68,68,68,56,0
6110 RETURN

```

Figure 2

```

5 CLEAR 65109: REM for 16K re
ad 32329
7 GO SUB 3000
10 RANDOMIZE USA 65110: REM
for 16K read 32330
20 INPUT n$
30 PRINT n$
40 RANDOMIZE USA 65120: REM
16K = 32340
50 STOP
6000 LET code=65110: REM 16K =
32330
6010 LET b=0: FOR n=code TO code
+40: READ a: POKE n,a: LET b=b+a
NEXT n
6020 IF b<>4637 THEN PRINT "Error
n in code data": STOP: REM 16K
= 4638
6030 DATA 62,9: REM 16K = DATA
62,40
6040 DATA 237,71,237,94,201,0,0,
0,82,62,237,86,237,71,201,0,0,25
5,240
6050 DATA 245,58,8,92,254,48,56,
9,254,58,48,5,198,26,56,0,92,241
9,251,201
6060 LET b=0: FOR n=USA "a" TO U
SA "j":+7: READ a: POKE n,a: LET
b=b+a: NEXT n
6065 IF b<>3304 THEN PRINT "Error
n in UDG data": STOP
6010 DATA 48,0,0,68,68,68,56,0
6020 DATA 24,36,0,60,60,68,62,0
6030 DATA 24,4,0,60,68,68,62,0
6040 DATA 0,0,60,64,64,68,8,24
6050 DATA 48,64,56,68,120,64,60,
6060 DATA 48,72,56,68,120,64,60,
6070 DATA 24,4,56,68,120,64,60,0
6080 DATA 16,40,0,16,16,16,16,0
6090 DATA 16,40,0,56,68,68,56,0
6100 DATA 16,40,0,68,68,68,56,0
6110 RETURN

```

posed in the lower part of the screen. Unfortunately, it does not work when *Stop* is entered in response to an input — the report is given, then a number of interrupts occur before the system is

ready for a new command.

As it is a little more complex than the scope of this article, I'll leave the actual coding to you — but the simplest solution is to use another variable like *Key* to enter

Continue three times. Alternatively, there are many other short machine code routines which can easily be converted for use with interrupts. Don't be afraid to experiment! ■

Figure 3

```

10 LASTK EQU 23560
20
30 ; On routine
40     ORG 65110
50     LD A,9
60     LD I,A
70     IM 2
80     RET
100 ; Off routine
110    ORG 65120
120    LD A,62
130    IM 1
140    LD I,A
150    RET
160
170 ; Substitute routine
180    ORG 65129
190    RST 56
200    DI
210    PUSH AF
220    LD A,(LASTK)
230    CP 48
240    JR C,Exit
250    CP 58
260    JR NC,Exit
270    ADD A,96
280    LD (LASTK),A
290 Exit POP AF
300     EI
310     RET

```

Figure 4

```

130    ORG 65129
140 ERRNR EQU 23610
150 LASTK EQU 23560
160 FLAGS EQU 23611
180    RST 56
190    DI
200    PUSH AF
210    PUSH HL
220    PUSH IX
230    LD HL,FLAGS
240    LD IX,KEY
250    LD A,(ERRNR)
260    CP 255
270    JR Z,OUT
280    LD A,(KEY)
290    CP 1
300    JR Z,ENTER
310    LD A,232;CONTINUE
320    LD (LASTK),A
330    SET 5,(HL)
340    SET 0,(IX)
350    JR OUT
360 ENTER LD A,13;ENTER
370    LD (LASTK),A
380    SET 5,(HL)
390    RES 0,(IX)
400 OUT  POP IX
410     POP HL
420     POP AF
430     EI
440     RET
450 KEY  DEFB 0

```

WRITE YOUR OWN MACHINE CODE ADVENTURES WITH

THE QUILL

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 cassette is available at £2.00 and The Quill itself is £14.95.

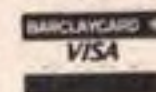
FOR THE 48K SPECTRUM AT £14.95

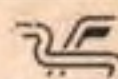
Our Software is now available from many computer shops nationwide, or direct from us by post or phone. SAE for details. Dealer enquiries welcome.

GILSOFT

30 Hawthorn Road, Barry
South Glam CF6 8LE
Tel: (0446) 736369

TELEPHONE YOUR ORDER
WITH





Town planning

Ian Robertson presents a high-resolution geography program

I was most impressed with John Meech's geography program for the BBC B which appeared in PCW 1-7 September, 1983. I am, however, one of those (probably few) schoolteachers who are not enamoured of the BBC machine, and I thought that it should be possible to produce something on similar lines (and more colourful — deliberate spelling), on my old faithful Dragon.

I am indebted to Mr Meech for his method of plotting the map using the BBC's Move and Draw statements, but readers might be interested to realise that these can be reproduced exactly in the Dragon's high resolution modes by using Draw "BM x,y" and Line -(x,y). The screen parameters are, of course, 255 and 191 as opposed to the Beeb's 1279 and 1023.

A complete character set (Ch\$(0) to Ch\$(35)), which represents the digits 0 to 9 and the letters A to Z, is included in the program. The digits and letters are in the form of strings which can be used with the Dragon's Draw statement, either directly in the form 'Draw Ch\$(x) + Ch\$(y)' etc in any scale and in any colour, or by extracting characters from normal strings using the Asc function to obtain the Ch\$ number (you have to deduct 48 to get the digits and

55 to get the letters).

The actual shape of the drawn letters etc, I have had in stock for some time. I think they came originally from an American magazine and, if you don't like their shape, they can always be redrawn to suit individual tastes.

Originally, I intended to produce this program using Pmode4 with black characters and map on a white background, and using the drawn characters in normal scale. Experiments showed, however, that a more impressive display could be obtained using colours and Pmode3. In this case, the characters had to be scaled up to retain their correct shape.

I also contemplated including more than one map and set of towns and a menu choice. There would appear to be plenty of memory left in the Dragon to do this. Readers might care to play about with these ideas — what about running it in Pmode1 and Pcopying to other pages? In this way, it should be possible to hold four maps in memory and access them by calling different pages in Pmode1.

The actual map and town coordinates were produced using a 15 x 19 grid on squared paper. The line numbers of the grid were (in steps of 10), 105 to 255 horizontally and 0 to 190 vertically, making

it quite easy to estimate the intermediate points. These numbers were chosen to match the right-hand side of the Dragon's screen.

A rather strange thing happened when trying to erase the town numbers and the 'Ok' or 'No' in the lower left-hand box, (Line 2100). I wanted to Paint in red on red to a limit of yellow (thus erasing the green letters which were on the red background), but found it would not work. I got over the problem by Painting in green first and then in red, but I am still mystified. Perhaps someone knows the answer.

Notes

- Lines
- 10 Goes to the subroutine to put the character set into array CH\$
- 20-190 Draws the title page using the character set in various scales and colours.
- 1000-1230 Sets up the display and draws the map. The words "BRITISH TOWNS" are drawn by extracting in turn from the strings AS and BS (by means of the ASC function) the codes of the correct "DRAW" string held in the array CH\$.
- 2000-2120 (Main Loop) Puts the town names and coordinates into arrays TT\$, X\$ and Y\$. Lines 2050-2060 draws each town number in the correct place and alternately PRESETs and PSETs a dot at the town's location. Lines 2070 asks for the name of the town to be spelt. Lines 2080-2120 compare the spelling and flash either "OK" or "No" on the screen and computes the score.
- 3000-3050 Ending routine.
- 4000-4380 Subroutine and data for character set.
- 5000-5050 Data for map.
- 6000-6090 Data for towns and town coordinates.
- 7000-7100 Subroutine for instructions.

```

1 REM*****
2 REM*      TOWNS      *
3 REM*      BY IAN ROBERTSON *
4 REM*      SEPTEMBER 1983 *
5 REM*****
7 REM
9 REM *****GET CHARACTERS INTO
  ARRAY AND DRAW TITLE
  SEQUENCE.*****
10 GOSUB4000
20 A$="BRITISH":B$="TOWNS"
30 PMODE1,1:SCREEN1,1:PCLS
40 DRAW"BM40,60S16C7"
50 FORN=1TOLEN(A$):DRAW CH$(ASC(
LEFT$(A$,1))-55)
60 A$=RIGHT$(A$,LEN(A$)-1)
70 NEXT
80 DRAW"BM68,110"
90 FORN=1TOLEN(B$):DRAW CH$(ASC(
LEFT$(B$,1))-55)
100 B$=RIGHT$(B$,LEN(B$)-1)
110 NEXT
120 DRAW"BM10,170S8C8"+CH$(11)+C
H$(34)
130 DRAW"BM+10,+0"+CH$(18)+CH$(1
0)+CH$(23)
140 DRAW"BM+10,+0"+CH$(27)+CH$(2
4)+CH$(11)+CH$(14)
150 DRAWCH$(27)+CH$(29)+CH$(28)+
CH$(24)+CH$(23)
160 FORN=1T05000:NEXT:SOUND100,2
170 DIMTT$(10),X(10),Y(10):S=0
180 CLS1:PRINT@196,"DO YOU WANT
INSTRUCTIONS?":PRINT@297,"TYPE
(Y OR N).":SCREEN0,1
190 R$=INKEY$:IFR$=""THEN190 ELS
E IF R$="Y"THENGOSUB7000
999 REM*****SET UP DISPLAY AND
  MAP. *****
1000 PMODE3,1:COLOR2,1:SCREEN1,0
:PCLS
1010 LINE(105,0)-(255,191),PSET,B
1020 LINE(0,0)-(101,50),PSET,B
1030 LINE(0,54)-(101,191),PSET,B
1040 PAINT(2,2),4,2:PAINT(2,56),
4,2
1050 FORI=1T070
1060 READX,Y
1070 IFX=-1 AND Y=-1 THENREADX,Y
:DRAW"BM"+STR$(X)+", "+STR$(Y)
1080 LINE-(X,Y),PSET
1090 NEXTI
1100 A$="BRITISH"
1110 DRAW"BM4,20S8"
1120 FORN=1TOLEN(A$)
1130 DRAWCH$(ASC(LEFT$(A$,1))-55
)
1140 A$=RIGHT$(A$,LEN(A$)-1)
1150 NEXTN
1160 DRAW"BM16,40"
1170 B$="TOWNS"
1180 FORN=1TOLEN(B$)
1190 DRAWCH$(ASC(LEFT$(B$,1))-55
)
1200 B$=RIGHT$(B$,LEN(B$)-1)
1210 NEXTN
1220 PAINT(107,2),3,2
1230 PAINT(195,120),1,3
1999 REM*****PUT TOWN NAMES
  AND COORDINATES INTO
  ARRAYS AND DRAW FLASHING
  TOWNS*****
2000 FORN=1T010
2010 READTT$(N),X(N),Y(N)
2020 NEXT
2030 FOR TU=10 T010
2040 DRAW"BM20,70S8C1"+CH$(29)+C
H$(24)+CH$(32)+CH$(23)
2045 IF TU=10 THENDRAW"BM45,90"+C
H$(1)+CH$(0):GOTO2060
2050 DRAW"BM45,90"+CH$(TU)
2060 FORN=1T010:PRESET(X(TU),Y(T
U)):FORD=1T0500:NEXT:PSET(X(TU),
Y(TU),2):FORD=1T0500:NEXT:NEXT

```




```

2069 REM *****ASK FOR ANSWER
      AND DRAW FLASHING 'OK'
      OR 'NO'*****
2070 CLS8:PRINT@384,"SPELL ITS N
AME AND PRESS <ENTER>";:PRINT@22
4,"";:INPUT"WHAT TOWN WAS THAT":
T#
2080 SCREEN1,0:FORN=1T010:DRAW"B
M30,150S16C1"
2090 IFT#=TT#(TU) THENDRAWCH#(24
)+CH#(20):FORD=1T0500:NEXT:DRAW"
BM30,150C4"+CH#(24)+CH#(20):FORD
=1T0500:NEXT:NEXT: ELSE DRAWCH#(
23)+CH#(24):FORD=1T0500:NEXT:DRA
W"BM30,150C4"+CH#(23)+CH#(24):FO
RD=1T0500:NEXT:NEXT
2100 FORD=1T01000:NEXT:PAINT(2,1
89),1,2:PAINT(2,189),4,2
2110 IFT#=TT#(TU) THEN S=S+1
2120 NEXTTU
2999 REM*****ROUTINE FOR SCORE
      AND ENDING*****
3000 CLS7:PRINT@69,"YOU SCORED";
S:"OUT OF 10";:PRINT@195,"DO YOU
WANT TO TRY AGAIN?";
3010 PRINT@296,"PRESS 'Y' OR 'N'
";:SCREEN0,1
3020 R#=INKEY#:IFR#=""THEN3020 E
LSE IF R#="Y"THENRUN
3030 CLS6:PRINT@196,"THANK YOU F
OR PLAYING. ";:SCREEN0,1
3040 FORN=1T03000:NEXT:CLS
3050 END
3999 REM ***** SUBROUTINE FOR
      ARRAY AND DATA FOR
      CHARACTER SET*****
4000 DIMCH#(35)
4010 FORX=0T035:READCH#(X):NEXT
4020 DATA "BU1U4E1R2F1D4G1L2H1B0
1M+4,-6BD6BR3"
4030 DATA "BU5BR1E1D6NL1R1BM+4,+
0"
4040 DATA "NR4U1BU3U1E1R2F1D1G1L
1G2BM+7,+1"
4050 DATA "BU5E1R2F1D1G1NL2F1D1G
1L2NH1BM+7,+0"
4060 DATA "BU3NR4M+3,-3D6BM+4,+0
"
4070 DATA "BU4NR3U2R4BD2BL1F1D2G
1L2H1BM+7,+1"
4080 DATA "BU6BR3NF1L2G1D2NR3D2F
1R2E1U1H1BM+4,+3"
4090 DATA "U1BU5R4D1M-4,+4BM+7,+
1"
4100 DATA "BU1U1E1R2E1U1H1L2G1D1
F1R2F1D1G1L2H1BM+7,+1"
4110 DATA "BU1F1R2E1U4H1L2G1D1F1
R3BM+3,+3"
4120 DATA "U5E1R2F1D3NL4D2BR3"
4130 DATA "U6R3F1D1G1L3F1D1G1L3
BR7"
4140 DATA "BU1U4E1R2F1D4G1L2H1B
R7BD1"
4150 DATA "R1U6NL1R2F1D4G1L2BR6"
4160 DATA "U3NR3U3R4BD6L4BR7"
4170 DATA "U3NR3U3R4BD6BR3"
4180 DATA "BU1U4E1R3BD4NL1D2L3H1
BR7BD1"
4190 DATA "U3NR4U3BR4D6BR3"
4200 DATA "BU6BR1R1ND6R1BR1BD6BL
1L2BR6"
4210 DATA "BU2D1F1R2E1U5BD6BR3"
4220 DATA "U6BR4M-4,+3M+4,+3BR3"
4230 DATA "NU6R4BR3"
4240 DATA "U6M+2,+3M+2,-3D6BR3"
4250 DATA "U6M+4,+6U6BD6BR3"
4260 DATA "U6R4D6L4BR7"
4270 DATA "U6R3F1D1G1L3D3BR7"
4280 DATA "BU1U4E1R2F1D4G1L2H1BE
1BR1F2BR3"
4290 DATA "U6R3F1D1G1L3R1M+3,+3B
R3"
4300 DATA "BU1F1R2E1U1BU3H1L2G1D
1M+4,+2BR3BD2"
4310 DATA "BU6R2ND6R2BD6BR3"
4320 DATA "BU1U5BR4D5G1L2H1B01BR
7"
4330 DATA "BU6M+2,+6M+2,-6BD6BR3
"
4340 DATA "U6BR4D6M-2,-2NU1M-2,+
2BR7"
4350 DATA "U1M+4,-4U1BL4D1M+4,+4
D1BR3"
4360 DATA "BR2U3M-2,-2U1BR4D1M-2
,+2BD3BR5"
4370 DATA "BU6R4M-4,+6R4BR3"
4380 RETURN
4999 REM ***** DATA FOR MAP***
5000 DATA -1,-1,160,175,170,180,
175,170,180,175,195,175,205,165,
205,160,215,162,225,167,230,167,
245,153,242,150,225,150,240,140,
240,130
5010 DATA238,122,235,121,225,124
,220,130,218,120,215,118,207,112
,197,95,200,85,192,78
5020 DATA 185,85,182,75,185,70,2
10,45,185,42,197,19,185,21,175,2
0,170,20,165,30,162,47,153,53,15
5,60
5030 DATA 165,55,155,70,160,74,1
70,60,171,62,170,70,172,75,162,8
7,165,94,175,91,170,105,175,105,
175,120,155,115,160,123
5040 DATA 155,131,166,131,166,13
9,155,145,160,151,172,145,175,14
8,185,141,193,143,185,150,175,15
1,168,160,163,160
5050 DATA 163,165,145,170,150,18
0,160,175
5999 REM ***** DATA FOR TOWNS
      AND TOWN COORDINATES***
6000 DATA LONDON,223,150
6010 DATA LIVERPOOL,177,120
6020 DATA MANCHESTER,185,117
6030 DATA BIRMINGHAM,205,135
6040 DATA NEWCASTLE,194,95
6050 DATA GLASGOW,175,75
6060 DATA CARDIFF,180,142
6070 DATA PLYMOUTH,165,176
6080 DATA YARMOUTH,239,130
6090 DATA LEEDS,195,110
6999 REM*****INSTRUCTIONS*****
7000 CLS7:PRINT@33,"YOU WILL SEE
A MAP OF BRITAIN. ";:PRINT@65,"Y
ELLOW DOTS WILL FLASH ON AND ";:
PRINT@97,"OFF AT VARIOUS PLACES
ON THIS ";:
7010 PRINT@129,"MAP AND YOU WILL
BE ASKED FOR ";:PRINT@161,"THE
NAME OF THE TOWN. ";:PRI
NT@193,STRING$(30,32):
7020 PRINT@225,"YOU MUST ENTER T
HE NAME OF THE";:PRINT@257,"TOWN
(SPELT CORRECTLY) AND ";:PRI
NT@289,"PRESS <ENTER>. YOU WILL
THEN ";:PRINT@321,"BE TOLD IF Y
OU ARE RIGHT. YOUR";:PRINT@353,"
SCORE WILL BE GIVEN AT THE END";
7030 PRINT@385,STRING$(30,32)::P
RINT@417,"DO YOU WANT A LIST OF
THE ";:PRINT@449,"TOWNS" TYP
E 'Y' OR 'NO' . ";:
7040 SCREEN0,1
7050 R#=INKEY#:IFR#=""THEN7050 E
LSE IF R#="N" THENRETURN
7060 CLS:PRINT@0,STRING$(32,143+
16):FORN=1T014:PRINT@32*N,CHR$(1
59)::PRINT@32*N+31,CHR$(159)::NE
XT:PRINT@480,STRING$(31,159)::PO
KE1535,159
7070 PRINT@65,"THE TOWNS ARE (BU
T NOT IN THIS");:PRINT@97,"ORDER)
:-";:PRINT@164,"LEEDS MANC
HESTER";:PRINT@196,"YARMOUTH
NEWCASTLE";
7080 PRINT@228,"BIRMINGHAM PLYM
OUTH";:PRINT@260,"LIVERPOOL CA
RDIFF";:PRINT@292,"GLASGOW LA
ONDON";:PRINT@418,"PRESS spaceba
r TO CONTINUE";
7090 R#=INKEY#:IFR#(>CHR$(32))THE
N7090
7100 RETURN

```

WAVE

48K SPECTRUM



VALHALLA

MOVI
SOFT



THE LEGEND

VALHALLA is supplied on a 48K Spectrum program cassette, with VALHALLA player manual and presentation box. As VALHALLA uses the full 48K RAM, microdrives and full-size printers are not supported. ZX printer optional.

VALHALLA will be despatched in the week commencing October 2nd. If, for any reason we are unable to fulfill your order within 14 days of receipt, we will notify you.

VALHALLA cassettes carry an unconditional lifetime replacement guarantee.

TO ORDER: (UK Orders Only) Simply complete the coupon, and FREEPOST with your cheque/P.O. made payable to LEGEND (UK Mail Order).
Credit Card Orders: By phone 9-5.30 Mon to Fri, stating name and address, Card No. and item(s) required.

RETAILERS: Please contact your regular distributor or LEGEND (Trade Distribution) at the address below.

LEGEND (UK Mail Order) FREEPOST
1 Milton Road, Cambridge CB4 1UY
(0223) 312453

MOVISOFT OPERATING SYSTEM UNDER LICENCE.

Post to:- LEGEND (UK Mail Order) FREEPOST
1 Milton Road, Cambridge CB4 1UY

Please send me.....Copy/copies of
VALHALLA for the 48K Spectrum.

I enclose cheque/P.O. for £.....
(£14.95 each incl. VAT and P&P).



Or I wish to pay by Access/Barclaycard/Visa
Card No.....

Please print name and address

Name.....

Address.....

.....

Credit Card holder's signature.....

PCWK.38

Erased

Hi-res graphics for the 64

Module 3.4.2

This module allows a flashing pixel to be moved around the screen, inking in and erasing individual pixels.

Commentary

Line 11030: X and Y are the co-ordinates of the pixel on the 300*200 screen. The flashing pixel cursor is set to the middle of the screen. The first position in normal screen memory is POKEd with a value which produces a colour indicator of the current mode (black = 0, red = 1, purple = 2, blue = 3). Effects of modes will be explained later.

Line 11040: The state of the screen at the position at which the cursor is to be flashed is obtained.

Lines 11042-11050: The cursor is flashed on and off until a key is pressed.

Lines 11060-11072: In mode 3, pressing the cursor arrow results in the flashing pixel moving 10 positions in the required direction (within screen limits). In modes 0,1 and 2 the cursor moves only one space at a time.

Line 11075: The unshifted function keys, from top to bottom, are used to set the modes. If the mode is changed the colour indicator is changed.

Lines 11080-11090: If the mode is zero (black) then the pixel at the cursor position is blanked. If the mode is 1 (red) then the pixel is inked in. The remaining two modes allow the cursor to be moved around, slow or fast, without affecting what is on the screen.

Lines 11100-11120: These inputs relate to the next module.

Testing Module 3.4.2

You should now be able to move the tiny cursor around the screen, drawing or erasing.

Module 3.4.3

This module provides for the drawing of straight lines between points defined by the user. It is an adaptation of a method known as Bresenham's algorithm and a version of it is often used in those Basics which have line drawing commands.

Commentary

Line 12025: The values X1 and Y1 were defined when the user input 1 — at that point they were set equal to the X and Y positions of the cursor. X2 and Y2 were set on input of 2. The line will be drawn from X1,Y1.

Line 12030: DX and DY are set equal to the distance between X1 and X2, and Y1 and Y2, plus one. The SGN function means that it does not make any difference if the distance is positive or negative (if it is negative then minus one will be added rather than 1).

Line 12032: The line-drawing algorithm uses the greater of the two differences as the basis of its calculations so it is faster to have two separate routines.

Line 12035: SL is the slope, or ratio between DX and DY minus 0.5.

Lines 12040: The loop is as long as the difference along the X co-ordinate.

Lines 12050-12055: Depending on whether the mode is 0 or 1, a single dot on the line is erased or drawn. Note that nothing will happen in modes 2 or 3.

Line 12060: According to the ratio between DX and DY, SL may now indicate that the

next dot should move up or down the Y axis. If so the Y position is changed and SL is reduced by one.

Line 12070: The slope value is added to SL each time a dot has been printed.

Line 12100: The X position is incremented for each iteration of the loop. Once again the SGN function takes care of lines which move backwards along the axis.

Lines 12200-12250: Exactly the same routine for those cases where DY is greater than DX.

Testing Module 3.4.3

You should now be able to specify a start and end point for a line (1 and 2) then to draw it or erase an existing line, depending upon whether mode 1 or 0 is set.

Summary

This program is intended as no more than an appetiser for the possibilities raised by the bit-mapped mode. Full use of bit-mapped graphics requires some careful thought as to what you wish to achieve and some often complex mathematics to achieve it. Should you decide to go further, the techniques given here, and the functions used to locate individual pixels, will make the task that much easier.

Going further

(1) Why not add a facility allowing the saving of a screen of graphics onto tape — you'll need a fairly long tape but the routine would be simple enough.

(2) Computer graphics books provide a number of algorithms which allow the drawing of circles and arcs. Why not add a module to the end of the program to achieve this — the main drawback will be lack of speed. ■

This is an extract from *The Working Commodore 64* by David Lawrence, published by Sunshine Books.

MODULE 3.4.2

