

May 1984

An independent magazine published by ECC Publications

sinclair user

Issue No 26

INCORPORATING SPECTRUM USER

Only
85p

**Award-winning
Battle 1917—
we print the
full listing**

**Software for
hypochondriacs**

**Exploring
the heart
of the QL**

**Pop
goes the
micro**



**Win thousands of £££s—
1984 CAMBRIDGE
AWARDS**

THE INDUSTRY STANDARD INTERFACE

**FULLY
MICRODRIVE
COMPATIBLE**



From
£39.99
Inclusive



At last you can have real print performance from your ZX Spectrum with the Kempston Centronics Interfaces. As the Interfaces allow you to link your ZX Spectrum to any of a vast number of printers with an industry standard centronics input, you can choose the printer that suits your needs - from high speed dot matrix to professional letter quality printers.

We recommend Epsoms, NEC, TEC, Seikosha, OKI Microline, Tandy GP115, Star DP 510, Shinwa, Brother HR15, etc.

NEW INTERFACE E - ONLY £55.00

Simply plug in and it's ready to use. All operating commands are held in an EPROM so LLIST, LPRINT and COPY can be used at any time without using up valuable user RAM. COPY will allow the reproduction of high resolution graphics with Epson (or derivatives) and Seikosha 80, 100 and 250 Series printers. Print width selection from 32 characters to full width depending on printer used.

INTERFACE S - ONLY £39.99

Visually identical to Interface E but without the EPROM, Interface S also recognises the LLIST & LPRINT commands and will allow print width selection from 32 characters to full width.

However, software routines will need to be loaded before use. Full screen dump to reproduce high resolution graphics is also

possible and supporting software is supplied to operate this facility with Epson and Seikosha printers. The software routines that are necessary to initialise the interface are held in the printer buffer so valuable user RAM will not be used up. There is a growing range of Business/Utility software that includes these routines. Details available on request.

Either interface simply plugs into the ZX Spectrum expansion port or interface and is supplied fully cased with a one metre ribbon cable which connects to the printer of your choice. Full instructions are included and driving software is supplied with Interface S.

KEMPSTON CENTRONICS INTERFACE COMPATIBLE SOFTWARE UTILITIES. FOR THE 48K SPECTRUM.

FINANCE MANAGER (OCP) - Menu driven program for all domestic and business accounting applications. **£19.95**

ADDRESS MANAGER (OCP) - Simple index filing system ideal for names, addresses, etc. Various search facilities. **£19.95**

FULL SCREEN EDITOR/ASSEMBLER (OCP) - Allows you to write Z80 assembly code using standard mnemonics on full screen. **£19.95**

WORD PROCESSOR (TASWORD TWO) - (TASMAN) A professional word processor allowing 64 characters per line and incorporating all usual editing facilities. **£13.90**

OMNICALC (MICROSPHERE) - The only spreadsheet written entirely in machine code. The easy and fast way of solving any numerical problem. Ideal for cash flow forecasting to concrete stress analysis. **£9.95**

MASTERFILE (CAMPBELL SYSTEMS) - Filing and retrieval system for domestic or business use. Files can be loaded and saved independently. Microdrive compatible. **£9.95**

NOW WE CAN ALSO SUPPLY YOUR PRINTER.

We've looked at the printers currently available and have selected what we feel is best value for money in dot matrix and daisy wheel printers:

EPSON RX-80 F/T - A dot matrix printer allowing full graphics dumping and a choice of printing styles. Speed: 100 C.P.S. **Price £325 Inc. VAT and Delivery**

BROTHER HR15 - A daisywheel printer ideal for letters, mail shots, documents, etc. Many typefaces available by changing daisywheel. Duplication facility but no graphics. Speed: Up to 18 C.P.S. **Price £425 Inc. VAT and Delivery**

Interface S

Available from
spectrum
COMPUTER CENTRES

WHSMITH

All products direct from:

KEMPSTON
MICRO ELECTRONICS LTD
Unit 30 Singer Way, Woburn Road
Industrial Estate, Kempston,
Bedford, MK42 7AF. Tel: (0234) 856633
Telex: 826078 KEMPMI G

All prices include VAT and P. & P.
Overseas orders please add £4.00 P. & P.
Please allow 21 days for delivery of
interfaces and software. Printers
available within 48 hours

**TRADE ENQUIRIES
WELCOME**



**For ZX
Spectrum**

sinclair user

Incorporating Spectrum User

Editor

Bill Scolding

Deputy editor

John Gilbert

Consultant editor

Mike Johnston

Managing production editor

Harold Mayes MBE

Program reviewer

June Mortimer

Illustrator/designer

Brian King

Group advertisement manager

John Ross

Production assistant

Dezi Epaminondou

Editorial assistant

Colette McDermott

Managing editor

Nigel Clark

Assistant managing director

Barry Hazel

Managing director

Terry Cartwright

Chairman

Richard Hease

Sinclair User is published monthly
by ECC Publications Ltd.

ABC

Telephone

All departments

01-359 3525

If you would like to contribute to
Sinclair User please send
programs, articles or ideas for
hardware projects to:

Sinclair User,
ECC Publications,
196-200 Balls Pond Road,
London N1 4AQ

Programs should be on cassette and
articles should be typed. We cannot
undertake to return them unless a
stamped-addressed envelope is
included.

We pay £10 for the copyright of
each program published and £50
per 1,000 words for each article
used.

© Copyright 1984

Sinclair User

ISSN No 0262-5458

Printed and typeset by

Cradley Print PLC,

Warley,

West Midlands

Distributed by

Spotlight Magazine Distribution Ltd,

1 Benwell Road,

Holloway,

London N7

01-607 6411

FEATURES

41 MEDICAL SOFTWARE John Gilbert explores the world of computer diagnosis.

55 CAMBRIDGE AWARD Announcing a £4,000 competition to find the best programmer of 1984.

61 QL FILE A full analysis of the main QL microprocessor chip and its use in the new machine.

86 MACHINE CODE John Kerrigan shows how to scroll graphics up and down the Spectrum screen.



The computer diagnosis, page 41

REGULARS

16 SINCLAIR SIMON The world of rock music beckons our hero with catastrophic results.

29 HARDWARE WORLD John Lambert examines a mass storage device and plays with the Trickstick.

33 SPECTRUM SOFTWARE SCENE We look at games for girls which include an educational adventure.

37 ZX-81 SOFTWARE SCENE Golden Oldies from the near past and the latest in high-resolution software.

40 HIT SQUAD Top programmer John Gibson shows his imagination for writing arcade games.

51 BOOKS Micromania hits the book shelf with a witty send-up of the computer scene.

104 USER OF THE MONTH The rock group Mensana makes music with the Spectrum.

109 SINCLAIR BUSINESS USER Mike Wright looks at two major financial packages.

117 EDUCATION Theodora Wood examines the use of mind games in the classroom.

125 HELPLINE Andrew Hewson answers some more computer queries from our post-bag.

135 MIND GAMES Quentin Heath starts a series on mind game programming techniques.



John Biggles Gibson, page 40



Spectrum rock, page 104

PLUS

- 5 SINCLAIRVOYANCE**
- 9 SINCLAIR USER CLUB**
- 13 NEWS**
- 21 LETTERS**
- 67 PROGRAM PRINTOUT**
- 95 STARTER PACK**
- 139 SOFTWARE DIRECTORY**



Battle 1917, page 73

GET TO GRIPS WITH ARCADE ACTION!



QUICKSHOT II £11.95

New improved design • Trigger + Top Fire Button • Auto Fire • Built in Stabilizing Suction Cups • For use with any computer with a '9 pin D' type connector. (Atari Compatible).

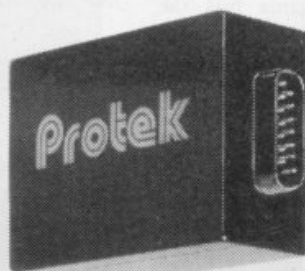


QUICKSHOT I £9.95

New improved styling • 3 Fast action fire buttons • 4' foot long cord • Arcade Control • For use with any computer with a '9 Pin D' Type connector. (Atari Compatible).

BBC JOYSTICK INTERFACE £11.95

Simply plugs in • Compatible with any Atari type Joystick, e.g. Quickshot and Games Master • Suitable for use with all standard BBC Software.



protek JOYSTICK INTERFACE

ZX SPECTRUM SWITCHABLE INTERFACE £19.95

No programming required • Simply plugs in • No additional software • Compatible at the flick of a switch with Protek (Cursor Keys) Kempston and Sinclair Joystick Software. Compatible with any Atari Type Joystick, e.g. Quickshot or Games Master.



BBC JOYSTICK SET £19.95

Contents: Quickshot I Joystick • Protek BBC Joystick Interface • In an attractive Gift Box.

ZX SPECTRUM JOYSTICK SET £24.95

Contents: Quickshot I Joystick • Protek Joystick Interface • Airliner — A Full Flight. Simulation Program (16K) • In an attractive Gift Box.



Protek=



Protek Computing Ltd, 1A Young Square,
Brucefield Industrial Park, Livingston, West Lothian. 0506 415353.

The writing on the wall

IT IS a widely-held belief that whatever happens in the United States will, sooner or later, happen on this side of the Atlantic. If that is so, we must view with some anxiety the sudden withdrawal of Timex from the home computer market in the U.S., a withdrawal announced with a somewhat ominous prediction from Mike Jacobi, vice-chairman of marketing and sales at Timex: "We believe instability in the market will cause the value of inventories to decline, making it difficult to make a reasonable profit."

That portentous statement refers to the price-cutting war waged recently in the States, a war which claimed several dead and not a few wounded, and which continues to influence the marketing strategies of those micro manufacturers fortunate enough to survive.

When Sinclair Research introduced the ZX-81 in the U.S. it

'In the long run it should result in a more stable, more mature computer industry'

was welcomed with immediate, if moderate success, selling an estimated 500,000 machines by the spring of 1982, at which point Sinclair handed the marketing to Timex. Six months later Timex launched its version of the ZX-81, the TS-1000, which proved to be even more popular than its predecessor. In three months 600,000 units were sold, securing for Timex a staggering 25 percent of the total U.S. home computer market. So far, so good.

Bouyed by such an achievement, the company predicted confidently at least a doubling of unit sales in 1983. The optimism was shared by others, among them Mattel, Commodore, Atari and Texas Instruments. A year later only two of those companies would still be manufacturing home computers, and only one, Commodore, would not have sustained enormous losses.

The move towards chaos in the market was initiated by Texas Instruments, which made a bid to secure a large share of the market by reducing its prices drastically to compete with Atari and Commodore; cutting them so low, in fact, that the TI 99/4a was selling for \$20 less than it cost to produce. In October, 1983 Texas Instruments decided to cut its losses — more than \$500 million for the year — and withdraw. Mattel Electronics had already reached a similar decision a month

'At least 25 percent of personal computer owners no longer use them'

earlier. Atari sustained losses of the same magnitude but survived, bloody but unbowed, and now refuses to be drawn into another price war, instead increasing its prices by \$40 a machine. Only Commodore emerged victorious, achieving record sales and appearing well set for continuing success.

An uneasy peace prevails but for Timex it has arrived too late. During 1983 sales of the new computer, the TS-1500, were poor and even the big discounts offered on the TS-1000

before Christmas, when it sold for as little as \$15, did nothing to maintain the Timex share of the market. The latest machine, the TS-2068, barely got off the ground.

Where does all that leave Sinclair Research? It seems likely that the company will forego the low end of the market and concentrate on selling the QL, which at \$499 should appeal to buyers who increasingly are expecting more from their computers. The company plans at first to sell through its traditional mail order policy, though it will have to opt for stronger promotion than it exercised in the U.K. where, it seems, Sir Clive has only to announce the ghost of an idea for consumers to be falling over themselves to be first in the queue.

As for stability in the British market, the shakeout has already begun, with Grundy and Jupiter Cantab the first casualties. In almost every direction companies are falling by the wayside. Distributors, software houses and add-on manufacturers are all feeling the pinch and even Sinclair Research disclosed disappointing profits for the first six months of the last financial year.

If all that sounds gloomy, in the long run it should result in a more stable, more mature, computer industry which must be good news for the consumer. The less professional fly-by-night companies will disappear or be amalgamated into larger, more viable concerns, and the consequent tightening of standards will ensure that the buyer has his money's worth. As Mark Eyles of Quicksilver sums up: "The computer industry has grown to the size where you have to have a fairly stable business-like approach to survive."

There is, however, a nagging suspicion that the worst is yet to follow. It has become apparent in the States that all is not well with the consumers. Research prepared for the U.S. magazine *Infoworld*, in November, 1983 revealed that at least

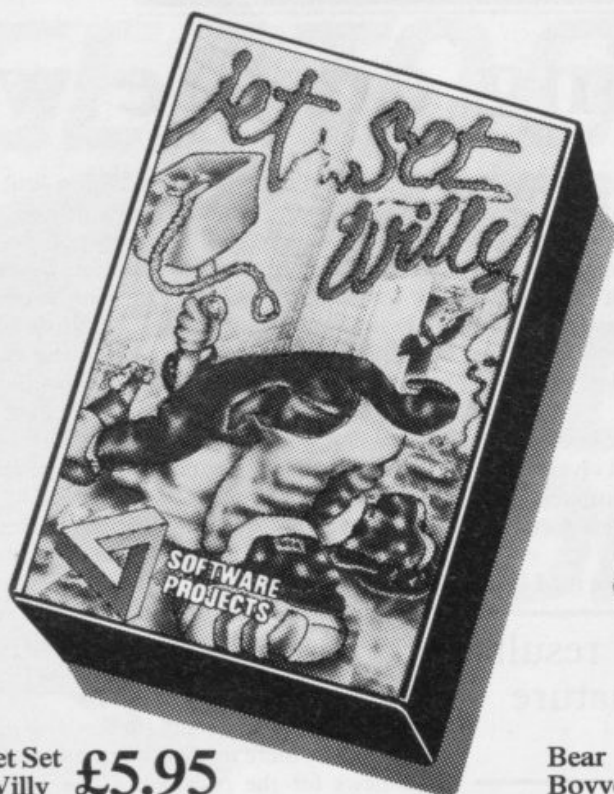
'It has become apparent in the States that all is not well with the consumers'

25 percent of personal computer owners no longer used them. The percentage was even higher among those who had owned a micro for less than six months. Another illuminating fact was that the less expensive the computer, the less it was being used. Of those who had paid less than \$300 for their machines, half had ceased to use them.

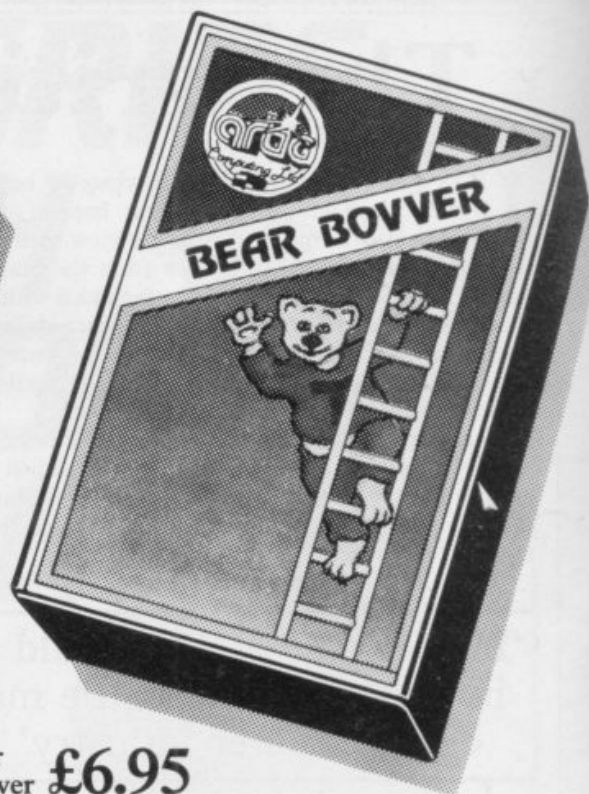
Reasons for the micro-in-the-wardrobe syndrome centred on false expectations on the part of the purchaser. Many bought computers only to find the claims made of its as an indispensable home aid to be greatly exaggerated, as it was little more to them than a glorified games machine which they soon grew tired of using.

Does that signify that all now caught in the latest craze to follow the now extinct hula hoops and pogo sticks? Probably not, for though computers are not yet essential in the home they soon will be, as networks, databases, electronic funds transfer and electronic mail come into their own. Games will then be the side product, not the mainstay, of the industry.

In the meantime, if your Spectrum is gathering dust under the stairs, side by side with the frisbees, skateboards and roller skates, you had better keep quiet about it. It would never do, after all, to criticise the Emperor's new clothes, would it?



Jet Set Willy £5.95



Bear Bover £6.95

Thousands of Spectrum



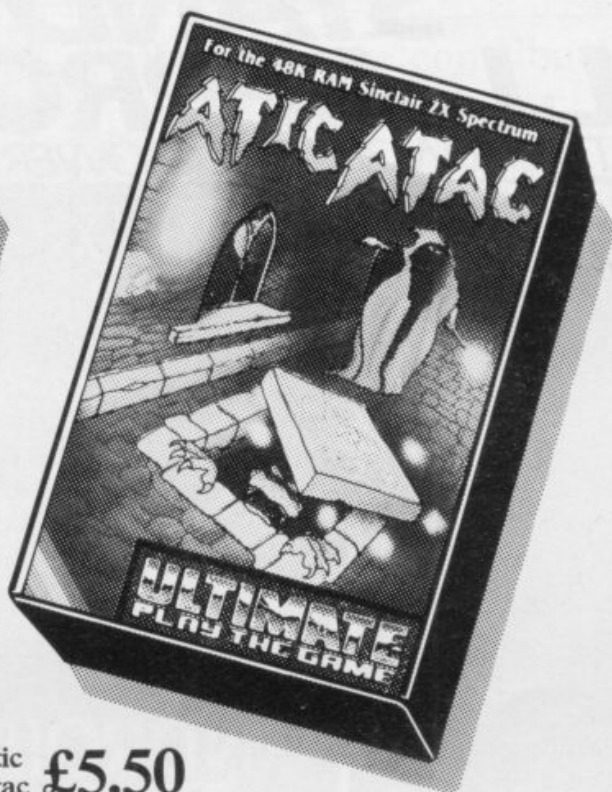
Chequered Flag £6.95



Ant Attack £6.95



Speed
Duel £5.95



Atic
Atac £5.50

owners know we're in the right game

Last year W.H. Smith sold thousands of Sinclair Spectrums, making us one of the leading stockists in the country and the ideal choice for Spectrum Software.

With Arcade Games ranging from Jet Set Willy to Ant Attack we've got action and excitement just waiting for you.

Of course, our range doesn't just stop at games. As leading stockists, we can also offer you an extensive choice of educational software.

What's more, we're constantly updating the range, as new software is released so you can count on us having all the latest, most current programs.

In fact, for the full spectrum, you can't do better than come to the people who know the game.

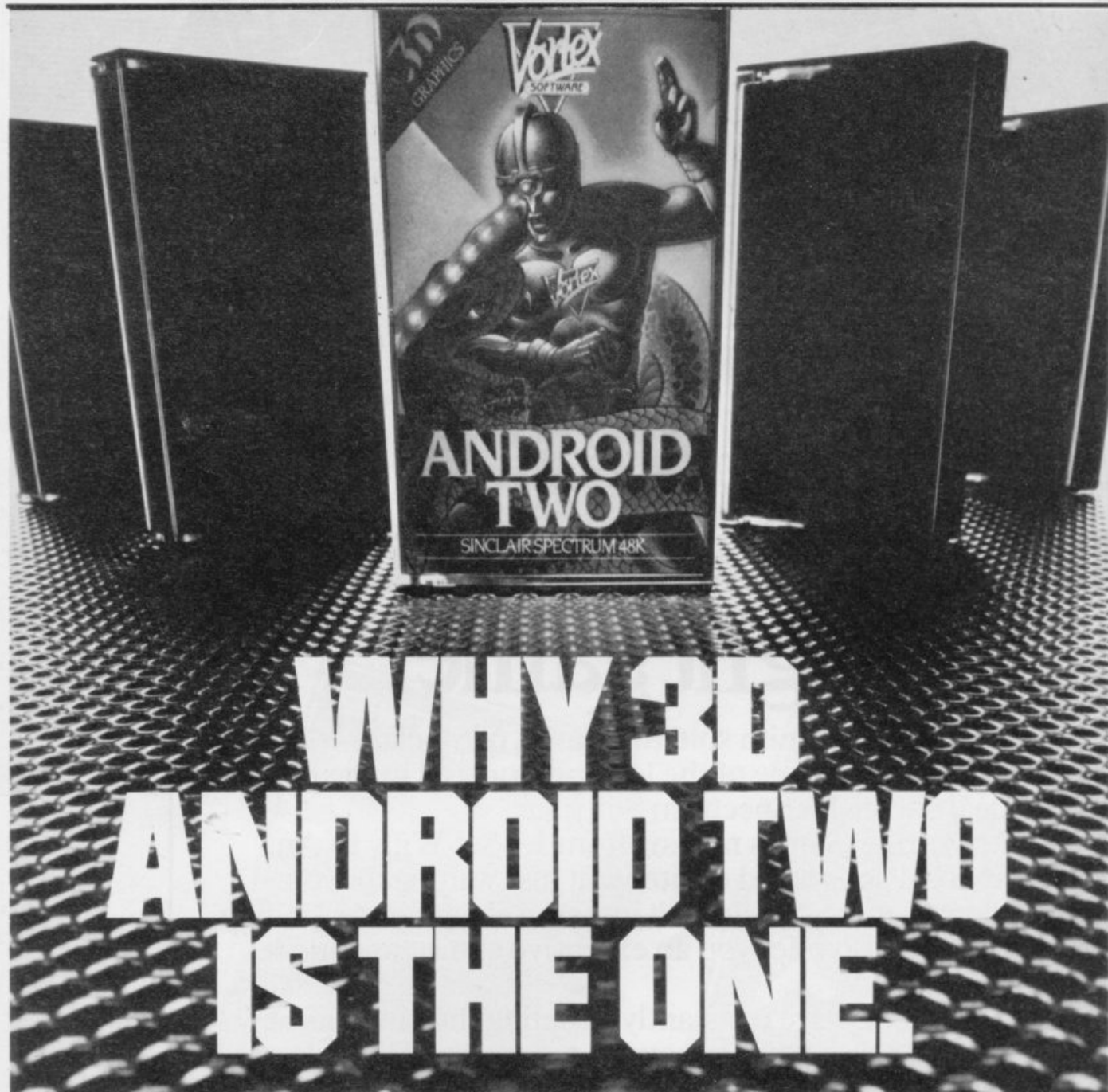
WHSMITH



Subject to availability. Prices correct at time of going to press. At selected branches only.

STAND BY. T.L.L. APPROACHES.

THE NEW 3D MINDBLOWER FROM VORTEX.



“The superb 3D effect... gives an impression of vastness which I certainly have not seen in any other game.” **HOME COMPUTING WEEKLY**

“Striking 3D graphics...” **SINCLAIR USER**

“... enough to keep you playing until the wee hours. Superb.” **POPULAR COMPUTING WEEKLY**

“... highly addictive and first rate value for money. Highly recommended.” **CRASH**



PLEASE RUSH ME

☐ ANDROID TWO SPECTRUM 48K £5.95
☐ ANDROID ONE SPECTRUM 16K + 48K £4.95

TOTAL VALUE £

Games suitable for keyboard and joystick

NAME

ADDRESS

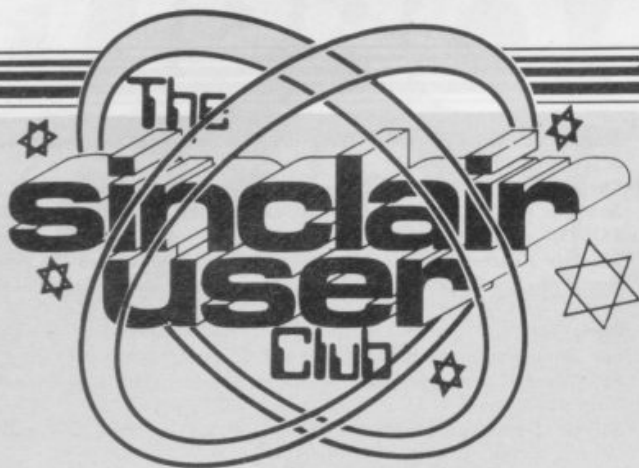
BLOCK LETTERS PLEASE

Enclose PO/cheque payable to VORTEX SOFTWARE and send to VORTEX SOFTWARE, 280 BROOKLANDS ROAD, MANCHESTER M23 9HD.

DEALER ENQUIRIES • CALL 061 973 9580

SUS

SEEK OUT ANDROID TWO AT W.H.SMITH, BOOTS, JOHN MENZIES AND OTHER GOOD RETAILERS.



CLUB BENEFITS

Bi-monthly club cassette available to all club members.
Special discounts on hardware, software and books.
Members recover their membership fee many times over.
Free Club software. Telephone Helpline.
Machine code teach-in. Technical advice.

3D bargains

THIS MONTH the Club can offer software and hardware at a reduced rate. The hardware consists of the **RD Digital Tracer** which is suitable for the Spectrum and the ZX-81. The tracer is like a mechanical arm which can be run over the lines of a picture, map or photograph. The software on offer includes the full range of 3D games for the ZX-81 from New Generation. **3D Monster Maze** takes place in the corridors of an ancient maze in which a terrifying dinosaur plods around. When you hear it coming you had better run or you will be eaten as the monster approaches and opens its mouth. **3D Defender** was one of the first games to use three-dimensional spaceships.

Black Star, from Quick-silva, is also a 3D game. When playing it you might be reminded of the Death Star in **Star Wars**.

For the Spectrum we have a range of software from dK'tronics.

All offers can be obtained only by Club members and



are available until the end of May.

If you are not a member but intend to join this month, you can take advantage of the hardware and software. Send an order with your membership fee.

	List price	Offer price
Hardware		
RD Digital Tracer	£55	£49.50
ZX-81 software		
3D Monster Maze	£4.95	£3.90
3D Defender	£4.95	£3.90
3D Black Star	£4.95	£3.90
Spectrum Software		
Mrs Mop	£5.95	£4.90
Apple Jam	£5.95	£4.90
Centi-Bug	£4.95	£3.90
Galactians	£5.95	£4.90
Gold Mine	£4.95	£3.90
Hard Cheese	£4.95	£3.90

Club software contributor on the road to success

Micro mania pays off

ONE OF the more pleasant tasks encountered when organising the Sinclair User Club is to report on any member who has achieved a reasonable level of distinction in their chosen hobby. That must surely apply to Chris Hinsley.

Club members will recognise the name as being one of our regular software contributors on the club cassette. The excellent **Scramble** program on the February tape is one example.

Hinsley says he first became interested in computers after visiting the terminal room at St Bede's Grammar School, Bradford. It was after that he decided to take O level computer studies but found that the course was full. He decided to study in his own time and after three months managed to pass the subject with a top grade. He admits that while studying for A level examinations computer mania set in. He and a close friend, Andrew Pizcub, used regularly to spend up to 24 hours a day in front of a ZX-81 learning machine code. Initially that proved a

difficult task but the club help-line assisted him to become proficient in the language. By the winter of 1983-84, he had experience of programming several machines in machine code — Z-80, 6502, 6809 — and had written a number of games for the ZX-81 and Spectrum.

He then obtained a place at Derby college on an HND computer studies course. Although he enjoyed college life, he experienced an urge to concentrate on his programming career and last Christmas decided to leave college and join a well-known software company.

When asked about his plans, Hinsley says he would like to be the best computer games writer in history — and to make a great deal of money.

CLUB NEWS

MEMBERSHIP FORM

I wish to join the Sinclair User Club and enclose my subscription of £12

Name

Address

Which computer do you own?

ZX-81 ☐ Spectrum ☐

Send your coupons to Sinclair User Club, ECC Publications, 196-200 Balls Pond Road, London N1 4AQ. Cheques should be made payable to Sinclair User Club.

Sinclair User Club

Britain

Aylesbury Computer Club: 12 Long Plough, Aston Clinton, Aylesbury, Bucks.

Aylesbury ZX Computer Club: Ken Knight, 22 Mount Street, Aylesbury (5181 or 630867). Meetings: first Wednesday and third Thursday of the month.

Basildon: Roundacre Microcomputer Users' Club. J Hazell, Basildon 285119/416333. Meetings every Wednesday 7.30 to 10.30pm.

Bristol Yate and Sodbury Computer Club: 99 Woodchester Yate, Bristol, BS17 4TX.

Cardiff ZX Club: Steve Smith (0222) 593237 or Mike Hayes (0222) 371732. Meets twice a month.

Colchester Sinclair User Group: Richard Lown, 102 Prettygate Road, Colchester CO3 4EE.

Crewe and Nantwich Computer Users' Club: J E A Symondson, 46 London Road, Stapeley, Nantwich, Cheshire CW5 7JL.

Doncaster and District Micro Club: John Woods, 60 Dundas Road, Wheatley, Doncaster DN2 4DR; (0302) 29357. Meetings held on second and fourth Wednesday of each month.

Eastwood Town Microcomputer Club: E N Ryan, 15 Queens Square, Eastwood, Nottingham B12 9DS.

Edinburgh: Edinburgh Home Computing Club. John Palmer (031 661 3183) or Iain Robertson (031 441 2361).

EZUG-Educational ZX-80-81 Users' Group: Eric Deeson, Highgate School, Birmingham B12 9DS.

Furness Computer Club: R J C Wade, 67 Sands Road, Ulverston, Cumbria (Ulverston 55068). Meets every other Wednesday.

Glasgow ZX-80-81 Users' Club: Ian Watt, 107 Greenwood Road, Clarkston, Glasgow G76 7LW (041 638 1241). Meetings: second and fourth Monday of each month.

Gloucester: Mid-weekly Spectrum User Group. Barry Ledbury, 8 Linnet Close, Gloucester GL4 9XA (0452) 23186.

Gravesend Computer Club: c/o The Extra Tuition Centre, 39 The Terrace, Gravesend, Kent DA12 2BA. Bi-monthly magazine and membership card.

Hassocks ZX Micro User Club, Sussex: Paul King (Hassocks 4530).

Inverclyde ZX-81 Users' Club: Robert Watt, 9 St. John's Road, Gourrock, Renfrewshire PA19 1PL (Gourrock 39967). Meets every other Monday at Greenock Society of the Deaf, Kelly Street, Greenock.

Keighley Computer Club: Colin Price, Redholt, Ingrow, Keighley (603133).

Lambeth Computer Club: Robert Barker, 54 Brixton Road, SW9 6BS.

Liverpool ZX Club: Meetings every Wednesday 7pm at Youth Activities Centre. Belmont Road, Liverpool 6. Details from Keith Archer, 031-236 6109 (daytime).

Manchester Sinclair Users' Club: Meets every Wednesday, 7.30pm, at Longsight Library, 519 Stockport Road, Longsight — 061-225 6997 or 061 445 6316.

Meopham: National ZX Spectrum User Club. Guy Fullalove, Woodcotes, Camer Park, Meopham, Kent DA13 0XS. Bi-monthly newsletter, subscription £1.50. Send SAE for details.

Merseyside Co-op ZX Users' Group: Keith Driscoll, 53 Melville Road, Bootle, Merseyside L20 6NE; 051-922 3163.

Micro Users' Group: 316 Kingston Road, Ewell, Surrey KT19 0SY.

Mid-Kent Micro Club: Meets once monthly. Enquiries to M Gates, 65 Buckland Road, Maidstone ME16 0SH.

Newcastle (Staffs) Computer Club: Meetings at Newcastle Youth and Adult Centre, Thursday, 7.30. Enquiries to R G Martin (0782 62065).

North Hertfordshire Home Computer Club: R Crutchfield, 2 Durham Road, Stevenage; Meetings: first Friday of the month at the Settlement, Nevells Road, Letchworth.

Northern Ireland Sinclair Users' Club: P Gibson, 11 Fitzjames Park, Newtownards, Co Down BT23 4BU.

North London Hobby Computer Club: ZX users' group meets at North London Polytechnic, Holloway Road, London N7 Monday, 6pm.

Nottingham Microcomputer Club: ZX-80-81 users' group, G E Basford, 9 Holme Close, The Pastures, Woodborough, Nottingham.

Orpington Computer Club: Roger Pyatt, 23 Arundel Drive, Orpington, Kent (Orpington 20281).

Perth and District Amateur Computer Society: Alastair MacPherson, 154 Oakbank Road, Perth PH1 1HA (29633). Meetings: third Tuesday of each month at Hunters Lodge Motel, Bankfoot.

Regis Amateur Microcomputer Society: R H Wallis, 22 Mallard Crescent, Pagham, Bognor Regis, West Sussex PO21 4UU.

Roche Computer Club: 8 Victoria Road, Coop Rooms, Roche, Cornwall: 0726 890473.

Scunthorpe ZX Club: C P Hazleton, 26 Rilestone Place, Bottesford, Scunthorpe; (0724 63466).

Sheffield: South Yorkshire Personal Computing Group. Enquiries to R Alderton (0742 20571), S Gray (0742 351440), P Sanderson (0742 351895).

Sinclair Amateur Radio User Group: Send SAE or two IRCs for details. Paul Newman G4 INP, 3 Red House Lane, Leiston, Suffolk IP16 4JZ.

Sittingbourne: Anurag Vidyarth (0795 73149). Would be interested to hear from anyone who wants to start a club near the Medway towns.

St Albans: Bi-monthly meetings and a magazine. Details from Adam Slater, 40 Watford Road, St Albans, Herts AL1 2HA. (0727 54176).

Stratford-on-Avon Computer Club: Meets on the second Wednesday of every month. Telephone: 0789 68080 for details.

Swansea Computer Club: B J Candy, Jr Gorlau, Killay, Swansea (203811).

Swindon ZX Computer Club: Andrew Bartlett, 47 Grosvenor Road, Swindon, Wilts SN1 4LT; (0793) 3077. Monthly meetings and library.

Sutton: Sutton Library Computer Club, D Wilkins, 22 Chestnut Court, Mulgrave Road, Sutton, Surrey SM2 6LR.

West Sussex: Midhurst and District Computer User Group. Enquiries to V Weston (073 081 3876), R Armes (073 081 3279).

Worle Computer Club: S W Rabone, 18 Castle Road, Worle, Weston-super-Mare BS22 9JW (Weston-super-Mare 513068). Meetings: Woodsprings Inn, Worle, on alternate Mondays.

ZX-Aid: Conrad Roe, 25 Cherry Tree Avenue, Walsall WS5 4LH. Please include sae. Meetings twice monthly.

Overseas

Austria: ZX User Club, Thomas Christian, c/o Wissenschaft Forscht e. V., Postfach 141, A1190 Vienna. Meets every first Friday of the month. Telephone 0222-44 32 050 for details.

Belgium, France and Luxembourg: Club Micro-Europe, Raymond Betz, 38 Chemin du Moulin 38, B-1328 Ohain, Belgium (32/2/6537468).

Denmark: Danmarks National ZX-8081 Klub (DNZK), Jens Larson, Skovmosevej 6.4200 Slagelese, post giro 1 46 24 66.

ZZ-Brugergruppen i Danmark, Boks 44, 2650 Hvidovre, Gratis medlemskab og gratis blad til enhver interesseret.

J Niels-Erik Hartmann, OZ-ZX-Radioamator, Bruger Gruppe, Bredgade 25 DK-4900, Nakskov.

East Netherlands: Jonathon Meyer, Van Spaen Straat 22,6524 H.N. Nijmegen; (080 223411).

Germany: ZX Club, a postal club; contact Aribert Deckers, Postfach 967, D-7000 Stuttgart 1, West Germany.

Indonesia: Jakarta ZX-80/81 Users' Club, J S Wijaya, PO Box 20, Jkuk, Jakarta, Utara, Indonesia.

Irish Amateur Computer Club: Martin Stapleton, 48 Seacourt, Clontarf, Dublin 3. (331304).

Irish Sinclair Users Club: PO Box 1238, Dublin 1. Publishes a newsletter. Send SAE for details.

Italy: Sinclair Club, Via Molino Vecchio 10/F, 40026 Imola, Italy. Genova Sinclair Club; Vittorio Gioia, Via F Corridoni, 2-1, telephone 010 3125 51.

Micro-Europe: Belgium or Club Paris-Micro, 19 Rue de Tilly, 92700, Colombes, France; associated with Club Micro-Europe.

Republic of Ireland: Irish ZX-8081 Users' Club, 73 Cnoc Crionain, Baile Atha, Cliath 1.

Singapore: Sinclair Users' Group: Eric Mortimer, 1D Wilmer Court, Leonie Hill Road, Singapore.

South Africa: Johannesburg ZX-80-81 Computer Users' Club: S Lucas, c/o Hoechst SA (Pty) Ltd, PO Box 8692, Johannesburg.

Johannesburg ZX Users' Club: Lennert E R Fisher, PO Box 61446, Marshallstown, Johannesburg.

Dumont and Syndercombe Amateur Computer Club. Jean-Pierre Dumont would like to correspond with ZX-81 owners via tapes. Write to 8 Kipling Road, Farrarmere, Benoni 1500, Transvaal.

ZX SA Club: Jonathan Jones, House 14, Anglo Alpha PO Box 15, 1725 Roodepoort.

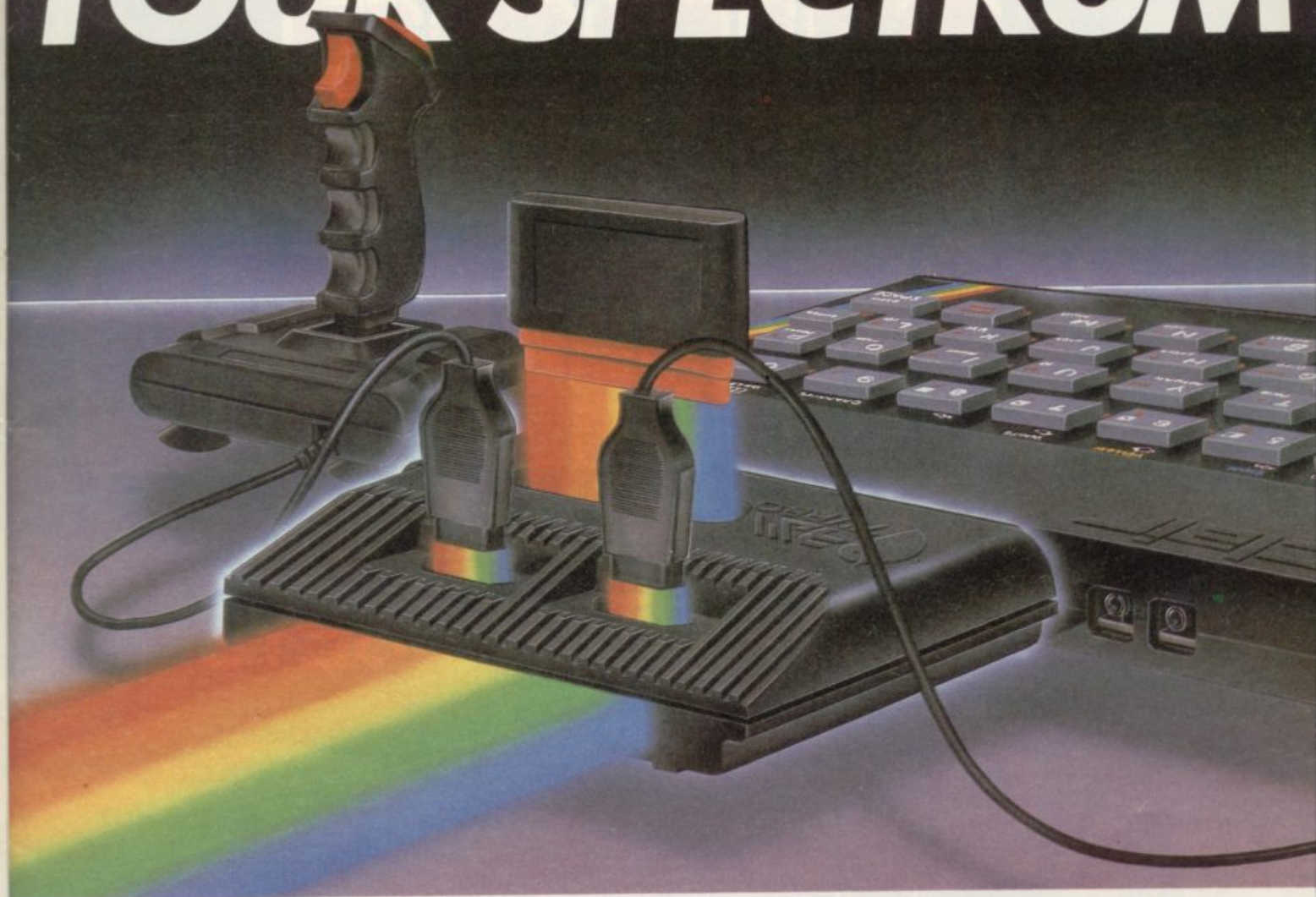
Spain: Club Nacional de Usuarios del ZX-81, Joseph-Oriol Tomas, Avda. de Madrid, No 203 207, 10, 3a esc. A Barcelona-14 Espana. International ZX Spectrum Club: Gabriel Indalecio Cano, Sardana, 4 atrico 2a, San Andres de la Barca, Barcelona. Send international reply coupon. Produces a bi-monthly magazine. Spanish ZX Micro Club: Apartado 181, Alicante (Costa Blanca), Spain.

ZX Club Spain: C Benito PO Box 3253, Madrid, Spain.

Swedish ZX-club: Sinclair Datorklubben, Box 1007, S-122, 22 Enskede.

United States: Bay Area ZX-80 User Group, 2660 Las Aromas, Oakland CA94611.—Harvard Group, Bolton Road, Harvard MA 01451: (617 456 3967).

TURBO CHARGE YOUR SPECTRUM



Outperforms any Spectrum interface

The unique Turbo interface from Ram gives you all these features – and more – in one unit:

- * A variety of interfaces including: Rom cartridges, two 9-way D plugs for standard joysticks, PLUS full expansion bus at rear.
- * Compatible with Kempston and Protek protocols.
- * Works with latest Quickshot Mk II auto rapid-fire joysticks!
- * Choice of Rom cartridge or tape cassette software.
- * Instant program loading with cartridge software.
- * Built-in power safety device – unique to Ram Turbo.
- * Full one year guarantee.
- * Immediate availability – orders will be despatched within 28 days of receipt of order.
- * Incredible value – only £22.95.

So don't wait around – simply complete the coupon and send it to us today.

Or call our credit card hot line on 02514 25252. (Access and Visa welcome).

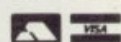
Ram Electronics (Fleet) Ltd, 106 Fleet Road, Fleet, Hampshire GU13 8PA.

Please send me:

_____ Spectrum Turbo Interface(s) at £22.95
+ £1 p+p (overseas orders £3 p+p)

_____ Quickshot II Joystick(s) at £9.95
(Only when purchased with Turbo – normally £12.95 + £1 p+p)

I enclose cheque/postal order or charge my Access/Visa for: £ _____



Name _____

Address _____

Tel _____ SU5

To: Ram Electronics (Fleet) Ltd, 106 Fleet Road, Fleet, Hampshire GU13 8PA.

Trade and export enquiries welcome.



See us at
the PCG Show,
Solihull from
April 20-22

A SENSATIONAL ADVANCE IN
COMPUTER GAME TECHNOLOGY

MICRO COMMAND

YOU SPEAK—
THE COMPUTER OBEYS

- Easily programmed voice control
- Sensitive to individual voice prints
- Instant response on screen
- Your attention can stay on the screen
— not on the controls

FOR USE
WITH **sinclair**
ZX Spectrum

HOME COMPUTER UNITS

MAJOR PRICE
BREAKTHROUGH ONLY
£49.95 R.R.P.



Further Distributor, Dealer and Export Enquiries Welcome
ORION DATA
3 Cavendish Street, Brighton, East Sussex
BN2 1RN
Tel.: (0273) 672994

Vehicle deal for Hoover

THE SINCLAIR Vehicle Project, researching into the electric car, has confirmed that it is negotiating with Hoover regarding the assembly of its first electric car.

It will be assembled under subcontract at the Hoover plant at Merthyr Tydfil. Sinclair had been negotiating to take over the De Lorean car factory in Northern Ireland but a company spokesman, Barrie Wills, head of the SVP, says:

"The Hoover advanced high-volume assembly capacity and considerable experience with electrical products are ideal for this project."

The first of the Sinclair family of electric vehicles is planned for launch in late 1984 or early 1985, depending on progress of negotiation concerning manufacture.

No chips — no problem

THE WORLD shortage of microchips has worsened and, as a result, prices have risen. Sinclair Research, however, stresses that the situation has not affected its production either of microcomputers, such as the Spectrum or the QL, or peripherals, such as Interface One. A spokesman for the company says:

"We are having no problems. There is an acute shortage of chips in the world but if people take that into account and order about six months in advance they should have no difficulty."

"If, however, a company orders supplies overnight, they will have difficulty. One would certainly occur if a company underestimated its chip needs. It would be unlikely that it could get supplies quickly."

Dealers set to lose as Imagine cuts prices

IMAGINE SOFTWARE has reduced the retail price of all its products to £3.95. The reduction even includes its new release, **Pedro**, for the 48K Spectrum and future software developments. A spokeswoman for the company says:

"We think we should pass the profits we have made in the last year to our customers who, we feel, are paying too much for software at the moment."

Other software houses do not believe the reduction will lead to a price-cutting war. A spokeswoman for Melbourne House, publisher of **The Hobbit**, says: "We certainly

would not reduce our prices. We have to pay the salaries of our staff. If Imagine wants to cut its prices that is up to Imagine but our prices are very fair and we shall keep to them."

The same is true of Quicksilver. A spokesman for that company says: "We do not need to cut our prices."

W H Smith, one of the biggest retailers of computer software, is not concerned about the price cuts. A spokeswoman says: "We get along perfectly well with Imagine. It is one of the biggest and most successful software houses so it must know what it is doing. Dealers who

have bought large stocks before the prices went down might be angry but we do not hold too much stock of any of the lines."

The Guild of Software Houses does not share that view. Mike Johnston, secretary of the association, says: "It is potentially damaging to the industry. It will cut margins for profit and there will be less money for development. It is, of course, for people to take whatever action they think is necessary but we will be considering our position very carefully."

Meanwhile, Imagine is having problems due to the termination of an agreement with publisher Marshall Cavendish to provide software for a part-work called **Input**. The company was to have produced 30 programs for the publication but Marshall Cavendish rejected them. That leaves the company with only a few new programs. A spokesman for Imagine says:

"Marshall Cavendish decided that it did not want to publish the programs with the part-work. The company did not think it would be suitable to do so."

Colin Stokes, former sales manager of Imagine, has been dismissed by the company for allegedly commenting on the 'financial state of Imagine to rival companies or individuals'. An injunction was sought against Stokes to prevent him disclosing information or starting a rival company.

Stokes, who now works for Software Projects, disputes the validity of the contract which he signed with Imagine as it prevents him setting up his own rival company after leaving Imagine.

More news page 15



Hours and hours and hours . . .

THE WINNER of the £500 Splat! competition organised by Incentive Software for one of its games is 17-year-old James Tant. The object was to achieve the highest score with Splat, a maze game where the maze moves. The scores were checked using a hi-code generator built into the program which produced a code for each score.

Tant attained a massive 112,930 points and when he visited the Incentive offices to verify the score he did even

better. His secret was between five and seven hours on the game every day for three months.

Hundreds of entries were received according to Incentive. The lowest score was 520 points and the average was around 10,500.

The new Incentive competition is to find the first person to complete the **Ket Trilogy** of adventure games. The prize will be a video recorder.

the LLAMA has LANDED!

..... and it's breeding fast.

Once upon a time, only Commodore owners could experience the thrill of playing an original game by Jeff 'Awesome' Minter. Lesser mortals could only sit and stare in wonderous rapture at the furry arcade action brought to you by Llamasoft.

BUT NOW THERE IS HOPE.

Dragon owners were the first to see the light of day, but now Salamander Software is pleased as punch to announce that selected titles **ARE NOW AVAILABLE FOR THE 48K SPECTRUM.**

Yes that's right, Salamander is now producing titles for the Spectrum, and the first of these are two great arcade games.

METAGALACTIC LLAMAS BATTLE AT THE EDGE OF TIME

On a forlorn observation post at the edge of the galaxy, the Metallamas wait for a sign of Zzyaxian spaceships. Suddenly the alarm claxons blare, and the furry friends of freedom rush to the fore only to find that there are no attacking spaceships, and that they are under attack from Cyborg Arachnid Mutants and Disgusting Weeviloids.

This classic arcade game, originally developed by Jeff 'Awesome' Minter of Llamasoft, features 1 and 2 player options, spitting Llamas, Cyborg Arachnid Mutants, Disgusting Weeviloids, 99 levels of play. Joystick recommended. Supports Spectrum ZX Interface 2 and Kempston joysticks.

MATRIX: GRIDRUNNER II

It is ten years after the infamous Grid Wars, and humanity is once again threatened by the evil droids, only this time they're back in force with new weapons and new allies.

The awesome sequel to the best selling Gridrunner, Matrix features all the old favourites like Droids and Zappers, but increases the panic quotient by adding Diagonal waves, Cosmic Cameloids, Energy deflexors, the Snitch and more.

Game originally developed by Jeff 'Awesome' Minter of Llamasoft. Joystick recommended. Supports Kempston and AGF joystick interfaces. In space, only the camels can hear you scream.

What some famous people have said . . .

"What's an arcade game	Aristotle
"Awesome"	Jeff Minter
"I prefer elephants"	Hannibal
"Don't shoot me, I'm only the piano player"	Elton John
"Boing"	Zebedee



**48K
SPECTRUM**

Please add 50p P.&P. to all orders. Send A5 SAE for full catalogue.

Cheques or postal orders payable to:

Salamander

SOFTWARE

17 Norfolk Road, Brighton, BN1 3AA. Telephone: (0273) 771942.

48K SPECTRUM TITLES *These titles available through Quicksilver Ltd.

Metagalactic Llamas Battle at the Edge of Time £6.95 • Matrix £6.95 • Gridrunner £6.95 • Traxx £6.95 • Laser Zone £6.95

DRAGON 32 TITLES Gridrunner £7.95 • Laser Zone £7.95



SELECTED TITLES AVAILABLE FROM:
John Menzies
WHSMITH




Andrew Hewson

Machine code book a winner

ANDREW HEWSON and John Hardman received the award for the Best Computer Book 1984 at the recent Computer Trade Association Awards ceremony.

The winning book was *40 Best Machine Code Routines for the ZX Spectrum* which, because of its success, is now being published in German and Spanish.

The award was presented by Trade and Industry Secretary John Butcher to Hewson, author of the *Sinclair User Helpline*.

Promises, promises

HAS THE QL finally arrived? At the time of going to press a spokesman for Sinclair Research was confident some customers would receive their computers by the beginning of April, but declined to estimate how many orders would be fulfilled.

The delays have caused a reduction in orders received, though the number is well in excess of 10,000. Customers ordering QLs in March received acknowledgments with expected delivery dates in June, when monthly production should be nearing the promised 20,000 units.

It was also expected that the ZX Microdrive and the Interface 1 were to be made available during April at retail outlets including W H Smith, Boots, Menzies and Prism Microproducts. Sinclair Research is anxious to scotch the myth that Microdrives are difficult to obtain.

Timex moves out after watch on computer trade

TIMEX, watchmaker and former distributor of Sinclair computers in the United States, has withdrawn from the computer market. The move has left Sinclair Research with the opportunity to expand its operation in the States and of introducing its marketing strategy there. Sinclair Research, however, has no plans to introduce the Spectrum to the American market.

A spokesman for Timex

Corp explained the reasons for the withdrawal. He says that 1984 will be a year of turmoil in the market. "We believe instability in the market will cause the value of inventories to decline, making it difficult to make a reasonable profit."

Timex also believes that the instability of the market will cause a strain on trade relations between retailers and manufacturers. Other Ti-

mex product lines are doing well, according to the company, so it can divert money marked previously for the computer market to other divisions of its business.

Sinclair Research sees it as unlikely that any of the problems cited by Timex will affect it. A spokesman for the company says: "Sinclair Research does not believe that the so-called instability will affect the QL market."

Stack tower to rise as add-on company falls

BASICARE, the company which produced the stack modules for the ZX-81 and Spectrum, has gone into voluntary liquidation. The move resulted partly through financial problems and because one of the partners wanted to do other things, according to

Peter Choy, the other partner in the company. He says:

"Benny Leung did not want to continue with Basicare and as part of our agreement we decided to go into liquidation."

"I have the technical knowledge in the company,

so I will be continuing to build the modules and sell them through a different company."

The modules include one which contains David Husband's ZX-81 Forth. That will be used for control applications. It will be a unit to complete the stack tower for which Basicare is famous but it will also be possible to use it alone.

Test run for Romox

THE ROMOX electronic software distribution system, from Prism Technology, has begun initial test operation in chain stores round the country. The Romox is a cartridge ROM system with a difference. The customer inserts a blank cartridge into the machine, which then programs it with a piece of software. The customer can take home

the newly-programmed cartridge and, when finished with it, can return it to the store to be re-programmed with a new piece of software.

At first, Romox is likely to go to retailers which have had previous dealings with Prism. They include W H Smith, Boots and Dixons and the stores are likely to be situated in the affluent south-east of

England. Prism is distributing 40 titles for the Romox but the list of titles will be increased as more prime U.K. software houses make agreements with Prism to have their software channeled on to ROM cartridge.

Prism will not be short of American inventiveness either, as 300 titles from the States are to be used with the new distribution system.

Prism feels that ROM cartridge offers better security than tape or disc storage. It is almost impossible to pirate copies of programs held on ROM. That will provide an added incentive to software houses wanting to put their software on Romox but who are also security-conscious.

Top Ten			
Program	Last Month	Company	Memory
1 Chequered Flag	5	Psion	48K
2 Atic Atac	1	Ultimate	48K
3 Flight Simulation	10	Psion	48K
4 Lunar Jetman	2	Ultimate	48K
5 Cyrus-IS-Chess	—	Intelligent	48K
6 Ant Attack	9	Quicksilver	48K
7 Scuba Dive	—	Durrell	48K
8 Pool	—	CDS	16K
9 Kong	—	Ocean	16K
10 Stonkers	3	Imagine	48K

Figures supplied by W H Smith.

More news page 16

Software house fury as MoD bans device

THE GUILD of Software Houses is alarmed because the anti-copying system devised by JLC Data of Barnsley has been seized by the Ministry of Defence.

The device apparently puts a soundtrack over the normal frequencies which make up a program tape and interfere with the tape recorder if someone tries to make illegal copies of a tape. Nick Alexander, chairman of GOSH, says:

"So far, no-one has been able to develop a protection system which works. Because of the Ministry of Defence action it is not possible for us to examine the JLC Data system, but the fact that the Ministry has embargoed it with a secrecy order seems to indicate that it should be taken seriously".

Alexander suggests that if the system works and the Ministry does not release it, the Government should com-

pensate the software industry for the £100 million the industry might lose because of software piracy the system might prevent. He says:

"It seems outrageous that the Government is, by this action, endorsing and giving support to computer pirates, from simple games piracy to industrial piracy".

Meanwhile, Jim Lamont, creator of the JLC device, is trying to side-step the Ministry of Defence and the Patent

Office. Patents on the device could be banned until 1985 while the two Government departments decide whether his invention is a risk to British security.

He says that he has an alternative to his anti-piracy device which he does not intend to patent. The only problem is that the device will not be protected from industrial piracy.

The Copyright Reform Group, whose members consist of pressure groups and unions concerned with the way in which copyright laws are enforced, has petitioned the Prime Minister asking that a Bill for a reformed Copyright Law be included in the 1984-85 legislative programme.

Members of the newly-formed group include GOSH, Equity, the Musicians' Union and the British Copyright Council.

Sinclair invades Korea

THE ZX-81 and the Spectrum will soon be available in South Korea, following an agreement between Sinclair Research and Samsung Electronics.

The agreement is effective immediately and the first products are expected to arrive on the Korean market later in

the year. The computers will be assembled and distributed locally.

Sir Clive Sinclair, chairman and chief executive of Sinclair Research, signed an agreement with the president of Samsung in London. He says:

"The link gives us access

to a market of considerable potential and the comprehensive support of a powerful and highly-experienced partner".

The ZX-81 and the Spectrum each have achieved one million sales world-wide. They are available in more than 50 countries.



Play with a Griffin

So they take school in their stride



Fisons plc Scientific Equipment Division

Your children are using a computer at school far more often than you think.

Computers make learning an absorbing game and retain a child's interest and participation.

Griffin Software have selected and adapted for home use, a series of Griffin educational software titles already used in schools.

The first six titles suitable for 4 to 8 year olds, are available now.

If you have a ZX Spectrum 48K or a BBC Model B microcomputer at home, you can so easily keep up the school's good work. And the beauty of it is, the child sees it as a game!

Wordspell helps with spelling; Tablesums unravels the mysteries of tables; Fairshare uses Ollie the Octopus to make sense of division; Numberfun makes addition and subtraction easy; Wordgames helps with spelling and expands vocabulary; and with Getset a child is helped with counting.

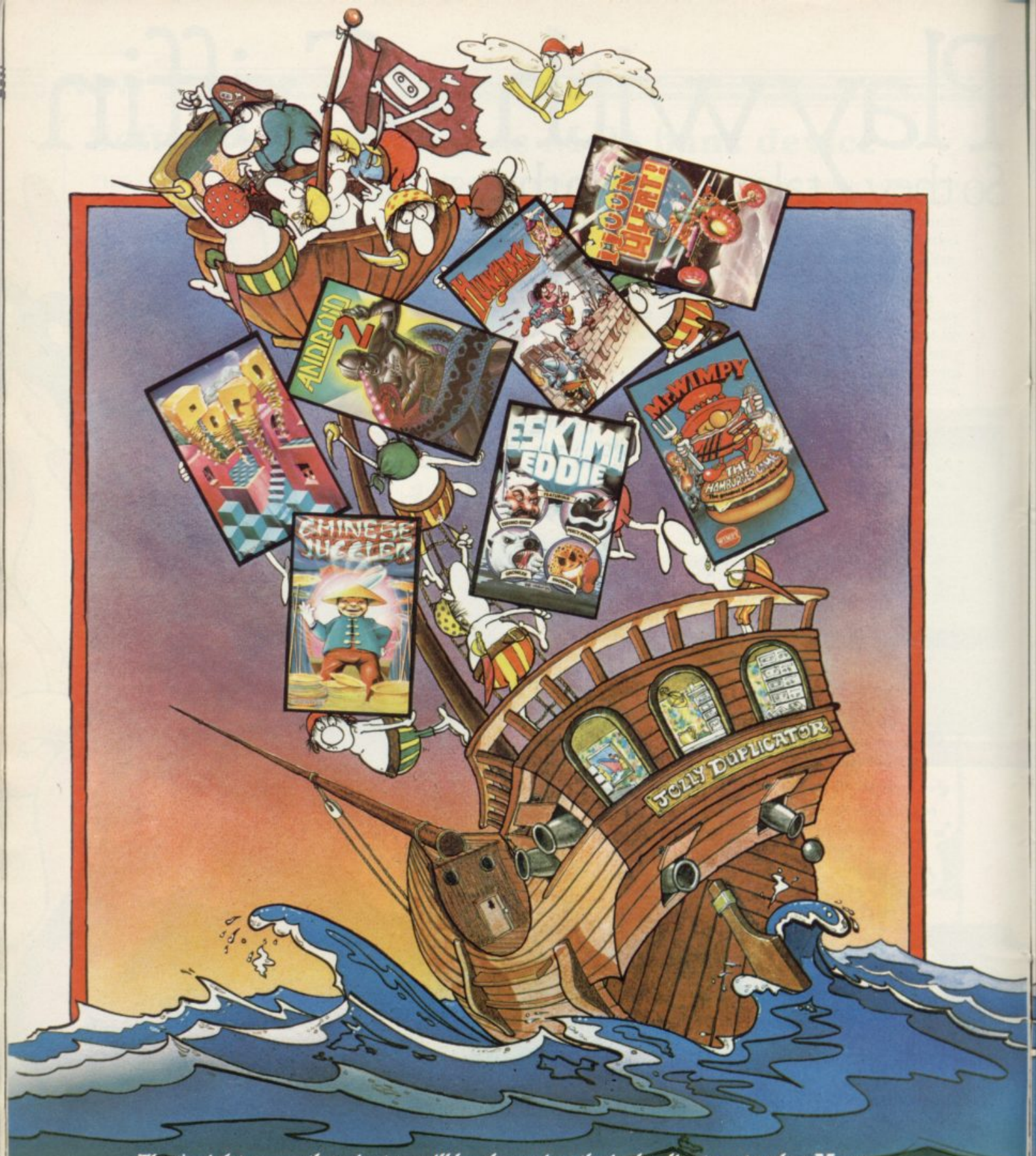
All good fun!

Griffin Software titles are at WH Smith, Boots, and other computer shops everywhere.




Only £7.99 each to suit the ZX Spectrum 48K Only £9.95 each to suit the BBC Model B

GRIFFIN SOFTWARE
- it's an education.



That's right, even the pirates will be dropping their duplicators to play **Moon Alert**, to join in the swinging fun with **Hunchback**, to attack with **Android Two**, jump for their lives with **Pogo**, spin themselves dizzy with **Chinese Juggler**, they'll just crack-up with **Eskimo Eddie's** Arctic action and there will be no stopping the captain once he gets his hook on **Mr. Wimpy** that zany burger battle.

Even the most ruthless of pirates will be kept busy trying to improve their handicaps on the testing greens of **Royal Birkdale** and if they are still game for action adventure then the **Island of Death** is the place where only the sharpest of swash-bucklers will survive. They'll all be fighting to save the



Even the pirates
can't stop playing these
priceless new gems
from Ocean!

beautiful maiden in the chart-topping **Kong**, and **Transversion** will keep the best of the fighter pirates on their toes. Don't you miss all the Ocean action, get down to your local dealer now and join in all the fun and games.

Moon Alert Spectrum 5-90
Hunchback Spectrum, Comm. 64, Oric 6-90
Android Two Commodore 64 6-90
Pogo Spectrum 5-90
Chinese Juggler Commodore 64 6-90
Eskimo Eddie Spectrum 5-90

Mr. Wimpy
Royal Birkdale
Island of Death
Kong
Transversion

Spectrum 5-90
Comm. 64, Oric 6-90
Spectrum 6-90
Oric 6-90
Spectrum 5-90
Spectrum 5-90

ocean

Ocean Software Limited
Ralli Building · Stanley Street
Manchester M3 5FD
Telephone 061-832 9143

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

ULTIMATE



THE NOT·SO·SOFTWARE

CAN YOU HANDLE THE **ULTIMATE**?
THE MOST AMAZING PROGRAMMES, THE SMOOTHEST
ACTION, THE HIGHEST RESOLUTION GRAPHICS?
ALL **ULTIMATE** GAMES ARE ARCADE STANDARD,

FEATURE PACKED, 100% MACHINE CODE.
AND PURE ADDICTION.
SO WHICH WILL BLOW FIRST - YOUR COMPUTER OR
YOUR MIND?



Cookie 16/48K ZX Spectrum



Tranz Am 16/48K ZX Spectrum



Atic Atac 48K ZX Spectrum



Pssst 16/48K Spectrum



Lunar Jetman 48K ZX Spectrum



Jet Pac 16/48K ZX Spectrum
or 8K Expanded VIC 20

ONLY £5.50 EACH

(All games joystick or
keyboard control)

Available from: W.H. Smith, Boots, John
Menzies, Spectrum Centres, large department
stores and all good software retailers. Or send the coupon direct.
We'll pack and post your order to you absolutely free in the U.K.

Okay, I dare take my computer to the edge of meltdown. Send me the following:

- | | | | |
|----------------------------------|--|------------------------------------|-----------------------------------|
| <input type="checkbox"/> Cookie | <input type="checkbox"/> Lunar Jetman | <input type="checkbox"/> Pssst | <input type="checkbox"/> Tranz Am |
| <input type="checkbox"/> Jet Pac | <input type="checkbox"/> Jet Pac - Expanded VIC 20 | <input type="checkbox"/> Atic Atac | |

I enclose cheque/PO for £ _____ Name _____

Address _____

Code _____

Send to:
Ultimate Play The Game,
The Green,
Ashby de la Zouch,
Leicestershire.



Improved magazine gets the thumbs-up

CONGRATULATIONS on the recent improvements in *Sinclair User*. The quality of print in the program printouts has been improved and the new system for displaying graphics in the printouts makes life much easier.

There was a mistake in the March issue. In the program Jaws, written for the 48K Spectrum, line 230 should read:

```
230 IF x1 < 0 THEN LET
    x1 = 30
```

Such a small error can be solved easily after consulting the *Sinclair User* Starter Pack helping with simple errors.

Soft Centre was also very useful and informative. Well done, and keep up the work to this standard.

Nicholas Wren,
aged 15,
Oxford.

● *Soft Centre will next appear in the June issue of Sinclair User.*

Struggling with Forth

WHAT a very interesting article on Forth was printed in the March issue. I bought Abersoft Forth three or four weeks before I had seen the article. The language seems to be ideal for process control but very weak in other areas.

As I am completely new to Forth I am still struggling, with precious little help from the manuals, to do things which more experienced users find easy. For instance, what is the equivalent of Basic "PRINT AT" or how do you read or write a data line to tape; or, having written a new word into your dictionary, how do you get it out again to change or modify it?

I will be looking forward to new projects with Forth and

to attempts to give more attention to serious work on the Spectrum instead of using it as a toy.

Alan Beer,
Baildon,
W Yorks.

● *Many readers have experienced problems with LOADing and SAVEing and John Gilbert will be answering those questions in an article which is at the planning stage. As to the other question, to retrieve a word from a Forth dictionary it is necessary to use a de-compiler. Some companies, including East London Robotics, plan to produce one for their products and it is hoped that Melbourne House will issue one in the future.*

Where are the women?

I NOTICE on reading *Sinclair User* every month that there is a distinct lack of female participation in the advertising sections. I am delighted to see that programs written by female users such as myself are included but am surprised to

observe the apparent lack of foresight on the part of the advertisers. Surely the female hand looks as attractive as the male on the Spectrum keyboard?

I am convinced that your male readers would not be averse to more female-dominated advertising and, at the same time, such advertising would reassure women that computing is a unisex occupation. **Elizabeth Wilson,**
Oxford.

Watch out for glitches

I WOULD like to say that *Sinclair User* surpasses all other magazines for the Sinclair range of computers. The articles and the information are consistently relevant and of a high standard. *Sinclair User* has greatly enhanced understanding of the new technology. May you continue with this good service for a long time.

On a different note, perhaps I can inform you of some research I have done relating to loading errors. A tape loading error — or a

complete failure to 'pick up' the program — will often arise from the recorder volume being too high or from the treble being too high, or both.

Customers often stop the tape when that happens and then rewind to try again. Many recorders cause a glitch on the tape where it was stopped and rewound. When that happens you have lost the program forever. The solution is not to stop and rewind until the tape has reached a blank section. Then lower the volume/treble and try again.

The stop on a program section and rewind glitch accounts for more than 90 per cent of returned tapes to software manufacturers. Some tape recorders do it and some do not.

Dr Karl Glasson,
Micro Master,
Chiswick,
London W4.

Egg-ceptional scoring

I ENJOY reading *Sinclair User* very much and I have heard about the defence of Chuckie Egg. I wonder if my score of 210,010 is the highest after going through 20 interesting levels?

Wayne Dennison,
aged 13,
Wakefield.

A change is on the cards

AS THE AUTHOR of Bridge Player for the 48K Spectrum, may I reply to the letter from J W Evans in the February issue in which he comments on the program?

His main criticism is of the arcade-type flashing scores and the jingles. I understand his point but on the other hand most people seem to find those at best amusing and at worst harmless. Contrary to his assumption, they occupy a minimal amount of memory, not sufficient to affect the level of play which, however, by virtue of other

changes, is better on the new version of the program to be available soon.

If Evans would like to return his existing tape to me I will not only upgrade it but also, specially for him, remove the arcade games aspects which offend him.

Richard Wheen,
12 Spurfield,
Hurst Park,
East Molesey,
Surrey.

REFERENCE letters in February issue, I endorse the observations of J W Evans regarding the CP Software

Bridge Player. Nevertheless, for a serious micro user who does not go for arcade games, the program has given me many hours of pleasure. I do not know how it can be achieved with such sophistication in 48K, despite the crazy opening and responding bids by partner North.

Wheen and Vachha could solve that failing and produce an Improved Bridge Player; I and many other will rush to buy.

R G Miller,
Ipswich.

more letters on page 23

RAINBOW'S SPECTRUM PROGRAMMABLE JOYSTICK INTERFACE WITH SOUND NOW IMPROVED

* The keyboard is NOT disabled when using the Joystick,

* You can have a Through Port — See Below.

As before, its features are:

- PROGRAMMABLE** — Allows any joystick position to represent any key on the Board — without wires, or leads, or tapes!
- UNIVERSAL** — Enables use of ALL Software
- AMPLIFIED SOUND** — Internal micro-chip amplifier boosts Spectrum's beep with simple connection to ear or mic socket.
- EASY TO USE** — All joystick positions are programmed simply by selecting joystick position, pushing desired key on spectrum, releasing joystick, and then the key.
- ADAPTABLE** — Accepts diagonal positions.

ONLY £24
Extra for
Through Port £3
plus £1 p&p.



This is a top quality product with guarantee

Send Cheque or P.O. to: **Rainbow Electronics**

Glebe House, South Leigh, Witney, Oxfordshire OX86XJ
Tel. Witney (0993) 5432

Hartland Software's Famous FOOTBALL POOLS PROGRAM

* This program lists out, in order of preference, the sixteen most likely score-draws; also the sixteen most likely homes, draws (including 0-0) and aways. For each forecast, it will also give you the probability that the forecast is correct.

* It picks out the results on the bookmakers' FIXED ODDS coupons that have been given over-generous odds. It calculates your expected profit!

* The program will be initialised to the English and Scottish league tables. You will be able to update these league tables week by week as results come in — or enter a complete new set of league tables. You will then be able to save the new league tables on another cassette; in other words the program will never become "out of date".

* Australian pools in the summer? No problem! You will be able to alter the built-in team names, and save them on another cassette.

* Advanced probability theory is used to make all forecasts — no guesswork or random numbers. A brief description of the theory is contained within the instruction leaflet. Only top quality cassettes are used — Sony or TDK.

"I HAVE SEEN THE OTHER PROGRAMS WHICH A FRIEND OF MINE HAS, BUT I LIKE YOUR PROGRAMS THE BEST. I HAVE USED IT ON THE POOLS SEVERAL TIMES, AND I HAVE BEEN VERY NEAR TO THE BIG DIVIDEND." Mr J. O., London N21.

This program will not cost you a fortune either! It is available for the ZX81 (16K) and the ZX Spectrum (48K) for just £6.95, including postage & packing, from:

**HARTLAND SOFTWARE (Dept. S), 8 PENZANCE PLACE,
LONDON W11 4PA**

campbell systems

for spectrum 48k

Can YOUR Database Handle This?

PROFESSIONAL FILE MANAGEMENT, DATA RETRIEVAL AND PRESENTATION
ANY ADDRESS LISTS, INVENTORY, CUSTOMER OR PERSONNEL RECORDS...

MASTERFILE can!

Microdrive commands included; 32, 42 or 51 characters per line!; 26 fields per record;
Unrestricted number of records; 36 user defined Display/Print formats; Fast search & sort facilities;
Around 32K of RAM available for data!

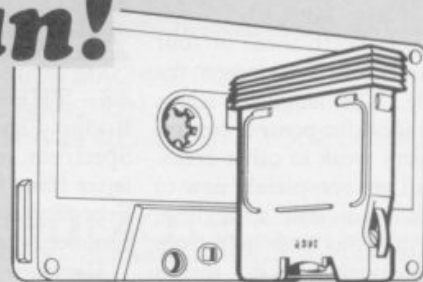
Now with **MF-PRINT** and MASTERFILE version 09, you can format your data for a full width printer!

Works with most popular printer interfaces. Fully variable report widths (over 100 columns) and lengths. Powerful numeric editing and column totals. Almost no reduction in space available for data.

Many more products available. Send SAE for details!

MASTERFILE version 09	£15.00
MF-PRINT	£ 6.95
MASTERFILE with MF-PRINT	£19.95

All programs mailed 1st class by return.
Prices include VAT and postage within Europe.
Campbell Systems
(Dept.SU) 15 Rous Road, Buckhurst Hill,
Essex, IG9 6BL England 01 504 0589



With MYRMIDON'S
Micro-Print[®]
up to 51 columns!



Cracking down on copying

HAUNTED HOUSE, published in March *Sinclair User*, had a line omitted. It should read '6 Return'. In the same program, for any readers wondering what significance the skeleton, ladder and ghost graphics characters beside the score have, they should not be there at all.

The letters AJM are the initials of the original author, Andrew Murgatroyd, from the August, 1983 *Computer and Video Games*, where the program was originally published.

The two programs are identical except for the removal of several AJM lines. I understand that not every entry can be checked for originality but I feel that such an obvious copy as this should have been discovered before printing.

Paul Bamborough,
Newcastle-on-Tyne.

• It has been brought to our attention by a number of readers that *Haunted House* was not the original work of the person who submitted the program. Our investigations have confirmed that.

While we make every effort to ensure that all programs published in *Sinclair User* have not been published elsewhere, occasionally one may slip through the net. Fortunately our readers are quick to inform us of any obvious plagiarism.

We take this opportunity to warn readers that programs

which have appeared elsewhere, in book, magazine or cassette form, cannot be considered for inclusion in *Sinclair User*, whether or not such programs are the contributor's original work.

Content is too childish

I BOUGHT my Spectrum last July and shortly afterwards I received an invitation to subscribe to *Sinclair User*.

At the same time I also placed a subscription with another computer magazine and seven issues later the difference between them is marked.

In defence of *Sinclair User* I feel that the comments made regarding the amount of advertisements as being excessive is merely nit-picking and would suggest to the reader concerned that he

checks other such magazines; the percentage is about the same in all of them.

With regard to the reader from Perthshire who bewails about difficult competitions, I would suspect that he fails to realise that one has to work at any competition and that prizes are not handed out on a plate. If he was unable to compete in the recent Micro-drive competition through lack of knowledge, the answer is develop your knowledge and try again.

I would agree with the reader who says that the level of software in general is poor, though I would go further and say that in particular the so-called arcade games are the biggest rip-off. In all of them the theme is the same — only the locations change.

Thankfully a few software houses are beginning to realise that the variations on the 'shoot-em-up' theme are wearing thin and are starting to produce quality software; it makes a pleasant change to be looked upon as intelligent people and not as gullible idiots.

Finally, may I add my only criticism of *Sinclair User*. In general it is an excellent magazine but obviously aimed at the young and teenage market. One only has to look at the comic illustrations which accompany readers' programs, *Sinclair Simon* and the proud letters re high scores to realise that perhaps your magazine should have

the title *Young Sinclair User*.

So once my subscription ends I will cheerfully leave your magazine to its intended market. I will miss Andrew Hewson and John Gilbert but the rest of your magazine, for me, leaves much to be desired.

P Gilbert,
Brighton.

• We have always endeavoured to publish something of interest to every *Sinclair user* in each issue and consequently some of the content is aimed at younger readers. At the same time there is much which is written with serious applications in mind, such as our recent articles on *Forth*, our continuing series on machine code, the education section, *Sinclair Business User* and *Hardware World*. Letters, news and *Sinclairvoyance* are also of relevance to all readers. Obviously we cannot please all users all the time but we feel we succeed in pleasing most of them most of the time.

Putting the record straight

HAVE I mastered *Jet-Pac*? If so, is this score a record? My score is 3,152,880, which took me many hours of square-eyed playing. Keep up the standard of a great magazine.

Richard Lee,
aged 12,
Hornchurch,
Essex.

Misleading hardware review

IN THE review of the Kelwood range of Backpacks, I should like to point out that there were inaccuracies and omissions which could give the customer a misleading view of the product.

The review referred to Mullard 'liquorice all-sort capacitors' which were 20 times too big for their job. In fact, the capacitors are not Mullard and to reduce their values by 20 times would certainly lead to high-frequency oscillations and that would be unsatisfactory.

The review failed to mention that the whole range of Backpacks has a housing which is very convenient for carrying the rather weighty Spectrum power pack and, in doing so, tidies the usual mess of wires which is found round the computer. That housing also doubles as a cassette stand for those people who have already found an alternative place for the

power pack. Your reviewer is entitled to his opinion but you should make sure of your facts. Surely you are failing in your duty to your readers if you do not give a full and true review of a product in question. Would it not be a good idea to have a readers' panel which could assess new products?

M D Belk,
Kelwood Computer Cases,
Rotherham.

more letters on page 24

All donations gratefully received

ABOUT three months ago I bought a Spectrum. As an experiment one day I took it to work and within a short time queues were forming to use it. What is so unusual about that? The fact is that I am a charge nurse in an acute psychiatric ward for about 20 patients.

The experiment was such a huge success that we have now started a fund to buy a Spectrum and portable TV for the permanent use of the ward. If any readers have unwanted software they would like to donate I and my patients would be most grateful.

Colin Knowles,
314 Birmingham Road,
Lickey End,
Bromsgrove,
Worcs.

I AM INVOLVED with an ILEA Saturday school project in Islington. As part of our activities I run a computer group and although we have access to three Spectrums we desperately need more facilities. There must be a number of people who have discarded their old ZX-80s or ZX-81s, having bought a Spectrum or other micro.

Perhaps some of the people would loan or donate such

unused micros, as the funding for the project is minimal. If anyone can help in any way perhaps they would contact me.

Stephen Oxford,
Highbury Fields School,
Highbury Hill, London.

Applying Occam's razor

I HAVE recently been reading some Spectrum books and have seen about three or

four complex programs which produce regular Spectrum sound from the keyboard, rather like a small synthesiser.

Those programs were about 100-200 lines long, which was a waste of time, because most of it was printing and telling people that whatever key they pressed they would get a sound from the keyboard and what all the sounds were — middle 'C' or an 'A'; for example. There is a simpler and shorter way of doing it in one line:

```
10 BORDER 0:PAPER
0:INK 0:CLS:PAUSE
0: BEEP
RND/3, RNDx 69: GOTO 10
```

Paul Huggett,
Basildon, Essex.

Cricket captain re-instated

WE SHOULD like to thank you for your review of our product Cricket Captain in the March issue but we would like to point out that the title of the program is

Cricket Captain and not County Cricket. You omitted to print our address and as the product is not as yet widely available through retail outlets that will cause some

inconvenience to readers who wish to buy the cassette.

Karl Manley,
77 Chorley Road,
Adlington,
Chorley, Lancs.

KERNOW SOFTWARE SERVICES LTD

SOFTWARE LIBRARY FOR SPECTRUM

Low cost weekly hire of the best arcade games, adventures, utilities, languages and business programs.

- Membership only £6.00 for 12 months.
 - Program hiring from only 80p (plus p&p).
 - Free fully descriptive catalogue for members.
 - New titles constantly being added.
 - Purchase new programs at discount prices.
 - Return of post service.
 - All tapes despatched using first class post.
 - We have full permission and licences from the leading software publishers, to whom royalties are paid.
- Compare these features with our competitors and you will see why more Spectrum owners are joining the Kernow Software Library. Join today by clipping the coupon below or send a S.A.E. for further details.

☐ YES, please send me my free catalogue and selection sheet. I enclose my £6 cheque/Postal Order.

NAME
ADDRESS
.....
TEL

Send to:

KERNOW SOFTWARE LIBRARY
(Dept. SU)
55 ELIOT DRIVE, ST GERMAN'S
SALTASH, CORNWALL PL12 5NL

THE KERNOW SOFTWARE EXCHANGE CLUB

An exciting new concept for Spectrum owners. Simply send your unwanted Spectrum tapes in exchange for a selection from our ever-expanding availability list. Keep your exchange tapes for up to 1 month and return for others or for vouchers to be used at a future date.

- Membership only £6.00 for 12 months.
- Each exchange only £1.20 (plus p&p)
- All tapes despatched using first class post.
- New titles constantly being added.
- Return of post service.

Join today by clipping the coupon below or send S.A.E. for further details.

☐ Yes, please enrol me as a member of the exchange club. I enclose my £6 cheque/postal order.

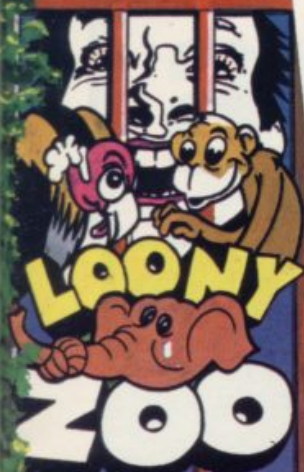
NAME
ADDRESS
.....
.....Post Code

Send to:

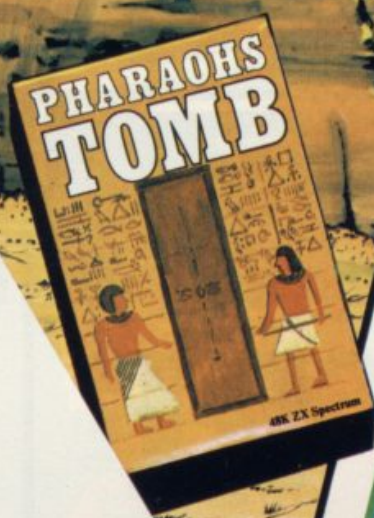
THE KERNOW SOFTWARE EXCHANGE CLUB
(DEPT. SU)
55 ELIOT DRIVE, ST GERMAN'S
SALTASH, CORNWALL PL12 5NL

SPECIAL OFFER—JOIN BOTH SOFTWARE LIBRARY & EXCHANGE CLUB—ONLY £10.00

48K ZX SPECTRUM



DO NOT
FEED THE
EARTHMAN.



LOONY ZOO Arcade escape game £5.95 PHARAOH'S TOMB Adventure £4.95 KNIGHT'S QUEST Adventure £5.95
COLDITZ Adventure £6.95 THE FOREST Orienteering simulation £9.95

PHIPPS ASSOCIATES

Dept G FREEPOST EM463 (No stamp)
172 Kingston Road, Ewell, Surrey KT19 0BR
Telephone 01-393 0283. 24 Hour answering.

Prices include postage (outside Europe add £1.00 per item). Access and Visa cards welcome



COMPUTER REPAIRS.

AT LAST!

A comprehensive repair facility for SINCLAIR products using genuine SINCLAIR parts

ZX81	ZX PRINTER	ZX SPECTRUM
£17.50	£21	£26

A ONE OFF Repair service undertaken by our EXPERT STAFF, to provide a FULLY TESTED repair:- **PROMPTLY!**

Complete the coupon below and post it with your remittance and machine to:-

Thomas Walker & Son Ltd., 58 Oxford Street, Birmingham B5 5NX.

All machines returned in the Packing supplied by customers.

The prices quoted above do not cover ABNORMAL DAMAGE and on receipt of your machine a rapid QUOTATION will be given for your approval.

Please repair:

_____ Computer @ £_____ inc. P & P
_____ Printer @ £_____ & VAT

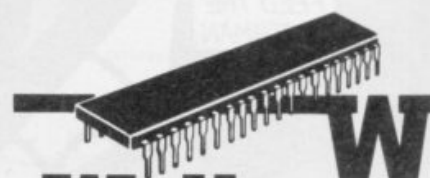
I enclose a cheque for £_____
or debit my ACCESS CARD No. _____

Signature _____ Tel No. _____

Name _____

Address _____

Please quote for the repair of my _____ enclosed. Serial No. _____



Walkers
COMPUTER SERVICE
AND REPAIRS

Thomas Walker & Son Ltd.,
58 Oxford Street,
Birmingham B5 5NX.
Telephone: (021) 643 5474
Telegrams:
Shiplog Birmingham



A name to PLAY with



DR FRANKY AND THE MONSTER

By Martin Wheeler
for the Spectrum 48K

VGC 1011

Battle your way
through 9 different
dungeons to help Dr
Franky revive his
monster. Arcade
action – action
packed!



ATLAS ASSIGNMENT

By Martyn Davies for the
Spectrum 48K

VGC 1017

This is a text adventure with
a difference – it incorporates
three arcade-style games, just
to keep you on your toes. The
player, a secret agent has to
seek and find stolen nuclear
plans. The fate of the world is in
your hands. Using cunning and
skill to find the plans, you must
decide what objects you find on
your journey will be of use to
you. Can you enter the world of
espionage and survive?



SORCERY

By Martin Wheeler for the
Spectrum 48K

VGC 1016

By the author of the much
acclaimed Dr Franky. In this
mystery tale, you are a wizard
who can fly, and fly you must,
through 15 screens avoiding
false trails, evil ghosts and
strange beings. You must collect
various items and reach the
door to the next scene before
the attacking beings drain your
power. The further you get, the
harder it gets and the more
compulsive SORCERY becomes.
To reach the ultimate goal of
your trapped sorcerer friends,
you must be fleet of finger and
brain. Excellent colour, graphics
and sound.



QUETZALCOATL

By Gareth Briggs
for the Spectrum 48K

VGC 1007

Trapped in an Aztec
temple, your only
means of escape is
through the passages
risking the vengeance
of the Aztec Gods.



SPECTRON

By Mark Kirkby
for the Spectrum 48K

VGC 1009

Your only aim in life
is to survive! 100%
M/CODE, 100%
arcade action.



RACING MANAGER

By Mark Alexander
for the Spectrum 48K

VGC 1005

All the thrills of the
racing world.

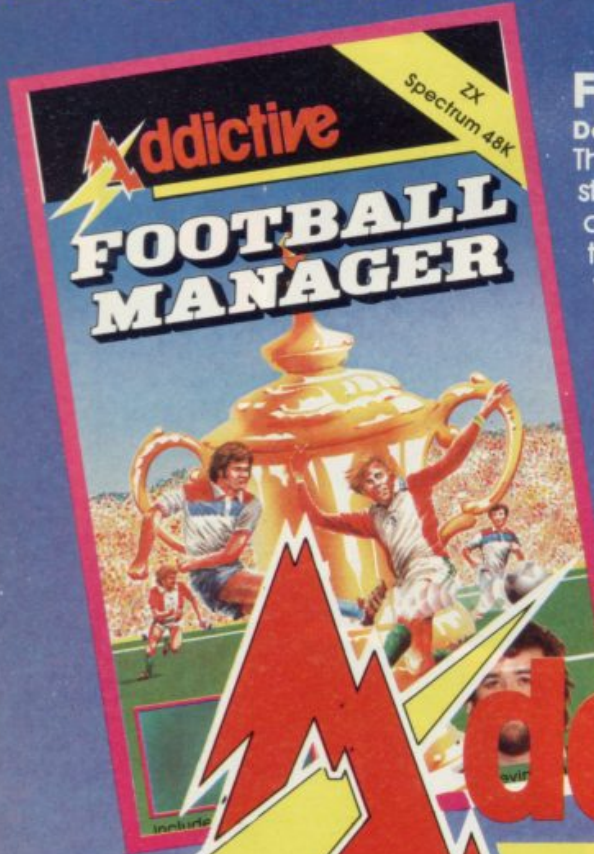


£5.95

Computer FUN... available NOW!

The No.1 Football Game

ZX81 16K,
ZX Spectrum 48K



Football Manager

Designed by Kevin Toms

This outstanding game of skill and strategy is now widely available and you can join the many thousands of satisfied customers who have purchased the game. This is no five minute wonder – you will be playing this game for hours over many weeks (we know – our customers tell us!).



Kevin Toms

Some of the features of the game:–

- ★ Matches in 3D graphics ★ Transfer market
- ★ Promotion and relegation ★ F.A. Cup matches
- ★ Injury problems ★ Full league tables
- ★ Four Divisions ★ Pick your own team for each match

- ★ As many seasons as you like
- ★ Managerial rating
- ★ 7 skill levels
- ★ Save game facility

Addictive

*ZX81 Chart,
Home Computing Weekly 16.8.83

Comments about the game from press
and our customers

"FOOTBALL MANAGER is the best game I have yet seen on the Spectrum and my personal favourite of all the games on any micro ... To the ordinary person it is an excellent view of what can be done in the field of computer games ... The crowning glory of this game is the short set pieces of match highlights which show little stick men running around a pitch, shooting, defending and scoring ... It is a compulsive game but people who cannot take game sessions of 9 hours or so, which happened on one happy Sunday, will be grateful to know that there is a 'save to tape' option. FOOTBALL MANAGER has everything it could ... The

originator, Addictive Games, certainly deserve the name." Rating: 19/20 (Practical Computing – August 1983).

"When I first received this game I spent the best part of the weekend playing it. Since then I have returned to it more often than any other. The truly addictive quality of this game is the remarkable way it mirrors the real football manager's problems ..."
(Personal Computer Games – Summer 1983)

Programmers

We want your software. Send us a sample, if accepted, we will supply generous royalties plus cash advances plus free advice from Kevin himself!

Versions coming soon for
BBC 'B' (End of March)
Commodore 64
Oric 48K, Dragon
etc.

"I am writing to say what a great game it is. I have spent over 45 hours on it." (Mr. D. Fearn – Gloucestershire.)



Action from the Spectrum version

Available from computer software stockists nationwide, including **Booth** & **John Menzies**

Prices: Spectrum 48K £6.95
ZX81 16K £5.95

(N.B. 3D GRAPHICS ARE NOT INCLUDED IN THE ZX81 VERSION).

Overseas orders add £1.50

To order by mail (p&p free) send cheques or postal orders to:

Addictive Games

7A RICHMOND HILL, BOURNEMOUTH, BH2 6HE

Dealers! For urgent stocks send your headed notepaper direct to our address.