```

11000 REM#*****
11010 REM DRAW ON SCREEN
11020 REM#*****
11030 X=160:Y=96:MO=1:POKE 1024,(PEEK(10
24)AND240) OR (MO*2)
11040 TT=PEEK(FNPP(X))
11042 GET A$:IF A$<>" " THEN 11050
11044 POKE FNPP(X),FNPV(X):POKE FNPP(X),
FNPE(X):GOTO 11042
11050 POKE FNPP(X),TT
11060 IF MO<3 THEN X=X-(A$="■" AND X<319
)+(A$="■" AND X>0)
11062 IF MO=3 THEN X=X-10*(A$="■" AND X<
310)+10*(A$="■" AND X>10)
11070 IF MO<3 THEN Y=Y-(A$="▒" AND Y<191
)+(A$="▒" AND Y>0)
11072 IF MO=3 THEN Y=Y-10*(A$="▒" AND Y<
182)+10*(A$="▒" AND Y>10)
11075 IFA$="*" THEN MO=MO+1:MO=MO+4*(MO>3
):POKE1024,(PEEK(1024)AND240)OR(MO*2)
11080 IF MO=1 THEN POKE FNPP(X),FNPV(X)
11090 IF MO=0 THEN POKE FNPP(X),FNPE(X)
11100 IF A$="1" THEN X1=X:Y1=Y
11110 IF A$="2" THEN X2=X:Y2=Y
11120 IF A$="L" THEN GOSUB 12000
11200 GOTO 11040
11499 GOTO 11499
    
```

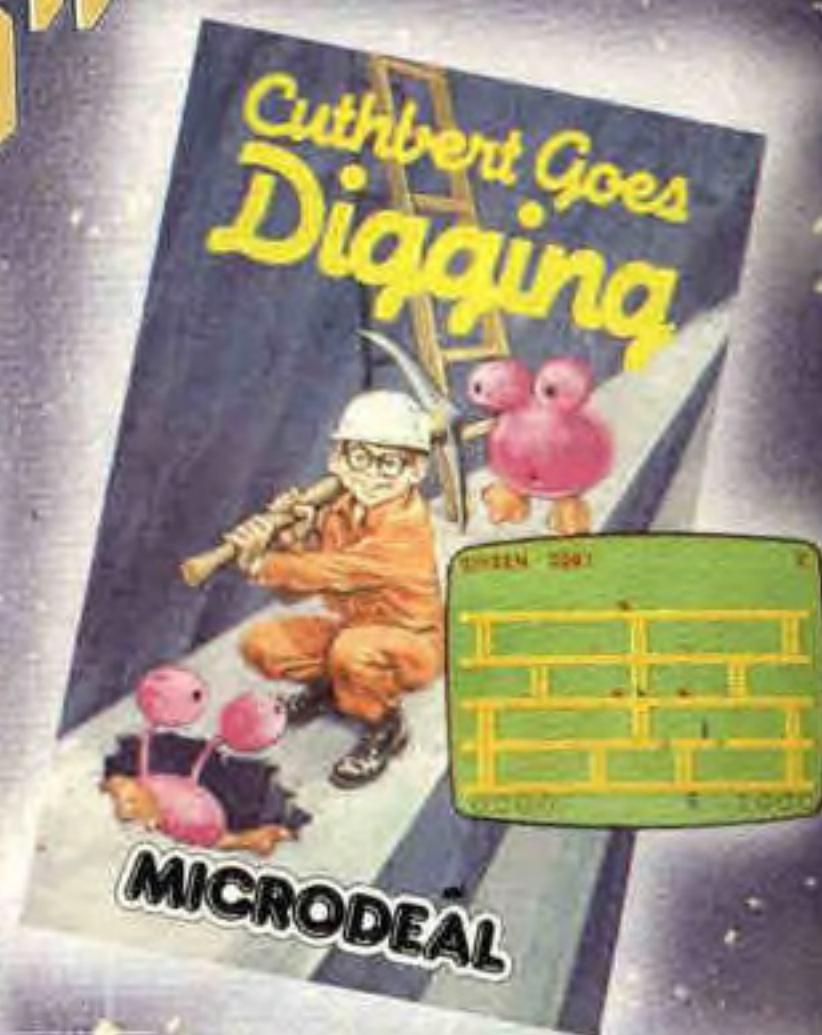
MODULE 3.4.3

```

12000 REM#*****
12010 REM LINE DRAWING
12020 REM#*****
12025 X=X1:Y=Y1
12030 DX=X2-X1+SGN(X2-X1):DY=Y2-Y1+SGN(Y
2-Y1)
12032 IF ABS(DY)>ABS(DX) THEN 12200
12035 SL=ABS(DY/DX)-0.5
12040 FOR I=1 TO ABS(DX)
12050 IF MODE=1 THEN POKE FNPP(X),FNPV(X)
)
12055 IF MODE=0 THEN POKE FNPP(X),FNPE(X)
)
12060 IF SL>0 THEN Y=Y+SGN(DY):SL=SL-1:G
OTO 12060
12070 SL=SL+ABS(DY/DX)
12100 X=X+SGN(DX):NEXT I
12120 RETURN
12200 SL=ABS(DX/DY)-0.5
12210 FOR I=1 TO ABS(DY)
12220 IF MODE=1 THEN POKE FNPP(X),FNPV(X)
12225 IF MODE=0 THEN POKE FNPP(X),FNPE(X)
12230 IF SL>0 THEN X=X+SGN(DX):SL=SL-1:G
OTO 12230
12240 SL=SL+ABS(DX/DY)
12250 Y=Y+SGN(DY):NEXT I
12300 RETURN
    
```

WHEN IT COMES TO DRAGON 32 Software

"WE'VE GOT
IT TAPED"



41 Truro Road, St. Austell, Cornwall PL25 5JE. Tel: 0726 3456

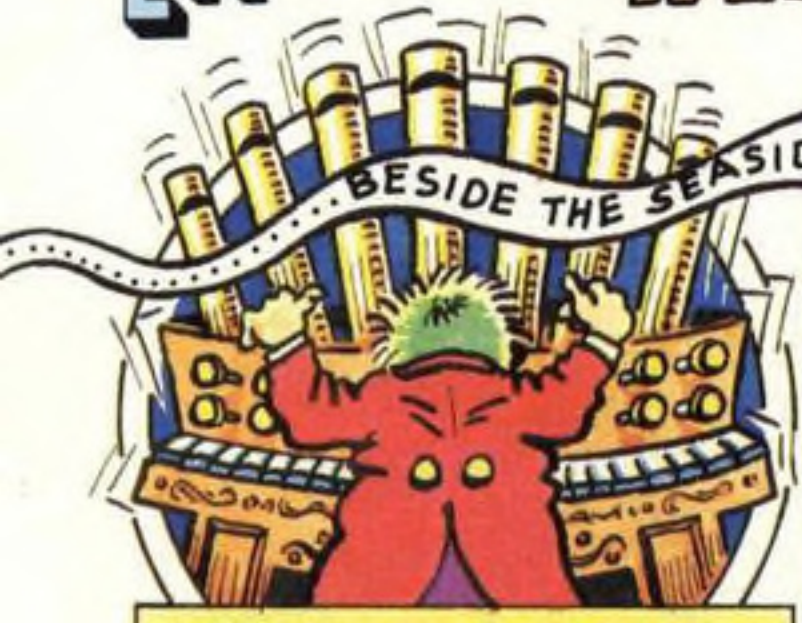
All cassettes £8 each

Selected titles available from larger branches of Boots, John Menzies, Spectrum, Computers for All and all good computer shops.

Virgin Games
 THE AMAZING ADVENTURES OF THE
LAUGHING SHARK
 PART ONE



THE LAUGHING SHARK TORPEDOED TO THE SURFACE ONLY TO FIND HE WASN'T IN THE SUNNY PACIFIC - BUT IN THE DARK MURKY MOAT OF THE.....



CASTLE ADVENTURE WITH A THOUSAND DASTARDLY DEATHS - ACCOMPANIED BY THE MAD ORGANIST - PULLING OUT ALL THE STOPS.....



ESCAPING THE DEADLY SOUND OF MUSIC, THE LAUGHING SHARK NARROWLY AVOIDED A CRUISE LINER - IN A MOAT?!!



PASSING A PORTHOLE HE ESPIED NASTY DR. SINISTER PLANTING A BOMB. STOP HIM SOMEONE - OR THIS COULD TURN INTO A.....
DEATH CRUISE!!



NOT WISHING TO SUFFER THE SAME FATE AS HIS COUSIN JAWS, OUR HERO DECIDED TO CONSULT THE ORACLE OF **I CHING**....



THE 4000 YEAR OLD CHINESE ART OF THE HEXAGRAM - WITH ITS KEY TO FUTURE AND THE MEANING OF LIFE.



OVERFLOWING WITH NEWLY FOUND SELF-CONFIDENCE, LAUGHING BOY FELT READY TO HELP PROF. BATTY SOLVE THE PROBLEM OF **LOJIX** AND FIT THE SHAPES



- INTO THE GRID. IF YOU MANAGE TO SOLVE IT, YOU COULD WIN THE **LOJIX** POT OF SILVER. 50p X EACH COPY SOLD



DIZZY FROM HAVING TO USE HIS LITTLE FISHY BRAIN OUR INTREPID 'CHUCKLES' GOT LOST AND FOUND HIMSELF IN THE DARK DEPTHS OF **KILLER CAVERNS**.



WITH ITS HORDES OF TREASURE AND DEADLY GUARDIANS... TOO MUCH, EVEN FOR A SUPER FISH, SO HE HOPPED ON A BUS

AND WENT OFF TO SPEND A DAY AT THE RACES, HAVE A FLUTTER OR TWO, EVEN INVEST HIS WINNINGS IN BECOMING A RACING MANAGER



FLUSH WITH HIS SUCCESS ON THE 'GEE GEE'S', SMILEY WAS ALMOST NIPPED IN THE TAIL BY ONE OF THE MOST FEARED CREATURES IN THE UNIVERSE....



A CREEPER IN ITS CRAZED QUEST FOR POWER CELLS.... STOP IT OR END CLICHÉS AS WE KNOW THEM.



HEADING BACK TO SEA, THE LAUGHING SHARK HAD TO AVOID THE ALIEN 'MUNCHIES' NIBBLING AWAY AT A GIANT DAM. HELP! IF THE DAM BURSTS, IT WOULD FLOOD ENVAHI



YOU MUST NOT MISS....
NEXT DARKNESS ON THE EDGE OF PENGE!

September RELEASES



RACING MANAGER
 by Mark Alexander
 SPECTRUM 48K
 VGC 1005
 All the thrills of the racing world.
 £5.95 R.R.P.



LOJIX
 by Steve Webb
 SPECTRUM 48K
 VGC 1006
 An intriguing intellectual puzzle - beat the puzzle, win the money.
 £5.95 R.R.P.



DEATH CRUISE
 by Lee J. Brookes
 DRAGON 32
 VGB 4001
 There's murder afoot on the high seas.
 £6.95 R.R.P.



I CHING
 by James Breffni
 DRAGON 32
 VGB 4002
 Consult the Oracle - Determine your future.
 £6.95 R.R.P.



CASTLE ADVENTURE
 by Conrad Jacobson
 DRAGON 32
 VGB 4003
 A humorous (insane) adventure game - set in and around an old castle.
 £6.95 R.R.P.



ENVAHI
 by Jeremy Walker
 VIC 20 (+8K EXPANSION)
 VGC 3002
 The game of the film of the book of the game.
 Joystick/key
 £5.95 R.R.P.



CREEPERS
 by Nick Rowden
 VIC 20 (+3K or 8K EXPANSION)
 VGC 3003
 An original, fast-moving arcade game.
 Joystick/key
 £5.95 R.R.P.



KILLER CAVERNS
 by Daryl Bowers
 ORIC 16K & 48K
 VGC 5001
 A graphic adventure game set in killer caverns.
 £5.95 R.R.P.

VIRGIN GAMES GANG

Our GANG is growing in numbers all the time, and everybody who buys one of our NEW GAMES will RECEIVE:

- a year's FREE MEMBERSHIP of the GAMES GANG;
- FREE ENTRY in the next VIRGIN GAMES GANG DRAW;
- 6 FIRST PRIZES, consisting of a VIRGIN DAY OUT - a trip on the VIRGIN GAMOR FUN BUS to the VIRGIN MANOR RECORDING STUDIO in Oxfordshire. And then be our guest at the famous KENSINGTON ROOFTOP NIGHTCLUB, "THE GARDENS";
- 50 SECOND PRIZES of VIRGIN GAMES T-SHIRTS;
- 100 THIRD PRIZES of VIRGIN GAMES POSTERS.

VIRGIN GAMES BUS TOUR

VIRGIN GAMES ARE ON THE ROAD! Look out for the VIRGIN GAMES LOOK BUS. From SEPTEMBER onwards our eye-catching double-decker, games bus will VISIT TOWNS throughout the U.K., demonstrating our games to the public, in conjunction (where possible) with local radio stations.

GAMES AVAILABILITY

If your LOCAL RETAILER is not yet stocking VIRGIN GAMES - tell him he should be - but, however, you can ORDER DIRECT from "I'VE GOT NO

GOOD LOCAL RETAILER" dept., VIRGIN GAMES, 61-63 PORTOBELLO ROAD, LONDON W11, enclose a cheque or postal order for the right amount and DON'T FORGET to put your name and address - people do, you know!

THE "I WANT TO BE RICH AND FAMOUS" DEPARTMENT

If you have a yearning to be RICH AND FAMOUS and have written an ORIGINAL GAMES PROGRAM, with good graphics, for any of the popular home computers other than the ZX81, PLEASE SEND A CASSETTE VERSION (with details) TO US.

EXISTING TITLES

Other titles in the VIRGIN GAMES range are: VGA 1003 - SHEEPWALK by Gregory Trezise for SPECTRUM 48K A sheepdog trial in your living room! VGA 1001 - YOMP by Terry Murray and Roy Poole for SPECTRUM 16 & 48K Command the paras and take on the impossible. VGA 1002 - STARFIRE by Martyn Davies for SPECTRUM 48K Rid the galaxy

of the Xtardan battle cruisers - a game of strategy and skill. VGA 1004 - GOLF by David Thompson for SPECTRUM 16 & 48K Championship golf in your own home. VGA 2001 - BUG BOMB by Simon Birrell for BBC B A skin-tingling new arcade game. VGA 2002 - LANDFALL by Gregory Trezise for BBC B An exciting and realistic space ship landing simulator. VGA 2003 - SPACE ADVENTURE by

R. Thomas and A. Thomas for BBC B A graphic adventure set on a seemingly abandoned ship drifting through space. VGA 3001 - MISSION MERCURY by Steve Lee for VIC 20 (UNEXPANDED) Land your craft on the surface and rescue the scientists... but beware the asteroid birds.

All our fun-to-play games are available from **BOOTS, MENZIES, DIXONS, THE GAME CENTRE, PHOTOMARKETS, VIRGIN RECORDS** and all **GOOD** computer shops everywhere.

To obtain **REVIEWS** of current releases please write to the "DON'T JUST TAKE OUR WORD FOR IT! Dept." at: **VIRGIN GAMES LTD. 61-63 PORTOBELLO ROAD LONDON W11 3DD**

**SIMPLE
TO USE**

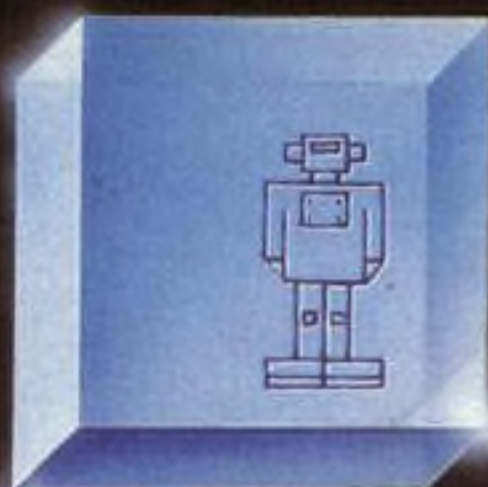
**"It will have to be a special kind of game to compete
with the quality you create yourself using this program."**

Software **STUDIOS** **Games Designer**

By John Hollis — author of TIMEGATE

Create your own smooth SPRITE BASED MACHINE CODE Arcade Games.

Invaders/Galaxians type • Defender/Scramble type • Asteroids/Berserk type.



**NO programming knowledge needed.
EIGHT pre-programmed games included.**

Smooth arcade quality movement throughout using full colour sprites.
Design your own animated Aliens, Ships, Missiles, Robots, Explosions,
Full Sound Generation, Scoring, Movement Control, Moving
Background Option and Attack Wave Design.

Marketed exclusively by Quicksilva Ltd. I enclose cheque/P.O. for £14.95

Name.....
Address.....

Send to Software Studios,
Quicksilva Mail Order,
55 Haviland Road,
Ferndown Industrial Estate,
Wimborne, Dorset BH21 7PY
Telephone (0703) 20169

Boots, W.H. Smiths, J. Menzies,
Microdealer, HMV, Hamleys,
John Lewis, Computers for All
and all reputable specialist
computer stores.



**48K SPECTRUM
£14.95**

Rotating ellipses

Michael Batty explains how to rotate ellipses in the second of a three-part series

Last week we presented programs to draw and fill ellipse shapes which had fixed orientations on the screen. In extending our computer art, we need to be able to rotate these shapes. To do this, we will use standard two-dimensional transformations which change the orientation but keep the scale and origin of the figure fixed. We will generate patterns by regular rotation of ellipses around a fixed origin, forming designs which resemble the petals of a flower, the cogs of a wheel or the points of a star.

The program to draw an ellipse (given last week as program 2) can be used to generate the figure to be rotated, but it is now necessary to store the X, Y co-ordinates of the figure in arrays so that we

can continually transform these points to other positions. The transformations used are quite standard, involving simple sine and cosine functions. They are given in most introductions to computer graphics — Roy Myers' *Microcomputer Graphics* (Addison-Wesley, 1982) is a good reference.

Program 1 shows how this rotation can be done. In fact, if you look at the way we originally generated the co-ordinates of the ellipse (lines 120, 130) and the way we transform these (lines 230, 240), you will see the same transformations are involved. When you run program 1, initially use XX and YY values between 10 and 200, measure TH the angle of rotation or pivot in degrees, and finish the rotation with TH = 0.

We can use the fast fill routine (program 3 last week) to fill these rotating shapes and then we are in a position to develop

some nice formal designs. Program 2 enables you to set up different sizes of ellipse with XX and YY radii and to rotate them regularly from a fixed origin by specifying the number of ellipses — we call them petals — forming the rotation. We then fill the centre of the resulting flower-like picture with a circle. The program is structured as a set of Procedures: we set up the original ellipse using *Procsetup*, rotate it using *Proctransf* and plot a centre circle using *Procsetup* once again. Each time, we fill the ellipse using *Procfill*.

This program can be used to explore a variety of shapes in the time-honoured experimental fashion of computer art. Typical designs are also illustrated. Once you have got a feel for the program, go wild and put in negative axes, and sizes much larger than the screen limits, and you will generate some dramatic effects. Next week, we will conclude by developing a program to elaborate pictures based on these designs. ■

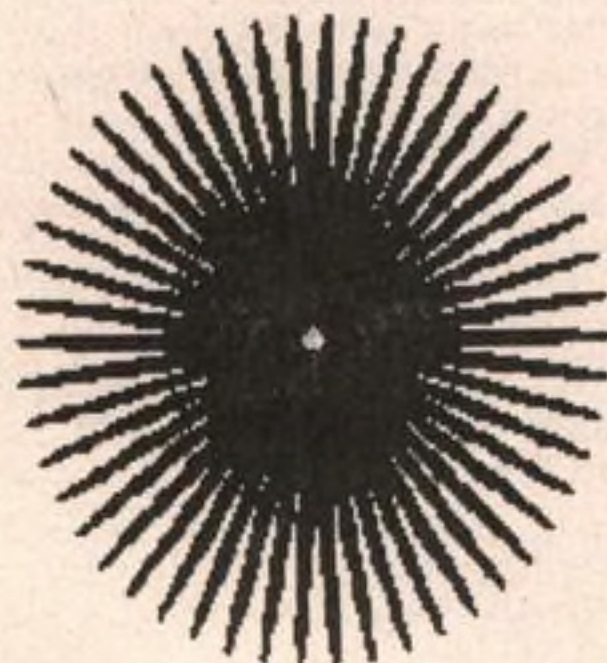
RAD OF X AXIS = ?40
 RAD OF Y AXIS = ?300
 NO. OF PETALS = ?14



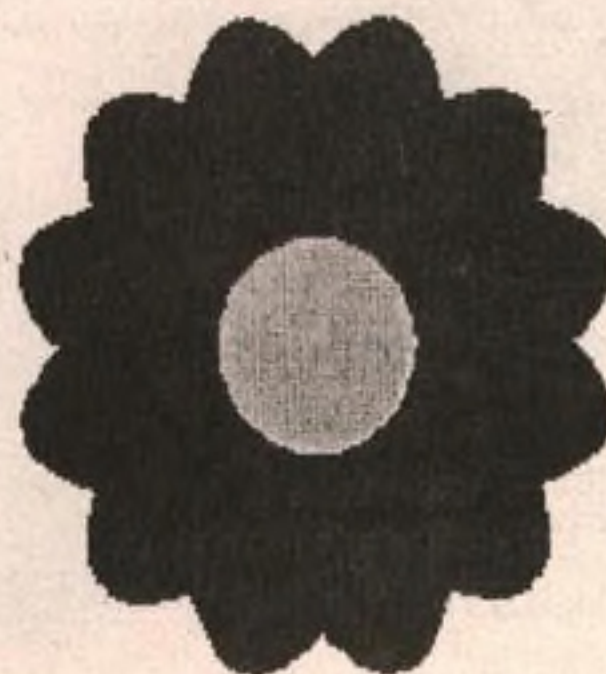
RAD OF X AXIS = ?150
 RAD OF Y AXIS = ?35
 NO. OF PETALS = ?14



RAD OF X AXIS = ?150
 RAD OF Y AXIS = ?7
 NO. OF PETALS = ?50



RAD OF X AXIS = ?80
 RAD OF Y AXIS = ?300
 NO. OF PETALS = ?12



WHERE IS JUMBLY?

RED SHIFT

APOCALYPSE
A new concept in computer gaming.
A multi-player game of strategy and diplomacy, designed to be expanded and manipulated, the game places YOU in POWER. Each game contains four maps. The BBC version is over 68K of program and data and the Spectrum totals over 90K.
PLAY IT BEFORE YOU'RE IN IT!

£9.95
inc. VAT
and P&P



Apocalypse
THE WAR GAME

SPECTRUM 48k
BBC Model B 1.2 GB

Coming soon:
VOLUME 1 — 6 new maps.
VOLUME 2 — 4 historical scenarios — specialist rules cover the collapse of the Roman Empire, WW II, 1984 and the Napoleonic Wars.

Available from
RED SHIFT Ltd, DEPT BRENDA
12c Manor Rd, Stoke Newington, London N16. Tel: 800-1333

Produced under licence from Games Workshop Ltd, London




The best books for the Micro Adventurer



Spectrum Adventures

A major work by Tony Bridge and Roy Carnell which details the growth and development of Adventure gaming and then presents a full graphic Adventure game called 'The Eye of the Star Warrior'
ISBN: 0 946408 07 6

Commodore 64 Adventures

A blueprint for the construction and playing of Adventure programs based on a full text Adventure.
ISBN: 0 946408 11 4



*** PUBLISHED JANUARY 1984**
Atari Adventures
A guide to playing and writing your own adventures by Tony Bridge & Roy Carnell

Look out for the Sunshine range in W.H. Smith's, Boots, John Menzies, other leading retail chains and through our national network of bookshops and specialist stores.
Dealer enquiries: 01-734 3454

Please send me
 Spectrum Adventures at £5.95 each Commodore 64 Adventures at £5.95 each

I enclose cheque/postal order for £_____ made payable to: Sunshine Books: 12/13 Little Newport St., London WC2R 3LD

Name _____

Address _____

Signature _____

Or telephone Access Mastercard on 01-734 3454

PROGRAM 1