Utility unit from Camel

THE NEW ROM SP from Camel Products is a utility device which allows Spectrum users to retrieve programs stored in EPROMs. Up to 16K of EPROM can be used and there is the option of either having the program load on power up or by pressing a pushbutton.

The ROM SP can be used on both Spectrums but the Camel companion EPROM programmer, the PROMER-SP, would be difficult to use on the 16K machine because of lack of memory.

The unit is housed in a custom-designed ABS case and has a flexible connector to the Spectrum user port; on the rear is an extender card for other add-ons. On the top of the case there is a LED, which lights when a program is being transferred, and a push switch.

The unit worked well, the only difficulty being when used on an Issue 1 Spectrum.

For the dedicated EPROM user the unit is essential. Details of the Camel PROMER-SP were not available at the time of writing but a program is apparently provided to allow only essential data to be stored — Basic and/or machine code — to optimise space on the EPROM.

The ROM SP costs £29.95, as does the PROMER-SP, both plus VAT. EPROM erasers are also available from £18.95 plus VAT, all inclusive of p&p. Camel Products is at 1 Milton Road, Cambridge CB4 1UY. Tel: 0223-314814.



Making light work of screen violence

IN THE DIM, dark past when video games consisted of black and white tennis with that distinctive 'boing', there was the then new idea of having a separate gun to fire at the TV screen. The Stack Light Rifle from Stack Computer Services takes the idea a stage further with a four-part sniper's rifle and high-resolution colour. The rifle is supplied with three games on tape, **High Noon**, **Shooting Gallery** and **Grouse Shoot** for the 48K Spectrum; it is also available

for the Commodore 64 and the Vic-20.

The main pistol is attached to 12ft. of cable which ends in a dead-ended ZX-81-size connector which plugs into the Spectrum user port. To the pistol you can attach a barrel, stock and telescopic sight.

Of the three games, **High Noon** requires the greatest skill. In it a cartoon-style gun fighter will walk across the screen and you have six shots with which to kill him. Of the other games, **Grouse Shoot**

entails shooting at rising birds while in **Shooting Gallery** you have to shoot a bouncing ball.

The rifle is well-made and surprisingly accurate. It is perhaps regrettable that the present trend towards death and destruction games should result in the appearance of such a device. If, however, that is what you want, then it is, arguably, the best of its type.

The Stack Light Rifle costs £29.95 inc. VAT from the manufacturer, Stack Computer Services, 290-298, Derby Road, Merseyside L20 8LN or local retailers.

Protection gives peace of mind

MICROBYTE has launched a new software protection unit for the Spectrum. It is designed to prevent the computer crashing in the event of either mains noise or a power failure.

The Spectrum power supply is plugged into the unit and a lead is then plugged into the power socket of the Spectrum.

Inside the unit are six AA-type rechargeable batteries and, if there is a power failure, the batteries are kept topped-up and should last for up to 15 minutes. That will give you time to save a program if you have a battery-

powered cassette player to hand.

The unit also contains a small circuit to cut mains interference. It is very disconcerting to load a program into the machine, switch it off at the mains and then switch it on again to find that you have not lost the program.

The unit is very easy to use. Once it is plugged in it can be forgotten and yet it gives great peace of mind. Costing £13.95 inc. for either the ZX-81 or Spectrum version, it may well save a good deal of frustration. Microbyte is at 19, Worcester Close, Lichfield, Staffordshire.

Cursor key simulation

WITH ALL Sinclair products any deficiency is soon noted by peripheral makers. Abtron has produced a joystick adaptor lead for people with an Interface 2 which permits a joystick to simulate the cursor keys 5, 6, 7 and 8 and use 0 as fire.

The lead consists of two plugs which plug into the interface and a socket for the joystick. Priced at £7.99 inc. p&p, the lead can be obtained from Abtron, 38 Rydens Avenue, Walton-on-Thames KT12 3JP.

More hardware on page 31

WHAT RESOLUTION FOR ONLY £230. (EX. VAT)



Our RGB high resolution colour monitors (580 × 470 pixels) sell for £229.95 (excluding VAT)—a saving of over £100 compared to other leading monitors of similar specifications.

That's a bargain we guarantee you won't see from any other micro retailer.

We've managed to acquire the sole distribution rights enabling us to offer these superb monitors at this unbeatable price.

And just because you're saving on price doesn't mean you're sacrificing quality. Here's what Personal Computer News had to say about our monitors.

"There is no doubt that the JVC range of ECM colour monitors is excellent value for money...there is no loss in quality of picture after long periods...remember as more and more resolution is available with new micros, the need for a better display will be that much greater."

For those who only require medium resolution we also have a model (370 × 470 pixels) at £179.95 (excluding VAT) which is equally excellent value for money.

Both units have a 14" screen and are suitable for the BBC Micro, Spectrum QL, Lynx, Oric, Apple, IBM and

most other leading micros.

And naturally there's a years full guarantee.

Another one of our commitments is to make certain we deliver your monitor by courier within ten days of receiving your order.

You can order by filling in the coupon below and posting to: Opus Supplies Ltd., 158 Camberwell Road, London SE5 0EE. Or by telephoning 01-701 8668 quoting your credit card number. Or, of course, you can buy at our showroom between 9.00–6.00pm, Monday–Friday 9.00–1.30pm, Saturday.

To: Opus Supplies Ltd., 158 Camberwell Road, London SE5 0EE.
Please send me:

- _____ High Resolution Colour Monitor(s) at £229.95 each (ex. VAT).
- _____ Medium Resolution Colour Monitor(s) at £179.95 each (ex. VAT).
- _____ Connection lead(s) at £6.00 each.

I understand carriage per monitor will cost an extra £7.00. (N.B. A High Resolution Monitor including VAT, lead, and carriage costs £279.39. A Medium Resolution Monitor including VAT, lead and carriage costs £221.89).

I enclose a cheque for £_____. Or please debit my credit card account with the amount of £_____. My Access/Barclaycard (please tick) no. is _____

Please state the make of your computer: _____

Name: _____

Address: _____

Telephone: _____

Opus.
Opus Supplies Ltd.

MODEL REFERENCE	1302.2 High Resolution	1302.1 Medium Resolution
RESOLUTION	580 x 470 Pixels	370 x 470 Pixels
C.R.T.	14"	14"
SUPPLY	220/240v. 50/60Hz.	220/240v. 50/60Hz.
E.H.T.	Minimum 19.5kv Maximum 22.5kv	Minimum 19.5kv Maximum 22.5kv
VIDEO BAND WIDTH	10MHz.	6MHz.
DISPLAY	80 characters by 25 lines	80 characters by 25 lines
SLOT PITCH	0.41mm	0.63mm
INPUT: VIDEO	R.G.B. Analogue/ TTL Input	R.G.B. Analogue/ TTL Input
SYNC	Separate Sync on R.G.B. Positive or Negative	Separate Sync on R.G.B. Positive or Negative
EXTERNAL CONTROLS	On/off switch and brightness control	On/off switch and brightness control

Comprehensive graphics aid

THE LAUNCH of the Spectrum heralded an avalanche of graphics pads and software utilities. The Format 4 kit from Orion Software is undoubtedly the most comprehensive and certainly one of the best.

Housed in a smart black ring binder, the kit consists of two main parts. On the rings are 80 sheets of various-sized grids.

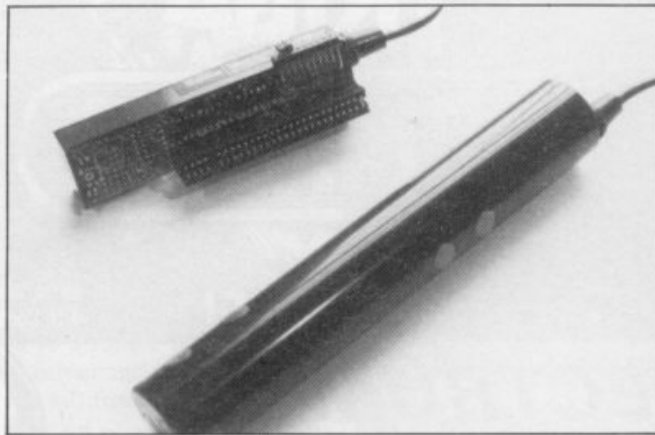
As well as that there is a clear plastic wallet to hold loose pieces of paper, a plastic ruler marked with a pixel scale and a translucent screen for placing over pictures with a full 32×24 grid, each square sub-divided into an 8×8 grid with markings round the sides showing the lines and columns, pixel positions and the memory addresses of each pixel line in hexadecimal.

Inside the front cover are a note pad, seven coloured pens to use on the various sheets, a water-soluble ink pen for use on the translucent screen, a calculator to help calculate the UDGs and a C15 cassette with an optional drawing program.

If you are looking for a serious graphics aid for a Spectrum this kit should be near the top of your list. The only part which is not necessary is the optional program.

The kit costs £16.95 or with the extra program £21.50, plus £2.50 p&p. The cassette is available separately at £6.50. A pack of refill sheets can be obtained for £3.95. If that is too costly, the SP2 kit consisting of translucent screen, pen and wallet is £3.75.

Orion also produces Teleplan, a 32×22 grid on a piece of clear plastic which fixes on to a TV screen and is available for either 14in. or 16in. sets at £1.25 plus 50p p&p. More information from Orion Software Products, Pippbrook Mill, London Road, Dorking, Surrey.



Tricky stick to master

THE LONG-AWAITED Trickstick from East London Robotics has been released. It is a 7in. long black plastic cylinder with six touch-sensitive pads which simulate the four usual joystick movements plus two fire buttons. It is complete with an interface which plugs into the back of the Spectrum. Up to

eight can be plugged in at any time and there is an option to give proportional movement on specially-written games. Normally it simulates the Kempston joystick, so there are many games readily available on which it can be used.

The touch pads are drawing pins which use your body as an aerial to pick up mains

hum. That is converted by the electronics to simulate the keypress. As some people are better 'aerials' than others, the sensitivity of the stick can be altered by a small screw near the top.

The stick was tried on a number of games, including the trainer tape supplied, and worked well. It takes some time to get used to it, unlike a joystick but, once mastered, was just as useful. The only difficulty is that you need two hands to use it, so for games where you have to use the keyboard as well as a joystick, you have to keep removing one hand.

If you are looking for a joystick, the Trickstick is worth considering. As it has no moving parts it should withstand a good deal of use and, provided you can spend time getting used to it, it is quicker than most joysticks.

Trickstick is available by mail order for £34.50 from East London Robotics Ltd, Gate 11, Royal Albert Dock, London E16.

Ideal home disc drive

IN RECENT months there have been a number of disc systems appearing for the Spectrum, not to mention the Microdrive. One of the first was the Viscount system from Interactive Instruments.

The system comprises an interface which plugs into the back of a 48K Spectrum and a 5¼in. Shugart disc drive, complete with connecting cable. Interactive can supply an extension cable if necessary if you want to add a printer interface, for example. Also the interface will support only one drive and that has only single-sided discs but it manages to squeeze more than 107K on to them.

Setting up the system is very straightforward. On power-up the contents of the EPROM is loaded into the upper 8K of memory and a number of extra variables are

added; they occupy another 110 bytes. Those variables are used to call the various functions of the interface.

The first step is to format a new disc, which is done by entering the command PRINT USR nd. Once formatted the disc will have 40 tracks, each 2,816 bytes long. The first track is always taken up with the directory, so you are left with 39 tracks, a total of 109,824 bytes of storage.

Both Basic and machine code can be made to auto-run; code can also be made to load into a different area from the one from which it was saved. The way of filing f\$ for arrays is a little complicated and arrays also have one major disadvantage.

Each time an array is saved you are limited to a length of 2,816 bytes, so if you were

using a program which uses a string of 28,000 characters you would have to save it in pieces.

In use, the system is at least twice as fast as a Microdrive but the penalty is that it uses a good deal of RAM space.

That means that although it is ideal for business you cannot use programs such as Tasword or Masterfile on it. Transform Ltd, however, can supply some of its software on disc.

Overall, the system is ideal for home users who write their own programs or as part of a development system. The system can be obtained from the Spectrum chain of shops, costing £245 inc. or from the manufacturer, Interactive Instruments, Ltd, Unit 6, Pilot House, King Street, Leicester.

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

**THE TOP
AMERICAN
JOYSTICK
IS NOW
AVAILABLE
IN THE U.K. . . .**



IS HERE!

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

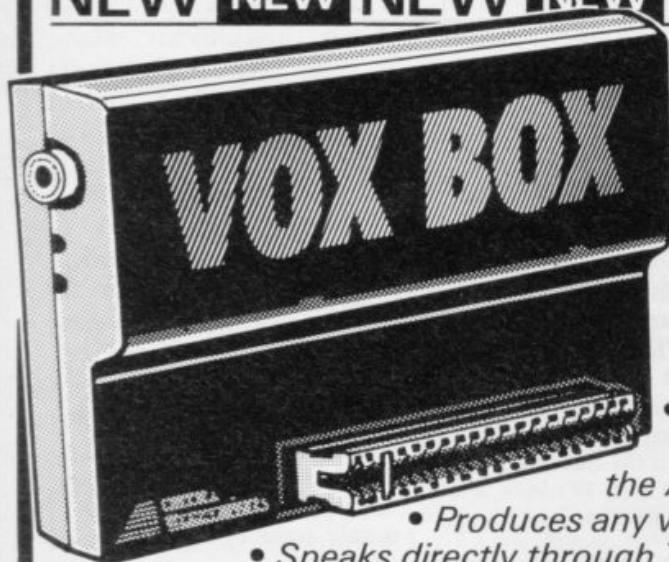
- Including Interface to plug straight into the Spectrum.
- The first Joystick to give you "Arcade" feel and control.
- "Jet Style" heavy duty, diamond cut grip.
- Fire Trigger placed under your index finger . . . the finger with the fastest reflex action.
- Self centring, 360° action.
- Compatible with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

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

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

Also available for Commodore / Atari / BBC /

NEW NEW NEW NEW NEW NEW NEW NEW



**SPEECH SYNTHESIZER
WITH BUILT IN
JOYSTICK INTERFACE
FOR THE SPECTRUM**

ONLY £29.99

NEW

- Simply plug into an exciting new world of computer speech synthesis. • Latest State of the Art Electronics. • Uses the Allophone system.
- Produces any word or phrase from an unlimited vocabulary.
- Speaks directly through TV speaker. • Also Amplifies Spectrums own sound through TV speaker! • Built in Joystick Interface accepts any Atari type joystick for full games control. (Kempston compatible). • Complete with Demo Cassette. • Full Instructions.

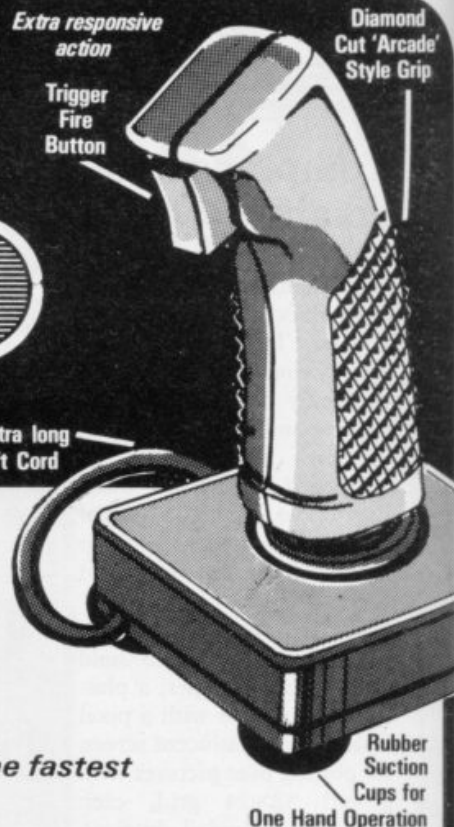
<input type="checkbox"/> Triga Command Spectrum	£19.99	<input type="checkbox"/> Triga Command BBC	£19.99
<input type="checkbox"/> Triga Command Atari	£12.99	<input type="checkbox"/> Vox Box, Spectrum	£29.99
<input type="checkbox"/> Triga Command Commodore	£12.99	<input type="checkbox"/> Vox Box and Triga Command	£39.99

TRADE ENQUIRIES WELCOME

Postage Please Add £1.50

DATTEL ELECTRONICS
UNIT 8, FENTON INDUSTRIAL ESTATE,
DEWSBURY ROAD, FENTON,
STOKE-ON-TRENT
TEL: 0782 273815

24 HR CREDIT
CARD LINE



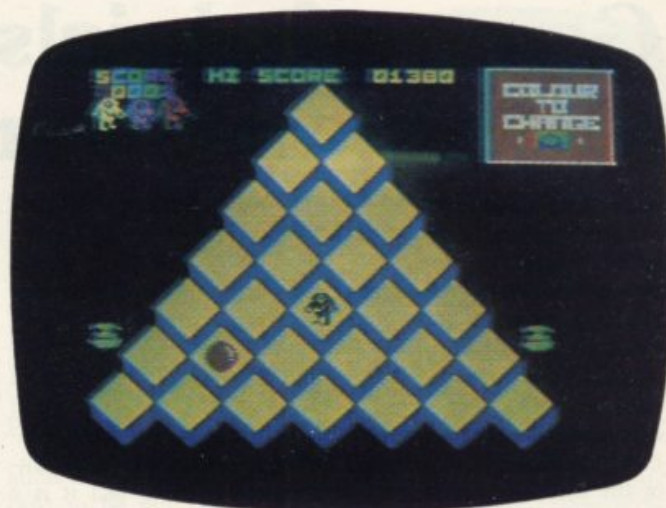
Keeping the balls rolling

THE LATEST sequel to Pi-mania, Pi-Eyed and other Automata productions is **Pi-Balled**. Starring the Pi-man again, the story involves the mystical pyramid of Pi, the colour of which you are attempting to change by jumping from square to square while avoiding collision with two bouncing balls, Sid the Snake, the Pi-man and other hazards.

In spite of the zany presentation which has become the Automata hallmark, includ-

ing a title screen crammed with grotesque leering characters, Pi-Balled is a fairly straightforward arcade game. You score points by jumping on to a square and changing its colour and you lose a life if you fall from the edge of the pyramid — which is easy to do until you become accustomed to the unusual diagonal movements required by the game — or if you land on the same square as one of the other characters. There are bonus points for every pyramid you complete and new hazards to make successive screens more difficult.

Among the original features which add appeal is a spinning disc which carries you aloft gracefully, a free



ride allowed once each screen. Beware, however, of the balls which materialise at the top of the pyramid; if you choose to transfer from your disc at the time they are doing so, you will lose a life.

Pi-Balled has lively graphics — the representation of the bouncing balls is particularly convincing — and the

degree of difficulty is well-judged to please both novices and more experienced players. A pop record on side two is a doubtful bonus.

PI-BALLED

Memory: 48K

Price: £6.00

Joystick: Kempston

Gilbert Factor: 7

Minter quality

SOFTWARE written for other machines usually loses some of its essence in translation to another machine. That is not true, however, of **Laser Zone** for the Spectrum. It is by Jeff Minter and was written originally for the Commodore machines.

The game revolves around a grid, called a zone, on which are mounted two laser turrets — one on the X axis and one on the Y. They can be used by one or two players to kill the exotic aliens which stream across from the left-hand side of the screen.

The laser turrets are powerful but on the higher skill levels you must watch for random laser bolts which flash across the screen.

The game is enjoyable and extremely addictive. The graphics may not be so good as on the more powerful machines which support sprites, but it is essential for any arcade fan who wants something different to fire at for a change.

LASER ZONE

Memory: 48K

Price: £6.95

Joystick: Interface Two, Kempston

Gilbert Factor: 8

Indefensible Defenda

DEFENDA, for the Spectrum, is hardly earth-shaking and it would barely register on the Richter scale of software, as it is yet another version of the well-worn arcade favourite Defender.

Interstella, the company which manufactures the game, may be new to the software scene and the Spec-

trum but that is no excuse for producing a game which appears outdated and uninventive.

You will experience a sudden attack of *déjà vu* as your ship appears above an alien landscape. It can move in all directions on the screen. As it moves horizontally the landscape below it scrolls across

the screen and the aliens materialise, ready to kill or be killed.

As in the arcade version, the alien ships have a habit of picking up refugees who are on the ground. If you shoot an alien which is carrying a refugee the little figure will fall to the ground and die. It is also your job to rescue refugees who look as though they may meet with a sticky end.

The game is joystick-compatible but it is scarcely worth using such an aid as the keyboard is ample for earning points. Neither is it worth moving through to the depths of skill in the game as the graphics do not become any more than ordinary. It can be obtained from Interstella Software, 82 New Forest Drive, Brockenhurst.



DEFENDA

Memory: 48K

Price: £5.50

Joystick: Interface Two, Kempston

Gilbert Factor: 2

Games for girls—slow, simple and patronising

THE FIRST THREE in a series of **Games for Girls** promised by CCS do not augur well for the rest of the line. Apart from a tenuous link with show jumping in one game, and a heroine rather than a hero in another, it is difficult to see where the special appeal for the female half of the cassette-buying public lies, unless simplicity and slowness are intended to be the main selling-point.

The intentions of CCS in producing the series may have been well-meaning but the overall quality of the games and the patronising tone of the inserts could lay the company open to charges of sexism.

Hicksted is designed as a simulation of a show jumping event but neither the graph-



ics nor the laborious question-and-answer process which has to take place before the game can start convey any sense of excitement. The control keys are placed awkwardly and a great deal of practice is needed before the path of the horse loses its resemblance to a bull on the rampage rather than a well-trained steed.

The second side of the tape offers a mathematical version which is a good deal more entertaining than the original, since the primitive graphics and movement do not matter so much. The object is to take the jumps by answering mathematics questions correctly; you can choose to be tested on multiplication, division, addition

and subtraction, with several levels of difficulty for each. A time factor adds a challenge and the game provides an effective form of maths drill.

The insert for **Diamond Quest** makes the dubious claim that the colourful graphics and absence of monsters make it specially suitable for girls. In fact it is a straightforward graphics adventure, in which the object is to collect four keys and find your way to a Golden Palace where a treasure is to be found. On your way you encounter unpleasant creatures such as a hulk, some blood-thirsty bats, wild lions and swarming mosquitoes, and you can replenish your strength by eating food or booking into a hotel.

The game features simple one-character commands, a variety of locations which have little to distinguish them from each other apart from their names, and a series of battles which take the form of your enemy's energy level and your own ticking away numerically before your eyes.

There are several levels of difficulty and if you have never played an adventure game previously, the ease of movement from one scenario to another might prove an attractive introduction to the genre.

In other respects the game does not have the sophistication or mind-taxing quali-

ties of many other adventures on the market.

Jungle Adventure features Bobo, a young African girl making her way from school to her home in the jungle. The game starts at school, where Bobo must try to win prizes such as an egg, a hamburger, a coconut or a book with which she will later bribe the creatures she meets in the jungle. The prizes are won by a Mastermind-style guessing game which, although scarcely original, is entertaining.

The second stage of the game, in which Bobo must make her way past a variety of creatures which become visible only when she bumps into them, is less successful, especially as the placing of the keys makes it extremely difficult to complete the journey. An unfortunate slip by which Bobo is referred to as he rather than she when she falls into the lake is in this context a serious fault.

HICKSTED/MATHSTED

Memory: 48K

Price: £5

Joystick: Kempston

Gilbert Factor: 5

DIAMOND QUEST

Memory: 48K

Price: £5

Gilbert Factor: 4

JUNGLE ADVENTURE

Memory: 48K

Price: £6

Gilbert Factor: 4



Greased lightning

YOUR HELICOPTER is poised on the deck of a battleship ready to take off and destroy the nuclear reactor which is endangering life in **Blue Thunder** for the 48K Spectrum.

You must fly your whirlybird through enemy terrain, attacked by the gun installations on land and sea. Once through that murderous onslaught you have to gain access to the nuclear reactor which is beneath the waves and fire your guns to make it explode. If you are not quick enough you will be destroyed.

The game has a simple appearance but the animated graphics are well-produced and are a major selling-point. The detail is so complete that the helicopter rotor blades seem to increase speed when it is stationary, hovering opposite a target.

The only difficulty a player could experience is completing one mission, let alone several. Your small ammunition, which looks like full stops coming from the helicopter, makes it difficult to judge whether you will hit anything or not.

Blue Thunder is original and entertaining. It can be obtained from Richard Wilcox Software, Foundary Business Systems Ltd, 2 Station Road, Walsall, West Midlands WS7 0JZ.

BLUE THUNDER

Memory: 48K

Price: £5.95

Joystick: Kempston

Gilbert Factor: 6



Bridge that gap and make that contract

IF YOU are an avid bridge player you will know that it is often very difficult to find three other people to play what is perhaps the most exciting and complex of card games. Unless you go to classes it is also difficult to have the opportunity to learn more advanced play without upsetting expert partners or losing a little cash.

CP Software has come to the rescue with two programs designed to meet the problems — **Bridge Player** and **Bridge Tutor — Advanced**.

Both programs use the Acol bidding system and accept most conventional bids, including the Stayman and Blackwood conventions. Full cassette notes supplement the programs and give comprehensive instructions on the playing method.

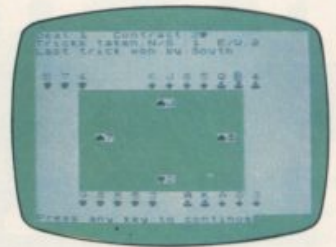
In **Bridge Player** it is assumed that you have some idea of the basics of bridge playing. The computer will shuffle and deal a new random hand each time and you can then elect either to bid your hand in the normal way, following it with the game, or you can choose to see all four hands, decide the contract and declarer, and then play

out the contract. When the play is completed, the score is displayed with details of vulnerability. If you did not make the contract, the program even plays the *Dead March* in sympathy. You can review and replay the hand if you wish, though a replayed hand will not count towards your score.

Each hand can be printed-out if you have a printer and general operating procedure is very simple, enabling you to get straight into the play. Remember, every hand is new, so you can go back to **Bridge Player** time after time.

Bridge Tutor — Advanced offers 40 pre-dealt hands for the more competent player. Each hand must be loaded separately after you have loaded the main program, so do not forget to follow the instructions on-screen — the prompts are very helpful.

The play is similar and will allow only the recommended card to be put down. After the hand has been played, there is a very full explanation of the bidding and play it was designed to illustrate. You may go direct to the explanation at any time or replay the hand.



Both programs are well-designed, with clear graphics using a green table. They are of a high quality and will be of great use to players who want to improve their game.

BRIDGE PLAYER

Memory: 48K
Price: £8.95
Gilbert Factor: 8

BRIDGE TUTOR (ADVANCED)

Memory: 16K
Price: £5.95
Gilbert Factor: 8

Ten years behind the times

ACCORDING to Smiffy, a character in **1994**, a new game for the Spectrum, George Orwell chose correctly with his Big Brother theory but had the year wrong — it should have been 1994.

Apart from that there is nothing remotely interesting or startling in the game. It looks as if manufacturer Visions has jumped on the Manic Miner bandwagon. Smiffy has to climb a structure of platforms which are being bombarded continually

by alien creatures. He has to climb through the nightmare world and attack the central computer which, in the best Tronic traditions, is holding the world in its metallic



grasp. Switching off the computer will win the game.

The screen is filled with a series of exotic blips and blobs which could be anything. If the scenario is a nightmare, the instructions are worse, as you have to grope round the keyboard to find which keys to press.

The high score table and paragraph giving details of the game may be futuristic in style but they are also illegible. The 'computer-style' characters are too heavy and it is difficult to distinguish between numbers and characters on the high score table.

There is nothing to distinguish the program from any of the others which resemble Manic Miner. If you are new to computers, however, and have not seen Manic Miner you may like 1994.

The game is produced by Visions, 1 Felgate Mews, Studland Street, London W6 9JT.

1994

Memory: 48K
Price: £9.95
Joystick:
Gilbert Factor: 4

Better than the average

THE CRICKET season has begun so it is a good idea to have a program which will keep track of players' averages.

Cricket Averages for the 48K Spectrum will keep track of all the details you will need to keep up-to-date with your home team and if you are managing a local club you will be able to organise play round the results produced by the program.

Names of players, batting and bowling must first be entered and that can then be

sorted by the computer into alphabetical and numerical order. That will take about two minutes, which is extremely slow for the amount of data which you can include in the program.

You will then have a list of players and their averages which you can store on tape. Once you have created a file, amending it is easy. All you have to do is push the correct menu option and the computer will prompt you for the information which is necessary.

Once you have entered the data you will be able to look at individual player records, bowling averages and catches taken. The batting averages of each player or all the team can also be accessed.

For the cricket enthusiast the tape will prove invaluable. More details of Cricket Averages can be obtained from Spartan CC, 29 Feltham Ave, East Moseley, Surrey KT8 9BJ.

CRICKET AVERAGES

Memory: 48K
Gilbert Factor: 7

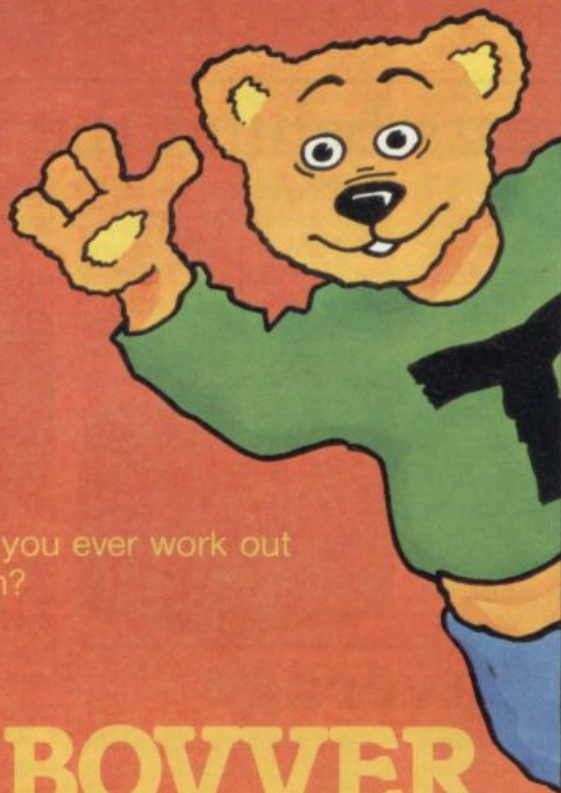
It's no picnic!

But if you go down to the woods today, will you help Ted get his batteries?

Or will you get bowvered?

Or get the cocktail?

Will you ever reach the 8th round?



Come to that, will you ever work out the scoring system?

BEAR BOVVER

£6.95

For 48K Spectrum



Available from:-
Artic Computing Ltd.
Main Street,
Brandesburton
Driffeld
YO25 8RG
Tel: 0401 43553

Blast from the past

We continue our look back at classic ZX-81 programs

IF YOU own a new ZX-81 and are wondering what you can do with it, Carnell Software might have the answer, a **ZX Compendium** of games ranging from the traditional to the completely alien. The two-cassette package contains six programs, two of which are adventures. The first, **Alien Intruder**, displays graphically the advance of the spaceman-eating life-form through the various levels of your starship as you load supplies frantically on to the shuttle craft which is your only means of escape.

In **Wumpus Adventure** you track the fearsome and smelly Wumpus through a maze of caverns, swamps and pits. The game can be played by one to four players.

The other programs on the cassettes are **Numerology**, **Movie Mogul**, **Hieroglyphics** and the ubiquitous **Hangman**. Of those, Hieroglyphics is the most interesting, a word game depicting a hieroglyphic message which must be deciphered before the intrepid explorer, Wullie Makeit, is buried alive.

Another version of Hangman, gruesomely titled **Lynchmob**, is produced by Bridge Software and provides a graphic animated hanging sequence. The game can be played by up to six people while the computer acts as referee. Bridge Software still produces a number of 16K and 1K cassettes and one of the most popular is **Ephe-meris**, an astrology program

which provides comprehensive information on the sun, moon and planets, including local sidereal times, rising and setting times, distances from Earth and much more. There is a COPY option for the ZX printer, a necessity for astrologers. Bridge Software can be contacted at 36 Fernwood, Marple Bridge, Stockport, Cheshire, SK6 5BE.

CCS has quietly been producing excellent strategy games for some time. Two of the earlier ones for the 16K ZX-81 are **Airline** and **Autochef**. In the former the aim is to take over British Airways—if the Government has not sold it in the meantime—while coping with a series of hazards such as staff disputes and PLO hijackings.

Autochef simulates the business of managing a chain of fast food outlets and in the limited time available you must increase your £1 million pound capital to £25 million, overcoming setbacks and dealing with annual inflation.

The distinctions between adventure, strategy and simulation games are often vague and open to publishers' interpretations. Occasionally software falls into all three categories. That is true of

both **Pioneer Trail** and **Ocean Trader** from Quicksilver, though both are advertised as adventure games.

In **Pioneer Trail** you set out with your family to conquer the untamed west in a covered wagon drawn by two decrepit horses, and with only \$700 with which to buy supplies. The program combines adventure and arcade graphics and the hazards to be faced range from patchy fog to Apache Indians.

Contemporary with that is **Ocean Trader**, set on the high seas in the 19th century and featuring pirates, sea mists and freak storms.

An interesting development in software is that of computer-moderated board games and it is surprising that few publishers have recognised the potential in that market. Martech has produced **Galaxy Conflict** for the 16K ZX-81, which comprises game board, counters, markers and program. The two players build and maintain battle fleets of Eon-cruisers and fight for the supremacy of the galaxy.

Galaxy Conflict can be obtained from Martech Games, 9 Dillingburgh Road, Eastbourne, Sussex BN20 8LY. Another war strategy game, **Conflict**, is also available.

Underground movements

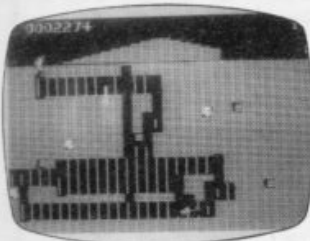
NEW ZX-81 software is difficult to obtain nowadays but Software Farm has released the first in its high-res range of games for the ZX-81. The graphics in the game, entitled **Forty Niner**, are impressive, depicting a tunneling miner as he digs in search of golden nuggets, avoiding the giant

next, more dangerous, stage by passing through the cave entrance in the bottom right of the screen.

As if all that frantic subterranean activity was not sufficient, above ground a misshapen one-legged gremlin is hopping around and chomping through your waste earth pile, seeking the entrance to the mineshaft to cut off your only means of escape. You can prevent that only by sending the miner back to the surface periodically to replenish the mound of earth.

An attractive and addictive game, **Forty Niner** is one of the best graphic arcade adventures for the expanded ZX-81. It is available from Software Farm, 155 White-ladies Road, Clifton, Bristol BS8 2RG.

FORTY NINER
Memory: 16K
Price: £5.95
Gilbert Factor: 9



rats which burrow towards him.

Knocking over the pit-props delays the rats by causing a cave-in but to destroy them you need to release the snakes from their nests. If you succeed in locating all the nuggets you pass to the

ZX-COMPENDIUM

Memory: 16K
Price: £6.90
Gilbert Factor: 7

LYNCHMOB

Memory: 16K
Price: £4.95
Gilbert Factor: 6

EPHEMERIS

Memory: 16K
Price: £6.90
Gilbert Factor: 7

AIRLINE

Memory: 16K
Price: £5
Gilbert Factor: 7

AUTOCHEF

Memory: 16K
Price: £5
Gilbert Factor: 7

PIONEER TRAIL

Memory: 16K
Price: £3.95
Gilbert Factor: 7

OCEAN TRADER

Memory: 16K
Price: £3.95
Gilbert Factor: 7

GALAXY CONFLICT

Memory: 16K
Price: £11.95
Gilbert Factor: 8

NEW Green Fingers GARDENERS !!

Here's your FIRST computerised plant database!

- ★ Only 80 seconds to find the ideal plants to fit your requirements.
You can ask for plants that suit up to any 5 out of 17 characteristics simultaneously (height, hardiness, sun, water and soil needs, pruning, month of flowering, colour, etc.).
- ★ Comprehensive details of over 350 flowers, shrubs and trees.
- ★ You can look up plants using Latin names, common names, or part of names (e.g. 'lily' displays nine different types of lily, any one of which you can obtain fuller details within 60 seconds).

To order cassettes for 48k SINCLAIR SPECTRUM send cheque/postal order for £8.95 to:

**PRACTICAL SOFTWARE,
DEPT. GF,
40 WORPLE ROAD,
LONDON, SW19.**

HORNBY SOFTWARE

SPECTRUM PRO GOLF SERIES

NEW ERA IN COMPUTERISED GOLF



* Recommended by "Sinclair User", August

EXACT SIMULATION OF BRITAIN'S TOP GOLF COURSES

- (1) ALL GOLF RULES APPLY
- (2) DESIGNED FOR ONE OR TWO PLAYERS
- (3) PLAYED OFF ANY HANDICAP
- (4) ON EACH HOLE DIST, PAR, GREEN ENLARGEMENT
- (5) CONTROL SHOT — CLUB, STRENGTH, DIRECTION, SHAPE OF SHOT
- (6) GRAPHICS EXCELLENT
- (7) EXTREMELY REALISTIC

**NOW INCLUDES
MATCH PLAY**

* TROON £6.95 48K
NEW BIRKDALE £6.95 48K
LINDRICK £6.95 48K
WENTWORTH — EAST & WEST COURSES £10.00 48K
PRO GOLF £4.95 16/48K
9 HOLE SIMULATED COURSE

ALL PRICES INCLUSIVE OF VAT, P+P, AVAILABLE FROM:

HORNBY SOFTWARE
21 PINFOLD HILL, LEEDS LS15 0PW

SU5



Published by Sigma Technical Press and marketed by John Wiley & Sons Ltd., Baffins Lane, Chichester, West Sussex England

SPEED UP YOUR SPECTRUM

FORTH is probably the most versatile and powerful language that can be used on microcomputers. Already it has been used for the animation scenes in *Star Wars* and it is in regular use in such diverse areas as the control of large telescopes and high speed video games.

FORTH is a compact and fast language: faster than BASIC yet more flexible. In fact it is more than just a language: it is a programming language, editor, assembler and disk operating system all rolled into one. In short, a complete 'environment'.

SINCLAIR SPECTRUM: FORTH COMPILER

Thurnall Engineering

This cassette comes complete with a comprehensive manual thus providing a full implementation of FORTH for your Spectrum 48K. 0905104 706 £17.25

THE COMPLETE FORTH by Alan Winfield

This book describes the standard dialect of FORTH together with numerous examples, exercises and complete programs. Once you've read it you'll never use BASIC again! 0905104 226 £6.95

Orders to: Annabella Duckit, John Wiley & Sons Ltd., FREEPOST, Baffins Lane, CHICHESTER, West Sussex PO19 1YP Tel: Chichester (0243) 784531 Telex: 862900 (Reg. No. 641132 England)

Please send me: ☐ 0905104706 Forth Compiler £17.25 ☐ 0905104226 The Complete Forth £6.95

☐ I enclose cheque for made payable to John Wiley & Sons Ltd.

☐ Please charge my AMERICAN EXPRESS/DINERSCLUB/BARCLAYCARD/VISA/ACCESS Card

Date of Expiry Acc No.

Telephone your credit card order — FREEPHONE 3477 (UK only)

Name/Address

Signature SU 5/84

"THE BEST SERVICE AND THE BEST GAMES I EVER HAD"

(D.M. Haigh, Staffs)

CONFUSED by the vast choice of Spectrum programs? We can help. We've played hundreds to choose the best (like the ones on this page). Details in our catalogue - free with your order. It's the only catalogue to give details of the best, omit the rest and quote all the reviews. All programs work with keyboard control or joystick as shown.

WE TRY TO SEND YOUR PROGRAMS THE SAME DAY WE GET YOUR ORDER. Access/Visa card holders phone 01-789 8546, 24 hrs, from any country where your own laws allow this. All games in stock - and tested by us - BEFORE we advertise them! Try us and see ...

Of course, we have the classics like VALHALLA and THE HOBBIT (£14.95 each) and MANIC MINER (£5.95). We also have the best, simplest, loudest battery-powered SPECTRUM AMPLIFIER for just £7.95. And read on ...

FIGHTER PILOT "A Superb simulation ... so realistic it leaves little to the imagination ... as a piece of programming it's impressive, as a game it's not to be missed". (Comp Choice) "Has the edge over Puan's Flight Simulator ... the flying is the best I've come across." (PCGames). 3D Cockpit View, 3D air-to-air combat, stunning instrumentation. This has to be the best Spectrum simulation ever - 70 options include landing practice, flight training, combat practice, actual combat. Clear instructions: 4 skill levels. KEMPSTON, INTERFACE 2, AGF STIX. 48K ONLY (Digital Integration) £7.95

TRASHMAN Come down to Earth and empty all the dustbins from stor Malcolm Evans. Keep off the grass, beware of the dogs, don't spend too long in the cafe! Very addictive unusual new game. 1 or 2 players. KEMPSTON, INTERFACE 2, PROTEK STIX. 48K ONLY. (New Generation) £5.95

THE SNOWMAN "The graphics are great ... you'll love this". (C&V Games). "An exciting game without a trace of violence ... beautifully designed" (Pop Comp Wkly). Fascinating 16 screen game based on Raymond Briggs' book and film, as you build, dress and protect your snowman. Freeze the frames, defeat the Sleep Monsters and collect Ice Cubes. Hall of Fame. KEMPSTON, CURSOR STIX. 48K ONLY. (Quicksilver) £6.95

THE OMEGA RUN Simpler than the most sophisticated flight simulation but a very exciting new game. Pilot your fighter bomber to beat the realtime clock. You have 25 minutes to locate and refuel from your tanker, then bomb the Domsday Machine. 5 skill levels: CUSTOMIZING feature. Good graphics, 7 cockpit instruments: very realistic and hard to put down! KEMPSTON, PROTEK, CURSOR STIX. 48K ONLY. (CRL) £5.95

WHEELIE "Exceptionally good graphics. Smooth, very detailed, with loads of animation ... excellent value". (Crash) Take off on your SuperDream Bike, jump buses and cars, watch out for hedgehogs as you search for the ghost rider. Will you find him? Can you beat him? Demo mode. Some of the most spectacular graphics and sound around. ALL STIX. 48K ONLY. (Microsphere) £5.95

KRAKATOA "Marvellous; excellent graphics, very colourful and with plenty of sound" (Crash). Fantastic full-screen graphics, great music. Your helicopter is huge, with a giant rotor. The volcano explosions are very convincing. The most detailed scenery we've seen! A year ago it would not have been possible. NO STIX. 48K ONLY. (Abbex) £5.95

THE TRAIN GAME "An excellent game ... original, well thought-out and full of action: absorbing and amusing". (S. User). Run your own railway! Change the points to avoid crashes: watch out for hijacking by irate passengers. Full-screen graphics: 30 command keys: 2 track layouts: 7 skill levels, 14 sub-levels. Demo mode and Pause while you strike! Very catching hobby. NO STIX. 16/48K (Microsphere) £5.95

BLACK CRYSTAL "Excellent graphics adventure". (S. User) "Impressed by its sheer quantity". (Home Comp Wkly). 180K of adventure loads from 2 cassettes in 6 chapters. Solve each of the 6 stages to defeat the Lords of Chaos. Realtime monster battles. 16 command keys. Illustrated manual OUR BEST-SELLER! NO STIX. 48K ONLY. (Carnell) £7.50

BUGABOO "Breath-taking graphics, perfect animation and a fresh and original approach to game design". (C&V Games) Highly original game getting raves all round! As Bugaboo, the flea, you must jump up through a series of beautifully drawn caverns while avoiding a pterodactyl. Realtime clock, the best animation you've ever seen. NO STIX. 48K ONLY. (Quicksilver) £6.95

GO TO JAIL "Excellent graphics are used to make a very impressive display indeed ... highly recommended" (ZX Comp) The best computer version of the famous game. From 2 to 5 players, including the Spectrum if you wish. It's ruthless, but honest. Every original feature faithfully reproduced: helpfully scrolling screen display. NO STIX. 48K ONLY. (Automata) £6.00

BIRDS & BEES "Genuinely original, very entertaining and appealing". (S. User) The best Bug-Byte game since Manic Miner. You are Boris Bee, collecting nectar, but The Birds are out to get you. So are the plants, the centipede, the bear, the wasps. It plays the 'Bumble Bee' and there are more screens than we can discover. Excellent graphics. KEMPSTON, PROTEK, AGF STIX. CURRAH SPEECH OK. 48K ONLY. (Bug-Byte). £5.95

THE FOREST "The world's most realistic adventure game". (PersCompNews). Fully graphic simulation of orienteering. You really feel you are map-making as you search for the Control Points. Draw 3D diagrams of the terrain, contour maps, feature maps. And there's 37Kms of unmapped country to explore. 32-page manual helps. "Extremely impressive" (Micro Adventurer) NO STIX. 48K ONLY. (Phipps) £9.95

SOFTWARE SUPERMARKET

VISA/ACCESS: CALL 01-789 8546 (24 hrs)

THE QUILL "Extremely valuable utility: the best answer yet to the adventure writer's dream of painless programming" (PersCompNews). "You really can create games as good as those available commercially" (PopCompWkly). Write your own machine-code adventures: create over 200 locations; describe and connect them as you wish: fill them with objects and problems you invent. And sell the result if you like. (To see a typical result send £5.50 for "DENIS THROUGH THE DRINKING GLASS" - a very amusing Quill adventure.) The Quill comes with a clear 52-page manual. NO STIX. 48K ONLY. (Gilsoft) £14.95

OLYMPIMANIA Topical rip-off from the Piman complete with International Anthem on the flipside. Help the Piman go for gold in all 5 events of the Olympi Games. Watch out for the Parrot! 3 skill levels. CURRAH SPEECH OK 100% m/code. Automata are very proud of the graphics: good job someone is. Mad, but you'll like it. NO STIX. 48K ONLY. (Automata) £6.00

10 SUPER SAVERS

All these programs have starred in our catalogues of Spectrum best!