```

10 REM Fixed Rotation of Ellipses
20 MODE1:VDU28,0,1,39,0
30 DIM X(60),Y(60)
40 REPEAT
50 INPUT "RADIUS OF X AXIS = ",XX
60 INPUT "RADIUS OF Y AXIS = ",YY
70 VDU29,640;512;
80 DT=2*PI/60:A=XX/YY
90 C=COS(DT):S=SIN(DT):SX=S/A:SY=S*A
100 XA=XX:YA=0:MOVE XA+XX,YA
110 FOR I%=1 TO 60
120 T=XA*C-YA*SY
130 YA=YA*C+XA*SX:XA=T
140 X(I%)=XA+XX:Y(I%)=YA:DRAW XA+XX,YA
150 NEXT I%
160 REPEAT
170 INPUT "ANGLE OF PIVOT = ",TH
180 TH=RAD(TH):CC=COS(TH):SS=SIN(TH)
190 XA=X(60)*CC-Y(60)*SS
200 YA=X(60)*SS+Y(60)*CC
210 MOVE XA,YA
220 FOR I%=1 TO 60
230 XA=X(I%)*CC-Y(I%)*SS
240 YA=X(I%)*SS+Y(I%)*CC
250 DRAW XA,YA
260 NEXT I%
270 UNTIL TH=0
280 AA=GET:CLG
290 UNTIL FALSE
300 END
    
```

PROGRAM 2

```

10 REM Exploring Patterns of Ellipses
20 REM (C)Michael Batty,1983
30 MODE1
40 DIM X(60),Y(60)
50 VDU23,1,0;0;0;0;
60 REPEAT
70 INPUT TAB(10),"RAD OF X AXIS = ",XX
80 INPUT TAB(10),"RAD OF Y AXIS = ",YY
90 INPUT TAB(10),"NO. OF PETALS = ",N
    
```

```

100 VDU29,640;512;
110 GCOLOR,1
120 PROCSETUP(XX,YY)
130 TH=2*PI/N
140 FOR K%=1 TO N-1
150 PROCTRANSF(TH)
160 NEXT K%
170 IF XX>YY THEN Z=YY ELSE Z=XX
180 Z=Z*1.25:XX=Z:YY=Z
190 VDU29,640-XX;512;
200 GCOLOR,2
210 PROCSETUP(XX,YY)
220 AA=GET:CLS
230 UNTIL FALSE
240 END
250 DEFPROCSETUP(XX,YY)
260 DT=2*PI/60:A=XX/YY
270 C=COS(DT):S=SIN(DT):SX=S/A:SY=S*A
280 XA=XX:YA=0
290 FOR I%=1 TO 60
300 T=XA*C-YA*SY
310 YA=YA*C+XA*SX:XA=T
320 X(I%)=XA+XX:Y(I%)=YA
330 NEXT I%
340 PROC FILL
350 ENDPROC
360 DEFPROC TRANSF(TH)
370 C=COS(TH):S=SIN(TH)
380 FOR I%=1 TO 60
390 T=X(I%)*C-Y(I%)*S
400 Y(I%)=X(I%)*S+Y(I%)*C:X(I%)=T
410 NEXT I%
420 PROC FILL
430 ENDPROC
440 DEFPROC FILL
450 MOVE X(60),Y(60):MOVE X(1),Y(1)
460 PLOT85,X(59),Y(59)
470 FOR J%=2 TO 29
480 PLOT85,X(I%),Y(I%):J%=60-I%
490 PLOT85,X(J%),Y(J%)
500 NEXT I%
510 PLOT85,X(30),Y(30)
520 ENDPROC
    
```

LYNX SOFTWARE

FROM

BUS-TECH

Please tick box as required

LYNX MUNCHER (By R. Gordon) £4.50

Eat the power pills then chase the ghosts.

BATTLE BRICK (By R. Gordon) £4.50

A bat and ball game with multi coloured bricks using good sound and a high score feature.

DEATH BALL (By A. Miller) £5.50

A new exciting style game with two options that everyone can play — highly recommended.

ZOMBIE PANIC (By A. Miller) £4.50

Escape the unrelenting Zombies and lure them into the pits. You have to think for this one.

SS ORION (By P. Nixon) £4.50

Lasers, Hyperspace, etc, superb in use of graphics and sound.

3D MAZE (By R. Gordon) £5.50

A different maze each time you play. Good perspective drawing and a map available if you need one.

HELPLINE (By M. Draper) £6.50

A useful maths teaching and design program for schoolchildren including tables, conversion, Trig, etc.

FREE

With each order on a machine code utility from Bus-Tech programmers giving a useful direct access to your arrow keys for faster games, and a graphics mover that shows what can be done smoothly with a small graphics model example. A complete graphics utility pack will shortly be available.

More programs wanted. Your program could be included in our new releases — with you receiving good royalties for your efforts. Please send tape with documentation to BUS-TECH

NAME

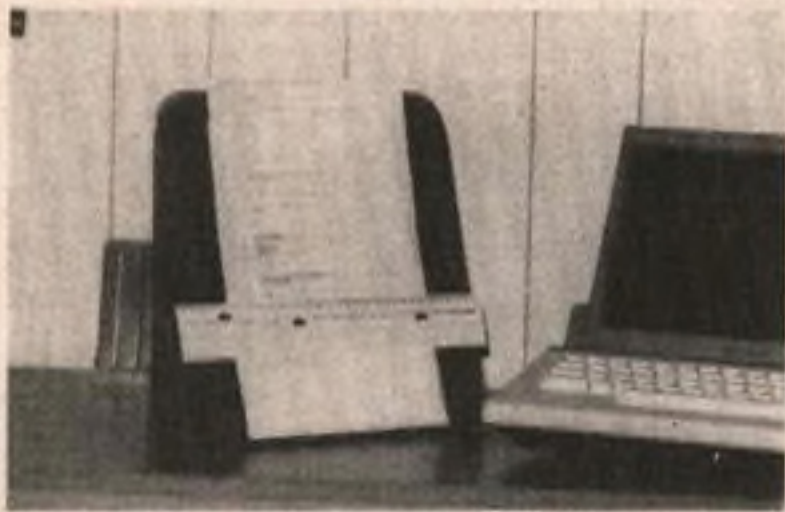
ADDRESS

All prices include p&p — please tick the boxes for programs wanted and fill in your name and address (please add 50p p&p outside UK). Please send cheques and postal orders to:

BUS-TECH
19 LANDPORT TERRACE,
PORTSMOUTH,
HANTS PO1 2BG

DELIVERY
 GUARANTEED
 WITHIN 14 DAYS
 FROM RECEIPT
 OF ORDER

REDUCE PROGRAM FATIGUE with a



BWN PROGRAM COPYHOLDER

By using a BWN Program Copyholder you reduce fatigue, and the risk of strain on neck, shoulder and spine muscles, therefore increasing computer/operator speed and efficiency, also reducing errors (BUGS).

The additional features of the Program Copyholder are:

- A flexible sliding line guide to keep your place on the program/copy.
- A ruler to help measure those awkward spaces in some program lines.
- Can hold firmly a single sheet, magazine or book up to 12 inches in width.
- When not required it can be easily stored flat in a drawer.
- Whether you have a computer, typewriter, Telex machine, composing and typesetting machine or any other keyboard machine, the BWN Program Copyholder will make typing a pleasure.

The BWN Program Copyholder costs only **£6.95 + £1.75 p&p**.
Cheque or Postal Orders to: **BWN Products, 57 Tan-y-lan, Morriston, Swansea, West Glam SA6 7DU.**

TRADE ENQUIRIES WELCOME



New from **SUNSHINE** Master your ZX Microdrive

master your
ZX microdrive
programs, machine code and networking

andrew pennell



programs, machine code and
networking by Andrew Pennell

Master your ZX Microdrive contains all the information you will ever need to use the ZX Microdrive to the full. Clearly explained, with many examples, it is equally suitable for the relative newcomer to BASIC through to the experienced machine code programmer.

ISBN 0 946408 19 X

Andrew Pennell has also included a full database file handling program to let you put the ZX Microdrive to practical use with your Sinclair Spectrum.

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. Dealer Enquiries: 01-734 3454

Please send me

Master your ZX Microdrive at £6.95 each

I enclose cheque/postal order for £_____ made payable to: Sunshine Books: 12/13 Little Newport St., London WC2 3LD.
Or phone your order through on Access Mastercard 01-734 3454

Name _____

Address _____

Signature _____

We can normally deliver in 4/5 days.

ULTRASOFT

BETTER SOFTWARE AT BETTER PRICES

31 KEITH PARK ROAD
UXBRIDGE, MIDDLESEX UB10 0QR

BETTER SOFTWARE AT BETTER PRICES

<p style="text-align: center; font-weight: bold;">DRAGON</p> <p>MICRODEAL: Android Attack, The King, Alcatraz, Defense, Escape, Shuttle, Invaders Revenge, Galactic Ambush, Frogger, Scarfman, Key of the Wizzard, Intergalactic Force, Crazy Painter. RRP £8.00 Our Price £7.75</p> <p style="text-align: center; font-weight: bold;">COMMODORE 64</p> <p>INTERCEPTOR: Frogger, Crazy Kong, Sriteman, Panic, Scramble, Star Trek. RRP £7.00 Our Price £6.00</p> <p>LLAMASOFT: Gridrunner. RRP £5.00 Our Price £4.80</p> <p>Laser Zone, Matrix, Mutant Camels. RRP £7.50 Our Price £6.50</p> <p>NEW Hover Bover. RRP £7.50 Our Price £6.50</p>	<p style="text-align: center; font-weight: bold;">VIC20</p> <p>IMAGINE: Arcadia, Catcha Snatcha, Frantic, Wacky Waiters, Bewitched. RRP £5.50 Our Price £4.95</p> <p>INTERCEPTOR: Galaxians, Alien Attack, Crazy Kong. RRP £6.00 Our Price £5.00</p> <p>QUICKSILVA: Super Offer, Trader (16K). RRP £14.95 Our Price £12.95</p> <p style="text-align: center; font-weight: bold;">SPECTRUM</p> <p>ULTIMATE: Jet Pack, Pssst, Cookie, Trans Am. RRP £5.50 Our Price £5.00</p> <p>IMAGINE: Arcadia, Jumping Jack, Ah Diddums, ZZoom 48K, Zip-Zap 48K, Schizoids. RRP £5.50 Our Price £4.95</p> <p>QUICKSILVA: Super Offer, Trader. RRP £9.95 Our Price £8.95</p> <p>SAXON: Smugglers Cove, Thelmas Lair, Aquaplane. RRP £6.95 Our Price £6.25</p>
--	---

SEND CHEQUE or POs for NEW CATALOGUE AVAILABLE
Please send 16p stamp

WHY PAY MORE?

CAMEL PRODUCTS

16K

RAM for £17.35
ZX81

Available Ex-Stock

PROMER-81 blows your programs into Eproms from ZX81 TWO or 4K Eproms 2516/32, 2716/32. Software on tape, with easy user notes assembled and tested **£19.95 + VAT**

ROM-81 is an Eprom reader for the ZX81, with two 24-pin sockets for above Eprom types. Up to 8K (2 x 2732) program sits in 8K-16K area. User notes give a small transfer routine for loading Basic programs using RAND USR **£14.95 + VAT**

PIO-SP. 8+8 Channel Latched Input/Output Card for the SPECTRUM. Simple IN, OUT Basic commands. All TTL design avoids complex register manipulations. Rear extender **£18.50 + VAT**

UK VAT extra P&P UK Free
Europe +5% Overseas +10%
Dealer enquiries welcomed

Cambridge Microelectronics Ltd., One Mill Rd., Cambridge CB4 1UY Tel 102731 314814

PROMER-81 ★ BLOPROM-81

OPEN FORUM

Open Forum is for you to publish your programs and ideas. Take care that the listings you send in are all bug-free. Your documentation should start with a general description of the program and what it does and then give some detail of how the program is constructed. We will pay the *Program of the Week* double our new fee of £6 for each program published.

Death Race

on Vic20

This program is intended for people like me; ie, those people who have a warped sense of humour. The idea of the game is to run over as many people as possible

whilst avoiding hazards such as oil slicks, pits in the road, and of course, the posts on both sides. The keys are z-left and m-right, but are easily changed by altering the values in lines 120 and 130.

Program notes

Lines 10 Calls a subroutine to initialise the graphics.

15-20 Initialise variables and move the cursor to the screen bottom.
 30-60 Make up the main program loop, the variable E stands for EVENT.
 100-170 Print and move the road, and check to see if anything is hit.
 200-380 Print a hazard or Print a Pedestrian in which case this routine takes over all functions until the character is off the screen or dead.
 1000-2000 Set up the graphics (called by line 10).
 3000-3030 Print out the score and if wanted will restart the game.
 5000-5010 Produce squelch sound.
 6000-6050 Produce skid and explosion sound effects.
 The program will run on either the unexpanded Vic20 or Vic + 3K.

PROGRAM OF THE WEEK

```

10 GOTO1000
15 CLR:POKE36878,10:G=0:PRINT"J":
    POKE36879,59
16 CH=0:D=0:SC=0:CA=7680+6*22+11:CO=CA+
    30720:POKE36869,255:POKECA,0:POKECO,0
20 SR=7:POKE782,0:POKE781,22:SYS65520
30 GOSUB100:IFCH=1THENCH=0:GOTO30
40 E=RND(1):IFE<.1THENGOSUB200
60 GOTO30
100 POKECA,32:POKE36874,128+G:G=G+1:IFG>
    35ANDRND(1)<.1THENG=-1
105 IFG>55THENG=-1
110 PRINTTAB(SR);"AA      AA":D=D+.2
120 PR=PEEK(203):IFPR<>33ANDPR<>36THEN140
130 CA=CA-1:CO=CO-1:IFPR=36THENCA=CA+2:
    CO=CO+2
140 IFPEEK(CA)=1THENGOSUB6030:GOTO3000
142 IFPEEK(CA)>1ANDPEEK(CA)<10THENGOSUB6000:
    GOTO3000
144 IFPEEK(CA)>9ANDPEEK(CA)<18THENGOSUB5000:
    SC=SC+(INT(RND(1)*3+1)*10):P=P1+1:RE
    TURN
150 POKECA,0:POKECO,0
160 X=INT(RND(1)*3)-1:SR=SR+X:IFSR=0ORSR=
    12THENSR=SR-X
170 RETURN
200 IFRND(1)<.8THEN250
210 P=INT(RND(1)*4+2+SR):CH=1
220 IFRND(1)<.5THENPRINTTAB(P)"TIBCDE"
    :RETURN
230 PRINTTAB(P)"TFGHI":RETURN
250 WH=INT(RND(1)*4+1)
255 P=SR+6:F1=SR:Z=0
260 PRINT"J":ONWHGOTO270,275,280,285
270 PRINTTAB(P)"JK":GOTO295
275 PRINTTAB(P)"L":GOTO295
280 PRINTTAB(P)"M":GOTO295
285 PRINTTAB(P)"N":GOTO295
295 IFZ>0THEN360
300 Z=0:FORL=1TO20
310 GOSUB100:Z=Z+1
330 POKE781,22-Z:POKE782,0:SYS65520
340 PRINTTAB(P)"J  "
345 IFL=1THENL=20:GOTO360
350 IFL/2=INT(L/2)ANDRND(1)<.7THENP=P-1:
    PRINT"J":ONWHGOTO270,275,280,285
355 GOTO260
360 POKE781,22:POKE782,0:SYS65520
370 NEXT
380 RETURN
1000 POKE52,28:POKE56,28:POKE51,0:CLR
1010 FORI=0TO511:POKE7168+I,PEEK(32768+I):
    NEXT
1020 FORI=1TO152
1030 READJ:POKE7167+I,J:NEXT
1040 DATA126,129,129,255,153,255,195,195,0,
    0,0,24,24,0,0,0
1050 DATA24,126,255,246,107,235,107,43,48,
    124,254,46,108,108,110,111,43,107,118,
    127,255
1060 DATA255,103,2,111,111,34,254,255,251,
    120,56,1,7,15,31,63,38,107,103
1070 DATA128,224,240,248,252,32,118,118,111
    110,63,63,31,15,7,1
1080 DATA118,54,252,252,248,240,224,128,24,
    60,60,60,126,60,24,126
1090 DATA189,189,189,126,60,102,195,102,0,
    8,28,28,15,14,14,62
1100 DATA62,126,126,97,97,225,33,30,0,28,62,
    28,28,12,28,60,92,156,156,148,148,14
    6,182,0
1110 DATA0,0,3,3,1,3,71,203,251,243,243,113,
    169,169,83,0,255,255,255,255,255,255
    ,255,255
2000 GOTO15
3000 POKE36869,240:POKE36874,0:PRINT"JDE
    YOU SCORED ";SC
3005 PRINT"JIN ABOUT";INT(D);"MILES
3010 PRINT"JPRESS SPACE TO PLAY AGAIN"
3020 FORDE=1TO1000:NEXT:POKE198,0:WAIT198,1
    :GETA$:IFA$<>" "THEN3020
3030 GOTO15
5000 FORX=127TO200STEP4:POKE36875,X:POKE
    36877,X+15:NEXT:POKE36875,0:POKE36877,0
5010 RETURN
6000 POKE36878,15
6010 POKE36877,245
6020 FORDE=1TO3000:NEXT
6030 POKE36878,15:POKE36877,220:FORL=15TO0
    STEP-1:POKE36878,L:FORM=1TO200:NEXTM
6035 POKE36879,INT(RND(1)*245)+10:NEXTL
6040 POKE36877,0:POKE36878,0:POKE36879,127
6050 RETURN
    