ARCADE SAMPLER (Workforce) 16/48K	NOW £5.00	SAVE £1.50
ETX (Abbex) 16/48K	NOW £4.95	SAVE £1.00
JETPAC (Ultimate) 16/48K	NOW £4.50	SAVE £1.00
3D STRATEGY (Quicksilver) 16/48K	NOW £5.45	SAVE £1.50
GROUND ATTACK (Silversoft) 16/48K	NOW £3.95	SAVE £2.00
MAZIACS (DK'Ironics) 48K ONLY	NOW £5.45	SAVE £1.50
PENETRATOR (Melbourne) 48K ONLY	NOW £4.95	SAVE £2.00
GROUCHO (Automata) 48K ONLY	NOW £8.00	SAVE £2.00
ZZOOM (Imagine) 48K ONLY	NOW £4.50	SAVE £1.00
KNIGHT'S QUEST (Phipps) 48K ONLY	NOW £4.95	SAVE £1.00

FREE KEYBOARD OVERLAYS!

If you order comes to £25 or more, excluding p & p, we will send you a set of 10 keyboard overlays - worth £2.50 - absolutely free!

STOP PRESS ...
Jet Set Willy now in stock - £5.50

To: SOFTWARE SUPERMARKET, 87 Howards Lane London SW15 6NU.

If you do not want to cut this magazine, write your order out carefully on plain paper and quote this number: SU18

I own a _____ K computer which is a SPECTRUM I enclose a cheque/PO made payable to Software Supermarket OR Charge my VISA/ACCESS/EUROCARD/MASTERCARD number:

Signature _____

Please write clearly. If we can't read it, you won't get it.

Name _____

Address _____

Postcode _____

Phone, if any, in case of query _____

PROGRAM NAME	Price
	£
	£
	£
	£
	£
	£
	£
POSTAGE AND PACKING	U K Add 55p only per order £0 55p
	EUROPE Add 55p for each program £
	OUTSIDE EUROPE Add £1 for each program airmail £
	OUTSIDE EUROPE ADD £1 TO TOTAL FOR REGISTERED MAIL TOTAL £

Nicole Segre zooms in on flight programmer Gibson

Reach for the sky

LESS THAN two years ago, John Gibson was living on a remote mountainside in Wales and making a precarious living by installing suspended ceilings. Today he is a mainstay of the Imagine Software team of programmers in Liverpool, author of three best-selling games for the Spectrum, and the proud owner of a metallic brown Porsche 924. "I can't believe my luck," he says, "especially at my age."

At 36, Gibson is the oldest of the Imagine Software team, whose average age is somewhere around 19. Age, however, has not prevented any of his games figuring in the charts within a short time of their release.

The first was **Molar Maul**, which was set, of all places, in a mouth where evil bacteria such as the green meanies and the DKs must be warded-off by means of weapons like toothbrush and toothpaste. "It sold well in spite of being in rather poor taste," says Gibson. His next game, **Zzoom**, was more in the classic mould of arcade games, except that it had a scrolling screen, then a novel feature, and that the enemy craft to be shot from the sky headed straight towards the player.

Gibson's present hit is **Stonkers**, a complex strategic war game which makes a complete break from previous

The truly original feature of the game is the way in which pressing the fire button permits the player to zoom in on any particular segment of the map, which is then displayed in fine detail, complete with whatever artillery units, tanks or supply ships happen to be in it.

Within the limits imposed by the Spectrum memory, the game also incorporates artificial intelligence techniques, with the computer making rational decisions based on the player's moves. "A fair degree of strategic planning is needed all the way through," says Gibson.

Stonkers represents a considerable programming feat, which is all the more surprising because Gibson entered the field comparatively recently and via a roundabout route. Born and raised at Mitcham, south London, he studied polymer engineering at Manchester University and then applied for a post as a trainee computer programmer with a multi-national plastics company. A promising career was nipped in the bud, however, when the company decided to cancel the scheme four weeks before Gibson was due to start, sending him on his way with a month's salary.

Gibson drove a wholesale chemist's van for a time before deciding to settle for something sedentary and enter the

43/41 in RPG II, which normally should have led to processing business data for a large company rather than working for Imagine Software," says Gibson, "but it also happened to put me in the right place at the right time."

Through the TOPS course, Gibson heard that Mark Butler and Dave Lawson, who had recently set up Imagine Software, were looking for machine code programmers. Although his course did not qualify him for the job, Gibson had taught himself machine code on a ZX-81 he bought in 1980. "I could not afford a 16K RAM pack in those days and with only 1K to play with, there was no choice but to learn machine code," he says.

Called for interview, Gibson was asked if he could produce a fully-fledged game for the Spectrum in the next month. "I did not know what to say," he recalls. "I had no idea whether I could do it or not." After some hesitation, he decided it was worth trying and set to work on **Molar Maul**, an idea which had grown out of the dental treatment both Butler and Lawson were receiving at the time. The game did well and Gibson has never looked back.

Since he joined Imagine Software at the beginning of 1983, Gibson has seen the company grow beyond his wildest predictions. From the original team of six, including himself and the celebrated Eugene Evans, it now employs 100 people, of whom 28 are full-time programmers, and has spread to three sleek buildings in the centre of Liverpool.

Fast cars are almost a company trademark and a fleet of Ferraris, Porsches and Lotuses indicates the presence of top Imagine programmers or directors. Gibson's Porsche was a bonus for completing **Stonkers** in a gruelling two months.

Imagine Software also boasts art and music departments to help with the graphics and sound of its programs. "It's very pleasant," says Gibson. "I had only to produce the code for **Stonkers** instead of doing everything myself, as I used to do."

The idea for **Stonkers** came from Lawson, who suggested it on the grounds that Imagine had never produced a war game. The emphasis was to be on graphics and real-time action, to distinguish the game from simpler ver-

'Stonkers represents a considerable programming feat, which is all the more surprising because Gibson entered the field comparatively recently via a roundabout route'

Imagine Software games. **Stonkers** features a battle zone — "nowhere in particular but it resembles the northern coast of Europe," says Gibson — complete with marshland, river, mountains and open country.

The player's army is ranged against that of the computer and must try to over-run its supply point and military HQ to win the war. The ordinary screen display shows the battle terrain, with panels at the sides and bottom keeping the player informed constantly as to the relative strength of the two armies and individual units. At regular intervals, ticker tape messages run across the bottom of the map with the latest battle updates.

services of the Department of Health and Social Security, where he was to remain for the next eight years.

"I was always bored with the job," he says, "but one way of relieving boredom was to ask to be posted to various parts of the country." As a result, he worked in social security offices in Manchester, Cornwall and Wales, before he finally exchanged the uncongenial task of visiting people to assess their eligibility for supplementary benefit for that of erecting suspended ceilings on a self-employed basis.

Seeing no glittering future in that career either, Gibson joined a TOPS computing course in Liverpool. "The course involved programming an IBM

sions produced by other companies. Gibson's research on the project was limited.

"I based it on TV and film documentaries, some war games magazines lent to me by a fellow programmer who is interested in those things, and plain common sense. The complexity of the strategy was in any case restricted to what I could fit into the computer memory," he says.

Gibson wrote the program on a company Sage IV, which has 1MB of memory. "It was wonderful to be able to store everything on one disc, rather than many different ones on which people made their jam sandwiches," he says. Before the Sage IV, he was using an Apple 256K and says he has never programmed directly on the Spectrum.

To plot the map for *Stonkers*, Gibson and Imagine artist Paul Lindale used a sheet of graph paper, or rather several stuck together, measuring 13ft. by 8ft. The graphics for the map and its large-scale segments took up 21K of memory and Gibson used every available remaining byte, plus a few more which he was able to squeeze from the machine by juggling with sections of the program, for the strategy and action. "That

is why the game has no catchy tunes or fancy title

screen. There simply was no room."

Gibson says he would have enjoyed writing *Stonkers* for the QL which would have allowed a more complex game than is possible for the Spectrum. He foresees a spate of games for the QL as soon as it becomes readily available.

"Certainly Imagine would have no difficulty in adapting to the QL, although I do not think we or other companies would cease to produce Spectrum games. The Spectrum is still the chief money-spinner for software houses."

With another programmer, Ian Wetherby, Gibson is working on a new Spectrum game, **Bandersnatch**, which is due to appear at the end of May. It is already being billed as a "megagame" and Gibson will say no more about it than that it will be game rolled into one and that look and sound fantastic."

In spite of the many changes at Imagine Software in the short time Gibson has worked there, he still finds it provides "a great working environment. I am working with friends and being paid for something I am good at and enjoy doing. I also feel fortunate at my age to be at the start of something so

new and exciting." A prey to constant jokes on the subject of his advanced years and decrepitude, Gibson explains the fact that most programmers are so much younger than himself by saying:

"They are the ones who like playing the games, so it is natural for them to be involved in writing them." He claims that he has no aptitude for playing computer games — "a 17-year-old like Eugene Evans can play the games I have written better than I can," he says. He attributes his programming skill to sheer patience and persistence.

Although Gibson thinks the games boom is bound to level-out in time, he sees no end to it in the near future. He also thinks that computers like the QL will become part of people's homes — not just for filing, word processing, accounting and the like, but for things like controlling lights, television sets and central heating.

Gibson frequently works late into the night, sometimes for days at a stretch where there is a deadline to be met, so that he has little time for outside interests, but he likes marquetry.

He recalls that while still at school he played with a rock group called Mud. He left the group to go to college, while they made a series of hits. "I often wondered whether I had done the right thing but it all seems to have come out right in the end," he says. "My mother would say it was fate. Perhaps she is right."

Gibson on the look-out for software bandits at 12 o'clock high?

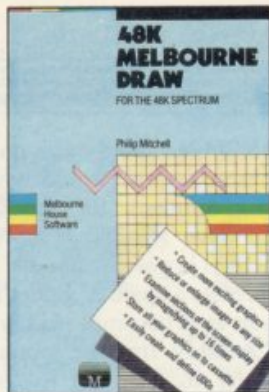




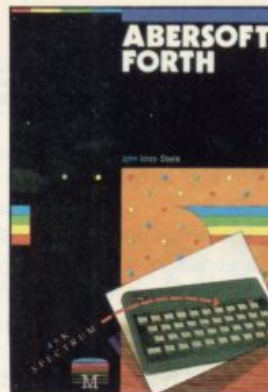
THE HOBBIT. Visit J.R.R. Tolkien's Middle Earth with The Hobbit. The most amazing adventure yet devised. "A game by which future games will be judged." — Personal Computing Today. "Superior to any other adventure game." — Your Computer. "1983 will go down in microadventure history as The Year of THE HOBBIT" — Popular Computing Weekly.



H.U.R.G. A revolutionary piece of software for your 48K Spectrum which allows you to develop high quality Machine Language arcade games with absolutely no programming experience. Enter the H.U.R.G. competition and win £3000.



MELBOURNE DRAW. Now with Melbourne Draw you can create dazzling, intricate colour graphics and pictures on your Spectrum screen without special programming skills. The most useful and powerful graphics utility program for the 48K Spectrum.

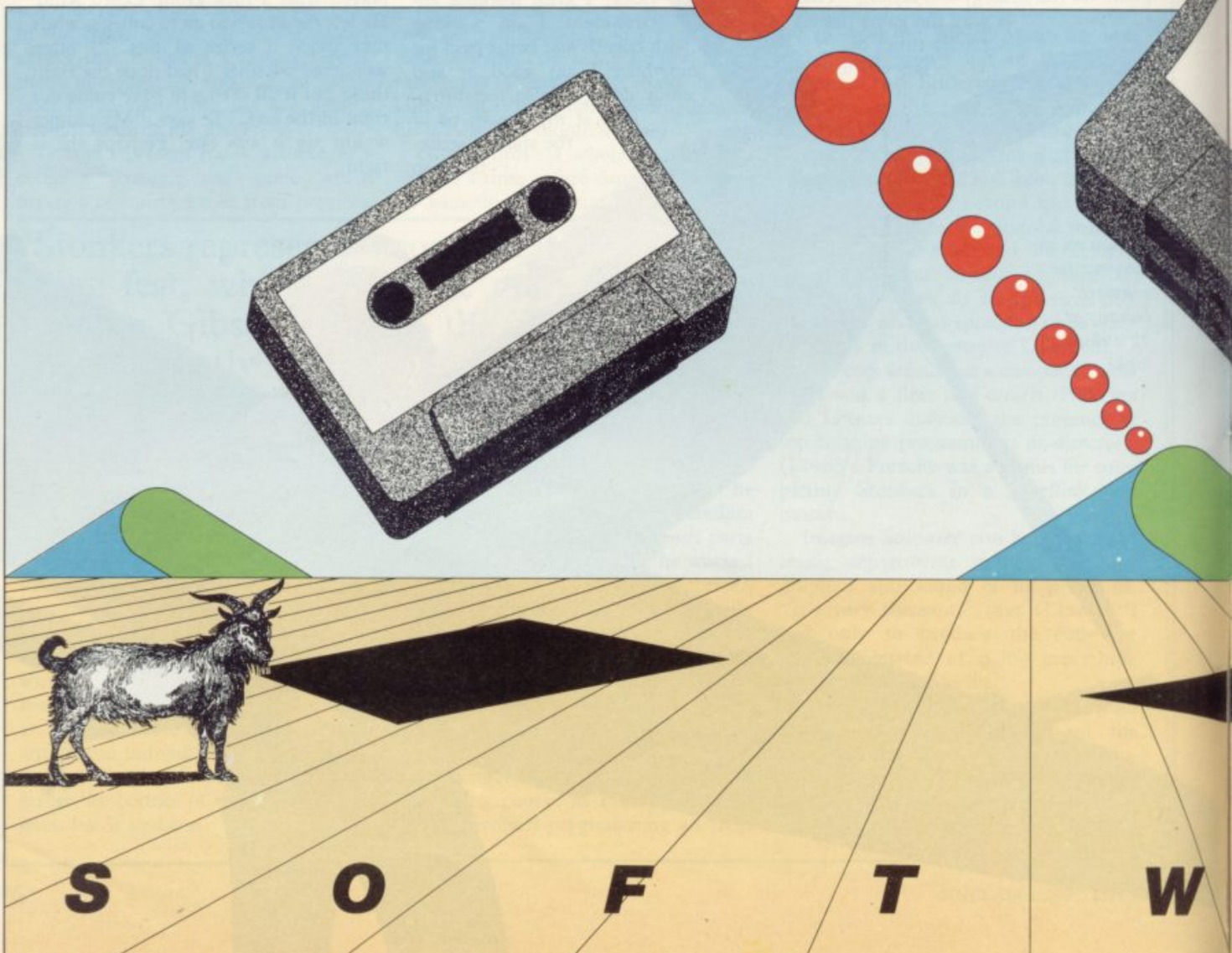


FORTH. Abersoft Forth is an implementation of the Forth Language for your 48K Spectrum. Forth is closer to Machine Code and more than 10 times faster than BASIC. "Abersoft Forth is the only Spectrum package which has been endorsed by the Forth Interest Group." — Sinclair User.



PENETRATOR is one of the most challenging arcade games for the 48K Spectrum. Amazingly fast arcade action includes training mode and unique customising feature. "Penetrator is my pick — the graphics are terribly impressive... a most enjoyable and addictive game." — Computer and Video Games.

MELBOURNE





TERROR-DAKTIL 4D. In a place forgotten by time the beating of wings heralds an incarnation too horrible to believe — Terror Daktil 4D. "The graphics are among the best I have seen." — Computer and Video Games.



CLASSIC ADVENTURE is the program that started it all! Now you can discover the excitement of Classic Adventure on your 48K Spectrum, and if you are masterful enough you too could become a Master Adventurer.



MUGSY gives a totally new direction for thrill seekers — comic animation in text, stunning graphics and a full arcade game! Mugsy is your one and only chance to become the greatest gang leader with definite ill repute.

Orders to:
Melbourne House Publishers
131 Trafalgar Road
Greenwich, London SE10

Correspondence to:
Church Yard
Tring
Hertfordshire HP23 5LU

All Melbourne House cassette software is unconditionally guaranteed against malfunction.

Trade enquiries welcome.

☐ Please send me your free 52 page catalogue.
Please send me:

SPECTRUM

Software

<input type="checkbox"/> Spectrum The Hobbit 48K	£14.95
<input type="checkbox"/> Spectrum Penetrator 48K	£6.95
<input type="checkbox"/> Terror-Daktil 4D 48K	£6.95
<input type="checkbox"/> Melbourne Draw 48K	£8.95
<input type="checkbox"/> H.U.R.G. 48K	£14.95
<input type="checkbox"/> Abersoft Forth 48K	£14.95
<input type="checkbox"/> Spectrum Classic Adventure 48K	£6.95
<input type="checkbox"/> Spectrum Mugsy 48K	£6.95

Books

<input type="checkbox"/> Over The Spectrum	£4.95
<input type="checkbox"/> Spectrum Machine Language for the Absolute Beginner	£5.95
<input type="checkbox"/> Understanding Your Spectrum	£6.95
<input type="checkbox"/> The Complete Spectrum ROM Disassembly	£9.95
<input type="checkbox"/> Spectrum Hardware Manual	£5.95
<input type="checkbox"/> Spectrum Microdrive Book	£5.95
<input type="checkbox"/> Super Charge Your Spectrum	£5.95
<input type="checkbox"/> C&VG Book of Adventure	£5.95
<input type="checkbox"/> Guide To Playing The Hobbit	£3.95
<input type="checkbox"/> Advanced Spectrum Forth	£8.95
<input type="checkbox"/> Advanced Spectrum Machine Language	£5.95

£

Please add 80p for post & pack £80

TOTAL £

I enclose my ☐ cheque
☐ money order for £

Please debit my Access card No

Expiry Date

Signature

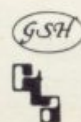
Name

Address

Postcode

Access orders can be
telephoned through on our
24-hour ansafone (01) 858 7397.

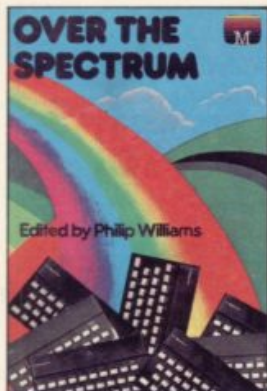
SU5B



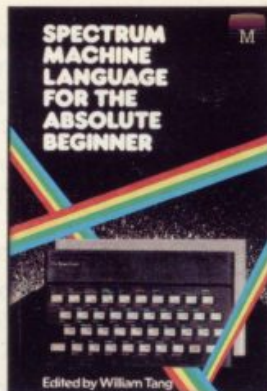
A

R

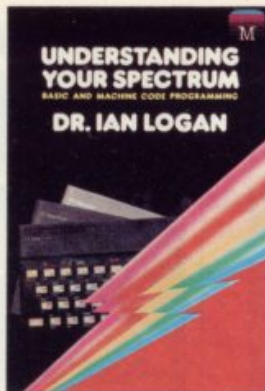
E



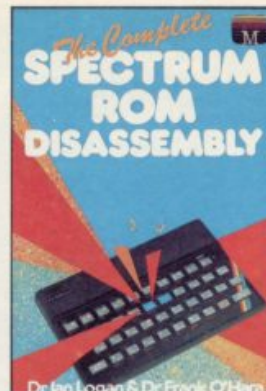
Over The Spectrum. 30 exciting, easy to enter programs designed specifically for the Spectrum. "A collection of truly outstanding programs." — Educational Computing. "A book that will continue to offer advice and instruction as your own skill increases." — ZX Computing.



Spectrum Machine Language For The Absolute Beginner. A 'no jargon' introduction to Spectrum Machine Language. "One of the best I have seen." — Popular Computing Weekly. "Very readable and excellent value for the beginner." — Sinclair Users' Annual.



Understanding Your Spectrum. A complete guide to the Spectrum software system for users who want to learn how to program in both BASIC and Machine Language. "Excellent in content." — Sinclair User. "An outstandingly important book". — Eric Deeson, Computers in Schools.

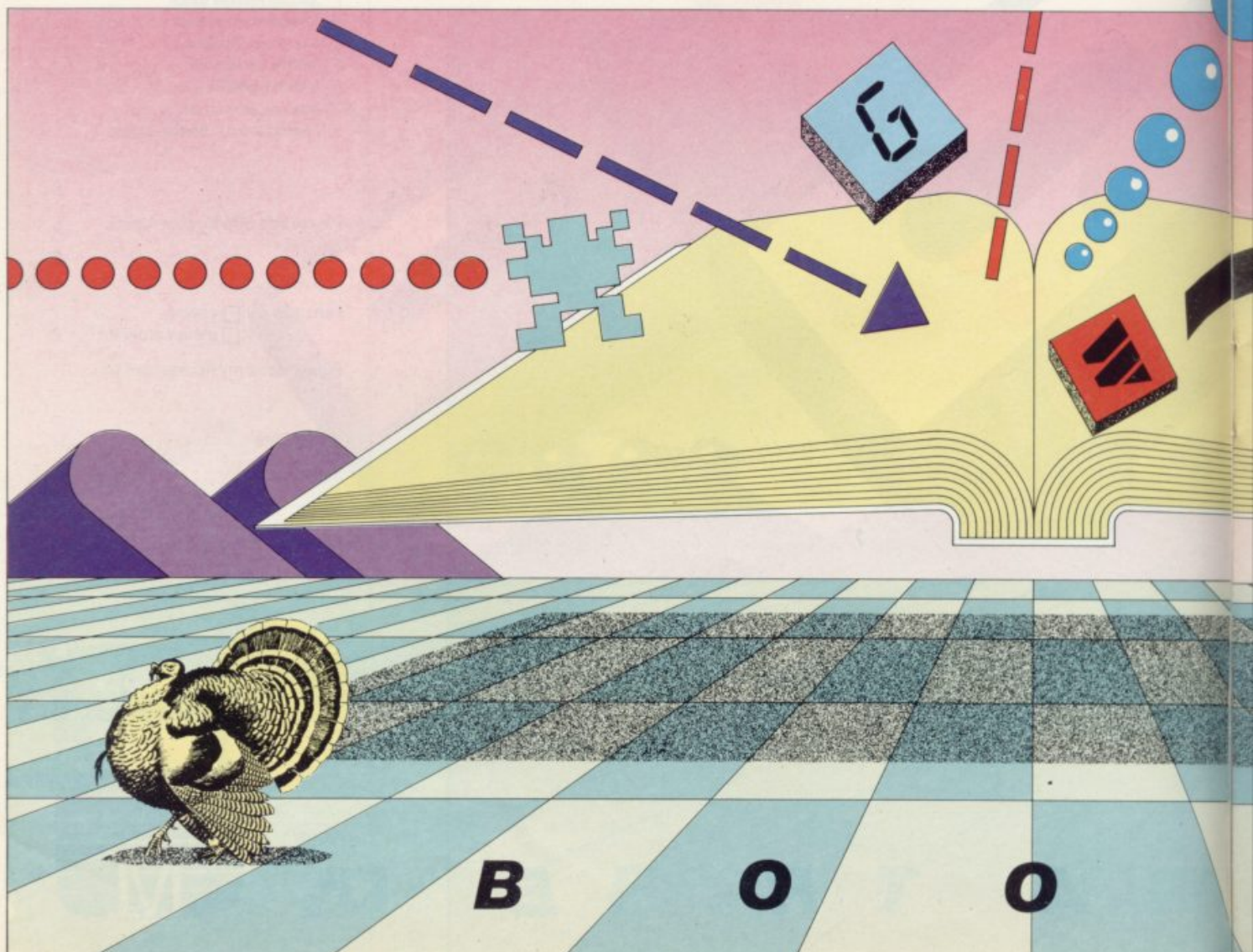


The Complete Spectrum ROM Disassembly. For the serious programmer who wants to get right to the heart of the Spectrum 16K ROM control program. "A useful and interesting book." — Personal Computer News. "The detail is ingenious." — Educational Computing.



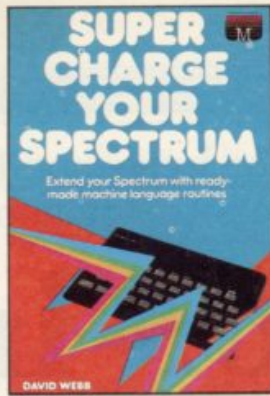
Spectrum Hardware Manual. An in-depth explanation for the hobbyist who wants to know how the Spectrum works. "The second most useful book you can buy — the first being the programming manual that comes with your machine." — Personal Computer News.

MELBOURNIE





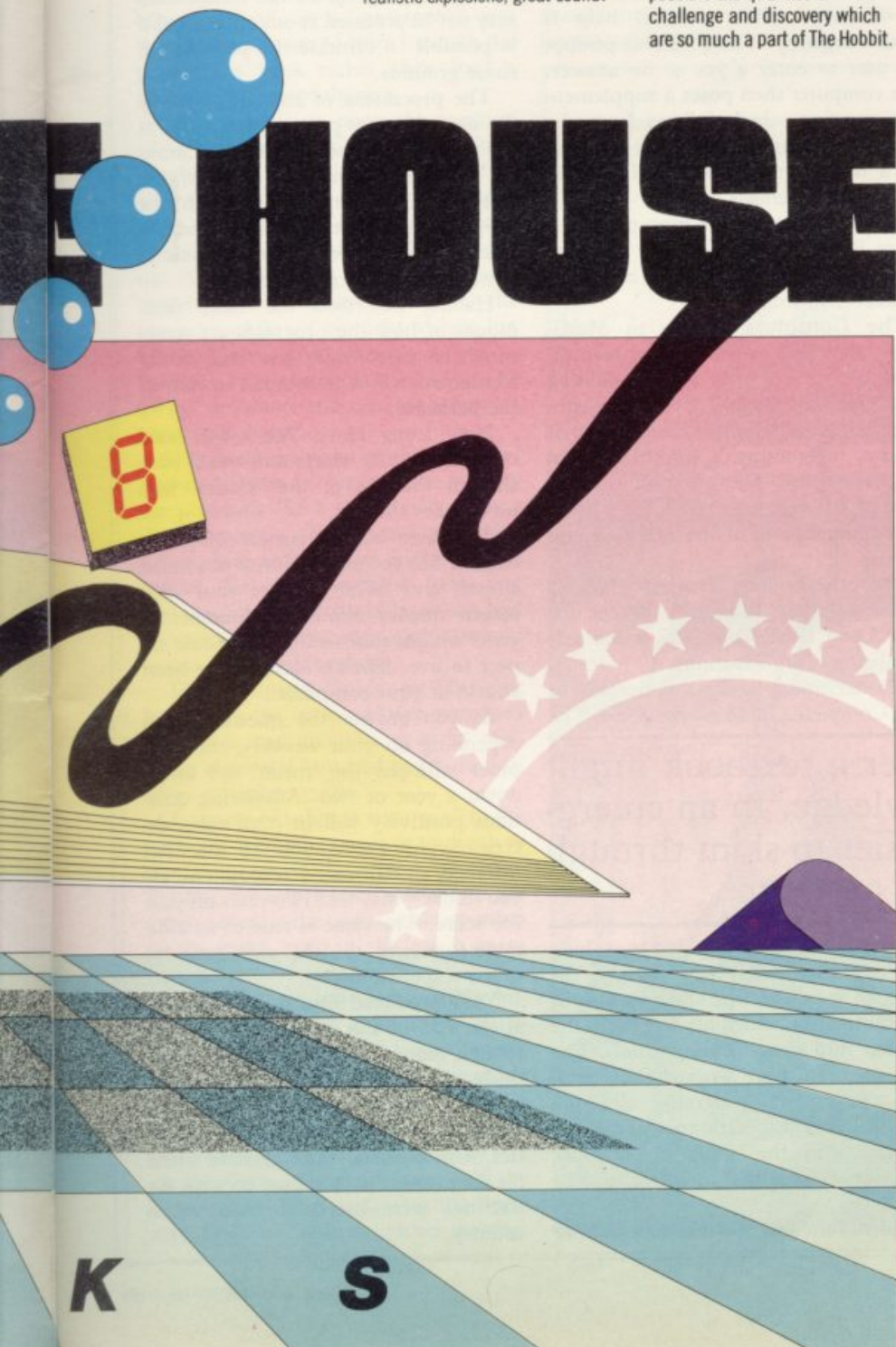
Spectrum Microdrive. In this book Dr. Ian Logan gives a detailed explanation of the Spectrum Microdrive — how it works, its capabilities from BASIC and Machine Language and the networking and RS232 possibilities



Supercharge Your Spectrum. Extend your Spectrum with ready made Machine Language routines. Now without any additional effort you can overcome the limitations of BASIC — faster programs, more powerful graphics commands, realistic explosions, great sound.



A GUIDE TO PLAYING THE HOBBIT "The Hobbit" program has revolutionised adventure on the Spectrum, Commodore 64, BBC and Oric computers. This book, whilst providing solutions to the problems which are encountered, aims to preserve as far as possible the qualities of challenge and discovery which are so much a part of The Hobbit.



Orders to:
Melbourne House Publishers
131 Trafalgar Road
Greenwich, London SE10

Correspondence to:
Church Yard
Tring
Hertfordshire HP23 5LU

All Melbourne House cassette software is unconditionally guaranteed against malfunction.

Trade enquiries welcome.

☐ Please send me your free 52 page catalogue.
Please send me:

SPECTRUM

Books

<input type="checkbox"/> Over The Spectrum	£4.95
<input type="checkbox"/> Spectrum Machine Language for the Absolute Beginner	£5.95
<input type="checkbox"/> Understanding Your Spectrum	£6.95
<input type="checkbox"/> The Complete Spectrum ROM Disassembly	£9.95
<input type="checkbox"/> Spectrum Hardware Manual	£5.95
<input type="checkbox"/> Spectrum Microdrive Book	£5.95
<input type="checkbox"/> Super Charge Your Spectrum	£5.95
<input type="checkbox"/> C&VG Book of Adventure	£5.95
<input type="checkbox"/> Guide To Playing The Hobbit	£3.95
<input type="checkbox"/> Advanced Spectrum Forth	£8.95
<input type="checkbox"/> Advanced Spectrum Machine Language	£5.95

Software

<input type="checkbox"/> Spectrum The Hobbit 48K	£14.95
<input type="checkbox"/> Spectrum Penetrator 48K	£6.95
<input type="checkbox"/> Terror-Dakti! 4D 48K	£6.95
<input type="checkbox"/> Melbourne Draw 48K	£8.95
<input type="checkbox"/> H.U.R.G. 48K	£14.95
<input type="checkbox"/> Abersoft Forth 48K	£14.95
<input type="checkbox"/> Spectrum Classic Adventure 48K	£6.95
<input type="checkbox"/> Spectrum Mugsy 48K	£6.95

£
Please add 80p for post & pack £80
TOTAL £

I enclose my ☐ cheque
☐ money order for £

Please debit my Access card No


Expiry Date

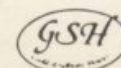
Signature

Name

Address

..... Postcode

Access orders can be telephoned through on our 24-hour ansafone (01) 858 7397. 



WHEN people think about the various types of computer software they usually divide them into three main categories — games, educational and business. The classification is also normally in that order.

The Eastmead Medical series, however, fits into none of the three main categories completely. It could be placed in the educational field but it is also of use in the home and even in the surgery, or so the manufacturers claim, but its educational value is questionable.

A team of three worked on the development of the packages — two programmers and a successful medical author. That is made apparent by the textbook style of the narration on the screen, a style which invites comparison with medical reference books.

The screen layout of the text in each of the programs accommodates the reader in every way. There is a space between every line of text which should help the reader to avoid eyestrain. There is also an insurance measure incorporated into every screen so that you do not move to the next screen by pressing a key accidentally.

The only way to access the next screen is to press the key specified by the program, which is usually on the bottom row of the keyboard. Accidents can still happen if you lean against the keyboard but they are made less likely by that safety measure.

The usual psychological techniques of learning are applied in the packages. The most successful is the asking and answering of questions combined with a period of tuition.

It is difficult to spot the technique in the first of the series, **How Long Have You Got?** but it is there. On the first

At last—software for hypochondriacs.
John Gilbert delivers the diagnosis

Doctor in the house?

First Aid uses the questioning technique in a different manner. The program performs a diagnosis of what to do in situations where medical help is needed urgently. The questions prompt the user to enter a yes or no answer. The computer then poses a supplementary question which follows from the first. The string of questions, each going a little further than the first, will end with a diagnosis.

The diagnosis report may provide a direct form of action or may give the unhelpful response of 'go and seek medical help immediately'.

The Complete Guide to Medicine, the final part of the medical trilogy, does not use the questioning technique very much. It provides a run-down of reproduction and the growth of a baby, together with information on internal organs. The questions in that piece of software are mainly for switching between parts of the program and menus.

The other aid to learning which is apparent in the programs, except for **How Long Have You Got?** is the sectionalising of information.

The technique is most noticeable in **The Complete Guide to Medicine**. The

utes to load as they contain large amounts of information. When working through a program all the information may not be accessed at one sitting and it is possible to criticise the program on those grounds.

The processing of answers given by the user also uses program space but as the options to most questions are limited, the decision-making parts of the software are compact. Although the programs are written in Basic and not machine code, the computer response to a user input is extremely fast.

Having described the basic techniques of how the programs are structured, let us consider how each of the techniques works in relation to each of the packages.

How Long Have You Got? could certainly induce stress and could even shorten the life of the 'victim' who undertakes the test.

The user has to answer questions such as 'Do you smoke?' 'Are you under stress?' and 'What sex are you?' The screen display shows the number of years which, statistically, you could expect to live, barring accidents or heart attacks at your computer.

As you answer the questions and, depending on your answers, the computer will put the 'mean' age up or down a year or two. Answering questions positively will in most cases decrease your expectation of life. For instance, an affirmative response to 'Do you smoke?' may take two years off your life score. The same is true of an affirmative answer to 'Do you have too much responsibility?'

Your predicted lifespan is displayed at the end of the question section, although that is a rough estimate. Obviously, the program is light-hearted in content, although all the results are based on knowledge gained from statistics. Unfortunately the cassette insert for the package does not say on what the statistics were based or from which country.

'You must ponder whether a textbook might be a better source of knowledge. In an emergency you would find it easier to skim through a book rather than load a program'

run through the package, which consists of one program, you will be asked a number of questions regarding health.

Once the program has finished and you have learned how long you can expect to live the computer will invite you to re-run and look at those questions with which you had difficulty and those which you answered incorrectly. In that case the questions would help you to analyse the problem areas of your life so far as health is concerned.

authors have obviously spent a long time working out which part of the program should be first and how to split the information which has to go into the package into several 48K portions. The split seems to have worked fairly well with the medical programs, although long waits for a specific part of a package, such as the 'guide', can cause irritation, especially if there is a loading error.

Most of the sections take several min-

The questions involved in the test seem sensible enough and it is easy to see how the resulting life expectancy is calculated, yet they are vague and there is only one which takes into account the male/female sex difference. That is not a major criticism of the product, although it makes one wonder if all eventualities have been taken into account.

The First Aid package deals with the kind of emergencies which happen in the home. The contents include dealing with bleeding, breathlessness, poisoning, fainting and convulsions although again not every eventuality is taken into consideration. For that reason you must ponder whether a textbook on the subject might be a better source of knowledge. After all, in an emergency you would find it easier to skim through the pages of a book rather than load a program for a consultation.

The last criticism poses the question as to the way in which the package should be used. If it is to be used in the classroom it is not sufficient to stand alone. At best it could be used only as a teacher's aid or learning prop. If that is not the case, surely the manufacturer cannot expect someone to LOAD the program while an accident victim lies on the floor. The package is not so portable as a textbook which can be carried anywhere and used for accidents away from home.

One major criticism of the First Aid package is that in many cases it gives the diagnosis 'Seek the advice of your doctor urgently'. That is not very helpful, as first aid is often applied while waiting for expert medical help; and you could buy a first aid book for half the price of the package and it would contain more information.

The Complete Guide to Medicine has, to say the least, an over-expressed title. It is not possible, even in textbooks of several hundred pages, to provide a complete guide.

A variety of subjects is covered in the package, although none is as in-depth as they could be. In the section on reproduction, the information starts with the sperm entering the woman. No mention of the man's part in the act is mentioned.

Other subjects covered include human anatomy and physiology, nutrition, how to cope with stress, emergencies, home care and nursing advice.

The authors have also included graphics in the sections on the body and its functions and those can only be described as funny and, with the Spectrum graphics facilities, rather sketchy.

The authors are certainly not artists, as the graphics show square heads and strange-looking limbs. For a package which is intended to cover medicine, one of the sciences, the graphics are not sufficiently accurate.

The Complete Guide to Medicine and First Aid are indicative of a distressing trend in software, as manufacturers and programmers attempt to find substitutes for the written word, working on the assumption presumably that anything a book can do, the computer can do better. In this instance that assumption is unfounded, as textbooks on the subject would be less superficial and contain illustrations considerably more illuminating. The access time alone should make users think twice before loading such software.

If the packages have an advantage over textbooks it is the provision of information in a palatable and amusing form for people who enjoy using computers and do not enjoy reading. How Long Have You Got? according to that criterion is the best of the three packages as it is the most fun to use.

FIRST AID

Memory: 48K

Price: £4.60

Gilbert Factor: 4

HOW LONG HAVE YOU GOT?

Memory: 48K

Price: £3.95

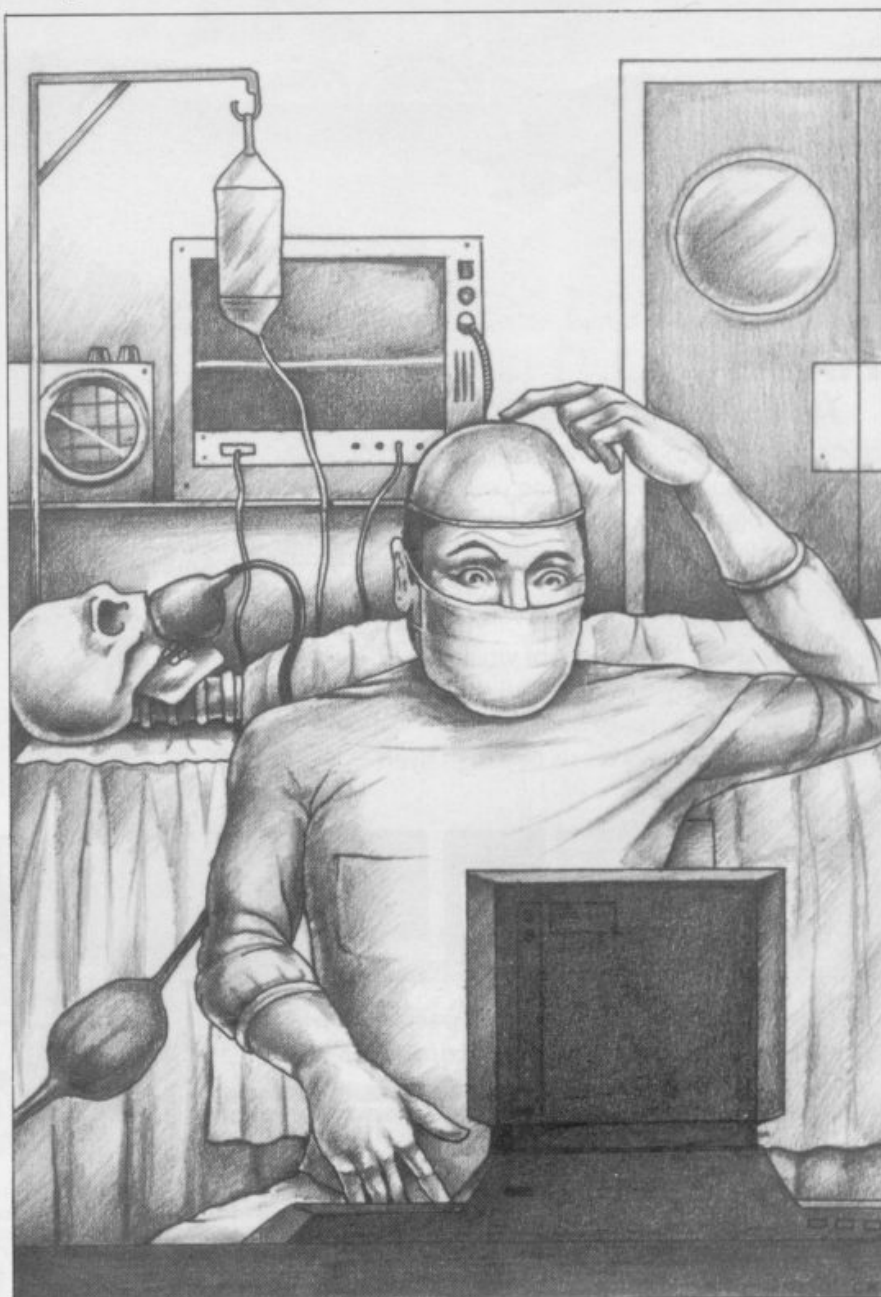
Gilbert Factor: 6

THE COMPLETE GUIDE TO MEDICINE

Memory: 48K

Price: £6.90

Gilbert Factor: 4

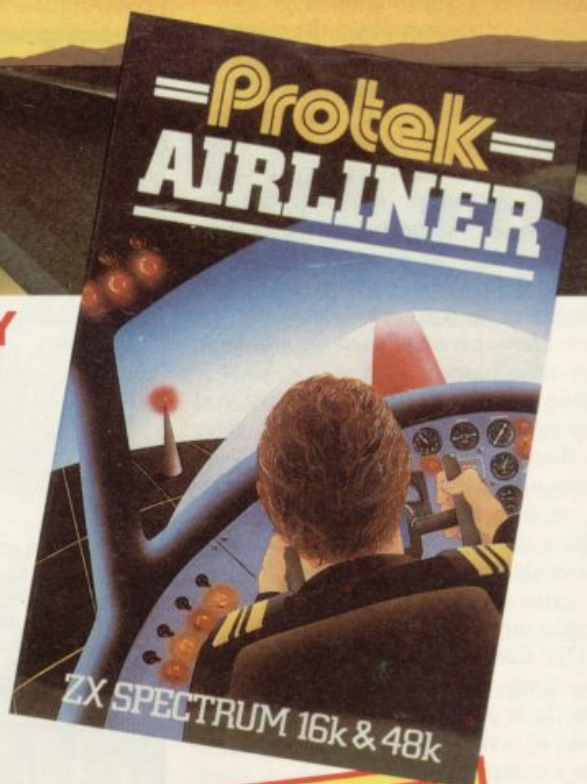


HIGH FLYING EXCITEMENT FROM PROTEK.



HAVE YOU THE SKILL TO FLY AND LAND AN AIRLINER?

From take off to touch down you're in control. Flight control is totally in your hands. Keeping your aircraft in full flight will be as complex as controlling the real thing. You'll be able to take off, manoeuvre, navigate, and land the aircraft using realistic aircraft controls. You'll chart your present position on a map or view the runway as you land without losing sight of vital instruments. In fact, you'll hardly be able to tell the difference thanks to 'Airliners' range of features. Have you got what it takes to be a high flyer?



See the complete range of action packed computer games from Protek at your local computer store.

£5.95
Available for the BBC
and Commodore 64 soon.

Protek=

Protek Computing Ltd, 1A Young Square,
Brucefield Industrial Park, Livingston, West Lothian. 0506 415353.





The **PARATROOPERS** have landed

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

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

...Home Computing Weekly

"One of our best games yet."

...Terry Grant, Rabbit software director

"An obscene celebration of slaughter."

...Home Computing Weekly

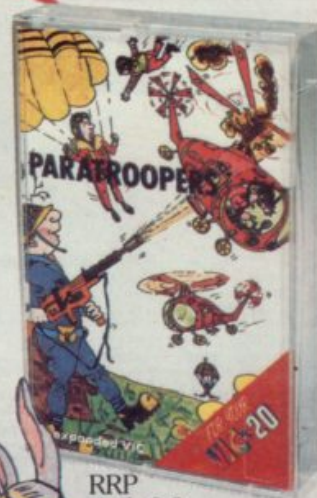
"My Terry wouldn't do a thing like that."

...Terry's mum

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

RABBIT SOFTWARE LTD

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



RRP
£5.99
inc. VAT

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



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

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

SUSP

ONLY THE BEST BECOME A....

FIGHTER PILOT

48K SPECTRUM

BY D.K. MARSHALL

A SPECTACULAR FLIGHT SIMULATION OF THE WORLD'S MOST EXCITING JET FIGHTER WITH STUNNING 3D COCKPIT VIEW AND THE MOST REALISTIC 3D AIR-TO-AIR COMBAT EVER SEEN ON THE SPECTRUM!