```

Death Race
by J Vanderslims

Tank Battle

on Spectrum

The program is a Tank Battle-type game in which two players battle against each other to score 15 points. The program is structured as follows:

Program notes

10 Defines the graphics
25 Outputs the screen display and sets up an array to contain the positions of the obstacles
80 Starts the main loop in which the direction and whether or not a missile has been launched is determined for each tank.

500 Starts the subroutine to output tank one
600 Starts the subroutine to output tank two
700 Starts the subroutine to output any fired missiles. Also in this subroutine there are checks to see if an enemy tank, an obstacle or a wall have been hit
1500-1570 Outputs the instructions for the program
1700-1750 Contains the routine for the option to re-run the program

```

1 REM *****
2 REM ***** © G.CYLFH *****
3 REM ***** MAY 1983 *****
4 REM *****
5 LET FIR=0: LET SHO=0: LET D
I=0: LET PO=0: LET DIR=0: LET PO
I=0
7 LET SCORE1=0: LET SCORE2=0
8 DIM F(21,32)
9 GO SUB 1500
10 FOR G=1 TO 6: READ A$: FOR
I=0 TO 7: READ D: POKE USR A$+I,
D: NEXT I: NEXT G
20 BORDER 5: PAPER 4: INK 0: C
LS
25 FOR K=0 TO 31: PRINT AT 0,K
INK 6;"█": NEXT K
30 FOR I=1 TO 160: READ D,E: P
RINT AT D,E;"█": LET F(D,E+1)=1:
NEXT I
70 LET A$="I": LET B$="I": LET
X=3: LET Y=11: LET U=11: LET W=
28: PRINT AT Y,X;"I": AT U,W: INK
1;"I"
79 PRINT AT 0,0: PAPER 6:"PLAY
ER 1": AT 0,21:"PLAYER 2"
80 PRINT AT 0,9: SCORE1: AT 0,30
: SCORE2: LET A=X: LET B=Y
81 IF SCORE1>=15 THEN FOR G=1
TO 100: NEXT G: PRINT AT 10,5: I
NK 2: FLASH 1:"PLAYER 1 IS THE W
INNER": GO TO 1700
82 IF SCORE2>=15 THEN FOR G=1
TO 100: NEXT G: PRINT AT 10,5: I
NK 2: FLASH 1:"PLAYER 2 IS THE W
INNER": GO TO 1700
85 LET X$=("1" AND (IN 63486=2
47 OR IN 63486=243))+("2" AND IN
64510=247))+("3" AND IN 64510=25
1))+("4" AND IN 65022=251)
95 IF X$="3" THEN LET X=X-1: L
ET A$="I": LET DI=3: IF FIR=0 TH
EN LET DIR=3
97 IF X$="2" THEN LET X=X+1: L
ET A$="I": LET DI=2: IF FIR=0 TH
EN LET DIR=2
98 IF X$="1" THEN LET Y=Y-1: L
ET A$="I": LET DI=1: IF FIR=0 TH
EN LET DIR=1
99 IF X$="4" THEN LET Y=Y+1: L
ET A$="I": LET DI=4: IF FIR=0 TH
EN LET DIR=4
100 LET C=U: LET D=W
105 LET Y$=("1" AND (IN 61438=2
54 OR IN 61438=252))+("2" AND IN
49150=253))+("3" AND IN 57342=25
3))+("4" AND IN 57342=254)
121 IF Y$="1" THEN LET U=U-1: L
ET B$="I": LET PO=1: IF SHO=0 TH
EN LET POI=1
122 IF Y$="2" THEN LET U=U+1: L
ET B$="I": LET PO=4: IF SHO=0 TH
EN LET POI=4
123 IF Y$="3" THEN LET W=W-1: L
ET B$="I": LET PO=3: IF SHO=0 TH
EN LET POI=3
124 IF Y$="4" THEN LET W=W+1: L
ET B$="I": LET PO=2: IF SHO=0 TH
EN LET POI=2
140 GO SUB 500
145 GO SUB 600
150 LET FI=IN 63486=251 OR IN 6
3486=243
151 LET SH=IN 61438=253 OR IN 6
1438=252
155 IF FIR=0 THEN LET FIR=FI: L
ET X1=X: LET Y1=Y
156 IF SHO=0 THEN LET SHO=SH: L
ET U1=U: LET W1=W
160 IF (FIR<>0) OR (SHO<>0) THE
N GO SUB 700: GO TO 190
190 GO TO 80
500 IF X<=0 THEN LET X=0
510 IF X>=31 THEN LET X=31
520 IF X>=31 THEN LET X=31

```

```

530 IF Y<=1 THEN LET Y=1
540 IF Y>=21 THEN LET Y=21
550 IF F(Y,X+1)=1 OR (X=W AND Y
=C) THEN LET X=A: LET Y=B
555 IF Y<>A OR X<>B THEN PRINT
AT B A;" "
560 PRINT AT Y,X: INK 2:A$
565 BEEP .01,0
570 RETURN
600 IF W<=0 THEN LET W=0
610 IF W>=31 THEN LET W=31:
620 IF U<=1 THEN LET U=1
630 IF U>=21 THEN LET U=21
640 IF F(U,W+1)=1 OR (U=Y AND W
=X) THEN LET U=C: LET W=D
650 PRINT AT U,W: INK 1:B$
655 BEEP .01,0
660 IF U<>C OR W<>D THEN PRINT
AT C,D;" "
670 RETURN
700 FOR G=1 TO 3
701 IF FIR=0 THEN GO TO 670
702 LET Y2=Y1: LET X2=X1
710 IF DIR=1 THEN GO TO 750
720 IF DIR=2 THEN GO TO 760
730 IF DIR=3 THEN GO TO 770
740 IF DIR=4 THEN GO TO 780
750 LET Y1=Y1-1: GO TO 790
760 LET X1=X1+1: GO TO 790
770 LET X1=X1-1: GO TO 790
780 LET Y1=Y1+1
790 IF X1>31 THEN PRINT AT Y1,0
1: INK 2: FLASH 1:"X": LET X1=31
: LET FIR=0: PRINT AT Y1,X1;" "
BEEP .01,-10
800 IF X1<0 THEN PRINT AT Y1,0:
INK 2: FLASH 1:"X": LET X1=0: L
ET FIR=0: PRINT AT Y1,X1;" " BE
EP .01,-10
810 IF Y1>21 THEN PRINT AT 21,X
1: INK 2: FLASH 1:"X": LET Y1=21
: LET FIR=0: PRINT AT Y1,X1;" "
BEEP .01,-10
820 IF Y1<1 THEN PRINT AT 1,X1:
INK 2: FLASH 1:"X": LET Y1=1: L
ET FIR=0: PRINT AT Y1,X1;" " BE
EP .01,-10
821 IF X=X2 AND Y=Y2 THEN GO TO
826
824 IF FIR=0 THEN GO TO 670
825 PRINT AT Y2,X2;" "
826 PRINT AT Y1,X1;" "
830 IF F(Y1,X1+1)=1 THEN PRINT
AT Y1,X1:"X": LET FIR=0: LET F(Y
1,X1+1)=0: PRINT AT Y1,X1;" " B
EEP .01,-10
840 IF Y1=U AND X1=W THEN PRINT
AT Y1,X1: FLASH 1: INK 2:"X": L
ET FIR=0: LET SCORE1=SCORE1+1: B
EEP .01,50
845 IF U1=Y1 AND W1=X1 THEN PRI
NT AT Y1,X1: INK 2: FLASH 1:"X":
LET SHO=0: LET FIR=0: PRINT AT
Y1,X1;" " BEEP .01,-10
850 IF FIR=0 THEN GO TO 670
870 IF SHO=0 THEN GO TO 1070
880 LET U2=U1: LET W2=W1
890 IF POI=1 THEN GO TO 930
900 IF POI=2 THEN GO TO 940
910 IF POI=3 THEN GO TO 950
920 IF POI=4 THEN GO TO 960
930 LET U1=U1-1: GO TO 970
940 LET W1=W1+1: GO TO 970
950 LET U1=U1-1: GO TO 970
960 LET U1=U1+1
970 IF W1>31 THEN PRINT AT U1,0
1: INK 2: FLASH 1:"X": LET W1=31
: LET SHO=0: PRINT AT U1,W1;" "
BEEP .01,-10
980 IF W1<0 THEN PRINT AT U1,0:
INK 2: FLASH 1:"X": LET W1=0: L
ET SHO=0: PRINT AT U1,W1;" " BE
EP .01,-10
990 IF U1>21 THEN PRINT AT 21,W
1: INK 2: FLASH 1:"X": LET U1=21

```


MICROTALKER

Speech synthesiser for the

ORIC and BBC

Now you can make your ORIC or BBC speak any word, phrase or sentence using the NEW MICROTALKER.

CHECK THESE FEATURES-

- Unlimited vocabulary: By using allophones, (the basic sounds of speech, 64 of which are available) any English word can be constructed and spoken and you don't have to be a linguist to use the it.
- Simple to program in BASIC. Spoken output can easily be built into all sorts of programs from games to control and educational programs.
- Realistic speech: By using allophones with added inflection highly comprehensible speech can be produced.
- Plugs into USER port on the BBC and printer port on the ORIC-1 thus leaving the main output busses free for other peripherals eg disc drives etc., Uses standard BASIC printer commands on the ORIC-1 thus no special machine code is required to drive the printer port.
- Uses very little memory, most words only require 4 - 10 bytes each.
- No hidden extra's to buy, ie NO extra ROMs, dealer upgrades or special interfaces required.
- Built in amp, volume control and speaker
- Output to HI-FI through 5 pin DIN socket
- Comprehensive 17 page instruction manual including over 170 example words plus 2 demonstration and development programs on cassette FREE!
- Applications include: Games, Education, Warning systems, Aids for the blind or disabled, General communications, Robotics, VDU assistance. In fact were ever a spoken output is preferred or required.

All this for the amazing price of only

£ 39.95 + 95p p&p + VAT (£47.00 inc)

Don't delay ORDER NOW. Make cheques or P/Os payable to:

R.P.S ELECTRONICS

DEPT PCW, UNIT C200, SALTAIRE WORKSHOPS
ASHLEY LANE, SHIPLEY, WEST YORKSHIRE. BD17 7SR.
TEL. (0274) 588310.

Phone or send SAE for details.

CALPAC EDUCATIONAL SOFTWARE

CALPAC LEARNING SERIES

Age: 6 Years Upwards

16K or 48K

SPECTRUM

Programs include:

- Tens and Units Addition • Tens and Units Subtraction • Picture Plotter
- North American Indians • Multiplication Tables • The Romans • Spelling Tester • Homophones • Nouns, Verbs, Adjectives and Adverbs • Verb Practice • The Structure of the Flower • Long Division

- ▶ Moving colour graphics and sound
- ▶ Detailed correction sequences
- ▶ Spelling checkers and "help" call-up facilities
- ▶ Adaptable for insertion of your own work, a 48K Spectrum will allow the insertion of over 200 questions and answers
- ▶ Feed in your own information and check English, French or Latin spellings
- ▶ Draw pictures, maps or diagrams

CALPAC CHEMISTRY SERIES

O-LEVEL

Revision tutorial programs, with detailed correction sequences

Please come and visit us on STAND 140, Hall A, Lower Level, at the:



BRITAIN'S No.1 MICROCOMPUTING SHOW
28 SEPTEMBER-2 OCTOBER 1983
BARBICAN CENTRE, CITY OF LONDON
Sponsored by Personal Computer World

Details of our software may be obtained by writing to:

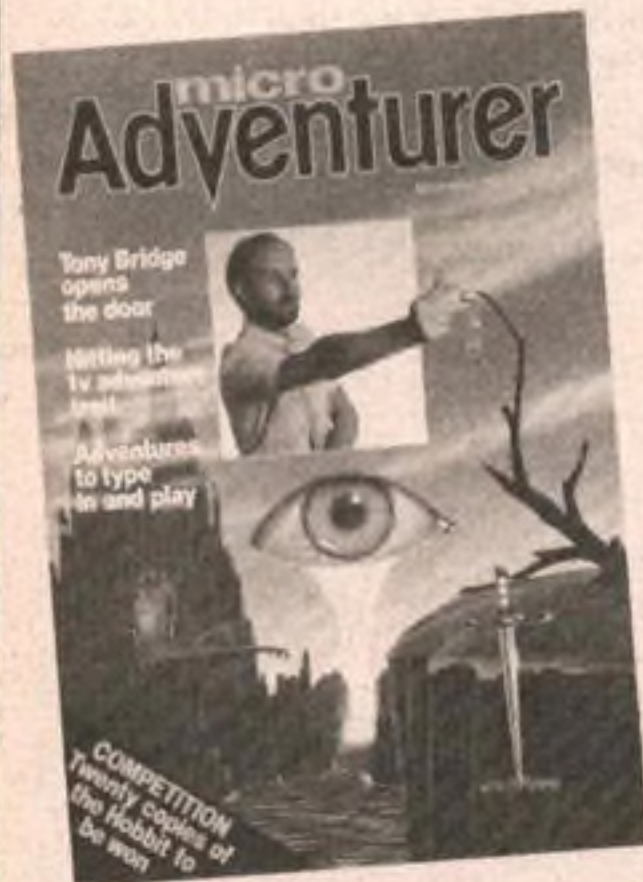
CALPAC COMPUTER SOFTWARE

108 Hermitage Woods Crescent
St Johns, Woking, Surrey GU21 1UF
or by telephone: 048 67 2584

We have demonstration programs available for retailers

We would like to hear from good programmers, graduates and teachers who would like to help with the expansion of our range on the Spectrum, BBC Model B and other machines. Thank you.

INTRODUCING



If you've ever been killed by the evil goblin, flamed by a dragon or turned to stone by a wizard, then *Micro Adventurer* is the magazine for you. Each issue is packed with stimulating features, such as advice on how to write your own adventures, reviews of the latest games, help for those in need and adventures to type in and play.

And if you want to make the most of your Commodore computer, you need *Commodore Horizons*. Each issue features: competitions with £200 in prizes, pages of program listings, in-depth hardware evaluations and reviews of the latest software.

Micro Adventurer will be launched in October, followed by *Commodore Horizons* in November. And you can get your first copy free by subscribing now. For only £10, 13 issues of either magazine will be mailed to you direct — the normal rate is £10 for a year's subscription (12 issues).



Fill in this form and send it to **Micro Adventurer, Subscription Department, 12/13 Little Newport Street, London WC2R 3LD** — along with a cheque or postal order made payable to **Micro Adventurer**. The special UK subscription rate is £10 for 13 issues, overseas it is £16.

Name:

Address:

Signature:

Date:

Fill in this form and send it to **Commodore Horizons, Subscription Department, 12/13 Little Newport Street, London WC2R 3LD** — along with a cheque or postal order made payable to **Commodore Horizons**. The special UK subscription rate is £10 for 13 issues, overseas it is £16.

Name:

Address:

Signature:

Date:

Time

on ZX81

Frequently, when designing electronic circuits, a time delay has to be calculated. This can be tedious if the time has to be converted into hours, minutes and seconds and the conversion has to be repeated several times.

This short program for the expanded

ZX81 utilises the ZX81's string handling capabilities in order to calculate the time, frequency, time in hours, minutes and seconds from the values of resistance and capacitance entered as they would be written.

The resistance and capacitance can be entered as 220K and 33N rather than converting to 220,000 ohms and 0.000000033 farads respectively. Also resistances can be entered as a calculation;

for example several resistors in parallel. This also applies to capacitors. These features can be by-passed and the resistances and capacitance entered as 150,000 ohms, etc.

The prefix and time conversions can easily be changed to different units, for example, the time could be extended to days. The print statements could be reduced so that the program will run on the 1K ZX81.

```

5 REM J. MOULDER, NOVEMBER 1982
10 PRINT "ENTER TIME CONSTANT"
20 INPUT A
30 PRINT "ENTER RESISTANCE (OHM
5) "
40 INPUT B$
50 PRINT "INPUT CAPACITANCE (FA
RADS) "
60 INPUT C$
70 IF B$(LEN B$)="M" THEN LET
B=VAL B$(1 TO (LEN B$-1))*1E6
80 IF B$(LEN B$)="K" THEN LET
B=VAL B$(1 TO (LEN B$-1))*1E3
90 IF B$(LEN B$)<>"M" AND B$(L
EN B$)<>"K" THEN LET B=VAL B$
100 IF C$(LEN C$)="U" THEN LET
C=VAL C$(1 TO (LEN C$-1))*1E-6
110 IF C$(LEN C$)="N" THEN LET
C=VAL C$(1 TO (LEN C$-1))*1E-9
120 IF C$(LEN C$)="P" THEN LET
C=VAL C$(1 TO (LEN C$-1))*1E-12
130 IF C$(LEN C$)<>"U" AND C$(L
EN C$)<>"N" AND C$(LEN C$)<>"P"
THEN LET C=VAL C$
140 LET D=A*B*C
150 LET F=INT (D/3600)
160 LET G=((D/3600)-F)*60
170 LET H=(G-INT G)*60
200 CLS
210 PRINT AT 0,0;"TIME CONSTANT
":A
220 PRINT AT 1,0;"RESISTANCE:";
B$;" OHMS"
230 PRINT AT 2,0;"CAPACITANCE:"
;C$;" FARADS"
240 PRINT AT 3,0;"FREQUENCY:";1
/D;" HZ"
250 PRINT AT 4,0;"TIME:";D
260 PRINT AT 5,0;F;" HOURS"
270 PRINT AT 6,0;INT G;" MINUTE
S"
280 PRINT AT 7,0;INT H;" SECOND
S"
290 PRINT AT 9,0;"ANOTHER RUN?"
300 INPUT I$
310 IF I$="N" THEN STOP
320 CLS
330 GOTO 10
    
```

Time
by J Moulder

Doily

on Dragon

This program draws a doily-like shape with various numbers of nodes (corners). Other adaptations give different patterns and shapes as listed below.

Line 20: This line dimensions the arrays that will hold the horizontal and vertical positions of the nodes.

Lines 40 to 80: These lines collect the details of the shape's size, colour, and

number of nodes.

Line 90: This line gives variable D the number of degrees between each node from the centre of the screen (128,96), and puts the screen high-resolution mode 3.

Lines 100 to 120: These lines make sure the pattern is drawn on a contrasting background.

Lines 140 to 160: These lines set up the position of each node (150 the vertical position, 160 the horizontal position), and place a dot in its place.

Line 170: This line increases the angle

variable to separate the nodes.

Lines 200 to 220: These lines draw the design on to the screen.

Lines 230 to 240: These lines hold the pattern on the screen until the space bar is pressed.

Variations	Description
Variation 1. 195 CIRCLE(128,96),R,C	
Variation 2. 195 LETB = S/2 200 FOR A = 1 TO S 220 NEXT A	Peacock
Variation 3. 200 FORA = 1 TO S:LETB = 1 + A 205 IF A = S THEN LETB = 1 220 NEXT A	Outline
Variation 4. 205 IF B = A + 1 THEN GOTO 220 207 IF A = 1 AND B = S THEN GOTO 220	Star

```

10 REM PATTERNS BY J. BURR
20 DIMD(360):DIMA(360)
30 CLS
40 INPUT"RADIUS OF THE SHAPE (MAX 96)";R
50 IFR>96THENGOTO40
60 INPUT"COLOUR OF THE LINES (1 TO 4)";C
70 IFC>4ORC<1THENGOTO60
80 INPUT"NO. OF SIDES";S
90 LETD=360/S:Pmode3,1
100 IFC>2THENPCLS2
110 IFC<3THENPCLS4
120 SCREEN1,0
130 FORA=1TOS
140 LETD(A)=96-(R*(COS(D*6.2831853/360)))
150 LETA(A)=128-(R*(SIN(D*6.2831853/360)))
160 PSET(A(A),D(A),C)
170 LETD=D+(360/S)
180 NEXTA
190 COLORC,2
200 FORA=1TOS:FORB=A TOS
210 LINE(A(A),D(A))-(A(B),D(B)),PSET
220 NEXTB,A
230 IFINKEY#<>" "THENGOTO230
240 GOTO30
    
```

Doily
by Joseph Burr

EAT YOUR HEART OUT GEORGE LUCAS!

ASSASSIN SOFTWARE

(in collaboration with Buccaneer)

Presents

USURPER

In versions for the 16K or 48K Spectrums featuring conflict, gambling and The Unge. Plus game map and rules for Board Game option

THE FIRST MULTI-PLAYER ADVENTURE GAME

1-10 (48K) or 1-4 (16K) players wade through the gamut of Beasts, Men and Monsters! Amass your forces and wealth. Seek the aid of powers temporal and spiritual (but beware the Undead). Attack and weaken the other players if you get the chance. When you are strong enough the time comes to overthrow the King or be crushed by his Army!

The first part of a trilogy



£6.50 P&P incl

Cheque POs payable to Town Nathan

10 ASH ROAD, LEEDS 6

Tel Leeds 744235

ASTROLOGY

truly AVAILABLE AT YOUR FINGERTIPS

USER PROMPTING PROGRAMS: merely key in birth information as requested by the computer — READ OUT (and/or PRINT OUT) what is normally the result of many hours of painstakingly tedious and complex mathematical calculations using tables, ephemeris, etc.

THE SIDEREAL TIME OF BIRTH.
THE ASCENDANT AND MIDHEAVEN in Sign, Degrees, Minutes and Seconds for EQUAL HOUSE SYSTEM.
THE SIGNS AND POSITIONS OF THE HOUSE CUSPS in Sign, Degrees, and Minutes for the PLACIDEAN SYSTEM.
THE SUN AND MOON POSITIONS in Sign, Degrees, Minutes and Seconds.
ALL THE PLANETS' POSITIONS in Sign, Degrees and Minutes.
THE LUNAR NODE — THE PART OF FORTUNE — THE VERTEX AND A HOST OF OTHER BIRTHCHART INFORMATION AT THE TOUCH OF A KEY.

ZX81 16K

ZODIAC I ONLY £10.00

ZODIAC II ONLY £8.00

GIVES YOU THE ASPECTS AND MIDPOINTS

FOR 48K SPECTRUM AND DRAGON 32

ZODIAC F

Full combined program on one cassette

FOR ONLY £15.00

Other programs in course of preparation include: PROGRESSING THE HOROSCOPE; RECTIFICATION OF THE BIRTH TIME, etc.

Send orders with cheque payable to:

STELLAR SERVICES

8 FIR TREE VALE, LEEDS LS17 7EY

Tel: (0532) 692770

Northern Computers

THE COMPUTER CENTRE OF THE NORTH

THE showroom for all the leading micros



easy parking off the M56 (junc 12) • VIC 20 • VIC 64
• BBC micros • Newbrain • Acorn Atom • Books
• Apple 11e, 111 • Dragon • Electron • Games
• Sinclair Spectrum, *

Secondhand computers • EASY PAYMENTS
ALL ACCESSORIES SALES AND SERVICE •

northern computers Churchfield Road,
FRODSHAM
Cheshire WA6 6RD

TEL: FRODSHAM (0928) 35110

WE WILL PURCHASE AND PUBLISH YOUR PROGRAMS. Call Steve Rhodes for details



STAR SOCCER



The ACTION game with the thrills of real football

Choose your team formations from 3-2-5, 4-2-4, or -4-4-2. When the game starts it's up to you to plan your moves and outwit your opponents. See the results played out by fast machine code routines on a birds-eye view of the pitch.

Make the split second decisions that the professionals have to!

Shall I make the short safe pass and maybe let the defence re-group?
Or do I try a long defence-splitting ball and risk an interception?
Has my winger got the speed to take on the full back and beat him?
Do I try a long shot and catch the goalie off his line?
Or shall I give the ball to a team-mate in a better position?

The more games of "Star Soccer" that you play, the more skillful you will become. You'll learn how to set up the goal-scoring opportunities, and how to get yourself out of tight corners. You'll develop your own style of play and find out which formation suits you best.

Side 1 features a SUPER LEAGUE competition between 8 top British sides. Aberdeen, Aston Villa, Celtic, Liverpool, Manchester United, Rangers, Spurs and West Ham. 28 games in all and the League Table is automatically maintained for you.

Side 2 replays the WORLD CUP finals. It's a knock-out competition between England, Scotland, N. Ireland, Italy, West Germany, France, Brazil and Argentina. Lots of excitement with sudden-death extra time in drawn games.

It's amazing how so much is packed into 16K!

Available for ZX Spectrum and ZX81
(Please state which machine when ordering) ONLY £5.95

Watson Software Services Ltd. (Dept. F1)

1, Ivy Cottages, Long Road West, Dedham, Essex CO7 6EL

Trade enquiries welcome.



OPEN FORUM

Jungle Picture

on Dragon

This program shows a native playing a drum. Sitting patiently beside him is his

dog. I wrote the program to show that the Dragon can produce good animation, without having to use *Get* and *Put*. The program works by drawing up one picture, and then drawing another one. Although only three pictures are used, the effect is

still pretty good.

Variables used

B\$ Draws the drum
T\$ Draws dog in first position
T1\$ Draws dog in second position
G\$ Draws the ground and shrubs

```

10 REM *****
20 REM * ANDREW PIDGEON *
30 REM * 6/4/83 *
40 REM * GRAPHICS DEMO *
50 REM *****
60 CLS
70 PRINT@166, "THE DRUMMING NATIVE"
80 PRINT
90 PRINT@238, "BY"
100 PRINT@296, "ANDREW PIDGEON"
110 FOR DLAY = 0 TO 5000 : NEXT
120 PMODE 4,1 : SCREEN 1,1 : PCLS
130 B$ = "BM110,110; R24; D10; G4; L4; D4; U4;
    L8; D4; U4; L5; H4; U10" : REM DRUM
140 T$ = "BM150,128; U1; R2; U2; L3; U2; R3; U1;
    R1; D1; R2; D1; R7; E3; G3; D4; L11" : REM
    DOG IN POSITION 1
150 T1$ = "BM150,128; U1; R2; U3; L3; U2; R2; U1;
    R1; D1; R7; H3; F3; D5; L11" : REM DOG IN
    POSITION 2
160 G$ = "BM0,128; R20; H4; F4; U4; D4; E4; G4;
    R170; H6; F6; U6; D6; E6; G6; R236" : REM
    GROUND & SHRUBS
    
```

```

170 DRAW "BM120,96; R4; D3; L1; D2; R1; E6; H2;
    E2; F6; G2; H2; G6; D6; R2; D1; L12; U1; R2; U6;
    H6; G2; H2; E6; F2; G2; F6; R1; U2; L1; U3" :
    DRAW G$ : DRAW B$ : DRAW T$ : FOR DLAY =
    0 TO 50 : NEXT : REM DRAWS FIRST FRAME
180 PCLS : DRAW "BM120,96; R4; D3; L1; D2; R5;
    F3; E2; F2; G6; H2; E2; H3; D6; R2; D1; L12; U1;
    R2; U6; H6; G2; H2; E6; F2; G2; F6; R1; U2; L1;
    U3" : DRAW G$ : DRAW B$ : DRAW T1$ :
    SOUND RND(240),1 : FOR DLAY = 0 TO 50 :
    NEXT : REM DRAWS SECOND FRAME
190 PCLS : DRAW "BM120,96; R4; D3; L1; D2; R1;
    E6; H2; E2; F6; G2; H2; G6; D6; R2; D1; L12; U1;
    R2; U6; G3; F2; G2; H6; E2; F2; E3; R5; U2; L1;
    U3" : DRAW G$ : DRAW B$ : DRAW T$ :
    SOUND RND(240),1 : FOR DLAY = 0 TO 50 :
    NEXT : REM DRAWS THIRD FRAME
200 PCLS : GOTO 170 : REM CLEARS SCREEN
    AND FLIPS THROUGH FRAMES, PRODUCING
    THE EFFECT OF ANIMATION
    