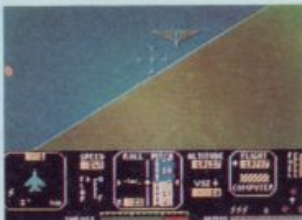
The SUPREME SIMULATION... it leaves the rest at the runway threshold!

£7.95

inc. VAT & p. & p.
Joystick Compatible
(Kempston, AGF, Sinclair
Interface 2, Protek etc.)*

OTHER AMAZING FEATURES

- * Landing and take off from 4 runways plus steering on the ground.
- * Fully Aerobatic Performance
- * Airfield attack by the enemy
- * Cross winds, Turbulence and landing in fog.
- * 4 Pilot ratings, 8 Beacons, ground features and map
- * Artificial horizon, radar and flight computer.
- * ILS, Flaps, U/C and system failures
- * 100% machine code with complete instructions and pilot notes.

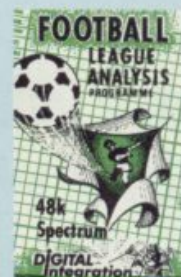


"Definitely the best simulation for the Spectrum..."
- Crash Micro



TAXI
£5.50

Any Spectrum
Become a Taxi Driver and test your skills - but beware the Reckless Drivers!
Fun for all the family



FOOTBALL
£7.95
48K Spectrum

League Analysis - Easy to use Pools Prediction.
With 9 methods of team performance analysis - let your Spectrum guide you to your pools selection.



NIGHT GUNNER
£6.95
48K Spectrum

Joystick Compatible *
The air battle where only aces survive - with enemy fighters attacking from all directions, guns blazing, explosive 3D ground attack sorties - and there's still the flight home.

WIZARDS OF COMPUTER GAMES SOFTWARE



DIGITAL INTEGRATION

Watchmoor Trade Centre,
Watchmoor Road,
Camberley, Surrey GU15 3AJ

Selected products available from:
Boots, Woolworths, H.M.V., Menzies,
Greens, Lasky's, Currys, Rumbelows, Selfridges, Spectrum
Dealers, Video Palace, Zappo, and all good Computer
shops.

Please send me the following games for the Spectrum

- | | |
|---------------------|--------------------------------|
| Fighter Pilot 48K | <input type="checkbox"/> £7.95 |
| Night Gunner 48K | <input type="checkbox"/> £6.95 |
| Football 48K | <input type="checkbox"/> £7.95 |
| Taxi (Any Spectrum) | <input type="checkbox"/> £5.50 |

VAT and p. & p. inclusive within UK
(Overseas inc. 55p. per cassette)

Please send to Digital Integration, Dept SU3
Watchmoor Trade Centre, Watchmoor Road, Camberley, Surrey GU15 3AJ

Trade and Export enquiries welcome.

Lifetime Guarantee Cheques payable to Digital Integration
I enclose a cheque/P.O. for _____ Total.

Name _____
Address _____

Or debit my Access _____ Account No. _____

Tele Sales Camberley (0276) 684959

Camberley, Surrey GU15 3AJ

Computer capers

John Gilbert reads more into two new books which aim to show the lighter side of computing.

IT HAD to happen. Someone has had the courage to print an exposé of the whole truth about the computer industry and its inmates. *Micromania*, by Charles Platt and David Langford, takes computing to pieces and finds the comedy under the skins of big business and the individual computer user. It does so by using a hatchet of slapstick humour with an ungainly mixture of clichés and buzzwords.

The book provides a compendium of insights into the personalities of those who use computers. The authors may be interested in the machines but they are ready to make fun of the behaviour of their fellow maniacs.

They divide users into four classes — the hardware freak, the video game nut, the end-user and the hacker. The descriptions of those people are as cruel as the names used to label them. A video games junkie is, for example, described as 'between 10 and 16 years of age, mentally if not physically'. The authors then describe video games as 'boring and, sooner or later, an intelligent person will notice this'. On the other hand, as the authors fail to admit, an intelligent person might not.

It is ridiculous to say that all video games players are idiots or morons. There are, of course, people addicted to those games, just as there are people addicted to barbiturates or aspirin, but many computer users play video games as a form of relaxation or entertainment. The criticism that computer users are junkies hooked on bashing a computer keyboard all day and night is, therefore, too general to be taken very seriously.

Micromania is also peppered with a long series of rules governing computers, called Platt's Laws. They cover all areas of computing and most of them make sense when the veneer of sarcasm is removed. For instance, 'the man who invests a lot in a system will swear by it in public, even if he swears at it in private' is funny but also true about ZX-81 owners who envy IBM owners. Also true is 'no matter how expensive you expect a system to be, it will always end up being more expensive than you expect'. Every micro owner would say that never a truer word was spoken.

The general structure of the book is

inventive, to say the least. Each chapter is labelled with a binary number, beginning with 0000 and rising to 1101. The text is split into modules which is reminiscent of the way in which programs should be structured. It also shows that the authors are part of the computer world of which they are making fun.

Chapter 1101 deals with the future of microcomputing, a subject which would have been a glaring omission from a book dealing with the whole computer scene. The authors may ridicule the denizens of the computer industry but they agree that our future is in their hands:

"We can laugh all we like at micro-manics, but they will have the last laugh — because they are designing the future that the rest of us will have to live in."

Micromania costs £7.95 in hardback



16. Typical hacker at work

and can be obtained from Victor Gollancz Ltd.

The Naked Computer, by Jack Rochester and John Gantz, is similar to *Micromania* in its ridicule of the computer scene but it provides more anecdotes and concentrations on big business. The book starts by looking at the computer invasion and the most successful and unsuccessful computer ventures.

The most ubiquitous computer? The Commodore Vic-20, one million strong at the end of 1982. The least ubiquitous? The CDC G-20, of which there is one left.

The future of high technology and information technology is discussed throughout the book, with a round-up in the last chapter. It is those parts of the book which are the most interesting and, possibly, most useful if you want to demonstrate your knowledge of computers. The style used to describe the innovations in technology is if anything too involved and few beginners would understand terms such as FOBS — fractional orbit bombardment system — charged particle beam and even satellite-mounted laser cannons. Few of those terms are explained in depth and it seems again that the authors are seeking a quick laugh.

The final chapter, *The Outer Limits*, is like *Micromania* in that it tries to explain what could happen in the next few decades so far as technology is concerned. The book looks at new IBM projects, research into chip use done at Massachusetts Institute of Technology and the way in which robots are being used by the U.S. Army. What it does not explain is the incredible influence the home computer industry is likely to have on the prices of computer-related components, such as RAM chips, and whether the home industry will have a good or adverse effect on high technology and information technology in the long run.

Like all the other chapters, *The Outer Limits* is a collection of anecdotes, although some of the authors' thoughts are included. The book leaves the reader with the feeling that the authors were afraid to approach the subject in anything but the impersonal third person. The authors give their views only a few times and they are only as postscripts to yet more anecdotes.

Despite that, *The Naked Computer* is an enjoyable book. It costs £9.95 in hardback and can be obtained from Arlington Books.

Victor Gollancz Publications, 14 Henrietta Street, London WC2.
Arlington Books, Clifford Street, Mayfair, London W1.

Trashman



New Generation products are
sold according to their terms
of trade and conditions of sale.

**It's the fun game of
the year – Trashman.**

From the moment you sit
down to play you'll be thrilled by
this exciting, original, laugh a
minute game.

Your job may look easy to the rest
of the world, but you know the hazards –
speeding cars and pavement cyclists can
both shake you up. Let's face it cars can
be fatal.

But if that isn't enough you've got the
other problems of vicious dogs, the after
effects of overeating in the transport cafe or one
too many in the boozier.

Not only will you be gripped by the action
you'll be amazed and amused by the high quality
graphics.

With seven levels of play featuring three
attempts to finish the game (assuming you are not
run over by a car) Trashman will provide even the
most experienced games player with a thrilling
challenge. 1 or 2 player option, Hall of Fame and
joystick compatibility* ensure this game has all the
best arcade features.

Trashman is available **NOW** for the 48K
Spectrum. Ask for it today at your local
computer store!

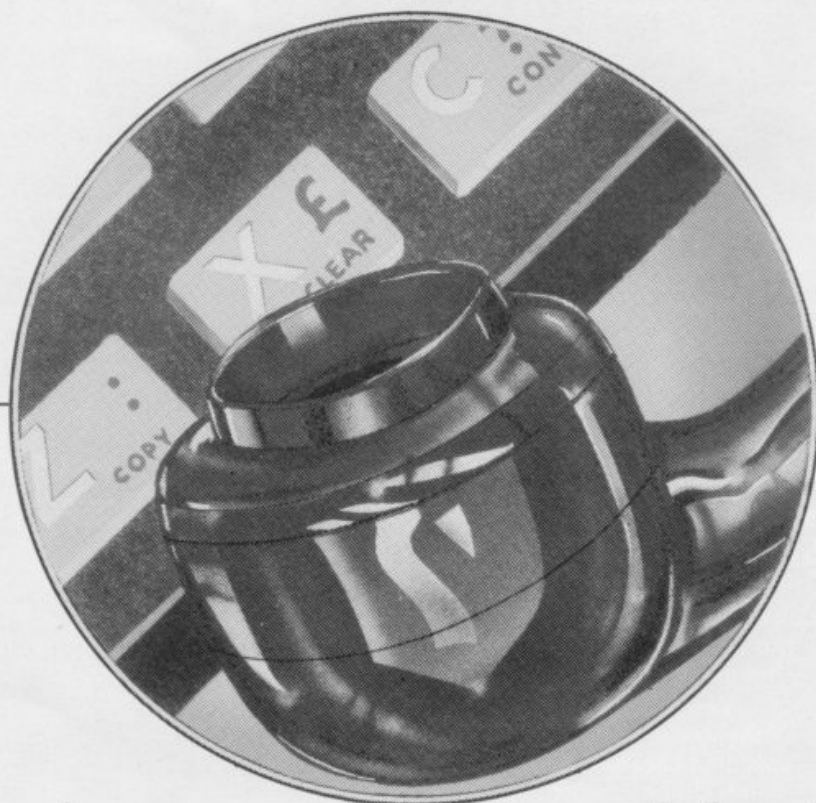
Only £5.95

*Kempston, Sinclair Interface 2, Protek or equivalent.

**New
Generation
Software**

FREE POST,
Bath BA2 4TD

Tel: 0225 316924.



Coming soon, a new Modem that's four times as fast and half the cost of the one you've been looking at.

Introducing an exciting new concept in computer communications—the Protek 1200 Modem. Specially designed to establish a two way computer link-up via the telephone, the Protek Modem transmits and receives information four times faster than any other model currently available at the price.

With so much to offer at such a competitive price, the Protek Modem is well worth waiting for. But don't worry, you won't have to wait too long.

- Two operating speeds:
Mode 1 1200/1200:
Mode 2 1200/75
- Battery powered (40 hours
from 4AA 1.5V battery)
- LED indicator
- Acoustic coupling
- Available for delivery
1st June 1984.
- Flexible design for
perfect acoustic
connections

Protek 1200
Modem— **£59.95**

CONNECTS TO ANY RS232C COMPATIBLE COMPUTER

SPECTRUM	(INTERFACE REQUIRED)
ORIC	(INTERFACE REQUIRED)
BBC	(CABLE REQUIRED)
ELECTRON	(INTERFACE REQUIRED)
VIC 20	(CABLE REQUIRED)
COMM. 64	(CABLE REQUIRED)



Protek=

Protek Computing Ltd, 1A Young Square,
Brucefield Industrial Park, Livingston, West Lothian. 0506 415353.

OVER £4 000 TO BE WON IN THE SINCLAIR USER AND CCS 1984 CAMBRIDGE AWARDS

SINCLAIR USER and Cases Computer Simulations announce the 1984 Cambridge Awards for programming, the annual competition to find top programmers for Sinclair computers. This year we are offering a first prize of £2,000 plus royalties to the programmer of the most innovative and appealing game for the Spectrum, ZX-81 or, in the unlikely event of anyone receiving one, the QL computer. The award winner will also be presented with the Cambridge Trophy for programming.

In addition to the first prize there are four second prizes of £250 each plus royalties and 25 runners-up prizes of five CCS programs. All prize-winners will receive a free annual subscription to *Sinclair User*.

We are looking for exciting adventure, strategy and simulation games. Entries will be judged for originality and innovation, playability and addictive quality, graphics, sound and the use

which is made of the computer. The presentation of the instructions and the program documentation will also be taken into account.

Last year a fascinating variety of games was received, ranging from the



complexity of war games **Battle 1917** and **War 70**, through the mind-boggling business simulation **Oligopoly**, to the mysterious, shadowy adventure worlds of **Broodslayer** and **Barrows Quest**. Those, and other programs submitted, will be published in *Sinclair User* in the next few months to stimulate your imagination, beginning with the 1983 award winner **Battle 1917**, to be found in this month's Program Printout. If you think you can do better, why not accept the challenge and enter the 1984 competition?

- Entries must be on cassette accompanied by a listing, detailed explanation of the program and an entry form. The entry form will be printed in the June issue of *Sinclair User*. Entrants must warrant that their programs are original.

- Only programs for the QL, Spectrum or ZX-81 will be considered.

- Entries must reach *Sinclair User* at 196-200 Balls Pond Road, London N1 4AQ not later than Wednesday, August 4.

- Entries will not be returned and no correspondence can be entered into between entrants and organisers. The judges' decision will be final.

- Employees of ECC Publications and CCS and their associated companies are ineligible.

More information, including the list of judges and the entry form, will be given in the June issue of *Sinclair User*. In the meantime, start programming.



BRIDGE SOFTWARE

THE NIGHT SKY

(**NEW** edition for 48K Spectrum)

An observer's guide to the stars visible anywhere in the world from Arctic to Antarctic Circles.

Discover the fascination of the limitless heavens.

Create brilliant hi-res starcharts with THE NIGHT SKY and your Spectrum

- Features over 1000 different stars
- 87 constellations identifiable
- Sky colour indicates day, night or twilight
- Make your TV screen a mini planetarium
- 5 magnitudes distinguished
- Over 4 million different skyscapes
- Navigation stars named

(Shorter 16K program for U.K. stars only also included)

Trace the movements of the constellations minute by minute, night by night

Send £8.90 for cassette and Manual

EPHEMERIS

(for any Spectrum and ZX81 16k)

Simply enter any date, time, longitude, latitude... then select SUN, MOON or planet from the Menu Printout includes all the information you need:-

- Local sidereal time
- Distance from earth etc. etc.
- Menu allows selection of another time, planet etc.
- Ascension and declination, altitude and azimuth
- COPY option for ZX Printer owners

Send £6.90 for cassette and instructions (ZX81 16k) or £7.90 (Spectrum 16k/48k)

STATISTICS I

(for any Spectrum and ZX81 16k)

- Data input routines allow for correction
- Three applications of the "t" test
- Analysis of variance (one way)
- Full range of descriptive statistics
- Correlation and regression
- COPY option for ZX Printer owners

Send £6.90 for cassette and Manual (any Spectrum, ZX81 16k)

STATISTICS II

(for Sinclair Spectrum 48k)

The second edition of a superb user - friendly program enabling you to create, edit and analyse your own numeric database

- Up to 48 variables, 2,400 items of data
- Edit/SAVE/reLOAD data (tape or microdrive)
- Histogram and Cumulative frequency graphs in high resolution graphics
- COPY/SAVE options for all results
- New features include larger number of variables, microdrive facilities and many minor improvements
- Add variables, cases - transform variables
- Full range of descriptive and rank order stats
- Correlation, regression, scattergram (in hi-res)
- Correlated "t" test
- First edition sold to many universities, colleges and research laboratories in UK and worldwide

Send £12.90 for cassette and Manual (48k Spectrum only)

Send s.a.e. for full list of our scientific, educational, graphics and games software.

Full money back guarantee. Trade enquiries welcome



Dept. SU, 36 Fernwood, Marple Bridge, Stockport, Cheshire, SK6 5BE, England.



"Run more than ten tasks on a ZX81-FORTH ROM?"

Sure! More than 10 tasks simultaneously and, in some cases, up to 300 times faster! That's what replacing the basic ROM with the new FORTH does for the ZX81 - and more!

The brains behind the breakthrough belong to David Husband, and he's building Skywave Software on the strength of it. Already orders are flooding in and it's easy to see why.

The ZX81-FORTH ROM gives you a totally new system. In addition to multi-tasking and split screen window capability, you can also edit a program while three or four others are executing, schedule tasks to run from 50 times a second to once a year, and with a further modification switch between FORTH and BASIC whenever you like.

The ZX81-FORTH ROM gives you a normal keyboard with a 64 character buffer and repeat, it supports the 16k, 32k, 64k RAM packs, it is fig-FORTH compatible and it supports the ZX printer.

The price, too, is almost unbelievable. As a "fit it yourself Eprom", complete with manual, it's just £25 + VAT. Add £2 p&p UK (£5 Europe, £10 outside Europe) and send your order to the address below.

Skywave SOFTWARE

David Husband
73 Curzon Road, Bournemouth,
BH1 4PW, ENGLAND.
Tel: (0202) 302385.
International +44 202 302385.

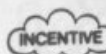
NEW FROM INCENTIVE

MILLIONAIRE

A NEW EXPERIENCE IN GETTING RICH!!



48K SPECTRUM £5.50



INCENTIVE SOFTWARE LTD, 54 London Street, Reading RG1 4SQ Tel: Reading (0734) 591678

WIN £500

in the GLC Anti-Racist Computer Game Competition

If you have received a home computer for Christmas; if you enjoy programming a computer skills and talents to good use - design the winning entry and collect the prize!!

The anti-racist computer game is one aspect of the Council's campaign to increase Londoners' awareness of racism and racial discrimination. The game will be run on a micro computer in a 'Space Invaders' type booth (similar to those in amusement arcades). The game consists of a series of factual questions about ethnic minority groups and pertinent race issues incorporated within an intergalactic voyager game.

The computer software for the game is to be designed via a London-wide competition which is open to all non-commercial entrants. Software for BBC Model B or Sinclair Spectrum computers will be accepted. The judges for the competition will be GLC members. All entries must be received no later than 8 June 1984.

For further information including a complete set of instructions plus the game's specifications, please phone: Pam Nanda, Ethnic Minorities Unit, 633 4273 or Patricia Devine, Central Computing Services, 633 3348; or write to: COMPUTER GAME COMPETITION Greater London Council, Director-General's Department (DG/EMU), Room 686, County Hall, London SE1 7PB.



INCENTIVE

PRESENTS...

SPLAT!



FOR THE
48K SPECTRUM
AND

COMMODORE 64

ONE OF THE MOST ORIGINAL
& COMPELLING ARCADE GAMES
EVER PRODUCED !!

£500 WINNER! James Tant from Wokingham who scored 112,930!!! (on visiting our offices to verify his high scoring ability - he scored even more!)

SPECTRUM 48K £5.50 - COMMODORE 64 £6.50

What they say:

"SPLAT" is one of the most addictive games I have ever played on the 48K SPECTRUM. It is certainly the most original!"

Computer & Video Games

"Highly recommended"

Crash Review



THE KET TRILOGY

MOUNTAINS OF KET

"A professional game in a competitive genre, especially if you want value for money, I can heartily recommend this adventure."

HCW REVIEW

★★★★★HCW NEW RELEASE

First get to the mountain...

MOUNTAINS OF KET

48K SPECTRUM £5.50

TEMPLE OF VRAN

48K SPECTRUM £5.50

TEMPLE OF VRAN

NEW An even greater challenge just released

1984

A GAME OF
GOVERNMENT MANAGEMENT



1984

THE HIGHLY
ACCLAIMED GAME OF
ECONOMIC SURVIVAL

THE BRITISH ECONOMY WITH YOU
AT THE CONTROLS! HOW MANY
YEARS WILL YOU LAST?

★ 5 STAR RATING HCW 31/1/84 ★

BBC "B" £6.50
SPECTRUM 48K £5.50

NEW FOR
THE BBC

MILLIONAIRE

From a small humble home to a magnificent estate? Take on one of life's little challenges & become a millionaire! Start up a Software Co, Buy, sell, Advertise, Deal with Honest Harry, Full Screen Graphic Representation of your current residence, + many other features. A compulsive game that grips you.

SPECTRUM 48K £5.50



OUR PROGRAMS ARE AVAILABLE FROM ALL LEADING DEALERS NATIONWIDE. In case of difficulty please use the coupon below.

ORDER FORM



Please send me the titles as indicated by 1st class post. I enclose cheque/P.O. for £..... or debit my Access/Visa Account

48K SPECTRUM
£5.50 EACH

COMMODORE
64 £6.50

SPLAT ☐

SPLAT ☐

MOUNTAINS OF KET ☐

BBC BISERIES 1) £6.50

TEMPLE OF VRAN ☐

1984 ☐

1984 ☐

1984 ☐

No

Name

Address

INCENTIVE

INCENTIVE SOFTWARE LTD, 54 London Street,
Reading RG1 4SQ Tel: Reading (0734) 591678

The Tandy Four Colour Graphics Printer

£149
Inc. VAT



CGP-115. Creates beautiful graphics in red, blue, green and black. Text mode prints 40 or 80 characters per line at 12 characters per second. Includes serial and parallel interfaces and easily replaceable ink cartridges and standard 4 1/2" paper rolls. 26-1192 £149.00

Tandy

The Biggest
Name in Little
Computers

See Our Extensive Range of Microcomputer Accessories
At Any One of the 340 Tandy Stores Nationwide!

GAMES FOR BOYS



GAMES FOR GIRLS



All available for Spectrum 48K at £5.95. Selected titles available from larger branches of Boots, Greens, John Lewis Partnership, Rumbelows, W.H. Smith and all good computer shops or mail order from **Cases Computer Simulations Ltd., 14 Langton Way, London SE3 7TL.**



WHSMITH



Strategy Games. They're no pushover.

WHEN IT COMES TO DISPLAYING THE SPECTRUM...



WE'VE AN IMPRESSIVE LEAD

Surprisingly enough, there's only one high performance BEAB approved colour monitor on the market with an input designed to accept the signal from the Sinclair Spectrum direct.

This same monitor also features a second input to receive T.T.L. signals for use with other micro computers including the BBC B.

This impressive lead over the competition in design specification is more than matched by the brilliance of the colour display, thanks to a standard resolution screen 585 pixels high by 452 wide, and a

MICROVITEC
CUB
COLOUR DISPLAYS

bandwidth of 18 MHz.

Needless to say, this gives colour reproduction far in excess of that available from an ordinary television.

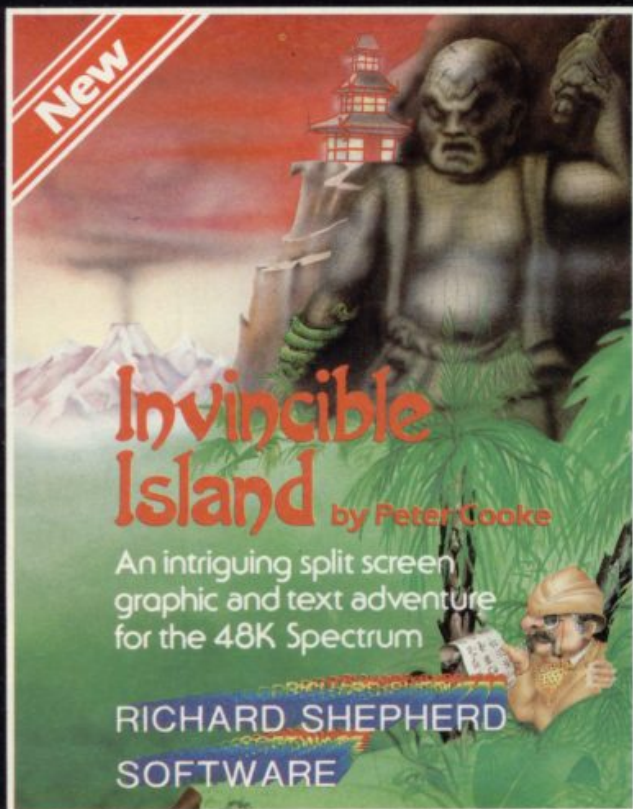
And the monitor in question? – **The 1431/MZ from the MICROVITEC range of CUB colour displays.**

Call at your local dealer or contact us now and we'll rush you full information.

RICHARD SHEPHERD SOFTWARE

ELM HOUSE, 23-25 ELMSHOTT LANE, CIPPENHAM, SLOUGH, BERKS.

CREDIT CARD HOTLINE 06286 63531



Invincible Island by Peter Cooke

Exhaust your ingenuity in the quest to find The Seven Parchments of Xaro and their meaning! Will they lead you to undreamt of treasures or eternal doom? Explore the mysteries of the stockade and puzzle within the Pagoda! A spectacular split screen graphic and text adventure to braintease you for weeks! Adventurous graphics for every location. Save routine. £6.50.



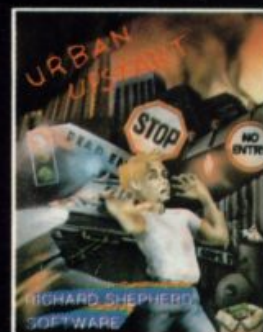
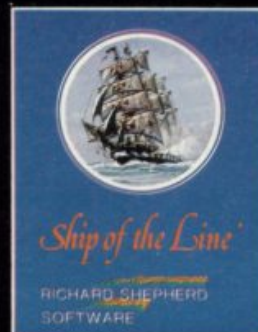
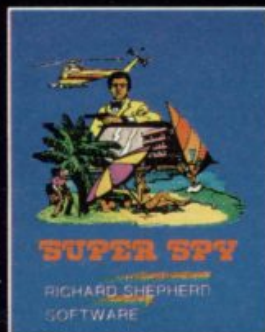
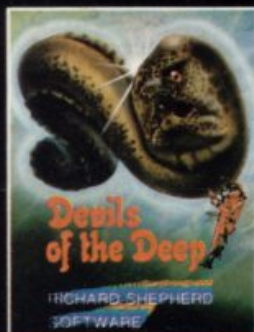
Transylvanian Tower

A spine chilling adventure... enter via the dungeons... navigate your way through 500 3-D rooms... survive the swooping vampire bats... reach the terrifying top... confront and kill Count Kreepie, ridding the world of this Transylvanian Terror. Can you survive the Top of the Tower? £6.50.

SELECTED TITLES AVAILABLE FROM

**W.H. SMITH, JOHN MENZIES, BOOTS
AND ALL LEADING COMPUTER STORES**

"ADVENTURES INTO IMAGINATION"



NEW DEALERS WELCOME — RING (06286) 63531 FOR DETAILS

All programs are sold subject to the condition that they may not, by way of trade or otherwise, be lent, hired out, resold or otherwise circulated without the written permission of Richard Shepherd

68008 versus Z-80

While waiting for Sinclair Research to deliver the goods, the computer press has been arguing over the size of the powerful Motorola chip at the heart of the QL. John Kerrigan joins the fray

HOW WILL the power of the 68008 help ordinary users of Basic, as well as those who use machine code?

With a more powerful microprocessor you can either perform arithmetic to a greater degree of accuracy in the same time or you can speed the execution of the same calculations. Each time you use a variable in Basic, the ROM program in the machine stores the number split within set limits of accuracy.

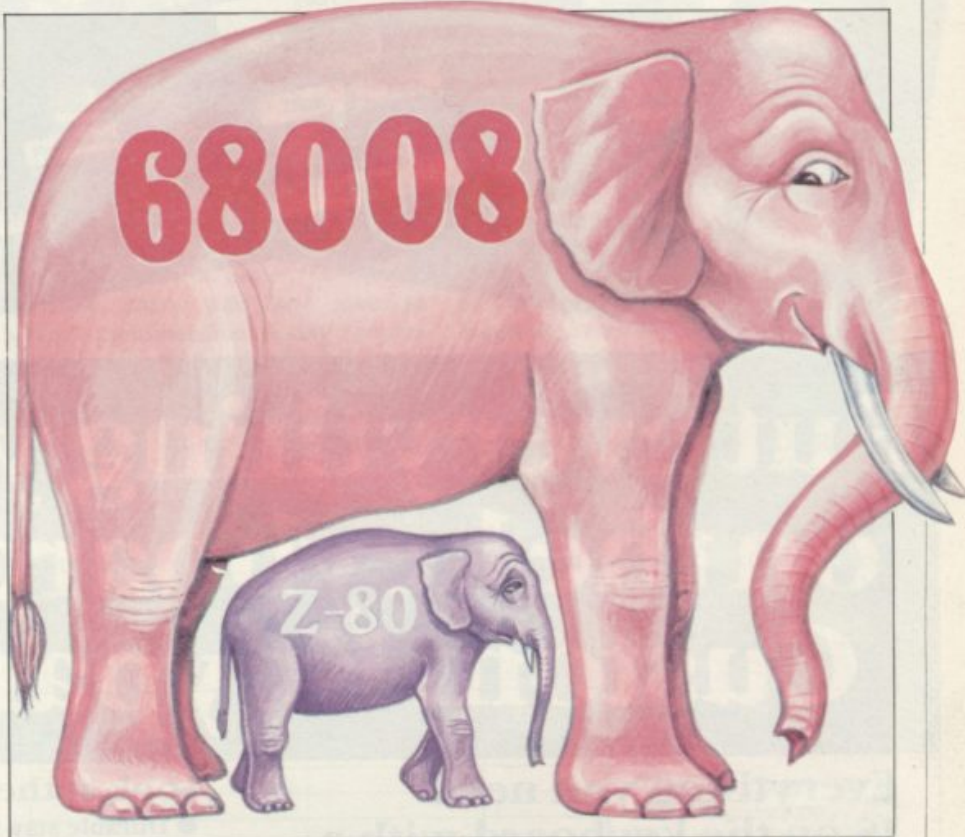
With the Z-80, small portions of a variable are manipulated separately with separate machine code instructions. Each of those instructions takes a little time to operate. With a more powerful processor the number of such portions can be reduced.

The greater memory of the QL allows word processor programs to store more words. It allows business accounting programs to hold more data for a bigger number of transactions on a greater number of accounts; it also reduces the need for discs and makes Sinclair Microdrives a sensible proposition for more business accounting functions.

Traditionally, business accounting programs have worked by keeping only a small portion of a file in internal memory. They can adjust single records in the middle of a file held in external memory if that external memory is on disc. Microdrives make that more difficult. A bigger internal memory makes it less necessary because, for many medium-sized businesses, it may be possible to hold the whole of some of their accounting files internally.

The microprocessor chosen for the QL represents an abrupt change of direction for Sinclair Research. The 68008 is much more powerful than the Z-80 and it is also designed by a different company with a different computing philosophy. Zilog developed the Z-80 and Motorola the 68000 series.

Enthusiasts for the Z-80 would describe it as "internally 16-bit" because register pairs can perform some 16-bit arithmetic. The Z-80 is, however, essentially an 8-bit microprocessor, both internally and externally. That means that internally each single register is



eight bits wide and externally the Z-80 can send or receive data a maximum of eight bits at a time.

Internally the 68008 is a true 32-bit microprocessor. That means that each register is a full 32 bits wide. Each register on the Z-80 can take only 256 different states or 2 to the power of 8, whereas each register on the 68008 can take 4,294,967,300 states, or 2 to the power of 32.

The main Z-80 rival is the 6502, the processor used in BBC, Commodore and some Apple machines. Compared to the 6502, the Z-80 has a large number of registers but the index registers and the shadow registers are inflexible and the fairly flexible registers for general use amount to seven. One of the seven can be used as an 8-bit accumulator, i.e., the A register can be used for 8-bit addition and subtraction. Another two, H and L, can be used together for certain 16-bit accumulator operations.

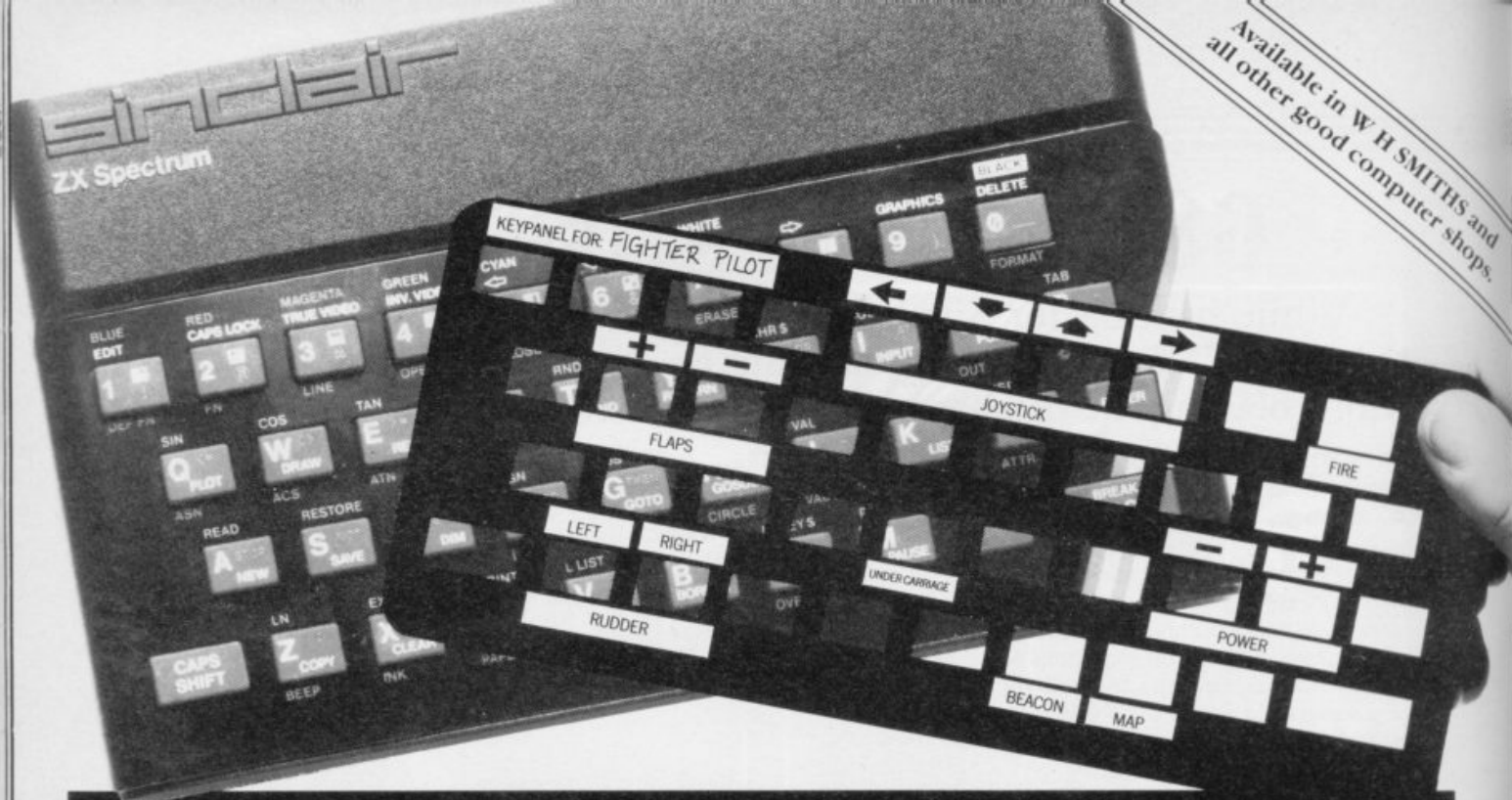
The 68008 has eight of those large 32-bit data registers and each can be used as an accumulator. If you are

accustomed to machine code with the Z-80 you are probably used to storing the result immediately after arithmetic so that H, L or A can be used for the next operations. On the 68008, eight separate calculations could be done one after another without moving the results from their separate registers.

It is an essential part of the philosophy behind 68000 series design that there should be "consistency" between registers, instructions and data types. In other words, anything you can do with one data register you should be able to do with all the others.

I have just used the odd term "data register". The reason for adding the word "data" is that, apart from the eight data registers, the 68008 also has seven "address registers". The distinction between holding an address or data in a register pair of the Z-80 normally is maintained solely in the mind of the programmer. For the 68008, the distinction is more clear-cut because there are 14 addressing modes and their full

continued on page 63



Put everything you need on the keyboard with a Custom Keypanel Kit.

Everything you need IS on the keyboard with a CUSTOM KEYPANEL KIT.

Assemble a KEYPANEL for each of your programs and you will have an instant and individual reference to all of your programs. These die-cut panels are made from PLASTIC and fit perfectly over your SPECTRUM keyboard.

Each Kit comes in a clear plastic storage wallet and contains:

10 Matt-black Keypanels plus sheets containing over 140 self adhesive Command labels pre-printed with words, symbols and arrows, plus a sheet of 140 blanks for your own designs.

SPECTRUM KEYPANEL labels are printed in 'Spectrum' bright red.

A MUST for Fighter Pilot, Flight Simulation and all multi-key games and applications.

A great help to small children with even the simplest game or Educational software.

The FIRST add-on for your Spectrum.

From W H SMITHS and other good computer stores or direct from SOFTEACH by return of post.

Look at these Features!

- Durable stay-flat plastic NOT cardboard.
- Pre-printed labels for a professional finish.
- Matt-black panels look super on your SPECTRUM.



JUST PEEL OFF



PLACE ON KEYPANEL ...AND PLAY!



We despatch to you first class post by return.

Post today to **Softeach Limited**, 25 College Road, Reading, Berkshire. RG6 1QE.

Please send me:

_____ Spectrum Keypanel kits at £3.95 + 35p p&p each (overseas should add 25% for additional surface mail).

_____ ORIC Keypanel Kits at £4.95 + 35p p&p each (overseas should add 25% for additional surface mail).

I enclose a total remittance of £_____ cheques/postal orders payable to **Softeach Limited**.

NAME _____

ADDRESS _____

continued from page 61

use depends on dextrous use of the address registers.

Sadly, Motorola has not given those registers exciting names. Early computers all had accumulators and some had byte counters and high and low pointers. Zilog reduced those names to A, B, C, H and L. Motorola calls its data registers D0, D1 to D7 and its address registers are called A0 to A6.

There are two purpose-made stack pointers on the 68008. As one would expect, there is also a program counter register and a status register. The status register is similar to but more sophisticated than the flag register on the Z-80. One of the stack pointers is for the programmer's use to provide a temporary store for data. The other is used on operations such as calls to subroutines and is not available directly to the programmer. Both are sometimes called A7.

As with data registers, there is an attempt at consistency between address registers. There are addressing modes which have the effect of allowing you to treat A0 through to A6 as if they were pointers to separate stacks.

On the Z-80 each address is 16 bits long. That means the maximum directly-addressable memory which can be attached to a Z-80 is 64K — 64K or 65536 is the same as 2 to the power of 16. The Spectrum has 16K ROM and that leaves a maximum of 48K for the RAM. There are Z-80-based machines with more than 64K internal memory but that is achieved by alternating between different banks of memory occupying the same addresses. At any time only 64K can be addressed directly by a Z-80.

On the 68008, each address is 20 bits long. That means the maximum directly-addressable memory is one megabyte — or 1,048,566, which is 2 to the power of 20. In practice, the QL is being sold with "only" 128K RAM but, no doubt, add-on RAM packs will become available if there is a demand. As usual, each address in internal memory can hold one byte.

The 68008 is related closely to the 68000. It has the same instruction set but the size of the address bus and the size of the data bus are two significant differences. The buses refer to the pins on the edge of the chip — the physical connections for passing address and data information to and from the microprocessor. The 68000 has a 16-bit data bus and the 68008 has only an 8-bit data bus.

The close relationship between the 68000 and the 68008 has led some commentators to call the 68008 a 16-bit microprocessor. The size of the internal registers has led others to call it a 32-bit microprocessor, while the size of the data bus leads some to call it an 8-bit microprocessor. Perhaps it is most informative to call it internally 32-bit and externally 8-bit.

The size of the data bus means that four physical movements are required to load a full data register from internal memory. That is transparent to the user in the sense that one instruction performs the whole load. It means that the 68000 will be slower than the 68008.

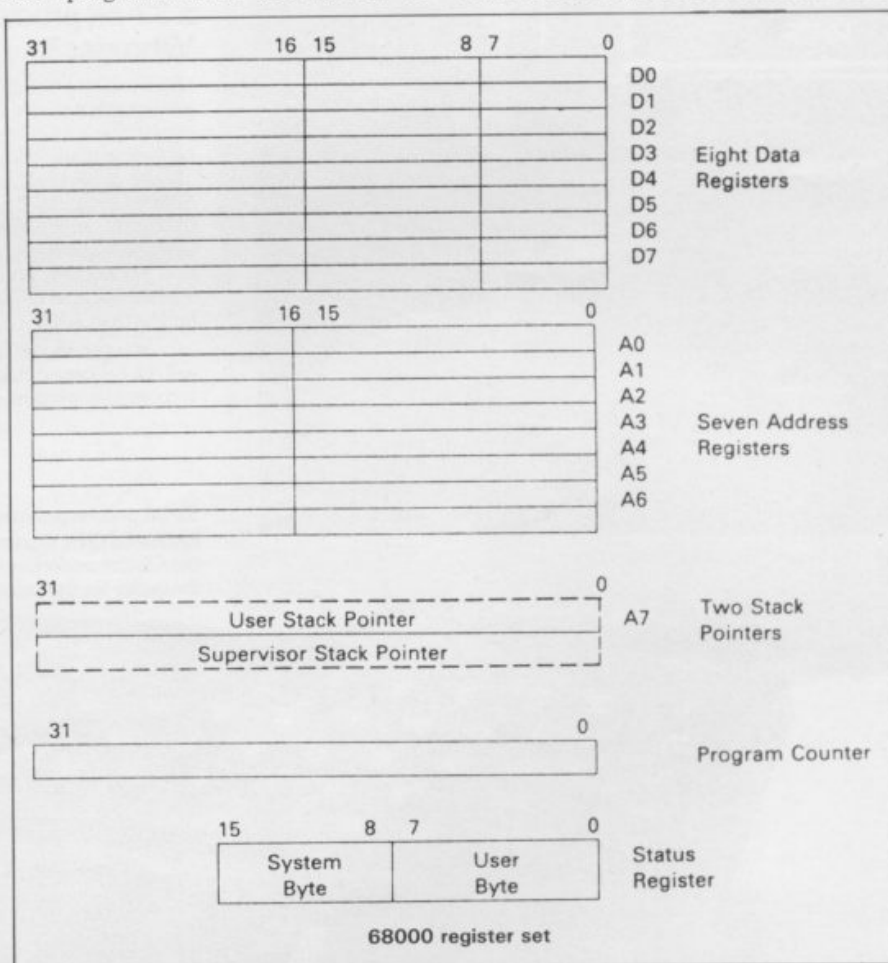
There are no direct multiply or divide instructions on either the 6502 or the Z-80. Many who have mastered binary multiplication using rotates might consider it cheating for a machine code instruction set to include them. Needless to say, the 68000 set does that. It also allows you to perform all arithmetic on several data types including bytes, words and long words. Words are 16 bits long and long words are the full 32 bits long.

Another change which will surprise Z-80 programmers is the number of

debugging functions built into the hardware. There is an automatic trap to prevent the division by zero. There is a trap instruction so that a machine code routine can be debugged portion by portion.

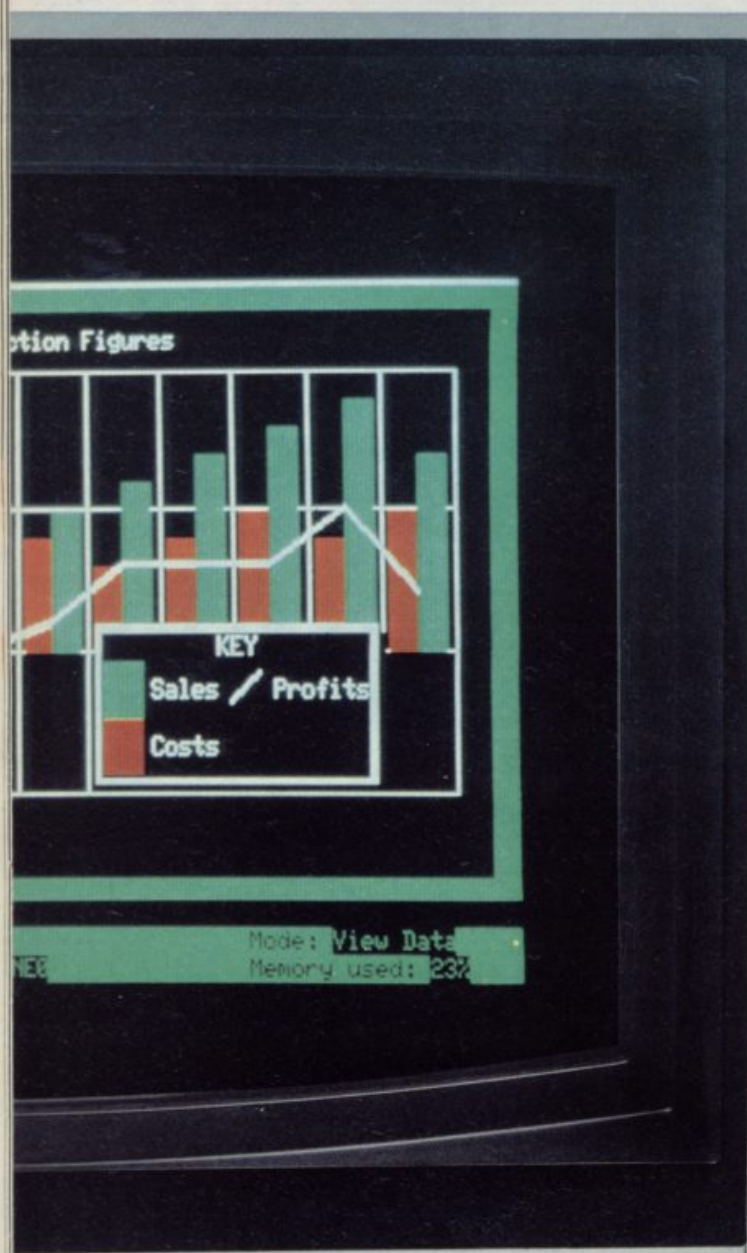
Those traps divert the path of execution by pushing a set address into the program counter. That allows the development programmer to test to ensure that his routine will reach a certain point in the program and then to test the register and memory values. There is even a trace facility built into the hardware. You may be used to those in software tools and high-level languages such as Basic but with the 68000 series they are built into the chip.

Are there any advantages for the good old Z-80 over the 68008? Well, more bigger registers, more stacks, more subtly different addressing modes, will certainly give scope for more complicated bugs and mistakes and the Z-80 repeating instructions, LDIR, LDDR and CPIR are a joy. They are subroutines within a single instruction. I have a sneaking suspicion that the designers of the 68000, with their purist search for consistency, would not approve of such light-hearted additions to the instruction set.



New-Sinclair QL

There's no comparison chart, b



The Sinclair QL is a new computer.

Not just a new Sinclair computer, but a totally new sort of computer – nothing like it exists anywhere.

It's not just a bit better than this, or a bit cheaper than that – it's a computer that's very hard to compare with anything. Just check the features below – and if you don't agree, take up the challenge at the end of the advertisement.

If you do agree, there's only one course of action you can take... get yourself a Sinclair QL at the earliest possible moment.

The Sinclair QL has 128K RAM. Big deal?

Several micros offer 128K RAM, or more, as standard. The 'What Micro?' table for December 1983 lists over 50 of them – but 40 of the 50 micros listed cost over £2,500!

The Sinclair QL offers you 128K RAM for under £400, and an option to expand to 640K. That's a lot of bytes to the pound!

The Sinclair QL has a 32-bit processor. Who else?

Under £2,700, nobody. Even the new generation of business computers, such as the IBM PC, are only now beginning to use 16-bit processors.

At prices like this, the Motorola 68000 family – widely regarded as the most powerful microprocessors available – will remain a luxury.

Yet with the Sinclair QL, the 32-bit Motorola 68008 is available for less than £400.

You can also be sure that the QL will not become outdated. 32-bit architecture is future-proof.

32-bit processor architecture, 128K RAM, and QDOS combine to give the QL the performance of a mini-computer for the price of a micro.

Exclusive: new QDOS operating system

No competition! QDOS sets a new standard in operating systems for the 68000 family of processors, and may well become the industry standard.

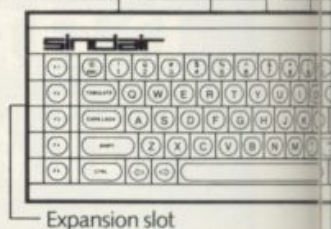
QDOS is a single-user, multi-tasking, time-sliced system using Sinclair's new SuperBASIC as a command language.

One of its most significant features is its very powerful multi-tasking capability – the ability to run several programs individually and simultaneously. It can also display the results simultaneously in different portions of the screen. These are features not normally available on computers costing less than £7,000.

Eleven input/output ports

QL ROM Cartridge slot

2 x Joystick ports 2 x RS-232C



New professional keyboard

The QL keyboard is designed for fast input of data and programs.

It is a full-size QWERTY keyboard, with 65 keys, including a space bar; left- and right-hand shift keys; five function keys; and four separate cursor-control keys – key action is positive and precise.

A membrane beneath the keyboard protects the machine from dust (and coffee!), and for users who find an angled keyboard more comfortable, the computer can be raised slightly at the back by small detachable feet.



£399

because there's no comparison!

Advanced new friendly language – Sinclair SuperBASIC

The new Sinclair SuperBASIC combines the familiarity of BASIC with a number of major developments which allow the QL's full power to be exploited.

Unlike conventional BASIC, its procedure facility allows code to be written in clearly-defined blocks; extendability allows new procedures to be added which will work in exactly the same way as the command procedures built into the ROM; and its constant execution speed means that SuperBASIC does not get slower as programs get larger.

Included – superb professional software

The suite of four programs is written by Psion specially for the QL and incorporates many major developments. All programs use full colour, and data is transportable from one to another. (For example, figures can be transferred from spreadsheet to graphics for an instant visual presentation.)

Word-processing

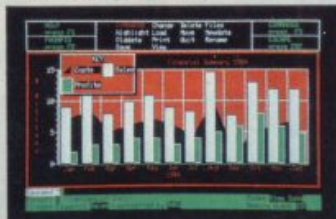


Certain to set a new standard of excellence, QL Quill uses the power of the QL to show on the screen exactly what you key in, and to print out exactly what you see on the screen.

A beginner can be using QL Quill for word-processing within minutes.

QL Quill brings you all the facilities of a very advanced word-processing package.

Business graphics



QL Easel is a high-resolution colour program so easy to use you probably won't refer to the manual! It handles anything from lines, shaded curves or histograms to overlapping or stacked bars or pie charts. QL Easel does not require you to format your display before entering data; it handles design and scaling automatically or under your control. Text can be added and altered as simply as data.

Spreadsheet



QL Abacus makes simultaneous calculations and 'what if' model-construction easier than they've ever been. Sample applications are provided, including budget-planning and cash-flow analysis. QL Abacus allows you to refer to rows, columns and cells by names, not just letters and numbers. Function keys can be assigned to change a variable and carry out a complete 'what if' calculation with a single key-stroke.

Database management



QL Archive is a very powerful filing system which sets new standards, using a language even simpler than BASIC. It combines ease of use for simple applications – such as card indices – with huge power as a multi-file data processor.

An easy-to-use labelling facility means that you don't have to ask for your file by its full name – a few letters are enough.

New – the Sinclair QLUB

The QLUB is the QL Users Bureau. Membership is open to all QL owners. For an annual subscription of £35, QLUB members receive one free update to each of the four programs supplied with the QL, and six bi-monthly newsletters. Sinclair has also made exclusive arrangements for QLUB members to obtain software assistance on QL Quill, Abacus, Archive or Easel by writing to Psion.

The Sinclair QL challenge

If you're seriously considering any other computer, post the coupon for a blow-by-blow comparison. We'll take a published comparison chart for the machine you're considering (not one we've created ourselves) and give you the Sinclair QL figures, detail by detail.

Take action today!

To order by mail

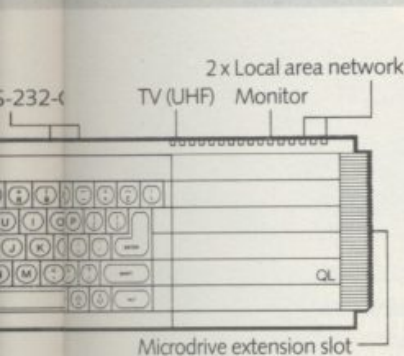
– complete the coupon and send it to the FREEPOST address below. For credit card holders it may be possible to extend your credit limit. Full details will be sent when we acknowledge your order.

To order by telephone

– phone Camberley (0276) 685311; – have your credit card (Access, Barclaycard, Trustcard) number ready. It may be possible to extend your existing credit limit. Please ask our telephone staff for more details. **Please do not use this number for other enquiries.**

For more information

Phone Camberley (0276) 686100, or use the coupon to get a QL brochure. Due to demand, delivery may take more than 28 days. Your order will be acknowledged immediately with an expected shipment date. Remember that Sinclair offers a 14-day money-back undertaking.



Two 100K microdrives built in

The Microdrives for the Sinclair QL are identical in principle to the popular and proven ZX Microdrives, but give increased capacity (at least 100K bytes each) and a faster data-transfer rate. Typical access speed is 3.5 seconds, and loading is at up to 15K bytes per second. The Sinclair QL has two built-in Microdrives. If required, a further six units can be connected.

Four blank cartridges are supplied with the machine.



™ Quill, Easel, Archive and Abacus are trade marks of Psion Ltd.

Send to: Sinclair Research Ltd, Computer Division, FREEPOST, Camberley, Surrey, GU15 3BR.

Qty	Item	Code	Item Price £	Total £
	Sinclair QL Computer	6000	399.00	
	QLUB membership (one year)	6100	35.00	
	Postage & packing (any order over £390)	6999	7.95	

Please tick the appropriate box-

- ☐ I enclose a cheque made payable to Sinclair Research Ltd for £ _____ £ _____
- ☐ Please charge my Access/Barclaycard/Trustcard Account No. _____

Signature _____

Mr/Mrs/Miss _____

Address _____

_____ | SUS 405 |

☐ Please send me a chart comparing the Sinclair QL computer with a _____

☐ Please send me a Sinclair QL brochure

sinclair

Sinclair Research Ltd, Stanhope Road, Camberley, Surrey, GU15 3PS.



EMPIRES

**When a Galactic war breaks out,
there is only one winner —
make sure it's you!**

Empires is a game of the type which has not been seen before. It is a fully player interactive strategy game for up to six players and an umpire. The basic set contains three players. Expansion set one contains three more. Each player controls a unique race struggling to take over the galaxy. Mining companies, space fleets and sound strategy all contribute to the success of your race; but beware the other players will be trying to tear your empire apart. The skill required to organise your empire as it grows is enormous. To assist you galactic maps and data cards are provided. Soon further expansion sets will be available to give you an advantage over the other players. Move information is transferred via cassette to the umpire who analyses it with his program and returns the new data to the players. Messages can be sent to other players in the same way.

**THIS IS A NEW CONCEPT IN STRATEGY
GAME PLAYING.**

48K SPECTRUM

CONTENTS: · THREE PLAYER CASSETTES, ONE UMPIRE CASSETTE,
4 GALACTIC MAPS, 81 DATA CARDS, 1 FULL SET OF RULES, 3 PLAYER INSTRUCTIONS

Price £19.95.

Please send me copy/copies of Empires Basic Set

Total cheque/P.O. enclosed
Cheques payable to Imperial Software.

Name

Address

Age

Send order to:
IMPERIAL SOFTWARE
IMPERIAL HOUSE
153 CHURCHILL ROAD
PARKSTONE
POOLE
DORSET

PROGRAM PRINTOUT

FORMULA ONE

STEER YOUR HIGH-SPEED, five-gear racing car round the track as you compete in the Sinclair Grand Prix. Your time, distance travelled and gears are displayed on the screen and a three-second penalty is incurred if you crash into the barriers. **Formula One** was written by Peter Dziwior of South Croydon, Surrey and was the winner of the 16K ZX-81 section of our Christmas Competition.

To enter the program type in the Basic listing and SAVE it. Then type RUN 9000 and enter each pair of characters in the hexadecimal listing in turn, e.g., the first characters to be entered will be 97 and the next pair will be 00. The program will convert the hexadecimal numbers entered into decimal and POKE the machine code into lines 1 to 8. After every eight pairs of characters their total (checksum) will be shown. If you have made a mistake enter "X" to re-enter the last set of characters. Finally SAVE the program and press RUN. Lines 9000 onwards can then be deleted.

```

1 REM .....
2 REM .....
3 REM .....
4 REM .....
5 REM .....
6 REM .....
7 REM .....
8 REM .....
100 SLOW
110 CLEAR
120 DIM R$(984)
130 LET LENH=INT (LEN R$/256)
140 LET LENL=LEN R$-LENH*256
150 LET ST=PEEK 16400+256*PEEK
16401+6
160 POKE 16508,INT (ST/256)
170 POKE 16507,ST-256*PEEK 1650
8

```

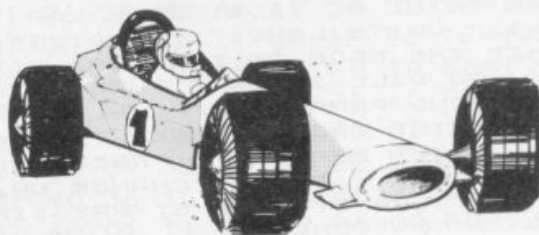
Instructions for graphics characters are printed in lower-case letters in our listings. They are enclosed by brackets and separated by colons to distinguish them and the brackets and colons should not be entered.

Inverse characters are represented by the letter "i" and graphics characters by "g". Thus an inverse W would be represented by "iw", a graphics W by "gw", and an inverse graphics W by "igw".

Spaces are represented by "sp" and inverse spaces by "isp". Whenever any character is to be used more than once, the number of times it is to be used is shown before it, together with a multiplication sign. Thus "6*isp" means six inverse spaces and "(g4:4*i4:g3)" would be entered as a graphic four, followed by an inverse four repeated four times, followed by a graphics three.

Where whole words are to be written in inverse letters they appear in the listings as lower-case letters. Letters to be entered in graphics mode on the Spectrum are underlined>.

Inverse characters may be entered on the ZX-81 by changing to graphics mode and then typing the appropriate characters and on the Spectrum by changing to inverse video and typing the appropriate letters. Graphics characters may be entered on the ZX-81 by changing to graphics mode and then pressing symbol shift while the appropriate characters are entered. On the Spectrum graphics characters may be obtained by changing to graphics mode and then pressing the appropriate character. User-defined graphics will appear as normal letters until the program has been RUN.



```

180 LET L$=STR$ (LEN R$+16)
190 DIM T$(6)
200 POKE 16418,0
490 REM -----
500 REM g SUBROUTINES
510 LET TITLE=1000
520 LET INSTRUCTIONS=2000
530 LET PLAY=3000
550 LET BORDER=5000
560 LET TRACK=5000
600 GOSUB TITLE
620 GOSUB INSTRUCTIONS
640 GOSUB PLAY
650 GOTO 620
990 REM -----
1000 REM g TITLE
1010 PRINT "

```

```

1020 PRINT "

```

```

1030 PRINT "

```

```

1040 PRINT "

```

```

1050 PRINT AT 23,3;" BY P.DZIWI
OR, MAY 1983 "
1060 FOR K=1 TO 75

```



```

6100 POKE 16448,12
6110 POKE 16449,INT (RND*128)
6120 IF USR 17110 THEN GOTO 6110

6200 DIM X$(7,17)
6210 LET LAP=1
6220 LET W$=""
6230 LET WSTLAP=0
6240 LET B$=""
6250 LET BSTLAP=0
6260 LET FSTLAP=-6
6270 RETURN
6990 REM -----
7000 SAVE "FORMULA ONE"
7010 RUN
9000 POKE 16511,220
9010 POKE 16512,2
9020 FOR K=0 TO 91
9030 SCROLL
9040 PRINT CHR$(51+INT (K/10));
CHR$(26+10*(K/10-INT (K/10)));";
";
9050 LET TOT=0
9060 FOR J=0 TO 7
9070 INPUT I$
9080 IF I$="X" THEN LET K=K-1
9090 IF I$="X" THEN GOTO 9030
9100 IF LEN I$>2 THEN GOTO 9070

9110 PRINT " ";I$;
9120 LET N=16*(CODE I$-26)+(CODE
I$(2)-26)
9130 POKE 16514+8*K+J,N
9140 LET TOT=TOT+N
9150 NEXT J
9160 PRINT "=";TOT
9170 NEXT K

```

Hexadecimal listing

```

gN0) 97 00 35 1B 29 3F 2E 3C=128
N1) 2E 34 37 1A 00 32 26 3E=128
N2) 00 1D 25 24 1F 76 FF FF=128
N3) FD 7E 34 FD 77 3C FD 36=128
N4) 3D 05 FD 36 3E 00 FD 36=128
N5) 3F 06 FD 36 42 06 2A 0C=128
N6) 40 01 0C 03 09 36 1C FD=128
N7) 7E 3C FD BE 34 28 FB FD=128
N8) 35 3C CD 46 0F D0 FD 35=128
N9) 3D 20 29 FD 36 3D 05 2A=128
00) 0C 40 01 02 03 09 34 7E=128
01) FE 26 38 18 36 1C 2B 2B=128
02) 34 7E FE 26 38 0E 36 1C=128
03) 2B 34 7E FE 22 38 05 36=128
04) 1C 2B 2B 34 CD 30 42 CD=128
05) 5B 42 FD 7E 3E A7 28 2D=128
06) FD CB 42 BE CB 47 C4 30=128
07) 42 FD 35 3E 20 A9 2A 0C=128
08) 40 01 31 02 09 06 00 FD=128
09) 4E 41 09 79 C6 02 CB 7E=128
P0) 28 02 D6 04 FD 77 41 CD=128
P1) 5B 42 C3 B0 40 21 45 40=128
P2) 06 07 CB 7E 20 06 FD 36=128
P3) 3E 97 18 B8 23 10 F3 FD=128
P4) 35 3F 20 1F FD 36 3F 08=128
P5) 3E EF DB FE 2F E6 03 28=128
P6) 12 CD 30 42 1F 30 03 FD=128
P7) 34 41 1F 30 03 FD 35 41=128
P8) CD 5B 42 FD 7E 42 E6 80=128
P9) 4F 3E FB DB FE E6 04 1F=128

```

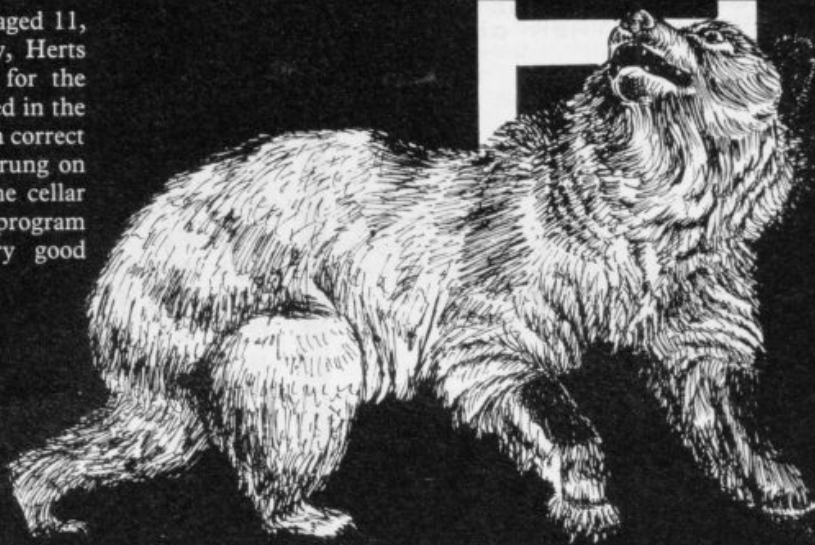
```

Q0) B1 4F 3E FD DB FE E6 04=128
Q1) B1 4F 2F FD A6 42 57 FD=128
Q2) 71 42 2A 0C 40 01 0C 03=128
Q3) 09 7E CB 52 28 05 FE 1D=128
Q4) 38 01 35 CB 4A 28 05 FE=128
Q5) 21 30 01 34 7E FE 1D 30=128
Q6) 0B FD CB 42 BE FD 36 40=128
Q7) 01 C3 B9 40 FD 35 40 C2=128
Q8) B9 40 2F C6 24 FD 77 40=128
Q9) FD 7E 42 EE 80 FD 77 42=128
R0) 17 DA B9 40 CD 30 42 2A=128
R1) 0C 40 01 B5 02 09 E5 01=128
R2) 21 00 09 54 5D E1 01 B6=128
R3) 02 ED B8 CD 5B 42 FD 7E=128
R4) 45 FE 86 CB 0E 80 ED 5B=128
R5) 43 40 7A B3 28 0B 1B ED=128
R6) 53 43 40 7A B3 20 02 0E=128
R7) 86 2A 7B 40 19 54 5D 2A=128
R8) 0C 40 1A 1F 1F 1F E6 1F=128
R9) 47 23 36 08 10 FB 1A E6=128
S0) 07 C6 08 47 23 71 10 FC=128
S1) 23 36 08 2A 0C 40 01 17=128
S2) 03 09 3E 25 34 BE D2 B9=128
S3) 40 36 1C 2B 18 F6 2A 0C=128
S4) 40 01 11 02 09 06 00 FD=128
S5) 4E 41 09 54 5D 21 45 40=128
S6) 01 03 00 ED B0 EB 01 1F=128
S7) 00 09 EB ED A0 EB 01 1F=128
S8) 00 09 EB 01 03 00 ED B0=128
S9) C9 2A 0C 40 01 11 02 09=128
T0) 06 00 FD 4E 41 09 11 45=128
T1) 40 FD CB 42 7E ED A0 2B=128
T2) 36 05 28 02 36 80 23 ED=128
T3) A0 2B 36 16 23 ED A0 2B=128
T4) 36 85 28 02 36 80 01 20=128
T5) 00 09 ED A0 2B 36 34 01=128
T6) 20 00 09 ED A0 2B 36 05=128
T7) 28 02 36 80 23 ED A0 2B=128
T8) 36 09 23 ED A0 2B 36 85=128
T9) 28 02 36 80 C9 00 00 00=128
U0) 00 00 00 00 00 00 00 00=128
U1) 00 00 00 17 17 35 1B 29=128
U2) 3F 2E 3C 2E 34 37 17 17=128
U3) 00 00 00 00 00 00 00 00=128
U4) 00 00 00 00 3A 3C 40 EE=128
U5) 80 32 3C 40 FD 4E 41 79=128
U6) E6 0F 3C 47 ED 5B 3F 40=128
U7) FD CB 3C 7E 20 07 15 CB=128
U8) 71 20 02 14 14 CD 25 43=128
U9) CB 69 20 03 CD 25 43 10=128
V0) E7 05 FD CB 3C 7E C0 CB=128
V1) 61 20 08 1C CB 71 28 09=128
V2) 15 18 06 1D CB 71 20 01=128
V3) 14 CD 25 43 C9 C1 FD CB=128
V4) 3C FE C9 7B FE 05 30 F5=128
V5) 82 FE 18 30 F0 7A A7 2B=128
V6) EC ED 53 3F 40 17 17 17=128
V7) B3 ED 5B 3D 40 1B ED 53=128
V8) 3D 40 2A 7B 40 19 77 21=128
V9) 10 00 1B ED 52 ED 5B 3F=128
W0) 40 D8 20 E5 C1 01 00 00=128
W1) 18 DF 76 00 64 02 00 E4=128

```

INFANT IQ TEST

BARRY RAWLINSON, aged 11, of Welwyn Garden City, Herts wrote **Infant IQ Test** for the 48K Spectrum. Teddy is trapped in the cellar and wants to get out. Each correct answer will let him climb one rung on the ladder until he is out of the cellar and in the garden. It is a good program for young children with very good graphics.



```

1 REM INFANT IQ
2 LET sc=0: LET q=1: LET wr=0
FOR a=USR "a" TO USR "t"+7: RE
AD user: PUKE a: user: NEXT a
4 DATA 1,3,7,15,31,63,127,255
,128,192,224,240,248,252,254,255
,0,0,60,126,126,60,0,0
5 DATA 255,255,193,193,193,19
3,193,255,255,255,191,191,191,19
1,191,255,255,193,193,193,193,19
3,255,255,255,191,191,191,191,19
1,255,255
6 DATA 255,0,255,0,255,0,255,
0
7 DATA 0,0,1,3,3,1,0,0,0,15
3,255,255,219,231,231,0,0,128,19
2,192,128,0,0,0,0,0,1,3,15,31,
255,126,255,255,255,255,255,255,
0,0,0,0,128,192,240,248
8 DATA 63,127,127,255,251,243
,227,1,255,255,255,255,255,255,2
55,255,252,254,254,255,223,207,1
99,128
9 DATA 3,7,15,15,31,31,63,60,
231,231,195,195,195,129,0,0,192,
224,224,240,240,248,252,60
10 BORDER 5: PAPER 5: INK 4: C
LS
20 FOR f=17 TO 21: PRINT AT f,
0,"(32*198)": NEXT f
30 LET q#="(a:8*198:b)": LET w
#="(a:10*198:b)"
40 DIM a#(6,10): LET a#(1)="(1
0*198)": LET a#(2)="(3*198:195:2
*198:95:3*198)": LET a#(3)="(198:
2*198:195:2*198:95:2*198:198)": LET
a#(4)="(198:2*198:195:2*198:95:2*
198:198)": LET a#(5)="(3*198:195:
2*198:95:3*198)": LET a#(6)="(3*1
98:195:2*198:95:3*198)"
50 INK 7: FOR f=1 TO 6: PRINT
AT f+10,18:a#(f): NEXT f
60 INK 2: PRINT AT 9,18,q#:AT
10,17,w#
70 FOR f=1 TO 5: PRINT AT f+11
,21: INK 1: PAPER 7:"(95:2*198:1
95)": NEXT f
90 PRINT AT 14,22: INK 7: PAPE
R 1:"c"
140 PRINT AT 13,19: INK 2:"de"
150 PRINT AT 14,19: INK 2:"fg"
AT 13,25: INK 2:"de"
160 PRINT AT 14,25: INK 2:"fg"
190 FOR f=14 TO 16: PRINT AT f,
5: INK 2: PAPER 0: BRIGHT 1:"hh"
: NEXT f
195 DIM t#(12,6)
200 LET t#(1)="(2*198:95:3*198)":
LET t#(2)="(2*198:95:3*198)": LET
t#(3)="(2*198:198:195:2*198)": LE
T t#(4)="(2*198:198:195:2*198)": L
ET t#(5)="(2*198:95:2*198:2*198)": L
ET t#(6)="(2*198:95:2*198:2*198)": L
ET t#(7)="(2*198:95:2*198:2*198)": L
ET t#(8)="(2*198:95:2*198:2*198)": L
ET t#(9)="(2*198:95:2*198:2*198)": L
ET t#(10)="(2*198:95:2*198:2*198)": L
ET t#(11)="(2*198:95:2*198:2*198)": L
ET t#(12)="(2*198:95:2*198:2*198)"
210 FOR f=1 TO 12: PRINT AT f+1
,23: INK 4:t#(f): NEXT f
220 PRINT AT 0,25: INK 0:"(198)"
230 FOR f=10 TO 0 STEP -1: CIRC
LE INK 0:210,190,f
240 NEXT f
300 REM QUESTIONS
330 IF q=1 THEN GO TO 500
340 IF q=2 THEN GO TO 1000
350 IF q=3 THEN GO TO 1500
360 IF q=4 THEN GO TO 2000
370 IF q=5 THEN GO TO 2500
380 IF q=6 THEN GO TO 3000
390 IF q=7 THEN GO TO 3500
400 IF q=8 THEN GO TO 4000
410 IF q=9 THEN GO TO 4500
420 IF q=10 THEN GO TO 5000
430 IF q=11 THEN GO TO 7000
500 REM QUESTION 1
510 LET q=q+1
520 INPUT "WHAT COLOUR IS THE D
OOR ? ": LINE q#
530 IF q#="BLUE" OR q#="blue" U
R q#="Blue" THEN GO TO 500
540 GO SUB 5500
550 GO TO 520
580 LET sc=sc+1
590 GO TO 6000
1000 REM QUESTION 2
1010 LET q=q+1
1020 INPUT "HOW MANY WINDOWS ARE
THERE ? ": LINE q#
1030 IF q#="2" OR q#="two" OR q#
="TWO" OR q#="Two" THEN GO TO 1
000
1040 GO SUB 5500
1050 GO TO 1020
1080 LET sc=sc+1
1090 GO TO 6000
1500 REM QUESTION 3
1510 LET q=q+1
1520 INPUT "WHAT COLOUR IS THE T
REE ? ": LINE q#
1530 IF q#="GREEN" OR q#="green"
OR q#="Green" THEN GO TO 1500
1540 GO SUB 5500
1550 GO TO 1520
1580 LET sc=sc+1
1590 GO TO 6000
2000 REM QUESTION 4
2010 LET q=q+1
2020 INPUT "BONUS QUESTION - WHA
T IS 2+3 ? ": LINE q#
2030 IF q#="5" OR q#="FIVE" OR q
#="five" OR q#="Five" THEN GO TO
0 2000
2040 GO SUB 5500
2050 GO TO 2020
2080 LET sc=sc+1
2090 GO TO 6000
2500 REM QUESTION 5
2510 LET q=q+1
2520 INPUT "WHAT COLOUR IS THE H
OUSE ? ": LINE q#
2530 IF q#="WHITE" OR q#="white"
OR q#="White" THEN GO TO 2500
2540 GO SUB 5500
2550 GO TO 2520
2580 LET sc=sc+1
2590 GO TO 6000
3000 REM QUESTION 6
3010 LET q=q+1
3020 INPUT "WHAT COLOUR IS THE S
UN ? ": LINE q#
3030 IF q#="YELLOW" OR q#="yello
w" OR q#="Yellow" THEN GO TO 30
00
3040 GO SUB 5500
3050 GO TO 3020
3080 LET sc=sc+1
3090 GO TO 6000
3305 FOR q=1 TO 4: PRINT AT f+9-
1,3: INK 6:n#(q): NEXT q
3500 REM QUESTION 7
3510 LET q=q+1
3520 INPUT "BONUS QUESTION - WHA
T IS 3-1 ? ": LINE q#
3530 IF q#="2" OR q#="TWO" OR q#
="two" OR q#="Two" THEN GO TO 3
500
3540 GO SUB 5500
3550 GO TO 3520
3580 LET sc=sc+1
3590 GO TO 6000
4000 REM QUESTION 8
4010 LET q=q+1
4020 INPUT "WHAT COLOUR IS THE R
OOF ? ": LINE q#
4030 IF q#="RED" OR q#="red" OR
q#="Red" THEN GO TO 4000

```



```

4040 GO SUB 5500
4050 GO TO 4020
4060 LET sc=sc+1
4090 GO TO 6000
4500 REM QUESTION 9
4510 LET q=q+1
4520 INPUT "WHAT COLOUR IS THE C
HIMNEY ? "; LINE q#
4530 IF q#="BLACK" OR q#="black"
OR q#="black" THEN GO TO 4580
4540 GO SUB 5500
4550 GO TO 4520
4560 LET sc=sc+1
4590 GO TO 6000
5000 REM QUESTION 10
5010 LET q=q+1
5020 INPUT "BONUS QUESTION - WHA
T IS 4+2 ? "; LINE q#
5030 IF q#="6" OR q#="SIX" OR q#
="six" OR q#="Six" THEN GO TO 5
000
5040 GO SUB 5500
5050 GO TO 5020
5060 LET sc=sc+1
5090 GO TO 6000
5500 REM WRONG ANSWER
5501 LET wr=wr+1
5510 PRINT EL; AT 0,0; INK 0; "Oh
Dear I          Tha
t's wrong - Try again"
5520 RESTORE 5530; FOR f=1 TO 36
: READ a,b; BEEP a/3,b; NEXT f;
RETURN
5530 DATA .5,0,.5,2,.25,3,.25,2,
.5,0,.5,0,.5,2,.25,3,.25,2,.5,0,
.5,3,.5,5,1,7,.5,3,.5,5,1,7,.375
,7,125,8,.25,7,.25,5,.25,3,.25,
2,.5,0,.375,7,125,8,.25,7,.25,5
,.25,3,.25,2,.5,0,.5,0,.5,-5,1,0
,.5,0,.5,-5,1,0
6000 REM REWARD
6010 BORDER 1; PAPER 1; INK 6; C
LS
6020 DIM m$(22,3)
6030 LET m$(1)="(191,193,192)"
6040 FOR f=2 TO 21: LET m$(f)=m$
(1); NEXT f
6045 LET m$(22)="(92,sp,92)"
6050 FOR f=1 TO 22: PRINT INK 7
;m$(f); NEXT f
6060 DIM n$(5,3)
6070 LET n$(1)="1jk"
6080 LET n$(2)="1m"
6090 LET n$(3)="opq"
6100 LET n$(4)="rst"
6110 PRINT FLASH 1; AT 2,15; "COR
RECT"

```

```

6120 PRINT AT 4,15; "How high can
"JAT 5,15; "Teddy climb ?"
6140 IF sc=10 THEN LET qwe=0; G
O TO 6300
6150 LET Poi=sc*2; LET lkj=19-Po
i; LET qwe=lkj
6300 FOR f=18 TO qwe STEP -1: FO
R g=1 TO 4: PRINT AT f+g-1,3; IN
K 6;n$(g); NEXT g; BEEP .1,f; FO
R h=1 TO 4: PRINT AT f+h-1,3; "
"; NEXT h; NEXT f
6301 IF sc=10 THEN FOR g=1 TO 4
: PRINT AT g-1,3; INK 6;n$(g); N
EXT g; FOR f=-60 TO 60: BEEP .01
,f; NEXT f; GO TO 6310
6305 FOR g=1 TO 4: PRINT AT f+g-
1,3; INK 6;n$(g); NEXT g
6310 FOR f=1 TO 200: NEXT f
6320 GO TO 10
7000 REM FINISH
7010 FOR f=1 TO 4: PRINT AT f+12
,13; INK 6;n$(f); NEXT f; PRINT
AT 3,8; FLASH 1; INK 1; "TEDDY CL
IMBED"; AT 4,8; FLASH 1; INK 1; "
THE LADDER "
7020 PRINT AT 6,8; INK 2; "YOU HA
VE AN "; AT 7,8; INK 2; "INFANT IQ
OF "; 100-wr
7100 LET tyr=INT (RND*5)+1
7110 IF tyr=1 THEN GO TO 7200
7120 IF tyr=2 THEN GO TO 7300
7130 IF tyr=3 THEN GO TO 7400
7140 IF tyr=4 THEN GO TO 7500
7150 IF tyr=5 THEN GO TO 7600
7155 GO TO 7100
7200 REM TUNE 1
7210 RESTORE 7220; FOR f=1 TO 81
: READ a,b; BEEP a,b; NEXT f; GO
TO 8000
7220 DATA .2,10,.2,10,.2,10,.2,7
,.2,10,.2,12,.2,10,.4,7,.2,7,.4,
5,.2,7,.4,5,.2,10,.2,10,.2,10,.2
,7,.2,10,.2,12,.2,10,.4,7,.2,7,.
2,5,.2,7,.2,5,.4,3,.2,10,.2,10,.
2,10,.2,7,.1,10,.1,10,.2,12,.2,1
0,.4,7,.2,7,.4,5,.2,7,.4,5,.2,10
,.2,10,.2,10,.2,7,.1,10,.1,10,.1
,12,.1,12,.1,10,.1,10,.4,7,.2,7,
.2,5,.2,7,.2,5,.8,3,.2,3,.1,3,.2
,7,.2,10,.8,15,.2,12,.1,12,.2,15
,.2,12,.4,10,.2,7,.2,10,.2,10,.1
,7,.1,7,.1,10,.1,10,.2,12,.2,10,
.4,7,.2,5,.1,7,.1,8,.2,7,.1,5,.1
,5,.8,3
7300 REM TUNE 2
7310 RESTORE 7320; FOR f=1 TO 27
: READ a,b; BEEP a,b; NEXT f; GO

```

```

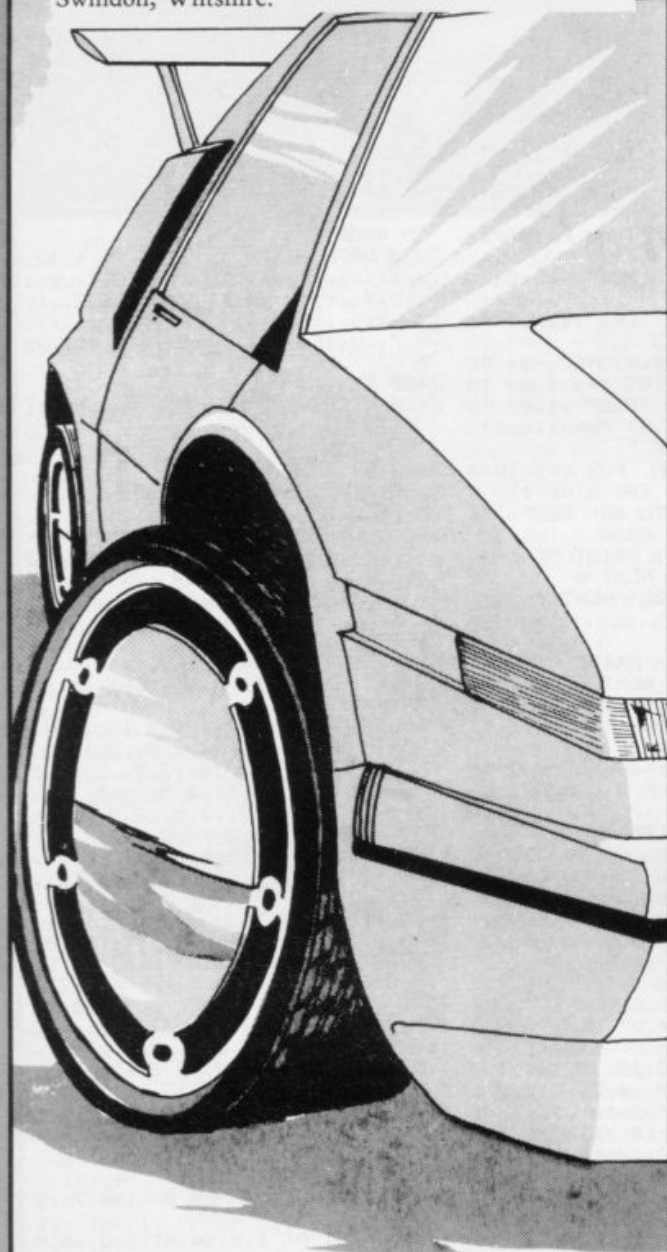
TO 8000
7320 DATA .2,7,.1,11,.2,9,.1,12,
.1,11,.1,14,.1,11,.2,7,.2,7,.1,1
,1,.2,9,.1,12,.3,11,.3,7,.2,7,.1,
11,.2,9,.1,12,.1,11,.1,14,.1,11,
.2,7,.3,16,.2,9,.1,12,.25,11,.25
,7
7400 REM TUNE 3
7410 RESTORE 7420; FOR f=1 TO 41
: READ a,b; BEEP a,b; NEXT f; GO
TO 8000
7420 DATA .6,9,.2,9,.2,10,.2,9,.
2,7,1,5,.6,14,.2,14,.2,10,.2,12,
.2,14,1,12,.2,12,.2,14,.2,14,.2,
14,.2,10,.2,12,.2,14,.2,12,.2,14
,.2,12,.4,9,.2,12,.2,14,.2,14,.2
,14,.2,10,.2,12,.2,14,.2,12,.2,1
4,.2,12,.4,9,.2,10,.4,12,.2,12,.
2,10,.2,9,.2,7,.8,5
7500 REM TUNE 4
7510 RESTORE 7520; FOR f=1 TO 49
: READ a,b; BEEP a,b; NEXT f; GO
TO 8000
7520 DATA .6,8,.2,10,.2,8,.2,5,.
2,3,.2,1,.2,3,.2,1,.2,5,.2,1,.2,
-2,.8,-4,.6,8,.2,10,.2,8,.2,5,.2
,3,.2,1,.2,5,.2,1,.2,5,.2,5,.8,3
,.6,8,.2,10,.2,8,.2,5,.2,3,.2,1,
.2,3,.2,1,.2,5,.2,1,.2,-2,.4,-4,
.2,1,.2,3,.2,1,.2,5,.2,1,.2,-2,
2,-4,-2,-2,.2,1,.2,5,.2,1,.2,5,
2,5,.2,1
7600 REM TUNE 5
7610 RESTORE 7620; FOR f=1 TO 30
: READ a,b; BEEP a,b; NEXT f; GO
TO 8000
7620 DATA .1,0,.1,5,.2,5,.3,5,.1
,5,.2,4,.2,7,.4,7,.1,0,.1,7,.2,7
,.3,7,.1,7,.2,5,.2,9,.4,9,.1,5,.
1,9,.2,9,.3,9,.1,9,.2,10,.2,14,.
4,14,.1,14,.2,12,.2,12,.2,10,.2,
4,4,6,5
8000 LET q#="Press Any"
8005 LET x#="Key To"
8010 LET u#="Restart"
8020 BORDER 0; PAPER 0; INK 7; C
LS
8030 PRINT AT 1,0;q#; AT 5,0;x#; A
T 9,0;u#
8040 PAUSE 0
8050 RUN
9100 SAVE "INFANT IQ" LINE 1
9110 PRINT AT 0,0; "REWIND TAPE A
ND VERIFY"
9120 VERIFY "INFANT IQ"
9130 STOP

```

MOTORIST MATHS

MOTORIST MATHS is a simple but graphical program for the 16K ZX-81. The aim of the game, which is suitable for young children, is to answer all the questions correctly to be saved from the motorist. You need a minimum of six sums correct to guarantee your safety.

Motorist Maths was written by Roger Fox of Swindon, Wiltshire.



```

2 LET W=0
3 LET S=0
10 PRINT AT 10,10;"ANY KEY"
20 PRINT AT 10,10;"ANY KEY"
30 IF INKEY$<>" " THEN GOTO 45
40 GOTO 10
45 CLS
50 PRINT "INSTRUCTIONS?(Y/N)"
60 INPUT A$
70 IF A$="Y" THEN GOTO 105
80 IF A$="N" THEN GOTO 118
100 IF A$<>"Y" OR A$<>"N" THEN
GOTO 60
105 CLS
110 PRINT "YOU HAVE BEEN CAPTUR
ED BY THE MAD MOTORIST.HE HAS
SET YOU A TEST, IF YOU SUCCEED
IN PASSING YOU BLOW UP THE MA
D MOTORIST. BUT IF YOU FAIL YOU
WILL BE KILLED...."
113 PRINT "ANY KEY"
115 PAUSE 4E4
118 CLS
120 FOR N=1 TO 31
130 PRINT AT 17,N;" "
140 NEXT N
150 PRINT AT 16,9;" L L ";AT 15,
9;" ";AT 14,8;" I I ";AT 13,8;
" ";AT 12,10;" ";AT 11,9;" ";
" ";AT 10,9;" "
160 PRINT AT 16,24;" O O ";AT
15,24;" ";AT 14,24;" ";
" ";AT 13,25;" I I ";AT 12,25;" "
"
170 FOR T=1 TO 10
171 LET A=INT (RND*10)+1
172 LET B=INT (RND*10)+1
180 PRINT AT 0,6;A;"+";B;"="
190 INPUT C
200 IF C=A+B THEN PRINT "RIGHT"

210 IF C=A+B THEN LET S=S+1
220 IF C<>A+B THEN PRINT "WRONG"
"
230 IF C<>A+B THEN LET W=W+1
240 IF W=5 THEN GOTO 1000
250 IF S>5 AND T=10 THEN GOTO 5
00
260 NEXT T
500 FOR D=14 TO 24
510 PRINT AT 12,D;" ."
520 NEXT D
540 FOR G=16 TO 11 STEP -1
550 PRINT AT G,24;" "
560 NEXT G
570 CLS
580 PRINT AT 10,1;"YOU HAVE KIL
LED THE MOTORIST...";AT 11,6;"SC
ORES=";S
590 STOP
1000 FOR C=24 TO 1 STEP -1
1010 PRINT AT 16,C;" O O ";AT
15,C;" ";AT 14,C;" ";
" ";AT 13,C+1;" I I ";AT 12,C+2;
" "
1015 PRINT AT 10,9;" ";AT 11,9;
" "
1020 NEXT C
1030 CLS
1040 PRINT AT 10,6;"YOU ARE DEAD
...";AT 11,6;"SCORES=";S

```

BATTLE 1917

BATTLE 1917 was written for the 48K Spectrum by Mark Lucas and was the winner of the 1983 Cambridge Award. The cassette version is published by CCS.

It is a game with moves which often require as much forethought and calculation as the moves in a game of chess. Each player has 29 movable pieces comprising tanks, artillery, cavalry and infantry and the object of the game is to kill the opponent's weakest piece, the King. There is a compass on-screen to aid the movement of pieces and each piece has a

certain number of spaces it can move, as do the pieces in a chess game.

The pieces manoeuvre across a battlefield featuring lakes, forests, minefields and barbed wire. It is advisable to keep units of four pieces together in formation, rather than leaving some behind.