```

Jungle Picture
by A Pidgeon

6,000 FREE TAPES TO BE GIVEN AWAY



Sunshine is giving away 6,000 software tapes — for free. All you have to do is cut out and fill in this coupon, together with the coupons in the next four issues. As soon as you have collected five coupons, post them to:

Popular Computing Weekly Tape Offer
12-13 Little Newport Street, London WC2R 3LD

But, remember you are limited to one tape per person and there is a limit of 1,000 tapes per game.

Rules

- 1) Each entry must consist of five coupons cut from the magazine
- 2) You may only order one tape per person
- 3) There is a limit of 1,000 tapes per game
- 4) No correspondence will be entered into
- 5) No employees of Sunshine Publications Ltd, or their families, will be eligible to enter



Phoenix. Swarms of robot scout birds attack you. Beautiful eggs magically appear, then hatch into deadly Phoenix war birds. Can you survive to face the heavily guarded flagship?

- 5 screens • 5 skill levels • demonstration mode
- full sound effects • music • flapping birds
- Kempston & AGF joystick compatible • 100% mvc

ONLY **£5-50**

for any 16k or any 48k
ZX SPECTRUM

DEALER ENQUIRIES WELCOME

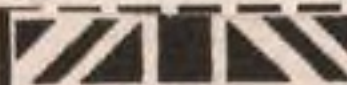
send cheque/P.O. to

Megadodo Software

16 White Road

Sutton Coldfield

W. Midlands B72 1ND



Britannia Software

THREE NEW GAMES TITLES FOR THE 48K SPECTRUM

HOME RUNNER Machine Code Arcade game. Can you survive and get HOME alive in this all action, musical game? RRP £4.95

STOMPING STAN Machine Code Arcade action. Help STAN THE MAN collect his keys to the next card in this highly addictive game RRP £4.95

GRAND PRIX DRIVER is a 3D, full machine code Formula One racing car game. Can you reach the chequered flag ahead of the field? Excellent colour and graphics RRP £6.95

All the above are Joystick (Kempston) Compatible.
Cheques/POs payable to 'Britannia Software'. Prices inc p&p and VAT.

CARDIFF CF2 4EE
Tel: 0222-25803



YAHTCEE . . . This traditional dice is for one or more players and features superb graphics to enhance your enjoyment. YAHTCEE is Fascinating, Absorbing and Challenging.

SPECIAL OFFER

Order YAHTCEE today for only £7.95 incl. and get a 10-game cassette FREE



30 KINGSCROFT COURT
BELLING, NORTHAMPTON

TICK BOX FOR YOUR REQUIREMENT

YAHTCEE	COM 64	SPECTRUM 48	DRAGON 32
NAME			
ADDRESS			
ENCLOSED TOTAL SUM			

VIC20

32K SWITCHABLE TO 3K, 16K, 24K, BLOCK 5

£49.95 inc. VAT

16K SWITCHABLE TO 3K

£34.95 inc. VAT

16K STANDARD

£27.95 inc. VAT

All units guaranteed 2 years. Add £1 P&P. Overseas orders add £3 P&P. Telephone your Access or Visa card number for despatch by return post, or send your cheque/POs to:

RAM ELECTRONICS (FLEET) LTD.,

(DEPT. WM)
106 FLEET ROAD, FLEET, HANTS GU13 8PA
Telephone (02514) 5858
Callers welcome Monday to Saturday
Half day Wednesday
Trade Enquiries Welcome

NOW! THE BEST RANGE of SOFTWARE for HOME MICROS

EXTENSIVE COMPUTER DEPARTMENT for Games, Education, Business and Utilities Programs.

NOW IN STOCK:

Vast Number of Titles for
ATARI 400/800 · SPECTRUM
ZX 81 · BBC MICRO · VIC 20
DRAGON · COMMODORE 64
APPLE · ORIC · TEXAS T199
LYNX *Expert staff will advise.*



Send NOW for FREE MAIL ORDER

BBC micros · Newbrain · Acorn Atom · Books
Apple 11e, 111 · Dragon · Electron · Games
Sinclair Spectrum, *

Secondhand computers · EASY PAYMENTS
ALL ACCESSORIES SALES AND SERVICE

northern computers Churchfield Road,
FRODSHAM
Cheshire WA6 6RD

TEL: FRODSHAM (0928) 35110

WE WILL PURCHASE AND PUBLISH YOUR PROGRAMS. Call Steve Rhodes for details

UPGRADE YOUR SPECTRUM to 48k

with an EASY TO FIT DELTA-RAM KIT

SPECTRUM

1 £33

SPECTRUM

2 £26

Each kit contains step by step instructions for easy, trouble-free installation within your Spectrum case. Prices include p. & p. and V.A.T.

FREE with every order the UNIQUE

Manchester United, Rangers, Spurs and West Ham. 28 games in all and the League Table is automatically maintained for you.

Side 2 replays the WORLD CUP finals. It's a knock-out competition between England, Scotland, N. Ireland, Italy, West Germany, France, Brazil and Argentina. Lots of excitement with sudden-death extra time in drawn games.

It's amazing how so much is packed into 16K!

Available for ZX Spectrum and ZX81
(Please state which machine when ordering) ONLY £5.95

Watson Software Services Ltd. (Dept. F1)

1, Ivy Cottages, Long Road West, Dedham, Essex CO7 6EL

Trade enquiries welcome.



Spectrum PROGRAMMABLE JOYSTICK INTERFACE

- ★ REVOLUTIONARY NEW CONCEPT
- ★ PHYSICALLY MICRO DRIVE COMPATIBLE
- ★ UNIQUE "WIZARD" PROGRAM CARD

SPECIAL FEATURES:

- NO software involved
- NO trailing wires
- NO crocodile clips
- 8 directions + fire
- 2 players
- Take any ATARI type joystick, ie: competition pro-Commodore — Starfighter — Quick Shot — Joy Sensor, etc . . .

● **TOTALLY** compatible with **ALL** software this interface brings **ARCADE ACTION** in seconds!

To add joystick action to **ALL** your GAMES simply plug the interface on to your Spectrum edge connector, set its unique "plug-in" program card and you are ready to bring full life out of your software.

Once easily set for your favourite game, using the quick programming chart, the card (reprogrammed in seconds if required) can be kept with your software. Ready for use at any time.

No reprogramming, messing around with wires or clips needed.

Supplied with: Program Cards and quick programming chart

PLEASE MAKE CHEQUES/POs PAYABLE TO:

WIZARD PRODUCTS
PO BOX 25, LEIGHTON BUZZARD,
BEDS LU7 7NE

DEALER ENQUIRIES WELCOME



ONLY
£26.35
+ £1.00 p&p

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, using allophone-type, dedicated speech chip
- Approximately 250 words predefined; accessed by entering word required
- Complete control using five 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 over five octaves — easy to use via BASIC — built-in sound effects — music and graphics can occur simultaneously — two I/O ports — user manual — **ONLY £34.95** inclusive

ACCESS/Cheque/PO to:

J.C.B. (MICROSYSTEMS)

29 Southbourne Road, Bournemouth, BH6 5AE
Tel: (0202) 423973

Write or phone for further details

PHEENIX



(screen 5)

You are in command of the star-destroyer Phoenix. Swarms of robot scout birds attack you. Beautiful eggs magically appear, then hatch into deadly Phoenix war birds. Can you survive to face the heavily guarded flagship?

- 5 screens • 5 skill levels • demonstration mode
- full sound effects • music • flapping birds
- Kempston & AGF joystick compatible • 100% m/c

ONLY **£5.50**

for any 16k or any 48k
ZX SPECTRUM

DEALER ENQUIRIES WELCOME

send cheque/P.O. to

Megadodo Software

16 White Road

Sutton Coldfield

W. Midlands B72 1ND

THE



RUN

IS COMING



Trade
enquiries
welcome

**BRITANNIA SOFTWARE
CO LTD**

116 Woodville Road
CARDIFF CF2 4EE
Tel: 0222-25803

Britannia Software

THREE NEW GAMES TITLES FOR THE 48K SPECTRUM

HOME RUNNER Machine Code Arcade game. Can you survive and get HOME alive in this all action, musical game? RRP £4.95

STOMPING STAN Machine Code Arcade action. Help STAN THE MAN collect his keys to the next card in this highly addictive game RRP £4.95

GRAND PRIX DRIVER is a 3D, full machine code Formula One racing car game. Can you reach the chequered flag ahead of the field? Excellent colour and graphics RRP £6.95

All the above are Joystick (Kempston) Compatible.
Cheques/POs payable to 'Britannia Software'. Prices inc p&p and VAT.

ASSEMBLY LANGUAGE PROGRAMMERS

We urgently require 30 Assembly Language Programmers conversant with one or more of 6502 Z80 6809.

Applicants must be prepared to work full-time in Liverpool and will be remunerated well.

Application by phone or in writing to
Tim Best,
Imagine House,
5 Sir Thomas Street, Liverpool.
Tel: 051-236 8100.



Self Adhesive Cassette Labels

- ★ **CASSETTE LABELS ON ROLLS** - Complete with tractor feed perforations to allow them to be printed in most modern computer printers. Now you can have 'Instant' labels, exactly when you need them! Minimum order 500 labels - £11
- ★ **Cassette labels on sheets** - 15 labels per sheet. These labels are suitable for rapid application by hand to cassettes and can easily be printed by any local instant print shop. They are also ideal for use in typewriters or word processors. Minimum order 100 labels - £3.50
- ★ **SMALL COMPUTER LABELS** - Many micro computer users are finding that they are able to provide a unique and profitable service to businesses in their locality. We manufacture a wide range of small computer labels at very attractive prices. They are used for so many purposes that it is difficult to list them, but price changing, tagging, coding and marking are some examples.

NEW - Sampler pack of all of our different types of label - £20.

All the above prices include VAT & carriage. Excellent quantity discounts.
PLEASE SEND 16p STAMP FOR PRICE LISTS AND SAMPLE LABELS.

Industrial
Process
SELF ADHESIVE
LABELS

Superfast

Unit A4
Smeed-Dean Centre
Eurolink Ind. Estate
Sittingbourne
Kent ME10 3RN

Sittingbourne (0795) 28425 (24 Hrs.)

VCS ATARI 400/800 Vic20 • PHILIPS INTELLIVISION CARTRIDGE LIBRARY

AUTHORISED DEALER

- All the latest games
- Fast reliable service
- Life membership now £10
- Descriptive catalogue
- Fortnightly or monthly hire
- p&p inc. in hire charges
- Discounts on purchases for members (hardware and software)

HIRE CHARGES: 2 WKS £3.00 — 4 WKS £5.00

JOIN NOW ON MONEY BACK APPROVAL
OR SEND SAE FOR DETAILS

To: MDM, HOME COMPUTER SERVICES, DEPT 5
20 NAPIER STREET, NELSON, LANCS BB9 0SN



The best books for the Dragon 32



The Working Dragon 32

A library of practical sub-routines and programs. ISBN: 0 946408 01 7

- "There clearly is a need for books of this kind which provide more than just games" — *Practical Computing*, Sept 1983.
- "It's a good one" — *Personal Computer News*, May 20 1983



The Dragon Trainer

Written as a combined manual and beginners course on the power of Dragon Basic. It is aimed at the beginner and assumes no previous experience of computing. ISBN: 0 946408 09 2

Plus Sunshine Software



Cruising

Quick thinking and dexterity are required to master this high speed chase game.

Look out for the Sunshine range in W.H. Smith's, Boots, John Menzies, other leading retail chains and through our national network of bookshops and specialist stores.

Dealer enquiries:
01-734 3454.

Dragon 32 Games Master

Learn how to write your own top level games. ISBN: 0 94068 03 3

- "If you can't write a half way decent game after this then it will be down to your own lack of imagination. I would recommend the Brains book as the best of this selection." *Which Micro* — Sept 83

Advanced Sounds & Graphics for the Dragon Computer

All the major aspects of the sound and graphics capabilities of this machine are covered in extensive detail. ISBN: 0 946408 06 8



Please send me

- The Working Dragon 32 at £5.95 each
- The Dragon Trainer at £5.95 each

- Dragon 32 Games Master at £5.95 each
- Advanced Sound & Graphics at £5.95 each
- Cruising at £6.95 each

I enclose cheque/postal order for £_____ made payable to: Sunshine Books: 12/13 Little Newport St., London WC2R 3LD

Name _____

Address _____

Signature _____

Or telephone Access Mastercard on 01-734 3454

Tony Bridge's Adventure Corner



Adventure problems

This week some more Adventures, and several problems that you may be able to help with.

I don't get many letters regarding Commodore 64 programs — this either means that there are not a lot of Adventures available for the machine, or that Commodore users are an especially cerebral lot (unless you know different . . .)! I don't know what the answer is, but Bob McClement has written to me, asking for help in *Hitch Hiker's Guide*. He can't get past the Great Green Arkleseizure! He is also having a problem in *Will o' the Wisp*, in which the Wizard sends him to sleep and transports poor old Bob to the Room of Sleeping Rocks. Is there another Commodore Adventurer who can help him out of his misery?

A little lower down the Commodore scale is the Vic20, and there is no shortage of letters about Adventures for this machine! They are almost always about the Scott Adams series and typical of these is the letter from Dr. Raymond Wheeler, of Stoke-on-Trent. His wife bought a Vic, and since then, family Wheeler has been immersed in Adventure cartridges.

The Count is the one that Dr. Raymond is currently playing — and he seems to have done quite well too. He has worked out that he needs to smoke a cigarette, and then lay down in the coffin, keeping awake with the No-Doz tablets, and keeping a supply of garlic handy. The Count proves a bit trickier to catch than that, however, and blows out the cigarette before the player can Zap him somehow. The good Doctor (Wheeler, that is!) says that the words *Stairs* and *Roof* are recognised by the program, so he knows there are locations that he has not yet seen — can anyone help him find those locations?

The Scott Adams series is also available for the Video Genie, and *Strange Odyssey* is giving S J Clark a few headaches. Is there life on the other side of the Mining Colony on Jupiter? What is the meaning of the Black Hole? Who are the Novaks? Is it possible to enter the maintenance hatch in the Scout Ship? What is this all about? Please help!

Every Vic adventurer will want to know the answer to the next question: Has Scott

Adams got any new adventures up his sleeve? Well, his company, Adventure International, as well as being modest, is also extremely rich and a powerful force on the US computer games scene (*Get rich. OK — what next?*) they have not got there by sitting on their behinds watching the world go by, and so we can safely assume that they will be working on something.

They are also producers of arcade games (the real variety!) and are the authors of "the world's first interactive war arcade game" which features sophisticated multi-screen, multi-player techniques. This is probably the reason for a long silence on the home micro front.

As to whether we shall see the *Adventureland* series implemented on other micros depends on the impact of those machines on the US micro scene — the Commodore range are the biggest sellers at the lower end of the market, which is showing some resistance to the Sinclair/Timex machine.

In a week or so I shall be looking at Adventure International and the man behind the name.

Now, another Spectrum Adventure, and help needed with *Knight's Quest*, from

3 March	<i>The Hobbit</i>	(Melbourne House)	Spectrum
24 March	<i>Perilous Swamp/Sorcerer's Island</i>	(Psion)	ZX81
17 March	<i>Ghst Encounters/Action Quest</i>	(JV Software)	Atari
28 April	<i>Knight's Quest</i>	(Phipps)	Spectrum
12 May	<i>Colossal Adventure</i>	(Level 9)	
19 May	<i>Sorcerer's Castle/Mad Martha 1</i>	(Microgen)	Spectrum
26 May	<i>The Valley</i>	(Kayde/Asp)	
9 June	<i>Volcanic Dungeon</i>	(Carnell)	ZX81/Spectrum
16 June	<i>Pharaoh's Curse</i>	(Synapse)	Atari
	<i>Journey to the Planets</i>	(JVS)	Atari
30 June	<i>Castle of Death</i>	(Electra)	
	<i>Castle of Doom</i>	(Specsoft)	
	<i>Magic Castle</i>	(Gilsoft)	Spectrum
7 July	<i>Ring of Darkness</i>	(Wintersoft)	Dragon
21 July	<i>The Hobbit (Part 2)</i>		
28 July	<i>Velnor's Lair</i>	(Quicksilva)	Spectrum
4 August	<i>Madness and the Minotaur</i>	(Dragon Data)	Dragon
18 August	<i>White Barrows</i>	(ASP)	Spectrum
25 August	<i>The Hobbit (Part 3)</i>		
And finally:			
23 June	<i>The Top Eight</i>	(in need of an up-date — let me know your top favourites)	

Phipps Associates. Several people are flummoxed right from the start in trying to deal with the Dragon. This Adventure, written by Mike Farley, is one in which the player cannot progress one inch without solving the puzzles at each location — no stumbling about, hoping to fall over the solution (and no peeking at the listing, either, it's all in indecipherable code!). However, everyone seems to want to kill the poor beast on first sight. Just be patient, you will indeed have to kill it, but later rather than sooner! For now, you should really try and make friends with it.

Other Adventurers are stuck later, having solved the problem of the Dragon. Now, I haven't had enough time to get too far in this Adventure, absorbing though it is, so I'd like to hear from anyone who has managed to finish the Quest.

Next week, I shall be looking at some more from Phipps Associates.

Many of your letters ask for a review of a certain adventure and quite often it has

already been covered in the Corner. So, for those of you who are not regular readers of *PCW*, below is a list of Adventures so far reviewed.

Let's finish on the subject of books about computer adventures. To put it simply, there are not many! Butterfield, Parker and Honigmann mention the hobby briefly in their school-fee supplementing *What Is D & D?* (Penguin), and a brief mention is also made in Ian Livingstone's *Dicing With Dragons* (RKP), but, unbelievably, the only book devoted entirely to the subject is *Creating Adventure Programs on the BBC Micro* by Ian Watt, published by Interface.

The book describes how to plan and write your own text Adventure, and includes three programs, along with hints on how to play the Adventures. As many letters I receive ask where books on the subject may be obtained, there would seem to be a demand.

The aforementioned Ian Livingstone, together with Steve Jackson (both highly-respected names in the gaming (D & D dept.) world) has produced a series of books for Puffin, which, although not computer adventure books, may well be of interest. The series begins with *The War-*

lock of Firetop Mountain, and takes the form of solo Adventures.

With the aid of two ordinary dice, and pencil and paper, the player works through the book, taking decisions at each turn of the page on where to go next. Good pictures, and a nice touch of humour, make these books rather interesting.

Finally, if you are one of the many stuck at the final gate in *Pimania*, and wondering how to open it — think about the title, and do a little mathematical cogitating . . . ■

This series of articles is designed for novice and experienced Adventurers alike. Each week Tony Bridge will be looking at different Adventures and advising you on some of the problems and pitfalls you can expect to encounter. So, if you have an Adventure you want reviewed, or if you are stuck in an Adventure and cannot progress any further, write to: Tony Bridge, Adventure Corner, *Popular Computing Weekly*, 12-13 Little Newport Street, London WC2R 3LD.



WIN THE POOLS?

48k

SPECTADRAW 2

A Pools Prediction Program for the 48K ZX Spectrum microcomputer. 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. It can then identify the matches which are likely to yield draws and output suitable predictions.

The program is supplied complete with a database tape containing data on over 7,500 matches and a comprehensive instruction manual.

For £12.95 inclusive (cheques/P.O.s payable to B. S. McAlley).
SPECTADRAW, 1 COWLEAZE, CHINNOR, OXFORD, OX9 4TD

PROGRAMMER REQUIRED

A leading South-East of England based software company, urgently require an in-house programmer to work on new product development for the home microcomputer software industry. Languages required.

Z80 ASSEMBLER 6502 ASSEMBLER

(both or either)

Short- or long-term contract considered, plus royalties.

For full details of this excellent opportunity

Telephone (0323) 768456

POOLS PREDICTION

"POOLSWINNER"

The most sophisticated Pools Prediction Aid available. Gives probabilities of score draws, draws, homes or aways, based on two databases holding over 20,000 matches (included). This season's results are provided with the package.

The databases are automatically updated as results are entered.

Can be used in simple mode, or with parameter adjustments to develop your own unique forecast method.

Fully documented, available now for Apple, Spectrum, BBC (B), Commodore 64, Dragon, ZX81 (16K) (others — please enquire).

£15.00 (discs/tapes)

"POOLSDATA"

Complete record of all English Football League matches 1978-83. Teams, scores and dates of 10,000 matches held in simple format, ready for your analysis. Starter analysis programs and full documentation included. Available for Apple, Spectrum, ZX81, BBC, Dragon, Commodore series.

Discs (5 year) £15.00. Tapes (5 year) £12.50. Tapes (2 year) £7.70.
all prices (p&p included)

SELEC SOFTWARE (PW)

37 Councillor Lane
Cheadle, Cheshire
061-428 7425



Cathedral Software

ZX81 (16K) £4.95

Cheque/P.O. to:
"The Lodge"
Brandon Lane
Brandon
Co. Durham
DH7 8SJ

SPECTRUM ONLY £5.95

TRADE ENQUIRIES WELCOME
GENEROUS DISCOUNT

© Howard Partnership

SPECIAL OFFER
Deduct £1
per cassette
when ordering
2 or more

TOP QUALITY DRAGON 32 PROGRAMS



AND ALL BECAUSE... (NEW RELEASE) £6.95

We proudly present our latest release. A totally original game with an amazing nine screens. Loosely based on a television advertisement the idea is to get the choccy's to your beloved's home before she arrives. You must risk life and limb by driving, running, horse riding, motor-cycle riding and jumping, hang-gliding, ski-ing, dangling from a ski-lift and parachuting to the scene. With superb graphics sound effects and a high-score chart, the game culminates with an excellent finishing display for those that make it. But will you?

"Impossible!" *Popular Computing Weekly*

FREE PARKING (NEW RELEASE) £6.95

The first full-feature version of the extremely popular board game available for the Dragon. A complete simulation including buying, selling, mortgaging, etc. etc. The program makes full use of the Dragon's colour facilities and incorporates some inspired graphics and sound effects. With options for 2-6 players, continually available instructions and the Dragon as banker, the game is terrific for all the family and there will be no missing £500's!

★ SUBMARINE COMMANDER £6.95

Navigate the seas to find the enemy with this high-resolution colour simulation. Engage enemy aircraft and ships who will try to torpedo and ram you. Depth charges and under-sea mines add to your problems. You are assisted by torpedoes, periscope view, radar compass, fuel and depth gauges with on-screen displays of ammunition and score. Realistic explosions and sound effects alongside identification sheet, home-coming display, hall of fame and graphic reward for beating the high-score makes this program a masterpiece. TRY IT!

★ LUNAR LANDER AND RESCUE £6.95

A brilliant two-part game. Part one is an arcade standard lander which trains you for part two. Here you must rescue lunar engineers in a tortuous cavern. Fuel dump landings and falling stalactites add to the perils of your heroic mission in one of the best Dragon programs available.

"The best version we've seen for the Dragon 32" *Dragon Dungeon*

"A challenging and well-written game" *Dragon User*

"Very good" *Dragon Data*

ALSO AVAILABLE

★ A WEEK AT THE RACES £6.95 GEOGRAPHY OF UK £6.95
★ JACKPOT £5.95 ★ BLACKJACK £5.95

★ GRAPHIC TOOLKIT £6.95

	No. 1 — Dragon Dungeon, Ashbourne, Derbyshire	
TOP FIVE DEALERS	No. 2 — Statacom, Sutton, Surrey	TOP FIVE DEALERS
	No. 3 — Ivysoft, Ivybridge, Devon	
	No. 4 — The Computer Centre, Hull, E. Yorkshire	
	No. 5 — Northampton Home Computer Centre	

B & H SOFTWARE
208 KING STREET
COTTINGHAM, HULL
Telephone 0532-744709

PLEASE NOTE

- (1) All prices are fully inclusive
- (2) Dealers always welcome
- (3) Excellent display on b/w television
- (4) We pay 25 per cent royalties for high-quality programs

HIRE ZX81/SPECTRUM PROGRAM TAPES

Make the most of your Sinclair ZX81 or Spectrum computer by hiring tapes from the original software library — NOW IN OUR SECOND YEAR with over 2,000 satisfied members!

- Over 950 tapes stocked, offering more than 130 different programs from 40 suppliers (all with their permission) — many of the best currently advertised, plus some specially commissioned — and the range is constantly updated!
- Adventure, arcade and simulation games, many business and other practical programs, utilities, graphics education and much more besides
- Descriptive list makes choice easy
- FREE quarterly, illustrated magazine includes tips from a professional programmer, DIY plans, reviews, letters, discount offers — plus our **Top 40 Tapes** chart averaged from thousands of members' scores
- Full-time staff offer you a really friendly, efficient welcome & service
- A fortnight's hire from just £1.20 including VAT and first class p/p — hire just what and when you like
- NEW! Overseas branches** now operating. **Benelux:** Jacobsmitslaan 75, B-2400 MOL, Belgium (mem. fee 44 & 49 Guilders/790 & 890 Bfr); **Elre:** Softenk, 120 South Circular Rd., Dublin 8 (£12.50 punt); **South Africa:** P.O. Box 1769, Manzini, Swaziland.
- All tapes guaranteed loadable
- You may switch from ZX81 to Spectrum at any time if you upgrade
- Don't make do with second best! Join the original and biggest library.

YOUR FIRST TAPE FREE if you use this month's coupon!

S-L The SINCLAIR OWNERS' SOFTWARE LIBRARY DEPT (PCWK)
Warren Road, Liss, Hants GU33 7DD.

SPECIAL OFFER THIS MONTH! Join using this coupon and receive your first tape hire (of our choice) FREE with your welcome package of magazine, tape catalogue, order forms etc. State main interest:.....

NAME.....

ADDRESS.....

Enclose cheque/P.O. for £7.50 for a guaranteed year's membership (ZX81) or £9.50 (Spectrum). Overseas £2 extra unless with local branch.



**PCW
BINDER**

N Hamer of Buttermere, Greenways, Spennymoor, Durham, writes:

Q I have bought *Popular Computing Weekly* since March and have found it very helpful and interesting. However, as my collection of magazines is growing rapidly, I very much need a binder of some sort to store them. Do you have anything to offer? If so, how much does it cost and where do I obtain one?

Also, my Spectrum has been acting very strangely recently and a local computer club has suggested that it could be the recent heatwave. Do you know if any other readers have had a similar problem?

A This is a problem that we do not, at the moment, have a real answer for. There are a few requests for binders, but not enough to make it worthwhile for us to get some specially made.

However, a friend has just pointed out that W H Smith carry magazine binders for 24 magazines, though apparently they are not in all branches of Smiths.

As for your question about your Spectrum, well I blamed the weather a few weeks ago when the same thing happened to me, but in all honesty, I do not know.

Continuing my policy of 'Quickies' I have been following over the last few weeks, here are some for the Spectrum.

D Marsh of Theydon Bois, wants to know how to test the size of the memory on his Spectrum. Ben Jenkins of Wallasey wants to know the same. B Walton of Whitley Bay knows the answer, but just wants to check if he is right.

You can do this either by looking at Ramtop, which is situated almost at the limit of the memory, or else by entering a *Dim* statement such as *Dim AS (1024,40)*. This asks the computer to set aside an area 40K large, which is, of course, not possible on a 16K computer.

F. Bennet, of Rotherham, Paul Slack of Burton-on-Trent, and someone whose name I cannot read from Nantwich in Cheshire all want to know where they can get a monitor for their Spectrum.

The Spectrum has a non-standard video output. The only monitor that I know of which has an additional special interface for the Spectrum is a full colour model from Microvitec. The cost is £274 + VAT and Microvitec are at Futures Way, Bolling Road, Bradford BD4 7TU.

To end with, both H Harvey of Three Bridges, and Michael Royle of Blackburn, are seeing squares on their televisions after using their Spectrums for a while. H Harvey says he has an issue one model. I wonder if Michael does as well. From your letters, I would say that your computers are crashing because of overheating. There is nothing you can really do except return them under the guarantee.

SINGLE PACKAGE

J Gurney of Saxilby near Lincoln, writes:

Q Now that the Commodore disc drive is cheaper than when it was first announced, I am thinking of getting one in a single package with my Commodore 64, to which I am treating myself within the next couple of months. I understand that it is compatible with the 64, but a few changes have to be made. What changes and is a special interface necessary?

A The Vic-1540 is an intelligent drive with its own Rom and 2K of Ram. The only change needed is with the Rom. The Vic Rom chip will have to be changed for a Commodore 64 compatible chip. It has its own 6502 chip onboard, which means it can format discs while the computer is getting on with other tasks, and of course the Dos is onboard as well.

As long as you ensure that the correct Rom is onboard, then you should have no problem, and it would make a very powerful home system to buy in one go.

DRAGON FORTH

David Freeman of Buckhouse Drive, London N16, writes:

Q I know there is a disc version of Forth for my Dragon, but I have not got a disc drive. Do you know if there is a cassette based version available somewhere?

A Oasis Software of Lower North Street, Cheddar, Somerset, produce a cassette version of Forth. It costs £18.95, and is a variant of Fig Forth. The language is on one side of the tape and a demonstration program on the other. It also includes a comprehensive manual.

OBSOLETE VIC?

A A Morris of Woodward Road, Bury, writes:

Q Please tell me I am wrong. I chose to buy a computer just a few weeks ago. So, after taking the salesman's advice and counting my pennies, I bought a Vic20 at £139.50. Since then I have heard that the top five software houses are going to stop, or have stopped writing programs for it. I was thrilled at first, but now I feel conned. Please tell me and 185,000 other Vic owners that we are not going to become an endangered species.

A I remember being flooded by similar letters when the ZX Spectrum was launched and all the ZX81 owners wanted to know whether or not they would be forgotten. That was a year ago. Anyone who went to the last ZX Microfair would know that the ZX81 is still very much alive and kicking. The reason for this, and why I expect a similar situation with the Vic, is answered in your

letter — 185,000 owners!

While I do not think that the Vic will engender the depth of response that the ZX81 has, I cannot see how the Vic can be written off. If you are happy with your computer, why worry? There are so many programs already for the Vic that I cannot envisage a software famine.

The only thing that might be worrying is what were you told by the assistant? If you were told that the Vic was the latest model, then you were misinformed.

64 COMPILER

Harry Mellish of Killearn, Scotland, writes:

Q I have had a Commodore 64 for a few months and find it much better than the Vic I used to have. I always meant to get a compiler for my Vic, but never did.

But, now I am thinking of getting one for my Commodore 64. I had pretty much decided on what to get when a friend reminded me of something we had both seen a few months ago — an optimising compiler. All I can remember was that it was for the 64 and very expensive. Do you know anything about this? I plan to keep this computer for some time, so if it is worth getting I will.

A An optimising compiler, not only compiles, but also tries to do it more efficiently. Naturally, if the code is compiled more efficiently and compactly, then it will run quicker.

The only such compiler I have seen for the Commodore 64 is Petspeed and costs £125. You were right when you said that it was expensive. However, it comes with a security 'dongle' and has a few additions to Pet Basic, in that it allows the use of long named variable, and extends the *Def Fn* to include String handling.

Petspeed can be purchased from Oxford Computer Systems, Woodstock, Oxford.

Is there anything about your computer you don't understand, and which everyone else seems to take for granted? Whatever your problem *Peek* it to Ian Beardsmore and every week he will *Poke* back as many answers as he can. The address is *Peek & Poke, PCW, 12-13 Little Newport Street, London WC2R 3LD.*

CLASSIFIED

Semi-display — £5 per single cc
Trade lineage — 20p per word
Private lineage — 10p per word

CALL DIANE DAVIS ON 01-734 2688 FOR SEMI-DISPLAY ADVERTISING

GAMES SOFTWARE



ROBOT PANIC
for your 16/48K
SPECTRUM

Big hit at the Microfair — now available to you! Zap the aliens before the walls crush your robot. £5 from retailers (ask) or direct (24-hour despatch)
Soft Mill, 20 Station Road, Madderham, Ely, Cambs. CB6 3XD

COLOUR CODEBUSTER, a brain game for the Sinclair Spectrum (16K/48K), not prettily packaged but practically priced and devastatingly difficult, just £3.95 from Crophorne Software, 117 Three Elms Road, Hereford.

TURBO, 100 per cent machine code racing agame for unexpanded Vic20 + joystick, multicolour Hi-Res graphics + sound, six levels. Send £3 to Andrew Wright, 12 Park Avenue, West Ewell, Surrey KT17 2NT.

Avalon Computing

A COMPREHENSIVE RANGE OF SOFTWARE TITLES: SPECTRUM 16K/48K, VIC20, DRAGON, ORIC, COMMODORE 64, BBC, ATARI 400/800

EG: Jet Pack (Spectrum) £5.49
Krazy Kong (Vic20) £5.99
Zoom (Spectrum) £5.49
Oric Chess, Zodiac

(RRP £9.99) £6.49 (incl VAT)

Plus 100s more titles at competitive prices. Send a large SAE for catalogue. P&P 50p per order or free for two tapes+.

AVALON COMPUTING, 14 CLIFF ROAD
HORNSEA, N. HUMBERSIDE HU18 1LL
Tel: 04012 2791

FOOTBALL MANAGER, Commodore 64, features Match commentary, league tables, 88 teams, divisional scoreboard, promotion/relegation, injuries etc and more! Only £2.99 (also on Vic20 same price. D. Spencer, 230 Lowgrange Avenue, Billingham, Cleveland.

LOVE QUIZ. For married or courting couples, test your love for each other with 2 machine code programs for 48K Spectrum, £4, inc p&p. From: Mr. K. Burton, 6 Westbourne Terrace, Barnsley, South Yorks S70 6HP.

ZX SPECTRUM SOFTWARE

We are offering 10% off one or more tapes in a range of software for the ZX Spectrum.

Telephone or SAE for list.

We are also offering Jetpac, Pssst, Trans-am and Cookie by Ultimate, Play-the-game for £5 each inclusive of postage and packing!

RULE COMPUTERS

30 Tylers Acre Road,
Corstorphine, Edinburgh,
EH12 7HZ.
Tel: 031-334 7261

★ Q-MAN ★

3D Pyramid Game for BBC B. Avoid the snake and the ball

Unique features — smart bombs and hyper-space

GREAT VALUE CASSETTE £3.95

M.R.M. SOFTWARE
17 Cross Coats Road, Grimsby
S. Humberside DN34 4QH

SPECTRUM SOFTWARE for sale or swap, Tranz-am, Terrordaktil + others. Phone (0203) 464156 after 5 pm.

SPECTRUM PROGRAMS

BACKGAMMON..... £5.95
3D VORTEX..... £5.95
3D TUNNEL..... £5.95
HEATHROW..... £7.95
NIGHT FLITE..... £5.95
GNASHER..... £4.95
ARCADIAN..... £4.95
ESCAPE..... £4.95

Many others. SAE for list
Prices including p&p

Cheque/POs crossed, payable to:
VYAJY'S H-K

11 MARGARET AVENUE
ST. AUSTELL, CORNWALL

YES, THAT'S RIGHT CAPTAIN PHOENIX!