To type in the program first enter the instructions and SAVE them. Then type in the main listing and once that has been SAVED the program is ready to be used.

```
6 5 CLEAR 64340
10 RESTORE 6000
20 FOR x=65368 TO 65455
30 READ n
40 POKE x,n
50 NEXT x
60 PRINT AT 1,4; BRIGHT 1;"BA
TTL 1917"; BRIGHT 0
65 PRINT AT 2,4; BRIGHT 1;"@
Mark Lucas 1983"; BRIGHT 0
70 PRINT AT 20,0; INK 2; PAPE
R 6; FLASH 1; BRIGHT 1;"STOP TAP
E NOW, PROGRAM RUNNING "; FLASH
0; BRIGHT 0; INK 0; PAPER 7
80 BEEP 2,10; BEEP 2,-10
```

```
90 GO TO 8000
100 CLS : PRINT AT 1,4; BRIGHT
1;"BATTLE 1917"; BRIGHT 0
110 PRINT AT 3,4; BRIGHT 1;"He
re are your armies..."; BRIGHT 0
120 PRINT AT 5,13;"How Fight
"; INK 1; PAPER 5;"II"; INK 4;
PAPER 7;" HH"
130 PRINT AT 6,13;"Far? Value?
"; INK 1; PAPER 5;"II"; INK 0;
PAPER 7;" JJ"
200 RESTORE 7000
210 FOR n=8 TO 12
```

```
220 READ a$,q$,w$,s$,f$,e$
230 PRINT AT 15,0;a$;q$;" ";w$
235 BEEP 2,0
240 PRINT AT 16,4;"moving at u
pto ";s$;" spaces"
245 BEEP 2,5
250 PRINT AT 17,4;"fighting wi
th an extra + ";f$
255 BEEP 2,10
260 PRINT AT 18,4;" cannot cr
oss lakes "; INK 1; PAPER 5;"I
IIII"
265 BEEP 2,15
270 PRINT AT 19,4;" cannot cr
oss forests "; INK 4;"HHHHH"
```



```

272 PRINT AT 20,4;" cannot cr
oss wire ";JJJJJ
275 IF n=10 THEN GO TO 1000
280 IF n=11 THEN GO TO 1100
285 IF n=12 THEN GO TO 1300
290 BEEP 4,20
300 FOR l=14 TO n STEP -1
305 PRINT AT 1+1,0;" "
310 PRINT AT 1,0;a$
315 BEEP .15,1
330 NEXT l
410 PRINT AT n,4;w$
500 PRINT AT n,15;s$;" "+";f
$;" no ";e$
510 FOR a=15 TO 21
520 PRINT AT a,0;" "

530 NEXT a
900 NEXT n
950 GO TO 2000
999 STOP
1000 PRINT AT 19,4; BRIGHT 1;"
flatten forests "; BRIGHT
0
1010 PRINT AT 20,4; BRIGHT 1;"
flatten wire "; BRIGHT
0; BEEP 4,-20
1020 FOR l=16 TO 20: PRINT AT l
,a$; PRINT AT 1-1,0;" ": B
EEP .1,-20: NEXT l
1025 PRINT AT 21,4; FLASH 1; IN
K 1; PAPER 6; BRIGHT 1;"LOOK OUT
!"; FLASH 0; INK 0; PAPER 7; BR
IGHT 0
1030 FOR t=0 TO 28: PRINT AT 20
,t;" ":a$; BEEP .1,-20: NEXT t
1040 PRINT AT 19,29;a$; PRINT
AT 20,29;" ": BEEP .1,-20
1045 PRINT AT 21,0; FLASH 1; IN
K 1; PAPER 6; BRIGHT 1;"TANKS, G
O BACK TO YOUR PLACES !"; FLASH
0; INK 0; PAPER 7; BRIGHT 0
1050 FOR t=28 TO 0 STEP -1: PRIN
T AT 19,t;a$;" ": BEEP .1,-20:
NEXT t
1060 FOR l=18 TO 15 STEP -1: PRI
NT AT 1+1,0;" ": PRINT AT 1
,0;a$; BEEP .1,1: NEXT l
1080 GO TO 300
1100 PRINT AT 20,4;"but "; BRIG
HT 1;" fire at other pieces !";
BRIGHT 0; BEEP 4,-20
1110 LET c=15: FOR a=8 TO 10: LE
T b=7: GO SUB 1119
1115 GO TO 1200
1119 PRINT AT c,0; FLASH 1; BRI
GHT 1;"E"; BRIGHT 0; FLASH 0;" "
; INK 2; FLASH 1; BRIGHT 1;"E"

1120 BEEP .5,-30
1130 PRINT AT a,b; FLASH 1; BRI
GHT 1; INK 2; PAPER 6;"*"
1140 PRINT AT a,b+2; FLASH 1; B
RIGHT 1; INK 2; PAPER 6;"*"
1180 NEXT a
1190 RETURN

```

```

1200 PRINT AT 21,4; FLASH 1; BR
IGHT 1; INK 1; PAPER 6;"STOP THA
T !"; FLASH 0; BRIGHT 0; INK 0;
PAPER 7
1210 FOR a=19 TO 21: GO SUB 1119
1220 PRINT AT 21,20; INK 1; PAP
ER 6; FLASH 1; BRIGHT 1;"TANKS,
HELP!"; PAPER 7; INK 0; FLASH 0;
BRIGHT 0
1225 BEEP 2,20
1240 FOR l=10 TO 13: PRINT AT l
,0;" ": PRINT AT 1+1,0;"C C
": BEEP .3,-20: NEXT l
1250 BEEP 2,-30
1260 PRINT AT 21,4; FLASH 1; BR
IGHT 1; INK 1; PAPER 6;"THANKS,
TANKS ! "
1270 FOR l=13 TO 10 STEP -1: PRI
NT AT 1+2,0;" ": PRINT AT 1
+1,0;" ": PRINT AT 1,0;"C C
": PRINT AT 1+1,0;"E E": BEEP
.5,-20: NEXT l
1280 BEEP 2,0
1290 GO TO 410
1300 PRINT AT 20,0; BRIGHT 1;"
and you must"; INK 2;" kill "
; INK 0;"the enemy king to w
in the game ! "
1310 BEEP 4,-30
1320 PRINT AT 15,0;" ": PRIN
T AT 14,1;"F F"
1350 FOR l=13 TO 0 STEP -1: PRIN
T AT 1+1,1;" ": PRINT AT 1,1;"
E": PRINT AT 14,(16-1);" ": PRI
NT AT 14,(17-1);"E": BEEP .05,3
0: NEXT l
1360 LET c=11: LET b=16: FOR a=1
0 TO 13: GO SUB 1119
1370 LET b=0: FOR a=0 TO 3: GO S
UB 1119
1380 FOR l=1 TO 14: PRINT AT 0,
(1*2)-1;" ": PRINT AT 0,(1*2)+1
;"F": PRINT AT 15-1,17;" ": PRI
NT AT 14-1,17;"E": BEEP .05,30:
NEXT l
1400 GO TO 410
2000 PRINT AT 15,0;"KKKK minefi
elds !

n usually clear them, but so
metimes they explode!"
2010 PRINT AT 0,25;"K": BEEP 4,
0
2020 FOR t=18 TO 25: PRINT AT 0
,t-1;" ": PRINT AT 0,t;"E": BEE
P .3,30: NEXT t
2030 PRINT AT 0,25; FLASH 1; BR
IGHT 1; INK 2; PAPER 6;" ": BEEP
2,-25
2040 PRINT AT 19,5; BRIGHT 1;"1
ike that !"; BRIGHT 0
2045 FOR b=0 TO 30 STEP 1: BEEP
.1,b; BEEP .15,10-b; BEEP .1,b-2
0: BORDER INT (b/4): NEXT b: BO
RDER 7
2050 GO TO 8000

```

```

6010 DATA 58,58,18,254,58,56,68,
130
6020 DATA 96,104,82,102,250,248,
136,136
6030 DATA 0,248,254,248,254,254,
186,238
6040 DATA 127,77,32,76,85,67,65,
83
6050 DATA 4,14,28,60,98,234,226,
252
6060 DATA 170,254,254,170,146,18
6,68,56
6070 DATA 166,148,150,168,159,11
5,160,210
6080 DATA 0,16,56,84,186,84,146,
16
6090 DATA 0,96,153,6,0,96,153,6

6100 DATA 2,92,34,102,34,148,79,
48
6110 DATA 0,16,56,124,56,16,0,0

7000 DATA "A A ", "8", "infantry "
,"5", "1", "no"
7010 DATA "B B ", "8", "cavalry "
,"6", "2", "no"
7020 DATA "C C ", "8", "tanks "
,"3", "3", "yes"
7030 DATA "E E ", "4", "artillery"
,"2", "0", "no"
7040 DATA "F F ", "1", "king "
,"2", "0", "no"
8000 PRINT AT 21,0; INK 2; PAPE
R 6; FLASH 1; BRIGHT 1;" DO YOU
WANT INSTRUCTIONS ? y/n "; FLASH
0; BRIGHT 0; INK 0; PAPER 7
8010 POKE 23560,0
8020 LET z=PEEK 23560: IF z=0 T
HEN GO TO 8020
8030 IF z=121 THEN GO TO 100
8040 IF z=110 THEN PRINT AT 20
,0;"
": GO TO 9000
8050 GO TO 8010
9010 PRINT AT 21,0; FLASH 1; BR
IGHT 1; INK 2; PAPER 6;" PLE
ASE START TAPE NOW "; FLASH
0; BRIGHT 0; INK 0; PAPER 7
9888 LOAD " " CODE
9890 LOAD "BATTLE1917"
9900 SAVE "battle1917" LINE 5

```

Main listing

```

6 PRINT AT 21,0; FLASH 1; BR
IGHT 1; INK 6; PAPER 2;"STOP TAP
E NOW, PROGRAM RUNNING "; FLASH
0; BRIGHT 0; INK 0; PAPER 7
7 PRINT AT 21,15; FLASH 1; B
RIGHT 1; INK 6; PAPER 1;" PROGRA
M RUNNING "; FLASH 0; BRIGHT 0;
INK 0; PAPER 7
8 BEEP 1,10: BEEP 1,-10
10 FOR x=64341 TO 65012: POKE
x,0: NEXT x

```



```

20 RESTORE 5000: FOR x=65128 T
O 65143: READ n: POKE x,n: NEXT
x
22 FOR x=65184 TO 65367: READ
n: POKE x,n: NEXT x
24 GO SUB 8900
25 BORDER 7: PAPER 7: INK 1: C
LS
26 PRINT AT 21,0: FLASH 1: BR
IGHT 1: INK 6: PAPER 1: " PLEASE
WAIT, PROGRAM RUNNING ": FLASH
0: BRIGHT 0: INK 0: PAPER 7
30 FOR n=65240 TO 65360 STEP 8
: RESTORE 7000: LET m=n/8
40 FOR x=1 TO PEEK (m+57053):
READ g$: NEXT x
50 FOR i=n TO n+6 STEP 2: IF
PEEK i>20 THEN GO TO 80
60 LET la= PEEK i: LET ta= PEE
K (i+1)
70 POKE (la*32+ta+64341),x-1:
PRINT AT la,ta:g$: BEEP .02,(la
+ta/2)
80 NEXT i: NEXT n
100 FOR x=13 TO 14: RESTORE x*9
: READ g$
102 RESTORE x*10: FOR y=1 TO 20
STEP 2: READ l,t
103 RANDOMIZE
104 LET l1= INT ( RND *4)+1: LE
T l1= INT ( RND *5)+11: LET t1=
INT ( RND *8)+t: LET th= INT ( R
ND *9)+t1
106 FOR l=11 TO l1: FOR t=t1 TO
th
108 POKE (l*32+t+64341),x: PRIN
T AT l,t:g$: BEEP .01,(l+t)/(x-
11.5)
110 NEXT t: NEXT l: NEXT y: NEX
T x
117 DATA "H"
126 DATA "I"
130 DATA 2,0,4,2,9,1,11,0,2,16,
3,15,11,14,9,16,8,12,5,11
140 DATA 2,1,3,0,10,0,11,2,2,16
,4,14,11,16,10,15,6,12,7,13
200 LET l=1: FOR a=64405 TO 648
84 STEP 32: LET l=1+1
210 FOR b=a TO (a+30)
220 IF PEEK b=14 AND PEEK (b+
1)=14 AND PEEK (b+2)=14 AND PE
EK (b+32)=14 AND PEEK (b+34)=14
AND PEEK (b+64)=14 AND PEEK (
b+65)=14 AND PEEK (b+66)=14 THE
N GO TO 300
230 NEXT b: NEXT a
240 GO TO 1000
300 BEEP .5,-20: LET t=b-(32*1)
-64341: PRINT AT l,t: BRIGHT 1:
"812": BRIGHT 0
310 PRINT AT l+1,t: BRIGHT 1: "
7+3": BRIGHT 0
320 PRINT AT l+2,t: BRIGHT 1: "
654": BRIGHT 0
330 POKE (b),15: POKE (b+1),15:
POKE (b+2),15: POKE (b+32),15:

```

```

POKE (b+33),15: POKE (b+34),15:
POKE (b+64),15: POKE (b+65),15:
POKE (b+66),15
400 FOR b=1 TO 4
410 RESTORE 500+(b*10): READ c,
d: RESTORE 600+(b*10): READ c$
420 FOR a=1 TO 10
430 LET n= INT ( RND *672)
440 IF PEEK (n+64341)=c THEN
LET l= INT (n/32): LET t= INT (n
-32*1): PRINT AT l,t:c$: POKE (
n+64341),d: BEEP .005,16-t: GO T
O 460
450 BEEP .005,20: GO TO 430
460 NEXT a
470 NEXT b
510 DATA 0,16
520 DATA 14,0
530 DATA 13,13
540 DATA 0,13
610 DATA "K"
620 DATA " "
630 DATA "J"
640 DATA "J"
1000 FOR n=65240 TO 65360 STEP 8
: LET m=n/8: IF PEEK (m+57069)=
0 THEN GO TO 2090
1100 RESTORE 7000: FOR x=1 TO P
EEK (m+57053): READ g$: NEXT x
1110 LET x=x-1
1190 LET br=1: GO SUB 4800
1200 PRINT AT 21,0: BRIGHT 1:g$
: " DIRECTION ? (0 to 8)
": BRIGHT 0: POKE 23560,0
1210 LET d= PEEK 23560: IF d=0 T
HEN GO TO 1210
1215 LET d=d-48: IF d<0 OR d>8 T
HEN GO TO 1200
1220 IF d=0 THEN LET br=0: GO S
UB 4800: GO TO 2085
1250 BEEP .05,15
1300 LET ms= PEEK (m+57037)
1310 PRINT AT 21,1: BRIGHT 1: "
HOW FAR ? (1 to "ms;")
": BRIGHT 0: POKE 23560,0
1315 LET s= PEEK 23560: IF s=0 T
HEN GO TO 1315
1320 LET s=s-48: IF s<0 OR s>ms
THEN GO TO 1310
1330 IF s=0 THEN LET br=0: GO S
UB 4800: GO TO 2085
1400 PRINT AT 21,1: BRIGHT 1: "
MOVING AS ORDERED "
BRIGHT 0
1500 FOR i=n TO n+6 STEP 2: IF
PEEK i>20 THEN GO TO 2080
1600 FOR o=1 TO s
1700 LET l= PEEK i: LET t= PEEK
(i+1): LET a=1: GO SUB (d*10+300
0)
1800 IF la<0 OR la>20 OR ta<0 OR
ta>31 THEN GO TO 2080
1900 LET k= PEEK (la*32+ta+64341
): IF k=0 THEN GO TO 2000

```

```

1910 GO SUB (k*10+4000)
2050 PRINT AT l,t: " ": POKE (l*
32+t+64341),0
2060 PRINT AT la,ta: BRIGHT 1:g
$: BRIGHT 0: POKE (la*32+ta+6434
1),x: POKE i,la: POKE (i+1),ta
2070 BEEP .001,20: NEXT o
2080 NEXT i
2085 LET br=0: GO SUB 4800: GO S
UB 4300
2090 BEEP .05,-20: NEXT n
2100 GO TO 1000
2500 PRINT AT l,t: FLASH 1: BRI
GHT 1:g$: FLASH 0: BRIGHT 0: FOR
b=65208 TO 65223: IF k= PEEK b
THEN GO TO 2510
2505 NEXT b
2510 LET b=b-57053: LET fd= PEEK
(b+56973): LET fa= PEEK (m+5697
3)
2520 LET a=fa+ INT ( RND *6): LE
T j=fd+ INT ( RND *6): IF a=j TH
EN GO TO 2520
2525 IF a>j THEN BEEP 1,-25: LE
T v$=g$: GO SUB 2710: GO TO 2600
2530 IF a<j THEN BEEP 1,25: GO
SUB 2700: PRINT AT l,t: " ": POK
E (l*32+t+64341),0
2540 LET sa= PEEK (m+57069): POK
E (m+57069),sa-1: GO SUB 2800
2550 FOR c=65240 TO 65366 STEP 2
: IF PEEK c=1 AND PEEK (c+1)=t
THEN POKE c,50: GO TO 2080
2560 NEXT c
2600 LET k=0
2610 FOR b=65240 TO 65360 STEP 8
2620 FOR e=b TO (b+6) STEP 2
2630 IF PEEK e=1a AND PEEK (e+
1)=ta THEN POKE e,50: LET sd= P
EEK (b/8+57069): POKE (b/8+57069
),sd-1: GO SUB 2800: GO TO 2000
2640 NEXT e
2650 NEXT b
2700 RESTORE 7000: FOR w=1 TO k:
READ k$: NEXT w: LET v$=k$: GO
TO 2730
2710 RESTORE 7000: FOR w=1 TO k:
READ k$: NEXT w
2730 PRINT AT 21,0: BRIGHT 1:g$
: fa: "+" (a-fa): "=" a: " ": k$: f
d: "+" (j-fd): "=" j: " ": v$:
" wins ": BEEP 2,-25
2735 PRINT AT 21,1: BRIGHT 1: "
MOVING AS ORDERED "
BRIGHT 0
2740 RETURN
2800 IF PEEK 65231=0 OR PEEK 6
5239=0 THEN GO TO 2900
2810 RETURN
2900 IF PEEK 65231=0 THEN LET
w$="F": LET l$="F"
2910 IF PEEK 65239=0 THEN LET

```



```

1$="F": LET W$="F"
2912 PRINT AT 21,0; BRIGHT 1;1$
;" LOST"; FLASH 1;" ";W$;" WINS
!
2914 FOR b=0 TO 30: BEEP .1,b: B
EEP .15,10-b: BEEP .1,b-20: BORD
ER INT (b/4): NEXT b: BORDER 7

2919 PRINT AT 21,0; BRIGHT 1;1$
;" LOST"; FLASH 1;" ";W$;" WINS
!"; INK 1; PAPER 6;" PRINTOUT ?
y/n "; INK 0; PAPER 7; FLASH 0;
BRIGHT 0
2920 POKE 23560,0
2922 LET z= PEEK 23560: IF z=0 T
HEN GO TO 2922
2924 IF z=121 THEN COPY
2929 PRINT AT 21,0; BRIGHT 1;1$
;" LOST"; FLASH 1;" ";W$;" WINS
!"; INK 1; PAPER 6;" PLAY AGAIN?
y/n "; INK 0; PAPER 7; FLASH 0;
BRIGHT 0
2930 POKE 23560,0
2940 LET z= PEEK 23560: IF z=0 T
HEN GO TO 2940
2950 IF z=121 THEN GO TO 7
2960 IF z=110 THEN NEW
2980 GO TO 2930
3010 LET la=1-a: LET ta=t: RETUR
N
3020 LET la=1-a: LET ta=t+a: RET
URN
3030 LET la=1: LET ta=t+a: RETUR
N
3040 LET la=1+a: LET ta=t+a: RET
URN
3050 LET la=1+a: LET ta=t: RETUR
N
3060 LET la=1+a: LET ta=t-a: RET
URN
3070 LET la=1: LET ta=t-a: RETUR
N
3080 LET la=1-a: LET ta=t-a: RET
URN
4000 RETURN
4060 IF x >= 7 THEN GO TO 2500

4061 GO TO 2080
4120 IF x <= 6 THEN GO TO 2500

4121 GO TO 2080
4130 IF x <> 3 AND x <> 9 THEN
GO TO 2080
4131 POKE (la*32+ta+64341),0: LE
T k=0: RETURN
4150 GO TO 2080
4160 IF RND >.2 THEN GO TO 413
1
4170 PRINT AT 1,t;" ": PRINT A
T la,ta; FLASH 1; BRIGHT 1; INK
6; PAPER 2;" ": BEEP 2,-30
4180 POKE (1*32+t+64341),0: POKE
(la*32+ta+64341),0: POKE i,50

4190 PRINT AT la,ta; FLASH 0; B
RIGHT 0;" ": LET sa= PEEK (m+570
69): POKE (m+57069),sa-1: GO SUB

```

```

2800: GO TO 2080
4300 IF x <> 5 AND x <> 11 THEN
RETURN
4310 IF PEEK (m+57069)=0 THEN
RETURN
4320 LET br=1: GO SUB 4800
4330 PRINT AT 21,1; BRIGHT 1; I
NK 2;" DIRECTION TO FIRE ? (0 to
8) "; INK 0; BRIGHT 0: POKE 23
560,0
4340 LET d= PEEK 23560: IF d=0 T
HEN GO TO 4340
4345 LET d=d-48: IF d<0 OR d>8 T
HEN GO TO 4330
4350 IF d=0 THEN LET br=0: GO S
UB 4800: GO TO 2090
4360 PRINT AT 21,1; BRIGHT 1; I
NK 2;" RANGE ? (1 to 9)
"; INK 0; BRIGHT 0: POKE 2356
0,0
4365 LET f= PEEK 23560: IF f=0 T
HEN GO TO 4365
4370 LET f=f-48: IF f<0 OR f>9 T
HEN GO TO 4360
4380 IF f=0 THEN LET br=0: GO S
UB 4800: GO TO 2090
4390 PRINT AT 21,1; BRIGHT 1; I
NK 2;" FIRING AS ORDERED
"; INK 0; BRIGHT 0
4400 FOR z=n TO (n+6) STEP 2
4410 IF PEEK z>20 THEN GO TO 4
570
4420 LET l= PEEK z: LET t= PEEK
(z+1)
4430 PRINT AT 1,t; FLASH 1;g$:
BEEP .5,-30
4435 LET a=f+ INT ( RND *3)-1: G
O SUB (d*10)+3000
4440 PRINT AT 1,t; FLASH 0;g$
4450 IF la<0 OR la>20 OR ta<0 OR
ta>31 THEN GO TO 4570
4460 LET k= PEEK (la*32+ta+64341
)
4465 IF k=15 THEN BEEP .5,30: G
O TO 4570
4468 IF k=14 THEN PRINT AT la,
ta; FLASH 1; BRIGHT 1; INK 1; PA
PER 5;"*": BEEP 1,-30: PRINT AT
la,ta; FLASH 0; BRIGHT 0; INK 1
; PAPER 5;"I"; INK 0; PAPER 7: G
O TO 4570
4470 PRINT AT la,ta; FLASH 1; B
RIGHT 1; PAPER 2; INK 6;"*
4480 FOR y=10 TO -10 STEP -1: BE
EP .01,y*3: NEXT y
4490 BEEP 1,-30
4500 IF k=0 OR k=13 OR k=16 THEN
PRINT AT la,ta; FLASH 0; BRIG
HT 0;" ": POKE (la*32+ta+64341),
0: GO TO 4570
4520 FOR b=65240 TO 65360 STEP 8
4530 FOR e=b TO (b+6) STEP 2
4540 IF PEEK e=la AND PEEK (e+
1)=ta THEN POKE e,50: LET sd= P
EEK (b/8+57069): POKE (b/8+57069
),sd-1: GO SUB 2800: PRINT FLAS

```

```

H 0; BRIGHT 0; AT la,ta;" ": POK
E (la*32+ta+64341),0: GO TO 4570

4550 NEXT e
4560 NEXT b
4570 NEXT z
4580 RETURN
4800 FOR a=n TO (n+6) STEP 2

4810 IF PEEK a <= 20 THEN PRIN
T AT PEEK a, PEEK (a+1); BRIGH
T br;g$: BRIGHT 0
4820 NEXT a
4830 RETURN
5110 DATA 1,1,2,2,3,3,0,0,1,1,2,
2,3,3,0,0
5210 DATA 166,148,150,168,159,11
5,160,210
5510 DATA 5,5,6,6,3,3,3,2,5,5,6,
6,3,3,3,2
5610 DATA 1,1,2,2,3,3,5,6,7,7,8,
8,9,9,11,12
5710 DATA 4,4,4,4,4,4,1,4,4,4,
4,4,4,4,1
5810 DATA 1,6,1,7,0,6,0,7,1,24,1
,25,0,24,0,25,1,2,1,3,0,2,0,3,1,
28,1,29,0,28,0,29,1,10,1,11,0,10
,0,11,1,20,1,21,0,20,0,21,1,14,1
,15,1,16,1,17,50,50,50,50,50,50,
0,15
5910 DATA 19,6,19,7,20,6,20,7,19
,24,19,25,20,24,20,25,19,2,19,3,
20,2,20,3,19,28,19,29,20,28,20,2
9,19,10,19,11,20,10,20,11,19,20,
19,21,20,20,20,21,19,14,19,15,19
,16,19,17,50,50,50,50,50,50,20,1
6

7000 DATA "A","B","C","C","E","E
","A","B","C","C","E","E"
8900 REM COPYRIGHT
8905 POKE USR "I",31: POKE USR
"I"+1,63: POKE USR "I"+2,112:
POKE USR "I"+3,224
8910 POKE USR "I"+4,224: POKE
USR "I"+5,112: POKE USR "I"+6,6
3: POKE USR "I"+7,31
8915 POKE USR "U",0: POKE USR
"U"+1,15: POKE USR "U"+2,15: PO
KE USR "U"+3,3
8920 POKE USR "U"+4,1: POKE US
R "U"+5,0: POKE USR "U"+6,127:
POKE USR "U"+7,127
8925 POKE USR "S",0: POKE USR
"S"+1,254: POKE USR "S"+2,254:
POKE USR "S"+3,128
8930 POKE USR "S"+4,192: POKE
USR "S"+5,224: POKE USR "S"+6,2
40: POKE USR "S"+7,240
8940 BORDER 0: PAPER 0: INK 7: C
LS
8942 PRINT AT 1,3; BRIGHT 1; FL
ASH 1; PAPER 7; INK 2;"CAMBRIDGE
AWARD WINNER !!"

8970 RETURN
9900 SAVE "BATTLE1917" LINE 5

```



SEMAPHORE



SEMAPHORE was written for the 16K ZX-81 by David Tulett, aged 14, of Edinburgh and is best played with a friend. The players take turns to write a message which the other person must decipher. There are six speeds from which to choose and a lower number will give you slower signals.

The man in the middle of the screen will display the message which has been input using Semaphore signals. A repeat facility is incorporated if it is necessary for the message to be viewed again. The game can be played by those unfamiliar with semaphore signals, as typing-in the alphabet will give you a demonstration run.

```

2 PRINT "THIS PROGRAM
FOR SENDING MESSAGES BY SEMAPH
ORE SIGNALLING"
4 FOR N=1 TO 200
6 NEXT N
9 CLS
10 PRINT AT 0,0;"SPEED (1 TO 6
)? "
20 INPUT A
25 IF A=1 THEN LET PAUSE=300
30 IF A=2 THEN LET PAUSE=200
40 IF A=3 THEN LET PAUSE=100
45 IF A=4 THEN LET PAUSE=50
46 IF A=5 THEN LET PAUSE=25
47 IF A=6 THEN LET PAUSE=0
50 PRINT AT 0,0;"MESSAGE?"
60 INPUT B$
70 PRINT AT 0,0;"TO START, HIT
ANY KEY"
80 IF INKEY$("<") THEN GOTO 80
90 IF INKEY$="" THEN GOTO 85
95 PRINT AT 0,0;"
100 FOR N=1 TO LEN B$
110 PRINT AT 12,12;"O"
120 PRINT AT 13,12;"■"
130 PRINT AT 14,12;"■"
140 PRINT AT 15,12;"■"
145 PRINT AT 16,11;"■"
150 IF B$(N)="A" THEN PRINT AT
13,11;"■";AT 14,10;"■"
160 IF B$(N)="B" THEN PRINT AT
13,10;"■";AT 13,11;"■"
170 IF B$(N)="C" THEN PRINT AT
11,10;"■";AT 12,11;"■"
180 IF B$(N)="D" THEN PRINT AT

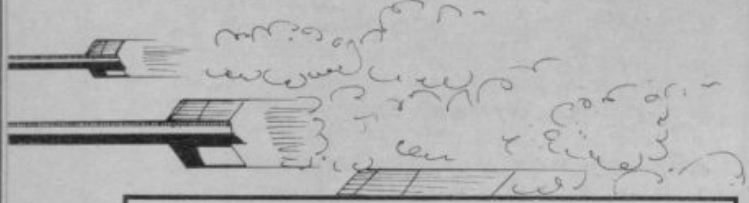
```

```

11,11;"■";AT 12,11;"■";AT 13,11;"■"
190 IF B$(N)="E" THEN PRINT AT
11,14;"■";AT 12,13;"■"
200 IF B$(N)="F" THEN PRINT AT
13,13;"■";AT 13,14;"■"
210 IF B$(N)="G" THEN PRINT AT
13,13;"■";AT 14,14;"■"
220 IF B$(N)="H" THEN PRINT AT
13,10;"■";AT 13,11;"■";AT 14,11;"■";AT 15,10;"■"
230 IF B$(N)="I" THEN PRINT AT
11,10;"■";AT 12,11;"■";AT 14,11;"■";AT 15,10;"■"
240 IF B$(N)="J" THEN PRINT AT
11,11;"■";AT 12,11;"■";AT 13,11;"■";AT 13,13;"■";AT 13,14;"■"
250 IF B$(N)="K" THEN PRINT AT
11,13;"■";AT 12,13;"■";AT 13,13;"■";AT 13,11;"■";AT 14,10;"■"
260 IF B$(N)="L" THEN PRINT AT
11,14;"■";AT 12,13;"■";AT 13,11;"■";AT 14,10;"■"
270 IF B$(N)="M" THEN PRINT AT
13,11;"■";AT 14,10;"■";AT 13,13;"■";AT 13,14;"■"
280 IF B$(N)="N" THEN PRINT AT
13,11;"■";AT 14,10;"■";AT 13,13;"■";AT 14,14;"■"
290 IF B$(N)="O" THEN PRINT AT
13,10;"■";AT 13,11;"■";AT 11,10;"■";AT 12,11;"■"
300 IF B$(N)="P" THEN PRINT AT
11,13;"■";AT 12,13;"■";AT 13,13;"■";AT 13,10;"■";AT 13,11;"■"
310 IF B$(N)="Q" THEN PRINT AT
13,10;"■";AT 13,11;"■";AT 12,13;"■";AT 11,14;"■"
320 IF B$(N)="R" THEN PRINT AT
13,10;"■";AT 13,11;"■";AT 13,13;"■";AT 13,14;"■"
330 IF B$(N)="S" THEN PRINT AT
13,10;"■";AT 13,11;"■";AT 13,13;"■";AT 14,14;"■"
340 IF B$(N)="T" THEN PRINT AT
11,10;"■";AT 12,11;"■";AT 11,13;"■";AT 12,13;"■";AT 13,13;"■"
350 IF B$(N)="U" THEN PRINT AT
11,10;"■";AT 12,11;"■";AT 12,13;"■";AT 11,14;"■"
360 IF B$(N)="V" THEN PRINT AT
11,11;"■";AT 12,11;"■";AT 13,11;"■";AT 13,13;"■";AT 14,14;"■"
370 IF B$(N)="W" THEN PRINT AT
11,14;"■";AT 12,13;"■";AT 13,13;"■";AT 13,14;"■"
380 IF B$(N)="X" THEN PRINT AT
11,14;"■";AT 12,13;"■";AT 14,13;"■";AT 15,14;"■"
390 IF B$(N)="Y" THEN PRINT AT
11,10;"■";AT 12,11;"■";AT 13,13;"■";AT 13,14;"■"
400 IF B$(N)="Z" THEN PRINT AT
13,13;"■";AT 13,14;"■";AT 14,13;"■";AT 15,14;"■"
410 FOR M=1 TO PAUSE
420 NEXT M
425 CLS
430 NEXT N
440 CLS
450 PRINT AT 0,0;"REPEAT (Y OR
N)?"
460 INPUT C$
470 IF C$="Y" THEN GOTO 490
480 GOTO 10
490 CLS
500 GOTO 100

```

SHAZMA PLASMA



SHOOT THE APPROACHING enemy with your Shazma Plasma bolts. The bolts are designed to catch the aliens by surprise. Once the aliens are within firing range the computer will flash a message on the screen and you must then fire at them using the "P". The bolts pass through the aliens and then rebound off the wall, destroying them from behind. There are several levels to be played and the aliens move at a faster speed as the game progresses. Written for the 16K Spectrum by Chris Duncan, aged 14, of Staines, Middlesex.

```

2 RESTORE 9000
5 BORDER 0: PAPER 0: INK 6: C
LS
10 FOR q=0 TO 15: READ w: POKE
USR "a"+q,w: NEXT q
15 LET ammo=9: LET lev=1: LET
sc=0
17 LET h=0: LET x=10: LET y=0

19 CLS : LET ammo=9+lev: LET h
=h+.25
20 FOR r=0 TO 4: LET a= INT (
RND *19): LET b=31: LET y$="b":
LET a$="a"
25 PRINT AT 21,0:"SCORE:": IN
T sc: AT 21,11:"AMMO:":ammo: AT
21,29:"L":lev: AT a,b: INK INT
( RND *7)+3:a$: NEXT r
26 PRINT AT x,y: INK 6:y$: BE
EP .005,a: PRINT AT x,y:" "
27 PLOT 165,8: DRAW 0,167
30 IF INKEY$ ="q" THEN LET x
=x-1: IF x <= 0 THEN LET x=0
31 IF INKEY$ ="z" THEN LET x
=x+1: IF x >= 20 THEN LET x=20

35 IF INKEY$ ="p" THEN GO TO
200
38 BORDER INT ( RND *7)+1
40 PRINT AT a,b:" ": LET b=b-
h
42 IF x=a AND INT b <= 0 THEN
GO TO 400

```

```

45 IF b <= 0 THEN PRINT AT a
,0;" ": IF b <= 0 THEN GO TO 70

50 IF b <= 20 THEN GO TO 100

60 GO TO 25
70 LET sc=sc-50: GO TO 20
100 PRINT AT 21,19: FLASH 1: I
NK 6:"[IN RANGE]"
110 GO TO 25
200 LET ammo=ammo-1: FOR q=y+1
TO 20 STEP 2: BEEP .001, RND *20
: PRINT AT x,y:y$: PRINT AT x,
q:"-": PRINT AT x,q;" ": NEXT q
: FOR q=20 TO y+1 STEP -1: PRINT
AT x,q;"=": PRINT AT x,q;" ":
NEXT q: NEXT q: IF ammo=0 THEN
GO TO 8500
201 IF x=a AND b <= 20 THEN LE
T p=b-y: LET sc=sc+p*5: IF sc >=
500*lev THEN GO TO 800: PRINT
AT a,b;" "
202 BORDER 0: CLS
250 GO TO 20
268 PRINT AT x,y: INK 6:y$: BE
EP .005,a: PRINT AT x,y;" "
400 PRINT AT x,y: INK 7:y$: AT
x,y: OVER 1;a$: PRINT "YOU ARE
DEAD": GO SUB 9900: GO SUB 9990:
PRINT AT x+2,y: FLASH 1:"PRESS
ENTER"
401 IF INKEY$ =" " THEN GO TO
401
402 GO TO 1
800 LET lev=lev+1: CLS : PRINT
AT 7,5:"LEVEL:":lev
801 PRINT AT 9,5:"PRESS ENTER
AND BE PREPARED": GO SUB 9990
802 IF INKEY$ =" " THEN GO TO
802
803 CLS : GO TO 19
8500 CLS : PRINT "YOU RAN OUT OF
AMMO": AT 2,0:"YOUR SCORE IS ":
INT sc: AT 3,0:"PRESS ANY KEY"

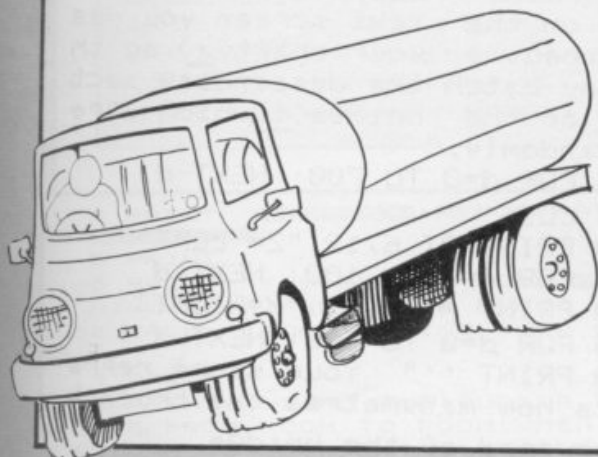
8510 IF INKEY$ =" " THEN GO TO
8510
8512 GO TO 1
9000 DATA 51,90,90,90,126,90,90,
37
9010 DATA 0,0,248,140,143,140,24
8,0
9900 FOR r=0 TO 100: OUT 44+32,2
.3: OUT 180,255: NEXT r
9910 RETURN
9990 BORDER 1: BEEP .5,7: BORDER
0: BEEP .5,9: BORDER 2: BEEP .5
,5: BORDER 4: BEEP .5,-2: BORDER
6: BEEP .5,0
9999 RETURN

```

TANKER

AN OIL TANKER is crossing an uncompleted bridge. It is your job to catch the descending sections and to complete the bridge before the tanker crashes. You will be sacked from your job if you do not complete the task.

Tanker was submitted for the 16K Spectrum by Malcolm Ross, aged 13, of Weston-super-Mare, Avon.



```

1 CLS
2 GO SUB 1000
4 BORDER 1: PAPER 1: CLS
8 FOR l=0 TO 5
10 FOR m=0 TO 15
12 PLOT 0,0: DRAW INK 4;l+m,m
14 PLOT 245,0: DRAW INK 4;l-m
,m
16 NEXT m
18 NEXT l
20 LET x=16: LET y=15
22 LET a$="J"
25 FOR t=0 TO 22
27 LET sc=t*10
30 LET r=INT (RND*25)+1
40 FOR s=0 TO 15
50 LET b$="1"
70 IF INKEY$="z" THEN LET y=y
-1
80 PRINT AT x,y+1;" "
90 IF INKEY$="x" THEN LET y=y
+1
100 PRINT AT x,y-1;" "
110 PRINT INK 5; BRIGHT 1; AT x
,y;a$
130 PRINT INK 4; BRIGHT 1; AT s
,r;b$
140 PRINT AT s-1,r;" "
145 BEEP .01,10-s
150 PRINT AT x,0;" "
160 PRINT AT x,31;" "

```

```

170 IF y=0 THEN LET y=30
180 IF y=31 THEN LET y=0
105 LET a=18: LET b=4
187 IF t=22 THEN GO TO 835
190 NEXT s
200 IF x-1<>s AND y<>r THEN GO
TO 710
210 PRINT AT x-1,y;" "
220 BEEP .02,20
230 PRINT INK 4; BRIGHT 1; AT a
+2,b+t+3;b$
500 LET c$="ace9"
510 LET d$="bdfh"
530 PRINT INK 4; BRIGHT 1; AT a
+2,b-2;"11111"
540 PRINT INK 3; BRIGHT 1; AT a
,b+t;c$; AT a+1,b+t;d$
550 PRINT AT a,b-t-7;" " AT a+1
,b-t-7;" "
560 BEEP .2,-20
570 PRINT INK 7; BRIGHT 1; AT 2
1,11;"SCORE=000"
580 PRINT INK 7; BRIGHT 1; AT 2
1,18;sc
590 NEXT t
710 PRINT INK 6; AT a,b+t-1;"km
09"
715 PRINT INK 6; AT a+1,b+t-1;"
lnPr"
720 FOR f=0 TO -30 STEP -1
730 BEEP .02,f
740 NEXT f
745 FOR d=0 TO 100: NEXT d
750 BORDER 2: PAPER 2: INK 0: C
LS
760 PRINT TAB 12;"RESULTS"
770 PRINT AT 1,12;"1111111"
775 FOR d=0 TO 100: NEXT d
780 PRINT " Your incompetence
has caused the oil tanker to c
rash..."
785 FOR d=0 TO 400: NEXT d
790 PRINT "...the tanker inevit
ably exploded the driver was kill
ed and the oil was lost..."
795 FOR d=0 TO 500: NEXT d
800 PRINT "...it was a costly m
istake..."
805 FOR d=0 TO 300: NEXT d
810 PRINT "...the company cannot
afford to lose money..."
815 FOR d=0 TO 400: NEXT d
820 PRINT "...the Boss has deci
ded to give you the sack!"
830 STOP
840 FOR n=0 TO 3
850 FOR e=40 TO 20 STEP -1
860 BEEP .002,e
870 NEXT e
880 NEXT n

```

continued on page 80

continued from page 79

```
890 BORDER 2: PAPER 2: INK 0: C
LS
900 PRINT TAB 12;"RESULTS"
910 PRINT AT 1,12;"iiiiiii"
915 FOR d=0 TO 100: NEXT d
920 PRINT "Congratulations!
Your amazing skill enabled the o
il tanker to cross the bridge wh
ere so many others have failed.
.."
925 FOR d=0 TO 600: NEXT d
930 PRINT "...the Boss has deci
ded to extend the contract betwee
n you and him"
935 FOR d=0 TO 350: NEXT d
940 PRINT "What do you say..
.."
945 FOR d=0 TO 200: NEXT d
950 PRINT "...do you agree to t
his..."
960 PRINT AT 16,7;"YES or NO"
970 INPUT LINE y$
980 IF y$="yes" OR y$="y" THEN
GO TO 4
990 STOP
1000 FOR n=1 TO 18: READ a$: FOR
l=0 TO 7: READ b: POKE USR a$+1
,b: NEXT l: NEXT n
1010 DATA "a",0,0,0,63,63,113,11
7,117,"b",113,63,31,6,9,9,6,0,"c
",0,0,0,255,255,239,255,239,"d",
239,255,255,24,36,36,24,0,"e",0,
0,0,248,248,124,124,124,"f",24,2
48,255,0,0,0,0,0,"g",0,0,0,248,1
32,130,194,254,"h",254,254,254,4
8,72,72,48,0
1020 DATA "i",255,85,255,0,0,0,0
,0
1030 DATA "j",255,24,60,60,153,2
55,129,129
1032 DATA "k",128,96,56,28,15,7,
3,1,"l",0,1,3,7,14,24,32,0,"m",0
,1,2,14,28,255,136,170,"n",152,1
70,130,255,7,14,24,32,"o",0,16,3
2,99,207,255,136,171,"p",170,170
,168,255,140,8,16,0,"q",1,14,124
,248,240,224,192,128,"r",128,192
,240,248,198,97,32,16
1038 BORDER 6: PAPER 6: INK 1: C
LS
1040 PRINT AT 11,0;"Do you requi
re instructions(y/n)"
1042 INPUT LINE q$
1044 IF q$="n" THEN CLS: GO TO
1100
1046 CLS
1048 PRINT TAB 10;"INSTRUCTIONS"
1050 PRINT AT 1,10;"iiiiiiiiiiii
"
```

```
1055 PRINT "You are responsib
le for the safety of an oil ta
nker. The oil tanker has to cross
a bridge. Simple eh?"
1057 FOR d=0 TO 500: NEXT d
1059 PRINT "...unfortunately the
bridge has not been completed
yet! You, as chief engineer must
finish the work otherwise the
oil tanker will fall to its do
om..."
1060 FOR d=0 TO 700: NEXT d
1062 PRINT "Using controls as s
hown on the next screen you mus
t manoeuvre your craft(j) so th
at you catch the descending sect
ions of the bridge(i) which appe
ar randomly."
1065 FOR d=0 TO 700: NEXT d
1067 CLS
1070 PRINT AT 6,12;"Z= LEFT"
1075 FOR d=0 TO 100: NEXT d
1080 PRINT AT 8,12;"X=RIGHT"
1085 FOR d=0 TO 100: NEXT d
1090 PRINT "...Your score repre
sents how many metres the truck h
as covered of the bridge..."
1091 FOR d=0 TO 300: NEXT d
1092 PRINT AT 17,10;"...GOOD LUCK
"
1095 FOR d=0 TO 50: NEXT d
1100 BEEP .2,10: FOR d=0 TO 12:
NEXT d: BEEP .2,10: FOR d=0 TO 1
2: NEXT d: BEEP .1,10: FOR d=0 T
O 7: NEXT d: BEEP .2,9
1110 FOR d=0 TO 20: NEXT d: BEEP
.2,12: FOR d=0 TO 12: NEXT d: B
EEP .2,12: FOR d=0 TO 12: NEXT d
: BEEP .1,12: FOR d=0 TO 7: NEXT
d: BEEP .2,11
1130 FOR d=0 TO 20: NEXT d: BEEP
.2,10: FOR d=0 TO 12: NEXT d: B
EEP .2,10: FOR d=0 TO 12: NEXT d
: BEEP .1,10: FOR d=0 TO 7: NEXT
d: BEEP .2,9
1140 FOR d=0 TO 5: NEXT d: BEEP
.1,12: FOR d=0 TO 3: NEXT d: BEE
P .1,11: FOR d=0 TO 6: NEXT d: B
EEP .2,13: FOR d=0 TO 6: NEXT d:
BEEP .1,13: FOR d=0 TO 6: NEXT
d: BEEP .3,12
1150 FOR c=6 TO 1 STEP -1
1160 BORDER c: PAPER c: CLS
1165 BEEP .02,c+20
1170 FOR d=0 TO 10: NEXT d
1180 NEXT c
1190 FOR d=0 TO 100
1700 RETURN
```

FRUSTRATION

THE object of the game is to visit each of the nine rooms once only with the exception of room A, which you need to visit twice to pass through the exit. Each of the nine rooms has four exits. To gain the maximum of 100 points you must only go through each room once, so making a map would be useful in achieving this.

Frustration was written for the 16K ZX-81 by John Harlow of Bridgwater, Somerset.

```

3 PRINT "*****FRUSTRATIO
N*****"
5 PRINT
6 PRINT "YOU ARE IN ROOM A OF
A NINE ROOM(A,B,C,D,E,F,G,H,I) H
OUSE, EACH ROOM HAVING FOUR DOO
RS."
7 PRINT
8 PRINT "USING THE CURSOR KEY
S MOVE FROM ROOM TO ROOM. WHEN YO
U RETURN TO ROOM A THE EXIT WIL
L APPEAR"
9 PRINT
10 PRINT "YOU CAN ONLY ACHIEVE
MAXIMUM SCORE(100) IF YOU VIS
IT EACH ROOM ONLY ONCE APART FROM
A FINAL VISIT TO ROOM A"
11 PRINT
12 PRINT "THIS IS NOT AS IMPOS
SIBLE AS IT MAY SEEM."
13 PRINT
14 PRINT "NEWLINE TO START. 600
D LUCK"
15 PAUSE 4E4
16 CLS
20 LET A=0
21 LET B=0
22 LET C=0
23 LET D=0
24 LET E=0
25 LET F=0
26 LET G=0
27 LET H=0
28 LET I=0
29 LET S=100
30 GOTO 700
40 IF A=1 THEN PRINT AT 0,22;"
ROOM A"; AT 15,22;"ROOMS"; AT 16,2
2;"VISITED"; AT 17,22;"SO FAR"
41 IF B=1 THEN PRINT AT 4,22;"
ROOM E"
42 IF C=1 THEN PRINT AT 7,22;"
ROOM H"
43 IF D=1 THEN PRINT AT 1,22;"
ROOM B"
44 IF E=1 THEN PRINT AT 6,22;"
ROOM G"
45 IF F=1 THEN PRINT AT 3,22;"
ROOM D"
46 IF G=1 THEN PRINT AT 5,22;"
ROOM F"
47 IF H=1 THEN PRINT AT 2,22;"
ROOM C"
48 IF I=1 THEN PRINT AT 8,22;"

```



```

ROOM I"
49 LET X=11
50 LET Y=11
51 PRINT AT Y,X;" "
55 LET X=X+(INKEY$="8")-(INKEY
$="5")
60 LET Y=Y+(INKEY$="6")-(INKEY
$="7")
65 PRINT AT Y,X;
70 LET P=PEEK (PEEK 16396+256*
PEEK 16399)
71 IF P=29 OR P=39 OR P=63 OR
P=55 THEN GOTO 250
72 IF P=23 OR P=30 OR P=53 OR
P=28 THEN GOTO 300
73 IF P=54 OR P=52 OR P=42 OR
P=33 THEN GOTO 350
74 IF P=51 OR P=40 OR P=56 OR
P=34 THEN GOTO 400
75 IF P=41 OR P=61 OR P=50 OR
P=32 THEN GOTO 450
76 IF P=37 OR P=49 OR P=44 OR
P=59 THEN GOTO 500
77 IF P=48 OR P=38 OR P=35 OR
P=58 THEN GOTO 550
78 IF P=43 OR P=47 OR P=57 OR
P=36 THEN GOTO 600
79 IF P=31 OR P=62 OR P=60 OR
P=45 THEN GOTO 200
80 IF P=8 THEN GOTO 2000
81 IF P=128 THEN GOTO 49
85 PRINT AT Y,X;"X"
90 GOTO 51
100 CLS
110 FAST
120 PRINT AT 0,0;" "
121 FOR N=1 TO 20
130 PRINT AT N,0;" "
140 NEXT N
145 PRINT AT 21,0;" "
150 SLOW
160 RETURN
200 GOSUB 100
210 GOSUB 1000
220 LET A=1
230 LET S=S-1
240 GOTO 40
250 GOSUB 100
260 GOSUB 1050
270 LET B=1
280 LET S=S-1
290 GOTO 40
300 GOSUB 100
310 GOSUB 1100
320 LET C=1
330 LET S=S-1
340 GOTO 40
350 GOSUB 100
360 GOSUB 1150
370 LET D=1
380 LET S=S-1
390 GOTO 40
400 GOSUB 100
410 GOSUB 1200
420 LET E=1
430 LET S=S-1
440 GOTO 40
450 GOSUB 100
460 GOSUB 1250
470 LET F=1
480 LET S=S-1
490 GOTO 40
500 GOSUB 100
510 GOSUB 1300
520 LET G=1

```

```

530 LET S=S-1
540 GOTO 40
550 GOSUB 100
560 GOSUB 1350
570 LET H=1
580 LET S=S-1
590 GOTO 40
600 GOSUB 100
610 GOSUB 1400
620 LET I=1
630 LET S=S-1
640 GOTO 40
700 GOSUB 100
710 GOSUB 1500
720 LET A=1
730 LET S=S-1
740 GOTO 40
1000 PRINT AT 0,11;"1";AT 11,0;"
U";AT 11,21;"X";AT 21,11;" ";AT
2,2;" ";AT 20,12;"EXIT"
1010 RETURN
1050 PRINT AT 0,11;"2";AT 11,0;"
U";AT 11,21;"5";AT 21,11;"H";AT
2,2;" ";
1060 RETURN
1100 PRINT AT 0,11;"3";AT 11,0;"
T";AT 11,21;"Q";AT 21,11;"B";AT
2,2;" ";
1110 RETURN
1150 PRINT AT 0,11;"4";AT 11,0;"
0";AT 11,21;"J";AT 21,11;"C";AT
2,2;" ";
1160 RETURN
1200 PRINT AT 0,11;"5";AT 11,0;"
Z";AT 11,21;"K";AT 21,11;"D";AT
2,2;" ";
1210 RETURN
1250 PRINT AT 0,11;"6";AT 11,0;"
Y";AT 11,21;"L";AT 21,11;"E";AT
2,2;" ";
1260 RETURN
1300 PRINT AT 0,11;"7";AT 11,0;"
M";AT 11,21;"W";AT 21,11;"F";AT
2,2;" ";
1310 RETURN
1350 PRINT AT 0,11;"8";AT 11,0;"
N";AT 11,21;"R";AT 21,11;"G";AT
2,2;" ";
1360 RETURN
1400 PRINT AT 0,11;"9";AT 11,0;"
0";AT 11,21;"P";AT 21,11;"A";AT
2,2;" ";
1410 RETURN
1500 PRINT AT 0,11;"1";AT 11,0;"
U";AT 11,21;"X";AT 21,11;"*";AT
2,2;" ";
1510 RETURN
2000 IF A=1 AND B=1 AND C=1 AND
D=1 AND E=1 AND F=1 AND G=1 AND
H=1 AND I=1 THEN GOTO 2100
2010 CLS
2020 PRINT "YOU DID NOT VISIT EV
ERY ROOM. SCORE:";100-S
2030 PRINT
2040 PRINT "PLAY FRUSTRATION AGA
IN? PRESS NEWLINE"
2050 PAUSE 4E4
2060 CLS
2070 GOTO 20
2100 CLS
2200 PRINT "WELL DONE.YOU VISITE
D EVERY ROOM.YOUR SCORE IS:";S+10
2300 PRINT "PLAY AGAIN?PRESS NEW
LINE"
2400 PAUSE 4E4
2500 CLS
2600 GOTO 20

```

FOY

CODENAME

MAT

MAT is mankind's last hope. The desperate plan to place in the mind of a teenager the combined tactical skills of all the planetary leaders in the solar system. Now your mind is MAT's mind. Take control of the USS Centurion Battle Cruiser and Tactical Command Centre to control the planetary defence fleets against the Myon attacks in **MISSION: ALIEN TERMINATION**.

Also from
MICROMEGA:

DEATHCHASE
LUNA CRABS
HAUNTED HEDGES
STARCLASH
All £6.95
for the
16K or 48K
Spectrum



Trade Enquiries:

Microdealer
0727 34351

Websters
0483 62222

Tiger
051 420 8888

Pinnacle
0689 73141

3-Dimensional arcade strategy
on the 48K Spectrum — £6.95

Compatible with Kempston, Protek/AGF,
and Interface 2 joystick types.

Available at:



spectrum

fantasy

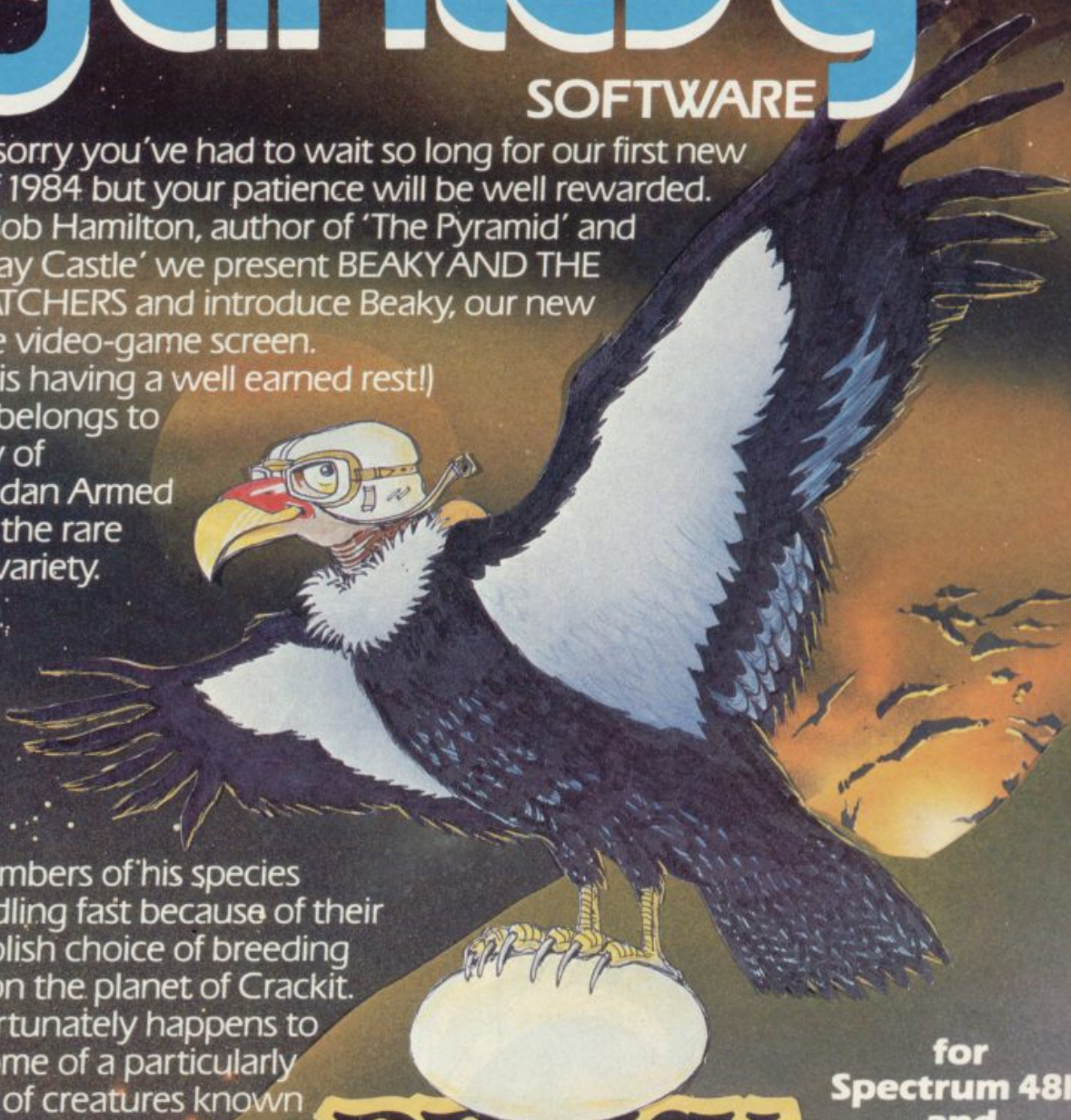
SOFTWARE

We're sorry you've had to wait so long for our first new release of 1984 but your patience will be well rewarded.

From Bob Hamilton, author of 'The Pyramid' and 'Doomsday Castle' we present BEAKY AND THE EGGSNATCHERS and introduce Beaky, our new star of the video-game screen.

(Ziggy is having a well earned rest!)

Beaky belongs to the family of Andromedan Armed Condors, the rare goggled variety.



The numbers of his species are dwindling fast because of their rather foolish choice of breeding ground, on the planet of Crackit. This unfortunately happens to be the home of a particularly evil band of creatures known collectively as the Eggsnatchers. Their sole malicious intent in life is to extinctify Beaky's species by stealing or destroying the eggs by any foul means available.

BEAKY and the Egg Snatchers

for
**Spectrum 48K
and
Commodore 64**

Your objective is to try and brood, hatch out and rear as many little Beakys as possible through 12 different screens of formidable but delightful arcade action.

FANTASY SOFTWARE is available from W.H.SMITHS, JOHN MENZIES, BOOTS, WOOLWORTHS, LASKYS, GREENS, RUMBELLOWS, SPECTRUM GROUP and all other good software retailers.

Beaky and the Eggsnatchers is available for 48K Spectrum and Commodore 64 at £6.50 on cassette or on disk for the Commodore 64 at £9.50 from

FANTASY SOFTWARE, FAUCONBERG LODGE, 27A ST GEORGES ROAD, CHELTENHAM, GLOS GL50 3DT
despatched by return first class post together with free membership of the Fantasy Micro Club.

Trade Enquiries welcome — telephone 0242-583661.

A NEW, IMPROVED ZX81 KEYBOARD AT THE SAME OLD PRICE. £9.95.



There's only one thing wrong with the ZX81. Its keyboard.

Or rather its lack of one.

Since it's flat your fingers don't feel as if there's any response to the pressure put on the keys.

ZX81 KEYS

FILESIXTY KEYS

In other words, you're not quite sure which keys you've pressed until the screen actually tells you.

Our new, improved push button keyboard changes all that.

It matches the ZX81 perfectly. And the keys give a real calculator-type feel.

To set it up all you have to do is peel off the adhesive backing and stick it on top of the ZX81 touchpad.

Because no tampering or soldering is involved the guarantee is not affected. And it will last for up to 3½ million operations.

Filesixty Ltd., 25 Chippenham Mews, London W9 2AN, England. Tel: 01-289 3059. Telex: 268 048 EXTLDN G 4087.

But our keyboard doesn't just come loaded with features. With it comes a separate overlay and a set of coloured stick-on labels to make game playing easier.

It's yours for the original price of £9.95.

Whichever way you look at it, we think you'll agree that it's a keyboard that's quite outstanding.

Orders to Filesixty Ltd., FREEPOST, London W9 2BR.
Cheques/PO made payable to Filesixty Ltd.
Please send me _____ (qty.) Keyboards at £9.95 each
(including VAT and P&P).

Total £

Name

BLOCK CAPITALS

Address

A2

FILESIXTY

John Kerrigan gives his machine code alligator a new direction

Shifting up and down one scan at a time

ROUTINES to make a figure of any size slide horizontally one pixel to the left or one pixel to the right were dealt with last month. A pixel is the smallest horizontal distance possible on the Spectrum screen, one-eighth of a normal character. The routines were contained in a Basic program which consisted of two parts. Lines 10 to 260 were detailed in box two of the article in the March issue. Lines 270 to 610 were shown in box three of the April issue.

If you typed in the full program, you should have found that the figure moved left when you hit the "l" key and right when you hit the "r" key. If you hold down either key the figure should continue in the same direction.

A friend of mine was disappointed at how slowly it moved. The reason is not that the machine code routines are slow but that they are being called for Basic via the INKEY\$ function. If the routines repeated themselves without the pause demanded by INKEY\$ — and the

Box 1.

7290	00100	ORG 7290H	
7290	2AF771	00110 S6	LD HL, (V1) ;LOCATION IN SCREEN MEMORY
7293	CD0070	00120	CALL S0 ;DOWN A SCAN
7296	ED5BF771	00130	LD DE, (V1) ;NOW DE POINTS TO SCAN ABOVE HL
729A	22F771	00140	LD (V1), HL ;NOW V1 IS 1 SCAN DOWN
729D	ED4BF971	00150	LD BC, (V2) ;C=NO. OF BYTES PER SCAN
72A1	0600	00160	LD B, 0 ;REMOVE RUBBISH FROM B
72A3	EDB8	00170	LDDR
72A5	3AFA71	00180	LD A, (V3) ;NO. OF SCANS LEFT TO MOVE
72A8	3D	00190	DEC A
72A9	32FA71	00200	LD (V3), A
72AC	C29072	00210	JP NZ, S6
72AF	2AF771	00220	LD HL, (V1) ;BOTTOM SCAN OF PREVIOUS POSITION
72B2	3AF971	00230	LD A, (V2) ;NO. OF BYTES PER SCAN
72B5	47	00240	LD B, A
72B6	3E00	00250	LD A, 0 ;XOR A WOULD HAVE THE SAME EFFECT
72B8	77	00260 NEAR	LD (HL), A ;BLANK THE BYTE
72B9	2B	00270	DEC HL ;ONTO NEXT BYTE
72BA	05	00280	DEC B
72BB	C2B872	00290	JP NZ, NEAR
72BE	C9	00300	RET
71F7	00310 V1	EQU 71F7H	
71F9	00320 V2	EQU 71F9H	
71FA	00330 V3	EQU 71FAH	
7000	00340 S0	EQU 7000H	
0000	00350	END	
00000 TOTAL ERRORS			
NEAR	72B8	00260	00290
S0	7000	00340	00120
S6	7290	00110	00210
V1	71F7	00310	00110 00130 00140 00220
V2	71F9	00320	00150 00230
V3	71FA	00330	00180 00200

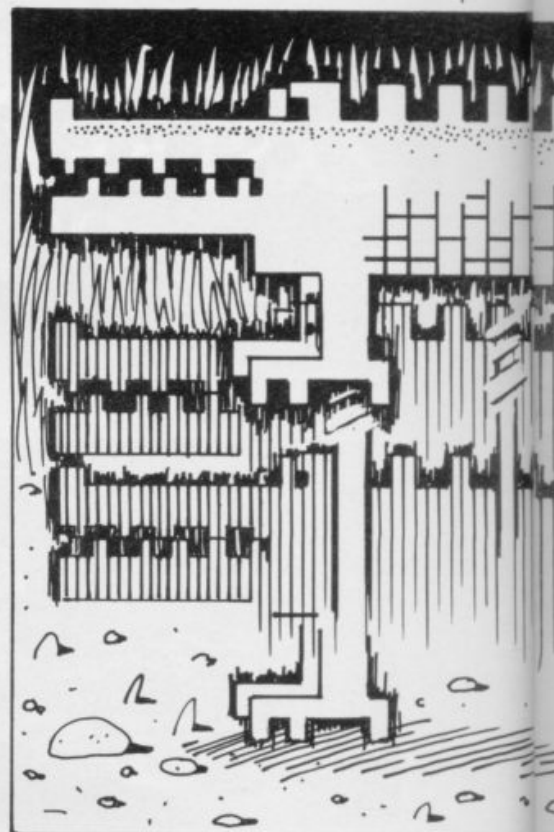
SPECIFICATIONS S6 — Spectrum.

GENERAL DESCRIPTION: Shifts the scans in a rectangle on the screen one scan up. That makes any figure in that rectangle appear to rise. The lowest scan on the initial rectangle will be re-set (=0=paper). The previous contents of the top scan of the new rectangle will be lost.

ON ENTRY: V1 — a 2-byte variable at 71F7H and 71F8H — must point to the scan above the top right of the figure in screen memory. V2 — a 1-byte variable at 71F9H — must hold the number of bytes per scan, or the width, of the rectangle. V3 — a 1-byte variable at 71FAH — must hold the number of scans, or the height, of the rectangle. S0 — down a scan — must be in memory at 7000H.

ON EXIT: The rise is performed. V1 and V3 have their contents destroyed.

USES: A, B, C, D, E, H, L, V1, V2, V3.



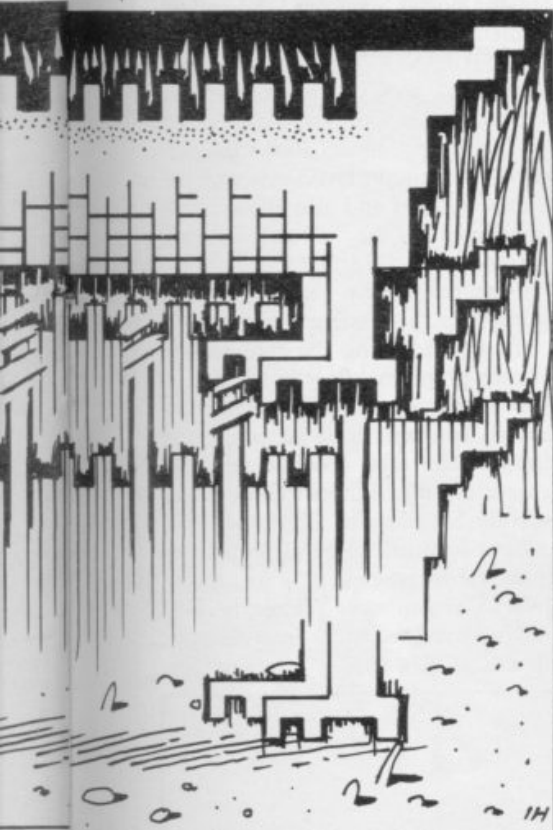
default value of the system variable REPPER at 23562 — they would act so quickly that the alligator would scuttle off the screen almost before you could see it.

You many have noticed that each of the subroutines so far is fairly short and there have been ways of testing each subroutine via Basic before we moved to the next stage. That is generally good practice. Beginners in machine code try normally to write a huge whole program which grows and grows with many jumps and scarcely any subroutines.

One difficulty with such programs is that it can be difficult to pinpoint a particular error. If the program can be broken down into stages and each stage or subroutine tested and documented separately, the frustrations of debugging are reduced. Typically the main calling routine can be left in Basic during most of the development. If speed demands it, that calling routine can be converted into machine code as the last job.

Logically, having devised routines to enable the smallest horizontal movement, we should turn to the smallest vertical movement — shifting up or down by one scan at a time. Horizontal movement involved moving the bits within each byte but vertical movement will involve copying whole bytes from one scan to another.

If you wish to move up the figure we



should start with the top scan of its present position and the scan immediately above that. If we copy the top scan into its new position, we can then copy the next to top scan, and so on down the figure.

If we wish to move the figure down, we should start with the bottom scan of its present position and the scan immediately below that. Then we can move up the figure. It is generally true that to move up data in memory you should start at the top of both the present position and the new position.

To move down data in memory, you should start at the bottom of the present and the new position. If there is any overlap between the present and the new position and you get this the wrong way round, you will lose some of the data and one portion of the data will be repeated in the position where the lost data should be.

In the March issue there was a definition of the opcode LDIR. That repeating instruction required BC, DE and HL to be set before it could be used. BC had to contain the number of repeats required or the number of bytes in the block of data. HL had to point to the bottom of the present position of the block of data to be moved. DE had to point to the bottom of the new position for the block of data to occupy.

There is another instruction called LDDR. It is similar to LDIR except

that HL and DE have to point at the top of the present and new positions. Once again BC has to contain the number of repeats required.

LDDR works by transferring the byte of data held at the address pointed to by HL to the address pointed to by DE. It then decrements HL and DE, whereas LDIR increments. Then it decrements BC. If that causes BC to go to zero, the instruction is terminated. Otherwise the PC or program counter register is decremented twice and hence the instruction is repeated.

Thus the rule for shifting data in internal memory is if you are shifting up data in memory, use LDDR and if you are shifting down data in memory, use LDIR. Those two instructions are very useful. They can be used for inserting or deleting records from the middle

of files, words from the middle of text, or blocks from the middle of look-up tables.

In the case of routines S6 and S7, shown in boxes one and two, it is not crucial whether we use LDIR or LDDR. That is because each scan has to be transferred separately. What is crucial is the order in which we tackle the scans. Since LDIR was used in S3, the routine to show a figure of any size, this time LDDR, is used in S6 and S7. S6 is a routine to shift up a scan and S7 is a routine to shift down a scan. Because LDDR is to be used, we must start at the right-hand corner of any figure. If LDIR was used, since HL and DE would be incremented after the transfer of each byte, we would have to start at the left-hand corner.

I mention the starting position par-

continued on page 88

Box 2.

72C0	00100	ORG 72C0H	
72C0	2AF771	LD HL, (V1)	;LOCATION IN SCREEN MEMORY
72C3	CD0071	CALL S2	;UP A SCAN
72C6	ED5BF771	LD DE, (V1)	;NOW DE POINTS TO SCAN BELOW HL
72CA	22F771	LD (V1), HL	;NOW V1 IS 1 SCAN UP
72CD	ED4BF971	LD BC, (V2)	;C=NO. OF BYTES PER SCAN
72D1	0600	LD B, 0	;REMOVE RUBBISH FROM B
72D3	EDB8	LDDR	
72D5	3AFA71	LD A, (V3)	;NO. OF SCANS LEFT TO MOVE
72D8	3D	DEC A	
72D9	32FA71	LD (V3), A	
72DC	C2C072	JP NZ, S7	
72DF	2AF771	LD HL, (V1)	;TOP SCAN OF PREVIOUS POSITION
72E2	3AF971	LD A, (V2)	;NO. OF BYTES PER SCAN
72E5	47	LD B, A	
72E6	3E00	LD A, 0	;XOR A WOULD HAVE THE SAME EFFECT
72E8	77	LD (HL), A	;BLANK THE BYTE
72E9	2B	DEC HL	;ONTO NEXT BYTE
72EA	05	DEC B	
72EB	C2E872	JP NZ, HERE	
72EE	C9	RET	
71F7	00310 V1	EQU 71F7H	
71F9	00320 V2	EQU 71F9H	
71FA	00330 V3	EQU 71FAH	
7100	00340 S2	EQU 7100H	
0000	00350	END	
00000	TOTAL ERRORS		
HERE	72E8	00260	00290
S2	7100	00340	00120
S7	72C0	00110	00210
V1	71F7	00310	00110 00130 00140 00220
V2	71F9	00320	00150 00230
V3	71FA	00330	00180 00200

SPECIFICATIONS S7 — Spectrum.

GENERAL DESCRIPTION: Shifts the scans in a rectangle on the screen one scan down. That makes any figure in that rectangle appear to fall. The highest scan on the initial rectangle will be re-set (=0=paper). The previous contents of the bottom scan of the new rectangle will be lost. **ON ENTRY:** V1 — a 2-byte variable at 71F7H and 71F8H — must point to the scan below the bottom right of the figure in screen memory. V2 — a 1-byte variable at 71F9H — must hold the number of bytes per scan, or the width, of the rectangle. V3 — a 1-byte variable at 71FAH — must hold the number of scans, or the height, of the rectangle. S2 — up a scan — must be in memory at 7100H.

ON EXIT: The fall is performed. V1 and V3 have their contents destroyed.

USES: A, B, C, D, E, H, L, V1, V2, V3.

continued from page 87

ticularly because there are subtle differences between the required contents of V1, the two-byte variable holding the starting position, for S3, S4, S5, S6 and S7. For S3, V1 must point to the top left of the position of the figure in screen memory. For S4, V1 must also point to the top left. For S5 V1 must point to the top right of the position of the figure in screen memory. For S6, V1 must point to the scan above the top right of the position of the figure in screen memory. For S7, V1 must point to the scan below the bottom right of the position of the figure in screen memory.

Those subtle differences mean that, to use the routines so that they act on only those bytes contained in the rectangle of a particular figure, we should have more routines which keep track of where the outer edges of that rectangle are. Such routines would also enable us to ensure that portions of the figure are not able to escape at the edges of the screen. You may already have noticed that you can lose the whole or a part of the alligator by shifting it into the border. Next month's article, the last in the series, will deal with that problem.

The Basic program this month, in box three, is somewhat crude in the values it pokes into V1, V2 and V3 before using the routines. It is arranging

'You can lose the alligator by shifting it into the border'

for the whole of the screen to shift up, down, left or right because there is no code ensuring that a track is kept of the position of the alligator.

Immediately after the LDDR instruction on line 170 of S6, there is some code to check whether all the scans have been moved. Since the number of scans left to move is held in V3, that variable is loaded in A. Then A is decremented, to see if we have dealt with all the scans. Instead of jumping on the basis of the zero flag at the point, we store the new value of V3 first. That instruction on line 180 will not affect the flags.

LD instructions have no effect on the flags and it is always safe to store the value of a counter before deciding whether to return once more round a loop. The code from lines 220 onwards sets the bottom scan of the previous position to paper.

All the routines in this series, apart from a completely separate Basic pro-

gram in box three of the March issue, have been written to fit into a 16K Spectrum. Unfortunately that means that we no longer have room to keep S0, S2, S3, S4 and S5 in Basic data statements as well as the new routines. If you try to add the S6 and S7 Basic data statements to the previous programs you will get an Out of Memory error message.

That is not an insuperable problem, because you can run the previous programs poking the earlier routines into memory and then record them as bytes. S2 — up a scan — will be required; it was shown in the February issue. S1 — January issue — must not be included; it was a test of the relationship between the scans within a standard character and it occupies the same space as S0. Box four with this article details the locations in hex and denary of S0, S2, S3, S4, S5, S6 and S7, together with a brief description of their purpose.

Having poked S0, S2, S3, S4 and S5 into memory, record them by typing SAVE "ALLINIT" CODE 28672,646. Line 20 of the program in box three will LOAD the bytes under that name from tape. The new program allows the previous left and right movements with the "l" and "r" keys and also allows vertical movements if the "u" and "d" keys are pressed.

I hope that many readers are not running only the Basic programs given but are also adapting the routines for their own programs. Bear in mind that, if you wish to move the routines in memory, you will have to adjust the addresses after each absolute jump. If you want complex shapes to move independently but close to each other, you may have to break some of the figures into several rectangles.

John Kerrigan runs courses in Z-80 assembly language. Details from Alligator Data Ltd. 01-674 8512.

Box 3.

```

10 CLEAR 28671
20 LOAD "ALLINIT" CODE
30 REM INITIAL V1,V2,V3,V4
40 DATA 10,72,34,112,8,14
50 FOR A=29175 TO 29180: READ B; POKE A,B: NEXT A
60 RANDOMIZE USR 29184
70 REM S6 MACHINE CODE
80 DATA 42,247,113,205,0,112,237,91,247,113
90 DATA 34,247,113,237,75,249,113,6,0,237,184
100 DATA 58,250,113,61,50,250,113,194,144,114
110 DATA 42,247,113,58,249,113,71,62,0,119,43,5
120 DATA 194,184,114,201
130 FOR A=29328 TO 29374: READ B; POKE A,B: NEXT A
140 REM S7 MACHINE CODE
150 DATA 42,247,113,205,0,113,237,91,247,113
160 DATA 34,247,113,237,75,249,113,6,0,237,184
170 DATA 58,250,113,61,50,250,113,194,192,114
180 DATA 42,247,113,58,249,113,71,62,0,119,43,5
190 DATA 194,232,114,201
200 FOR A=29376 TO 29422: READ B; POKE A,B: NEXT A
1000 PAUSE 0
1010 IF INKEY$="r" THEN GO SUB 1500
1020 IF INKEY$="l" THEN GO SUB 1600
1030 IF INKEY$="u" THEN GO SUB 1700
1040 IF INKEY$="d" THEN GO SUB 1800
1050 GO TO 1000
1500 POKE 29175,0: POKE 29176,64: POKE 29177,192: POKE 29178,32
1510 RANDOMIZE USR 29232: RETURN
1600 POKE 29175,31: POKE 29176,64: POKE 29177,192: POKE 29178,32
1610 RANDOMIZE USR 29280: RETURN
1700 POKE 29175,31: POKE 29176,64: POKE 29177,32: POKE 29178,191
1710 RANDOMIZE USR 29328: RETURN
1800 POKE 29175,255: POKE 29176,87: POKE 29177,32: POKE 29178,191
1810 RANDOMIZE USR 29376: RETURN

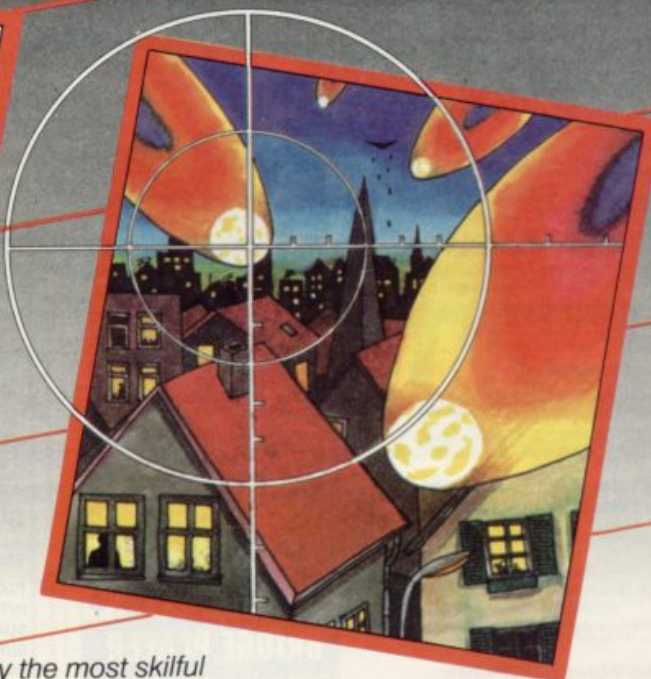
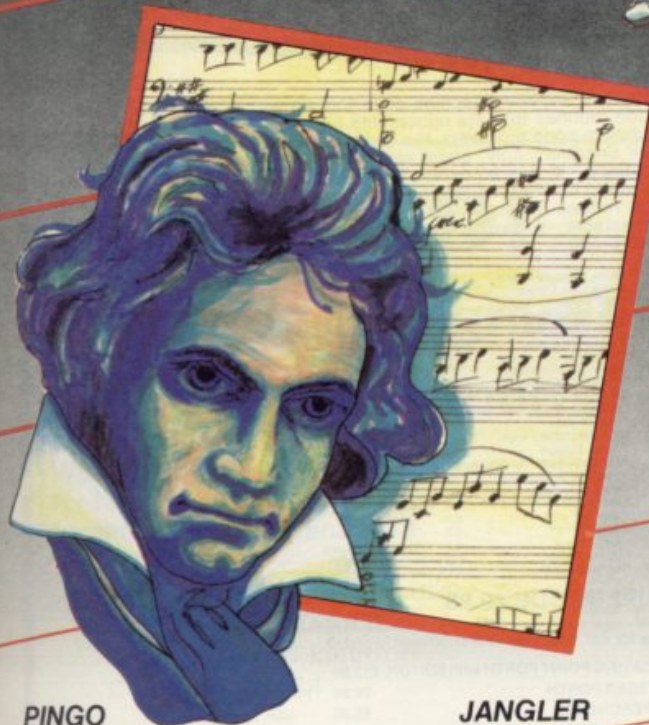
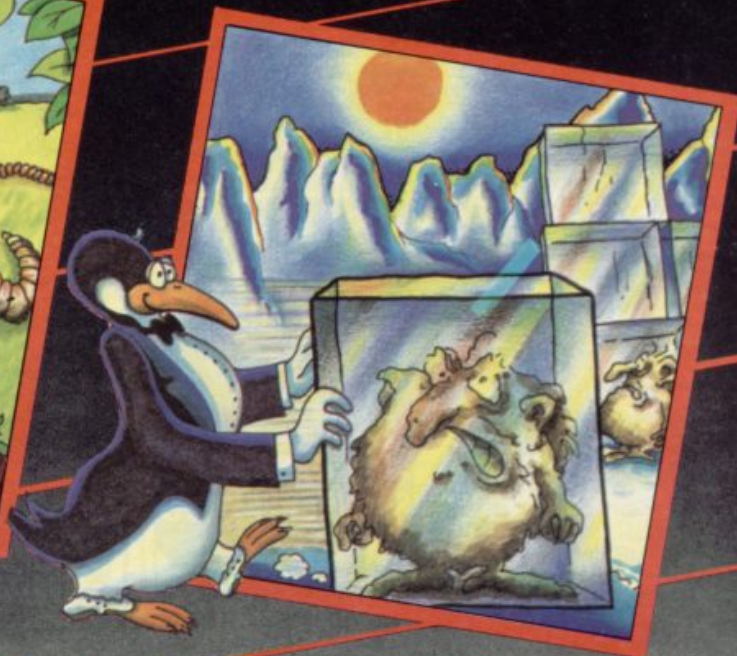
```

Box 4.

S0	7000H to 7021H	28672 to 28705 Down a scan
Fig	7022H to 7091H	28706 to 28817 Alligator figure
S2	7100H to 711DH	28928 to 28957 Up a scan
V1-V4	71F7H to 71FCH	29175 to 29180 Variables
S3	7200H to 7225H	29184 to 29221 Show figure
S4	7230H to 7254H	29232 to 29268 Shift right
S5	7260H to 7284H	29280 to 29316 Shift left
S6	7290H to 72BEH	29328 to 29374 Shift up
S7	72C0H to 72EEH	29376 to 29422 Shift down

For The First Time Ever

In England



PINGO

Battle in the ice maze with Pingo to destroy the Sno-bees. If you're fast enough you may survive!

ZX Spectrum 48k

5.95

SPACE MISSILE COMMAND

Incoming waves of missiles and only you between the earth and destruction.

ZX Spectrum 48k

5.95

JANGLER

A game for only the most skilful joystick adepts. Has to be experienced to be believed.

ZX Spectrum 48k

5.95

MUSIC COMPOSER

- ★ 3 channel composer
- ★ professional musical notation
- ★ correct phrasing
- ★ 5000 notes
- ★ music sheet scrolled across screen or printer

- ★ fully editable
- ★ synthesizer coming shortly

ZX Spectrum 48k

6.95

Available from your software dealer

proffsoft

Dealer enquiries contact telex
Germany 94966 proffs d.

SUPERCHESS 3.0

ABSOLUTELY GUARANTEED ABLE TO BEAT ALL OTHER SPECTRUM CHESS PROGRAMS

Superchess 3.0 has been developed to bring you the strongest chess program yet for the Spectrum computer.

At the tournament level Superchess 3.0 has a look-ahead of five to seven ply (moves) in the middle game, and ten to twelve ply in the end game. This gives Superchess 3.0 a substantial advantage against other chess programs and promises the experienced player an interesting and challenging game of chess.

Unlike other chess programs, Superchess 3.0 is not just a brute-force calculator, but employs artificial intelligence techniques to allow deeper searching along the main lines of play.

FEATURES:

- 10 levels—all play within tournament time limits.
- First level made especially easy for beginners.
- Easy to use—help menus provided.
- Recommended move option.
- Change sides and level during game.
- Self play mode.
- Set up/change position.
- Technical information—how the program 'thinks'.
- Program's internal score for position displayed.
- Number of evaluated positions displayed.
- Library of opening moves.
- Select your own colour scheme for graphic board display.
- Solve mating problems—up to mate in four.



48K SPECTRUM—Price £8.95

BRIDGE PLAYER

PLAY AN ENTIRE GAME OF BRIDGE AGAINST YOUR SPECTRUM
—WITHOUT GETTING IN THREE FRIENDS FOR THE PURPOSE

Dealing—the program shuffles, deals and sorts the cards to produce randomly dealt hands. An almost infinite number of hands are therefore possible, with all kinds of distributions.

Bidding—is in the familiar ACOL system, including Stayman and Blackwood conventions. You bid your hand while the Spectrum bids the other three hands.

Card Play—you play from your own and dummy's hands, which are displayed as they would be at the bridge table, with the program playing the other two hands.

Scoring—at the end of each hand the score is calculated, including honours, slam and rubber points. Both the old and new scores are displayed in the usual manner.

Replay—at the end of each hand, all four hands can be displayed and, if desired, the hand replayed.

48K SPECTRUM
BRIDGE PLAYER—£8.95

An ideal complement to the Bridge Player Program:

Bridge Tutor (Beginners)—£5.95
Bridge Tutor (Advanced)—£5.95



SPECIAL OFFER:

Bridge Player and both
Bridge Tutors—£18.95

Available at most good computer stores.

DELIVERY:

UK—prices include VAT and postage & packing.

EUROPE—add 80p per program

ALL OTHER PLACES—for air mail add £2 for the first program and 50p for each subsequent program. Surface delivery add 80p per program.

Send SAE for Catalogue.

Send Cheque, Postal Order or Access No. to:
CP SOFTWARE, Dept SU1
2 Glebe Road, Uxbridge
Middlesex UB8 2RD

cp software



AIRBASE INVADER

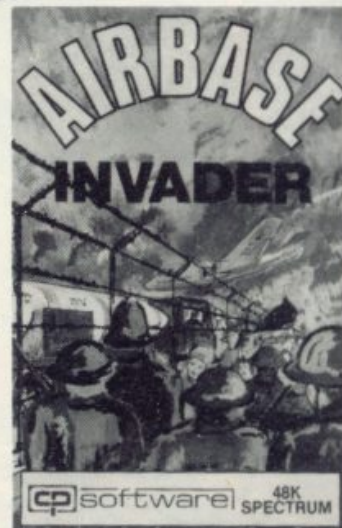
Non-sexist, non violent,
satirical, sprite graphic
all-action arcade adventure.

Featuring:

- Iron Lady
- Ronnie Raygun
- Old Bill
- Squaddies
- Gutter-press photographers
- Peace women

—and maybe the end
of the world!

48K SPECTRUM—£5.95



SUPERCODE —for 16K and 48K Spectrum

100+ ROUTINES

This is a superior machine code tool kit with one hundred machine code routines that are relocatable for use in your own BASIC and/or machine code programs, the combined user friendly BASIC program, 48k Spectrum only, gives easy access to all routines: • Index of routines. • Call up details of each routine including all information required to tailor the routine to your needs. • Demonstration of how the routine works under software control, the demonstration is repeatable. • Save and verify individual routines. • Comprehensive user guide.

1. Block Memory Insert	24. Sci-Fi Character Set	47. Wait-Key
2. Block Line Delete	25. Memory Available	48. Strings to Upper Case
3. Chr\$ Swap	26. Line Renumber	49. Strings to Lower Case
4. Chr\$ Scramble	27. Uni-Note Sound-Gen	50. Program to Upper Case
5. Super-Renumber	28. Dual-Note Sound-Gen	51. Program to Lower Case
6. 2 Byte Converter	29. Uni-Beep Simulator	52. Confuse
7. Dec+ Hex Converter	30. Multi-Beep Simulator	53. Clarify
8. Hex+ Dec Converter	31. Screen Fill	54. Space Saver
9. Remkill Condenser	32. Screen Store	55. Screen Overprint
10. On Error Goto	33. Screen Exchange	56. Screen Invert
11. On Break Goto	34. Protect Program	57. Clear All
12. Free-Scroller	35. Block Copy	58. Ink Change
13. Non-Deletable Lines	36. Contract	59. Paper Change
14. Border Effects	37. Expand	60. Flash On
15. Screen Search	38. Expand Rem	61. Flash Off
16. Variables Search/List	39. Append	62. Bright On
17. 24-Line Printing	40. Count Program	63. Bright Off
18. Star Draw	41. Tape Header Reader	64. Screen-Print
19. Flash Switch	42. Address	65. Random Number Generator
20. Bright Switch	43. Checker-Board	
21. Paint Shape	44. Remove Colours	
22. Record Sound	45. Display-Memory	
23. Replay Sound	46. Hex Loader	

Routines 66-100: Screen routines

SUPERCODE £9.95

Plus for 48K Spectrum unless otherwise stated:

FLOATING POINT FORTH with EDITOR	£13.95	PINBALL WIZARD	
INTEGER FORTH	£9.95	(48K Spectrum)	£5.95
SUPERCHESS II	£5.95	PINBALL WIZARD	
SUPERCHESS I (16K ZX81)	£4.95	(Commodore 64)	£6.95
16K SUPERCHESS (16K Spectrum)	£6.95	DRAUGHTS	£5.95
REVERSI	£6.95	BACKGAMMON	£5.95
SPECIAL OFFER:		SNAIL LOGO (Turtle Graphics)	£9.95
LOGO and Floating Point Forth	£20.95	GOLFING WORLD	£5.95
SUPERCODE and EXTENDED BASIC	£17.95	SPECTRUM EXTENDED BASIC	£9.95
DRAUGHTS and BACKGAMMON	£9.95		

WANTED:

Interesting programs for Spectrum,
Commodore 64 and QL

ESPECIALLY WANTED:

QL/Commodore 64 Bridge