FOOTBALL MANAGER, Vic20 8K plus, features match commentary, league table, 88 teams, divisional scoreboard, promotion/relegation, injuries etc, and more!!! Only £2.99 (also on Commodore 64, same price. D. Spencer, 230 Lowgrange Avenue, Billingham, Cleveland.

PINBALL for the unexpanded Vic20. Features, hires graphics, 3 ball speeds, 4 flippers, Hi-score, on-board scoring plus a free space game. D. Spencer, 230 Lowgrange Avenue, Billingham, Cleveland.

VIC20 (UNEXPANDED), four great games on cassette, incredible quality and value, £3.50 to A. Penrose, 20 Ponderosa, Eastmoor, Sutton-on-Forest, York YO6 1EX.

HARDWARE

'SADU' ELECTRONICS



DUAL PURPOSE ZX

SPECTRUM AMPLIFIER and POCKET RADIO

ONLY £9.95 including P&P
Mail order only 28 days delivery

from
SADU Electronics, 19 Bluebell Lane
Walsall WS6 6HG

SPECTRUM, rechargeable battery back-up unit. Allows possible 40 minutes, portability and automatic switch-over during mains failure/drop out without memory loss, £17.99. Details SAE, Marder Electronics, 26 River Close, Abingdon, Oxon.

VIC20 OWNERS! Our Rampack adaptor allows standard software to be run on your expanded system without removing the Rampack. Simply switch your extra memory on or off as needed. Prevents wear to computer Rampack terminals, £12.45 inc. p&p. L. W. Staines & Co., Unit 2, Roding Trading Estate, London Road, Barking, Essex. Tel: 01-591 2900.

POWER TO THE DRAGON! Hardware expansions for the Dragon, 16 line input/output port from £19.95, EPROM programmer (2716/2732 type) from £19.95. Send large SAE for further details to: B. Mistry, 75 St Margaret's Road, Bradford BD7 2BY.

FOR HIRE

TO HIRE A COMPUTER from ZX81 upwards, ring or write to Business and Computer Services, 292 Caledonian Road, London N1 1BA. Tel: 01-607 0157.

UTILITIES

SPECTRUM CHARACTER KIT. 64 print prints 64 characters per line, from your basic program instead of 32. Master define gives 96 user definable graphics. Rotate, reflect, invert commands included. Two alternative character sets free. SAE for details. Both £4.50, each £2.90 cassette. K. Ahmed, 28 Magpie Hall Lane, Bromley, Kent.

BBC (B) KOPYKAT and file clone. A complete back-up package for £3! including P&P. M. A. Paris, 38 Wooburn Manor Park, Wooburn Green, High Wycombe, Bucks.

WHAT YOU SEE on the screen appears on paper from two colour high-resolution mode for Dragon 32 to Acorn AP100A printer or Seikosha GP100A and Tandy DMP100 — only £7.95 by return post. Cheques/POs to: Caveman Computers, 55 Iona Road, Windy Nook, Gateshead. Covered by no quibble guarantee.

CLASSIFIED ADVERTISING RATES:

Line by line: 20p per word, minimum 20 words.

Semi-display: £5 per single column centimetre, minimum length 2 cm. (Please supply A/W as PMT. Or supply rough setting instructions.)

Conditions: All copy for Classified section must be pre-paid. Cheques and postal orders should arrive at least two weeks before the publication date.

If you wish to discuss your ad, PLEASE RING Diane Davis 01-734 2688.

Here's my classified ad.

(Please write your copy in capital letters on the lines below.)

Please continue on a separate sheet of paper

I make this words, at per word so I owe you £

Name

Address.....

Telephone

Please cut out and send this form to: Classified Department, Popular Computing Weekly, 12-13 Little Newport Street, London WC2R 3LD.

TELETEXT ON YOUR SPECTRUM.

Create your own 900-page teletext system with ZXTEXT. Full colour, graphics, flashing, 24-hour clock with alarm, free sample system, it's all here! Cassette £4.95, Iain Stewart, 17 Torry Drive, Alva, FK12 5NQ.

THE KEY
THE ULTIMATE SPECTRUM BACK-UP COPIER FREE HEADERLESS COPIER

100% simple to use - does not use any program memory. Multi-section programs copied in one go. Sold in over 18 countries worldwide.

Order THE KEY for any ZX Spectrum ONLY £5.95 - IMMEDIATE DESPATCH (Europe) - £6.75. Outside Europe - £7.50

KEYSOFT, DEPT PCK 2
6 BRUCE GROVE, LONDON N17 6RA

The programs of this tape are sold subject to the condition that only one back-up is made of any commercial program. This back-up must be for personal use only.

DEALER ENQUIRIES WELCOME

DRAGON AUTORUN program, create your own autorun screen and save it when run will autostart your machine code games, easy to use, full instructions, £8. A. Selby, 16 Willowtree Crescent, Lutterworth, Leicestershire LE17 4TD.

ZX81, 16K, machine code subroutines enables you to produce fast games in basic, includes scroll in all directions, screen search, fire, full keyboard, control and screenflash, tape, £3.50, from E. Wilson, 72 Allan Park, Kirkliston, Edinburgh.

SOFTSAVE for the Vic20 is a 100 per cent machine code utility program which allows you to back-up most software on to a new tape, cassette with instructions, £4.95, from Softsave, 248 Evelyn Street, London SE8 5BZ.

BBC USERS. Save yourself hours use "Soft-keys". It sets function keys to provide 10 valuable facilities, also supplied template for key reference. Send cheque/PO for £2.95 to: A. J. Hawkins, 15 Godwin Road, Bromley, Kent.

SPECTRUM KOPYKAT

IMPROVED PERFORMANCE

Simply the best. Copying any program is now as easy as LOADING and SAVEing your own programs. Any ZX Spectrum program can be backed-up onto a fresh tape. Even programs that cannot be stopped can now be copied. 100 per cent machine code. Copies headerless files. Prints file name. SPECTRUM KOPYKAT uses no program area so full size programs over 41.7K (9K for 16K machines) are easily duplicated. PLUS FREE Header Reader program. Immediate despatch by first class return of post.

Send cheque/PO for £4.95 to:

MEDSOFT

61 Ardeen Road, Doncaster, DN2 5ER
IT CAN EVEN COPY ITSELF

SPECTRUM NOSEY, reads your tapes and prints out program name, length, start address and auto start line. Machine code and Basic, £2 or send £3.95 for Nosey plus Copyall Kopykat. ZX-Guaranteed. 29 Chadder-ton Drive, Unsworth, Bury, Lancs.

AUTOKOPY copies any type of Spectrum tape (16/48K), even programs full 16K or 48K long, the best available, machine code, simple to use, full guarantee, £3. B. Tidd, 160 Howlands, Welwyn Garden City, Herts.

SOFTSAVE - Vic20 machine code utility. Could the person living in Portsmouth who recently answered the "Softsave" advert please send their name, address and postal order number as proof, to the advertisement address: S. Pendry, 248 Evelyn Street, London SE8.

STOP! LOOK! LISTEN!

STOP searching for a TOP QUALITY back-up copier for the SPECTRUM (16/48K) "TAPE COPIER" we are certain is the MOST ADVANCED package available. Does any other copier come near?

LOOK at ONLY SOME of its options:

- ★ Copies up to approximately 47.7K (15.7K for 16K Spectrum).
 - ★ Verifies; Repeat Copies, Auto, Abort, and STOPS programs.
 - ★ Loads CONTINUOUSLY (not just one part at a time like most copiers) even without pressing a key!
 - ★ Copies HEADERLESS and ALL programs that we are aware of!
 - ★ Very user friendly and simple to use.
- LISTEN to this. We are so convinced you will be delighted with our product that we can offer a FULL MONEY BACK GUARANTEE if not fully satisfied. Cost ONLY £4.50.
- LERM, Dept PW, 16 Stonepit Drive, Cottingham, Market Harborough, Leics.

SOFTWARE

Survey Analysis is a friendly new computer program from **Microworksops Ltd**
QUESTIONNAIRES ANALYSED!

The program, running on a 48K Spectrum will analyse up to 3,000 questionnaires, each with 10 questions. Analyses include Percentage Breakdowns, Frequency Distributions, Histograms, Crosstabulations, Chi-Square and Significance Tests.

A full manual is provided to assist in the interpretation of results and a complete analysis can be printed out while you go for a drink.

Send a cheque for £10 (inc. p&p) for cassette and manual, payable to **Microworksops Ltd**, 16K ZX81 or ANY SPECTRUM (please specify)

1 PARK LANE, BAILDON, SHIPLEY WEST YORKSHIRE BD17 7LQ
Telephone BRADFORD (0274) 581375

VIC20/CBM64: LOOK! STOCK CLEARANCE! Over 40 SUPERB programs. ALL at trade prices! Send SAE to: C. P. White (Services), 52 Northfield Avenue, Ealing, London W13 9RR or call round personally. Weekdays 10-4, Saturdays 10-1.

10 PER CENT TO 60 PERCENT DISCOUNT on all software! Send £1 (refundable) for free cassette and price list; stating computer type, to: S. Kelly, 7 Atherton House, Harewood Road, South Croydon CR2 7AL.

LYNX SOFTWARE, tape 1, Blitz + Pac-Man; tape 2, 3-D Maze + Quest, £4 per tape. A. Rose, 9 Eaglehurst Road, Liverpool L25 3QH.

DISK SOFTWARE for small businesses. Accounts, complete package, handles sales + purchase ledgers, VAT returns, statements, profit margins, analysis etc, £35.00 inclusive. Datadesk, powerful data base, £9.50 inclusive. Morsetutor, teach yourself morse code, £9.50 inclusive. Send cheque to Martin Vernon, 8 Trinity Square, Llandudno, Gwynedd. SAE for full details.

DRAGON CRUNCHER

First cassette-based conversion program for Tandy Color programs to Dragon 32 and vice versa. Ideal for "Rainbow" readers. Only £7.95.

ELKAN ELECTRONICS, FREEPOST, 11 Bury New Road, Prestwich, Manchester M25 6LZ
Tel: 061-798 7613

ZX SOFTWARE - for our free catalogue of practical programs send sae to Dept P, SD Systems, PO Box 24, Hitchin, Herts. Prompt despatch.

WANT TO GAIN AN UNFAIR ADVANTAGE over your friends? Kilsofts 'Physics 1' or 'Biology 1' will help your 'O' level revision. Moving graphics, four major topics, documentation included for 48K Spectrum. Free morse-code program, only £4.95 each (both £9.00). Chris Vlahovic, 32 Briarlyn Avenue, Birchcliffe, Huddersfield - or send for my catalogue. Apply within 10 days and receive free vouchers. Or telephone (0484) 31491.

"YOUR OWN SOFTWARE BUSINESS"

Start your own full/part time Home Based Software Business. Specially written Manual covers all you need to know including all Legal/Practical aspects. Advertising, Accounts, Sign Writers, Supplies, etc, etc.
Order Now! Send £3.99 to: T.M.B. (PC), 15 Clifton Rd., Prestwich, Manchester.

CLUBS

SOFTWARE CITY SOFTWARE CLUB

Massive list of games, tapes and discount card
For Spectrum, Dragon 32, Vic20, BBC, Sharp, Apple
TRY BEFORE YOU BUY
SAE FOR LIST
16 THEOBALD STREET
BOREHAMWOOD, HERTS

SOFTWARE EXCHANGE. Swap your used software via our club. Free membership, £1 per swap. Most computers. SAE for details, UKSEC, 15 Turnwell Greave, Sheffield S5 9GB.

EDUCATIONAL SOFTWARE

At last!

Educational software developed and proven in schools

OUR NEW RANGE INCLUDES
5 EXCELLENT PROGRAMS FOR 32K BBC

SPELLDEVEL - All you need to develop spelling skills

COUNTON - Develops and teaches counting techniques

SUMBALANCE - A great help in mastering number bonds

FRISMS - Develops and shows calculation to surface area and volume

BEARINGS - Improves skill in estimation of angles

All PROGRAMS £7.50 EACH
Discount for schools and bulk ordering

Send for details to:

MICRO concept

22 Allenby Ave., GRIMSBY, Humberside

*** PARENT? TEACHER? ***

LERM announce **EDUCATION ONE** and **MARKS BOOK** for SPECTRUM. Written by highly experienced teacher both with **MONEY-BACK GUARANTEE**. SAE for full details. **EDUCATION ONE** - 3 programs "Number Game", "Spelling Game", and "Coordinates". All for £4.99. **MARKS BOOK** (basic + machine code - truly amazing) only £4.99 for 48K only.

***** LERM *****
Dept W, 16 Stonepit Drive, Cottingham Market Harborough, Leicester.

ACCESSORIES

COMPUTER CASSETTES

High quality at low prices!!!
C10's 25p each (including case)
C15's 29p each (including case)
P&P 10p per cassette, minimum order five
Send cheque/PO to:
S. Borian, Suite 44, Ivor Court
209 Gloucester Place
London NW1 6BL

COMPUTER CARRYING CASE

Suitable for Spectrum, Oric, Lynx, etc.: hard case (black) 13" x 8" x 3"
Separate pockets for leads, power pack, etc.
Folds flat for storage. £13.95 including VAT, p&p £2.

Dealer inquiries welcome

SHERBORNE DESIGNS
Victory House, 8a The Rank
N. Bradley, Trowbridge, Wilts.
Tel: 02214 4425

SPECTRUM I/O port, single-wire (breadboard), compatible and/or edge card connection to 24 latched I/O lines, £13.85. Control IC's, books, hardware. SAE for lists, Multitron, Dept PCW, 5 Milton Close, Redditch B97 5BQ.

BROKEN JOYSTICK?

STRONGER joystick insert replacements supplied with full fitting instructions. 3 YEAR GUARANTEE
£2.50/pair inc p&p
SOFTWARE FOR ATARI (TM) 400/800
All cassettes under £5
send s.a.e. for lists



Computer Supplies (PCWK)
146 Church Road
Boston, Lincs PE21 0JX

DO YOU USE COMPUTER STATIONERY? Then don't buy more than you need. We will provide as little or as much as you require. Listing paper, labels, etc, etc. HCL, 19 Greenland Road, Kemsing, Sevenoaks, Kent. Tel: Orford 2918.

FLOPPIES, cassettes, paper, ribbons, labels, I/Cs, bits etc. SAE for prices. Dept MO, MMS, 28 Poplar Road, Cleethorpes DN35 8BQ.

DEALERS

CARVELLS OF RUGBY LTD

3/7 BANK STREET, RUGBY
Tel: 0788-65275

Vic20 Starter Pack Computer and C2N Tape unit, intro to Basic Pt1 and 4 games. Only £134, usually £139.95.

Atari 800 + software, £250. 48K Ram + Basic - plus the best of the US software in stock.

We also stock BBC B, Electron, CBM 64, Spectrum and software books. Phone or visit soon!

COMMODORE 64

£164 (excl. VAT)
64 Programmers Ref Manual £9.00 + £1.50 p&p
Tel: Chris Gurney, Dave Walsh or Floyd Patterson

Tel: 01-969 4858/7527 or send SAE
Image Science Micro Computers Ltd
189 Freston Road, London W10 6TH
or cheques PO (add 15% VAT) and £8 for p&p Securicor delivery
Prestel Frame 4820000 (a) for latest software and hardware information and prices. Full after-sales maintenance on all Commodore Equipment bought from us.

SOFT MACHINE

A selection of the very best Software, Books and Accessories available for ZX81, Spectrum, BBC, Dragon, Vic20 and Commodore 64 Microcomputers.

3 Station Crescent
Westcombe Park
London SE3
Tel: 01-305 0521

or send SAE for free catalogue (state which computer)

ROCHESTER SOFTWARE AND COMPUTER CENTRE

38 Delce Road
Rochester
Kent

OPENING
12 September 1983

TEL: 0634 408 305

FOR ALL COMPUTERS,
SOFTWARE AND
PERIPHERALS

SERVICES

★ DRAGON TAMERS! ★
IS YOUR LATEST MASTERPIECE
GIVING YOU A HEADACHE?
A Quality Hard-Copy would be the
professional approach
NO PRINTER — NO PROBLEM!
Allow us to list your programs
Send £1.50 per tape + £1.50 per
Program. Cheques/POs payable to:
DATAPRINT
32 Wickham Road, London SE4

★ DRAGON TAMERS! ★
IS YOUR LATEST MASTERPIECE
GIVING YOU A HEADACHE?
A quality hard-copy would be the
professional approach
NO PRINTER — NO PROBLEM!
Allow us to list your programs
Send £1.50 per tape + £1.50 per program.
Cheques/POs payable to:
DATAPRINT
32 Wickham Road, London SE4

TAKE THE HEADACHE out of the programming. Your listings for any Spectrum, Vic 20, Texas, saved on quality tape. SAE, 188 Brocklesmead, Harlow Essex with details.

PROGRAM DUPLICATION

QUALITY CASSETTES, ANY LENGTH
ANY QUANTITY
PROOF TAPE BEFORE RUN
LABEL AND INLAY SERVICE

SENTINEL • PAUL • PENZANCE
Tel: 0736 731246

BBC LISTINGS, send cassette, large SAE, 25p per copy. Mr S. Pithers, Great Colemans, London Road, Ongar, Essex.

EXCHANGE

software exchange centre

TO ALL ZX SPECTRUM EPSON
HX-20 PROGRAM WRITERS
★ Obtain 100s of programs without cost
★ No copyright. No royalties
★ All the latest programs
★ Software transferable by telephone
★ Free program when you join
★ Start a software house and make money
★ Fastest growing home software exchange group
For more details
Tel: (0293) 544322 at all times

EXCHANGE SPECTRUM SOFTWARE. Wanted any digital fantasia adventures but all offers considered. Tel: Graham on 0293 541988.

EXCHANGE YOUR old software with people from Europe, USA and UK. Cassettes available for all home computers. Send your software cassette (plus 50p p&p) with name of program you want to: Double M, Windermere, Cherrywood Road, Loughlinstown, County Dublin, Ireland.

BBC/SPECTRUM SWAPSHOP! Membership free. Send now for membership or details to: M. A. Paris (Swapshop), 38 Wooburn Manor Park, Wooburn Green, High Wycombe, Bucks.

WANTED



is seeking authors for new titles to add to its highly original and successful book range. Experienced and first time authors are invited to submit manuscripts, ideas or fields of interest. Full details of what we can offer from David Lawrence, Book Editor, Sunshine, 12-13 Little Newport Street, London WC2R 3LD.

Sunshine: Publishers of Popular Computing and Dragon User.

WANTED, Dragon 32 users for the Slough branch, free entry. Ring John on Slough 35268.

WANTED, services for printer listings from cassette, for Oric 1 T199/4A, Commodore 64 and Lynx programs. Tel: 01-427 7344 after 6 pm.

WANTED, will pay £100-£130 for good condition Commodore 1525 printer. 01-941 6079 evenings.

TI-994A Extended Basic, joysticks and any cheap games tapes and programs. Tel: Nottingham 232370.

WANTED. Commodore C2N cassette unit, will to pay £15. Tel: 01-427 7344 (after 6 pm).

WANTED. Atari 810 disk-drive, please phone Chris on (0667) 53688 (evenings).

URGENT

We urgently require for a nationwide retailer, quality machine-code Arcade games, for Vic20 and Spectrum machines.

Best prices paid for the right programs

RAINBOW RESEARCH
288 HIGH STREET
PONDERS END, ENFIELD, MIDDX

WANTED

Quality Games and utility programs for any Micro. All programs considered. Instant cash plus royalties, on all programs accepted with a view to distribution in UK, USA and Europe.

Dream Software PO Box 64
Basingstoke, Hants RG21 24B
Tel: Basingstoke (0256) 25107

RECRUITMENT

PHOENIX SOFTWARE

Are looking for Machine-Code Arcade-quality games. We have an idea which could make your game the best seller in Europe.

Send your program to

PHOENIX SOFTWARE
Spangles House
116 Marsh Road
Pinner, Middx.
or Tel:

01-868 3353
NOW!!!

FOR SALE

ORIC 1, 48K, as seen in Dixons, colour TV and tape recorder, all for £140. Tel: 01-573 6980.

VIC20 + CN2 + 16K + 3K super expander + joystick + dustcover, 4 books, 4 cartridges, 14 games, offers. Tel: (0452) 502272 after 4.30 pm.

DRAGON 32, plus £300+ software games, utilities including Telewriter plus £50 books, unbeatable value. Phone for details Richard 01-584 2566 daytime.

ZX80, no software but one three page magazine with faulty game, £2.85, or will swap for an Atari 800, ring Spiney Norman on 0785 850787.

DRAGON 32, lots of software, joysticks, 2 cartridges including Berserk, value £280, sell for £200. Tel: Bristol 0272 696406.

SHARP MZ80K 48K and high rev Ram, hardly used, PCG editor/software (games), full documentation, £300 ono. Tel: Coxtie Green 72037 (6 pm onwards).

SEIKOSHA GP 100 VC printer with paper for Vic20. Hardly used, excellent load, cost £260, will sell £150. Tel: Balcombe 532.

INTELLIVISION, 6 months, good condition, Soccer, £80 ono. Tel: Nottingham (0602) 872 915 (4.30).

AGF JOYSTICK INTERFACE for Spectrum, under guarantee, cost £21, sell £16. Softex Compiler for 48K Spectrum, boxed with manual, £7. Tel: 0383-735126.

CENTRONICS 101AL PRINTER plus manual parallel input. Needs attention, hence only £75. Phone Liss (Hants) 2720.

CASIO VL/1 electronic musical instrument and calculator, envelope, control and rhythm, cost £35, sell £25 or Spectrum hardware. Write 18 Rainsford Lane, Chelmsford, Essex.

TRS-80 Model 1, 16K, level 2. New green screen monitor, cassette recorder, covers, manuals, software. Excellent condition, £150. Tel: 061-764 4909.

PROGRAMMERS

5D SOFTWARE
Program Writers Co-operative
Hempland Cottage, N. Lopham
Diss, Norfolk

★ PROGRAMMERS: Our Author-Members not only receive 70% of income from their published software, also there are many other benefits in joining us. Send us a copy of your latest work and tell us about yourself. (Any Popular Micro). Copyrights fully respected.

★ MICRO-OWNERS. We write and distribute good quality, original software at sensible prices, not expensive psychedelic packaging. Why not send for our lists (Give details of your system).

COMPUTER SWAP

Computer Swap entries are limited to 30 words. Either fill in the accompanying form and send it to Computer Swap, Popular Computing Weekly, 12-13 Little Newport Street, London WC2R 3LD or telephone 01-734 3454.

All software offered through computer swap must be in original condition and for private sale only.

Warning: It is illegal to advertise pirated software.

COMPUTER SWAP

Please write your copy in capital letters on the lines below.

Name.....

Address.....

Telephone.....

NEW RELEASES

JEEPERS



Despite its lack of memory, people are still buying the Vic20. Presumably, having bought it, they are sticking with it and buying add-ons for extra memory. Most of the new games I've seen require at least 3K expansion — maybe because of the need to compete with some of the spectacular Spectrum programs.

Creepers requires an additional 3K and is one of Virgin's recent releases. You control a space ship which you can move up and down and turn to face different directions.

Your task is, as ever, to blast away the little aliens that bounce up and down in front of you (and sometimes behind you). Although usually they take their punishment like men (well, like aliens), sometimes they rush for you and you must quickly move your spaceship out of the way.

Program *Creepers*
Price £5.95
Micro Vic20 (+3K)
Supplier Virgin Games
61/63 Portobello Road
London W11

DEATH STARE

The latest releases from Phipps Associates are not adventures — bad news for addicts of *Knights Quest* and *Magic Mountain*.

Instead *Black Planet* and *Gorgon*, written by Barry Cornhill of the Aylesbury Computer Club, are what you might call multi-state arcade games. *Black Planet* has nine

stages through which you must pass before you can destroy the *Black Planet* (and get a free badge).

Gorgon is set in ancient Greece — as Spectrasses you must fight Grang and return a stolen chalice to its rightful home.

There are two sections to the game, firstly you fight off the Gorgon (Grang's friend) by reflecting his death-dealing stare back at him/her/it.

Assuming you manage this, there follows a sword fight with Grang. You can parry, thrust, advance and retreat to try and score as many hits as you can. All this within a time limit because (oblivious to the merits of the case) the Gods have decided to destroy your town by flood unless the chalice is returned.

Program *Gorgon*
Price £4.95
Micro Spectrum 48K
Supplier Phipps Associates
172 Kingston Road
Ewell
Surrey KT19 0SD

ENERGY



Knowing quite what to say about *The Oracle's Cave* is not easy but one thing seems clear — it is the closest yet to a true animated graphic adventure and is excellent value for money.

Like most adventure games, there are secret passages to be discovered and monsters to be fought, but in this program you direct a little man who moves, fights, etc, according to your instructions.

If, for example, there is a cave with a rope in it and you type *u* for up, the little man

jumps up and climbs the rope. The effect is startling at first.

Like other adventures, you have to pay attention to things like combat energy and will have to rest if it starts to fall, but the whole quest has a time limit of five days, and resting (or any other action) uses up precious hours.

Hardened adventurers may feel limited by the single key instructions — no guessing the right words here, but the range of options is still more than I've seen on many text-only adventures.

At £7.95 it makes some adventures (particularly on other micros) look silly.

Program *The Oracles Cave*
Price £7.95
Micro Spectrum 48K
Supplier Doric Computer Services
3 The Oasis
Glenfield
Leicester

FUNCTIONS

Compusense has built a good reputation with its range of cartridge based utilities for the Dragon.

The latest addition to the range is *Edit +* a full screen editor for program development.

Existing Basic commands are unaffected, but various new functions are added, including up and down scrolling, specific line *Goto* and find string.

The program is designed to be simple to use. It incorporates the hi-res 51 x 24 screen program within it (a separate manual is provided) and so retails for a whopping £34.50.

Program *Edit +*
Price £34.50
Micro Dragon 32/64
Supplier Compusense
PO Box 169
Palmer's Green
London N13 5XA

HEX DUMP

The *Exmon* monitor, which has been available for quite a while on tape, is now available on Eprom.

The Eprom version has a number of extra features. There are register displays and alteration, with disassembler, hex dump and save to file.

Other features include a relocator, and single step tracing of program. *Exmon* is particularly designed for debugging machine code programs and can be included within source code.

Program *Exmon*
Price £16.50
Micro BBC A or B
Supplier Beeb Bug Publications
PO Box 50
St Albans
Herts AL1 2AR

PRICE DROP



Virgin Games will be hoping to improve its reputation with its latest batch of games.

Regarding Virgin's Spectrum releases at least, critical opinion was decidedly negative on the company's first offerings.

There are two Spectrum games this time, one is a puzzle called *Lojix*, the other is *Racing Manager*.

The latter seems to be an equine version of *Football Manager*, involving both making decisions about what to spend and graphics of the actual horse race itself.

Looking at the game only briefly, I have to say that graphically it is poor. The selection routines for horses, odds, etc, look slow, although it is apparently written in machine code. Virgin has, however, dropped its prices from £7 to £5.95 for Spectrum games which is certainly welcome news.

Program *Racing Manager*
Price £5.95
Micro Spectrum 48K
Supplier Virgin Games
61/63 Portobello Road
London W11

NEW RELEASES

FUZZY



3D programs are nothing new, though the 3D effect has varied from terrible to a grudging not bad. Postern has adopted a different approach.

With *3 Deep Space*, by Mike Singleton, comes a free pair of 3D glasses. Without them the program looks fuzzy and out of focus, with them full 3D effects.

The game itself sounds like the standard space extravaganza with baddies that swoop not only up and down but also in and out of your TV screen.

From reading the blurb on

the cassette, it seems that a reasonable quality television will be necessary for good results, since you have to fine tune the colour/intensity for best results.

Program *3 Deep Space*
Price £7.95
Micro BBC B
Supplier Postern
 PO Box 2
 Andoversford
 Cheltenham
 Glos GL54 5SW

TWITCH

Identikit is an educational program from Stell Software. I'm not sure exactly how it is educational, but it is quite good fun.

You design a face from a choice of 'bits', various noses, eyes, etc. Once you have a face you like, it can be saved on tape.

Most of the results are comical and use big graphic shapes. Once the face is finished there is what might be termed a 'twitch' option where you can get eyes to blink, noses to wrinkle, ears to wiggle or (most dramatically of all) everything moving at once.

Program *Identikit*
Price £5.95
Micro Spectrum 48K
Supplier Stell Software
 36 Limfield Avenue
 Whalley
 Lancs BB6 9RJ

ATTACKED

No prizes for guessing the arcade parentage of *Defend the Cities* from Intersoft.

Missile Command (for this it is) is a game in which you defend three cities from repeated attacks. You must destroy not only the bombs as they fall, but also the aircraft which are dropping them.

There are two versions of the Game, one in extended Basic and another in machine code for the mini memory module. Extensive notes come with both versions.

Program *Defend the Cities*
Price £14
Micro TI99/4A (Extended Basic/MMM)
Supplier Stainless Software
 10 Alstone Road
 Stockport
 Cheshire SK4 5AH

DIGGER



Paul Johnston,
 author of *Hard Cheese* by
 DK 'Tronics

Hard Cheese is a sort of *Dig Dug* (the celebrated arcade game) in which you guide your digger around a field, running away from the standard funny creatures who commonly inhabit such games.

The significance of the cheese may not be immediately apparent, but if you eat it there is a charming rendition of "We plough the fields and scatter".

Killing all the monsters on each frame, either by shooting them or dropping what look like cherries, gets you on to the next frame.

Program *Hard Cheese*
Price £5.95
Micro Spectrum 16/48K
Supplier DK 'Tronics
 Unit 2
 Shire Hill
 Industrial Estate
 Saffron Walden
 Essex CB11 3AX

ALIEN SHIPS

The newest addition to the growing number of software houses offering Oric programs is Express Software. Among its releases is *Space Quest*.

The earth is being destroyed by bombs from alien ships orbiting the earth, your job is to encourage the aliens... oh, all right, I'm sorry, your job is to stop the aliens at all costs by detonating the bombs while they fall.

Program *Space Quest*
Price £5.95
Micro Oric 1 16/48K
Supplier Express Software
 City Gate
 25 Moat Lane
 Birmingham B5 6BH

★★★★★★★★★★★★★★★★

COMING SOON

Like many of the mythical Greeks, Perseus had a hard time of it because of an Oracle.

The ancient Greeks, instead of reading their horoscopes in the daily paper, listened to Oracles who usually predicted dire events.

Perseus' adventures may be more familiar than you think, since the myth formed the basis of *Clash of the Titans* — the most recent Ray Harryhausen film.

To cut a long story short, Perseus can win a homeland and a bride if he can return with the head of Medusa.

Now you can live out the myth as an adventure game complete with Medusa, the lovely Andromeda, various challenges and quests along the way — and garish graphic illustrations at each point.

Aside from the pictures, it is also claimed that the program understands full sentences, eg, "Pick up the sword and go north" like *The Hobbit*. Could be good for Christmas. The programs will be available for the Commodore 64 and the Spectrum (48K).

New Releases is designed to let people know what software is coming on to the market. If you have a new game or utility which you are about to release send a copy and accompanying details to: New Releases, Popular Computing Weekly, 12-13 Little Newport Street, London WC2R 3LD.





Home education

More computer education happens in the home, than occurs in schools or colleges.

With over a million computers in British households (far more than there are in the education system) we have to concentrate on the importance of the home.

Whereas in "educational" circles the BBC computer is supreme, in the home the Spectrum is king. More computer education happens through the soggy keyboard of a Spectrum than through any other, regardless that schools support the BBC. And it looks as if this imbalance between the "official" and "unofficial" education will become worse.

The Spectrum is successful because it fulfils a need, not because someone said they have to use it (not that I am knocking the BBC machine — in fact I prefer it).

The same is true of software. I started to think — always a dangerous sign — what is it that puts Logo, Forth, C, and Basic, into one group and Algol and Pascal into another group?

The answer is that Logo and the others became successful because of the pressure from satisfied users.

Basic became such a successful language because it allowed real people to do what they thought they wanted to do. When ordinary Basics stop doing what people want to do, and as other easily used languages become available, Basic will become less popular. If Basic withers and dies, it will be because users have found a better alternative.

At a recent meeting I attended of the British Logo Users Group (BLUG), there were hundreds of people. They came, not because of some commercial pressure, but because they found that Logo actually did what they wanted it to do.

C, and Unix, are now commercial successes.

But successful because of the numbers of satisfied users who found both worked, and worked well.

In contrast, Algol (60 and 68) and Pascal have never been successes. And never will be, apart from in "education", because they were imposed from above. Once outside "education", the languages were found so unhelpful that they are resounding tinkles.

Personally, I think that many home users will stop using ordinary Basics and will move over to using Logo and (a lesser number) Forth, because they are both languages which do more and are fun to use. One of the few Basics to remain may well be BBC Basic, but then it is rather unlike many more traditional versions.

Forth is now available for most machines (with implementations of varying excellence), and shortly good versions of Logo will be available for most computers. I know there will be versions of Logo available (by Christmas) for the Apple, Atari, Commodore 64, IBM PC, Research Machines, Sinclair Spectrum, and TI-99/4a (a new version).

Note that there is no BBC version likely for some time yet — so schools who have chosen the BBC computer are being deprived of a full version and will have to use stop gaps.

If the school has a Research Machines computer then there will be a version of Logo available, but a version so different from any other that it might not be classed by some as a Logo.

Schools with Spectrums will soon be able to obtain copies of Logo. A very good version it is too, written to the standard of the US implementations.

By restricting the choice of micros in schools to the three manufacturers, with Sinclair being a grudging addition, the Department of Industry has placed schools in a bit of a quandary. Logo cannot be used on most schools' micros.

I always did think that the Dol scheme was a waste of money, especially given the silly restriction on choice. And look what has happened. There was much gnashing of teeth, and pulling of hair, from schools because Acorn were going to be so late with Logo.

Yet, education in the home has not been affected. All those Apples, Ataris, TIs, Commodores and IBM PCs, will soon have (or already have) a Logo implementation. A great language, and much fun.

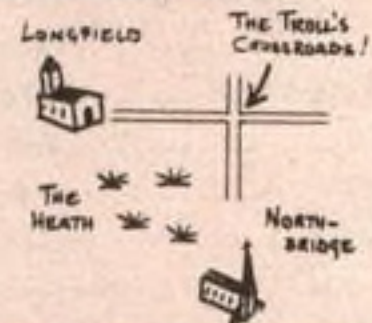
So will the overwhelming majority with Spectrums.

Boris Allan

Evening walk

Puzzle No 75

We were out walking the other evening from Longfield to Northbridge. As you can see from the map, Longfield is exactly one mile due west of the troll's crossroads and Northbridge three-quarters of a mile due south of it.



After walking along the road for some time, we decided to cut across the heath and make straight for the Northbridge church spire.

If we can walk at a steady four miles per hour along the road, but only three miles per hour across the rough heath, at which point (to the nearest yard) should we leave the road in order to arrive at Northbridge the quickest?

Solution to Puzzle No 70

For a triangle to exist, the sum of the length of the two shorter sides must be greater than the length of the larger side. In the program successively large triangles are constructed with this fact in mind. Note that the area of any triangle is given by the formula.

$$A = \sqrt{S(s-a)(s-b)(s-c)}$$

where *a, b* and *c* are the sides and *s* is equal to half the perimeter ($(a + b + c)/2$).

In the program, *T* is the count and stops when it reaches four. *C* always represents the largest side, and *A* the smallest.

```
10 LET T = 0 20 LET C = 1 30 FOR B = 1 TO C 40
FOR A = 1 TO B 50 IF B + A <= C THEN GOTO 90
60 LET S = (A + B + C)/2 70 LET AREA = VAL STR$(
SQR(S*(S - A)*(S - B)*(S - C))) 80 IF AREA = A
+ B + C THEN GOSUB 200 90 NEXT A 100 NEXT B
110 LET C = C + 1 120 GOTO 30
```

The sides and areas/perimeters of the four smallest triangles are (in yards and yards/square yards):

- 6, 8, 10 and 24
- 5, 12, 13 and 30
- 9, 10, 17 and 36
- 7, 15, 20 and 42

There are in fact only five triangles possible, these four and the fifth and largest with sides: six, 25 and 29 yards.

Winner of Puzzle No 70

The winner is: Steve Parker, Greenpark Avenue, Skircoat Green, Halifax, West Yorks, who receives £10.

Top 10

- Atari**
- 1 (—) Ultima II (Sierra On-line)‡
 - 2 (4) Paris In Danger (Avalon Hill)‡
 - 3 (—) Zork I (Infocom)§
 - 4 (2) Diamonds (English)
 - 5 (—) Night Strike (TG Products)*
 - 6 (—) Preppie (Adventure International)
 - 7 (—) Flying Ace (Avalon Hill)
 - 8 (1) Miner 2049er (Big Five)*
 - 9 (—) Arcade Machine (Broderbund)‡
 - 10 (10) The Blade of Blackpoole (Sirius)
- *Cartridge. †32K cassette. ‡32K disc. †48K disc.
(Figures compiled by Calisto Computers, Birmingham 021-632 6458)

- Spectrum**
- 1 (3) Jet-Pac (Ultimate)
 - 2 (1) Tranz Am (Ultimate)
 - 3 (4) Scrabble (Psion)*
 - 4 (2) The Hobbit (Melbourne House)*
 - 5 (8) Horace and the Spiders (Psion/Melbourne House)
 - 6 (5) Flight Simulation (Psion)*
 - 7 (9) Ah Diddums (Imagine)
 - 8 (7) 3D Tanx (DK Tronics)*
 - 9 (—) Chess (Psion)*
 - 10 (—) Cookie (Ultimate)
- *Requires 48K.
(Figures compiled by W H Smith and Sons, London)

Top 10

- ZX81***
- 1 (3) Flight Simulation (Psion)
 - 2 (4) Football Manager (Addictive Games)
 - 3 (2) Space Raiders (Psion)
 - 4 (6) QS Scramble (Quicksilva)
 - 5 (—) Planetoids (Psion)
 - 6 (5) Fantasy Games (Psion)
 - 7 (9) Defender (Quicksilva)
 - 8 (10) Ship of Doom (Artic)
 - 9 (7) Asteroids (Quicksilva)
 - 10 (8) Espionage Island (Artic)
- *All run in 16K
(Figures compiled by Boots & Co, London)

- Books**
- 1 (1) Structured Programming with BBC Basic, Atherton
 - 2 (6) Basic Programming on the BBC Micro, Cryer
 - 3 (—) The BBC Micro, An Expert Guide, James
 - 4 (4) Complete Spectrum Rom Disassembly, Logan and O'Hara
 - 5 (—) The BBC Micro Book, Basic Sound and Graphics, McGregor and Watt
 - 6 (2) Commodore 64 Programmer's Reference Guide, Commodore
 - 7 (8) Anatomy of the Dragon, James
 - 8 (10) Spectrum Hardware Manual, Dickens
 - 9 (7) Commodore 64 Machine-code Master, Lawrence and England
 - 10 (—) 36 Challenging Games for the BBC Micro, Hartnell
- (Figures compiled by Watford Technical Books, Watford 0923 23324)
(Last week's position in brackets)

Top 10

- Dragon**
- 1 (1) The King (Microdeal)
 - 2 (2) Frogger (Microdeal)
 - 3 (3) Talking Android Attack (Microdeal)
 - 4 (5) Night Flight (Salamander)
 - 5 (4) Space War (Microdeal)
 - 6 (6) Ring of Darkness (Wintersoft)
 - 7 (10) Dragon Trek (Wintersoft)
 - 8 (7) Planet Invasion (Microdeal)
 - 9 (9) Morocco Grand Prix (Microdeal)
 - 10 (8) Quest (Dragon Data)
- (Figures compiled by Boots & Co, London)

- BBC***
- 1 (—) Hopper (Acomsoft)
 - 2 (—) White Knight Mark II (BBC Soft)
 - 3 (—) Dr Who — The First Adventure (Microdeal)
 - 4 (9) Alien Swirl (Program Power)
 - 5 (4) Starship Command (Acomsoft)
 - 6 (3) Felix in the Factory (Program Power)
 - 7 (2) Danger UXB (Program Power)
 - 8 (5) Centipede (Superior)
 - 9 (6) Snooker (Acomsoft)
 - 10 (8) Great Britain Limited (Simon W. Hessel)
- *All Model B only.
(Figures compiled by Micro Management, Ipswich 0473 59181)

Top 10

- Vic20**
- 1 (1) Arcadia (Imagine)
 - 2 (2) Wacky Waiters (Imagine)
 - 3 (3) Sky Hawk (Quicksilva)
 - 4 (7) Grid Runner (Llamosoft)
 - 5 (5) Catcha Snatcha (Imagine)
 - 6 (4) Cosmiads (Bug-Byte)
 - 7 (—) Escape MCP (Rabbit)
 - 8 (6) Cosmic Crunch (Commodore)*
 - 9 (9) Frantic (Imagine)
 - 10 (10) Panic (Bug-Byte)
- *Cartridge
(Figures compiled by Boots & Co, London)

DEAR AUTOMATA, DESPITE YOUR VERY SILLY ADVERTISING, I AM ORDERING THE FOLLOWING FINE COMPUTER SOFTWARE FROM YOU!!

GO TO JAIL	(Spectrum 48K) @ £6	<input type="checkbox"/>
PIMANIA	(Spectrum 48K) @£10	<input type="checkbox"/>
PIMANIA	(Dragon 32) @£10	<input type="checkbox"/>
PIMANIA	(BBC Micro 32K) @£10	<input type="checkbox"/>
PIMANIA	(ZX81 16K) @ £5	<input type="checkbox"/>
BEST POSSIBLE TASTE	(ZX81 1K) @ £5	<input type="checkbox"/>
THE BIBLE	(ZX81 1K) @ £3	<input type="checkbox"/>
CAN OF WORMS	(ZX81 1K) @ £3	<input type="checkbox"/>
DRAGON DEMOS	(Dragon 32) @ £5	<input type="checkbox"/>
BUNNY + E.T.A.	(Spectrum 16K) @ £5	<input type="checkbox"/>

I enclose the right money TOTAL..... £

or please charge my ACCESS CARD / EUROCARD / MASTER CARD

CARD NUMBER

my signature.....

my name.....

my address.....

.....POST CODE.....

send to: AUTOMATA U.K. LTD. 27 HIGHLAND ROAD
PORTSMOUTH, HANTS. PO4 9DA, ENGLAND

all prices include VAT, packing & postage within the U.K.
please add 10% to total price for overseas orders. Trade enquiries are welcome. Please leave the following space blank for DESPATCH NUMBER:

LADIES, GENTLEMEN AND MULTITUDINOUS LIFE FORMS, THIS WEEK AUTOMATA PRESENTS A BRAND NEW SERVICE THE PIMAN'S COMPUTER DATING SERVICE

Just fill in the spaces below, send your form in to us, & we'll feed it to Lurch the office parrot, at least we think he's a parrot. Tick as many boxes as you desire, "A" for yourself and "B" for your ideal partner. See next week's back cover for our EXCITING UNCLE GROUCHO OFFER.

CENSORED	SEX	A	B	STATUS	A	B
	Male	<input type="checkbox"/>	<input type="checkbox"/>	Wally	<input type="checkbox"/>	<input type="checkbox"/>
	Female	<input type="checkbox"/>	<input type="checkbox"/>	Canonised	<input type="checkbox"/>	<input type="checkbox"/>
	Androgyne	<input type="checkbox"/>	<input type="checkbox"/>	Cauterised	<input type="checkbox"/>	<input type="checkbox"/>
	None	<input type="checkbox"/>	<input type="checkbox"/>	Supine	<input type="checkbox"/>	<input type="checkbox"/>
	Lots	<input type="checkbox"/>	<input type="checkbox"/>	Pampant	<input type="checkbox"/>	<input type="checkbox"/>
	Spayed	<input type="checkbox"/>	<input type="checkbox"/>	Pimaniac	<input type="checkbox"/>	<input type="checkbox"/>
Eh?	<input type="checkbox"/>	<input type="checkbox"/>	Credit card	<input type="checkbox"/>	<input type="checkbox"/>	
HOBBIES	A	B	AGE	CENSORED		
Sport	<input type="checkbox"/>	<input type="checkbox"/>	Geriatric			
Pimania	<input type="checkbox"/>	<input type="checkbox"/>	Innocent			
Piracy	<input type="checkbox"/>	<input type="checkbox"/>	Unemployed			
Hiccoughs	<input type="checkbox"/>	<input type="checkbox"/>	Who cares			
Being silly	<input type="checkbox"/>	<input type="checkbox"/>	Eh?			
Smirnoff	<input type="checkbox"/>	<input type="checkbox"/>	Ripe			
Eh?	<input type="checkbox"/>	<input type="checkbox"/>	Under			

PLEASE TICK WHICHEVER OF THE FOLLOWING SNAPSHOTS MOST RESEMBLES YOUR IDEAL PARTNER...



Finally write your own special requirements in not more than 10 words on the dotted line

SEND THIS PAGE ALONG WITH LOTS OF MONEY FOR OUR SUPERB COMPUTER SOFTWARE to "AUTOMATA!!"

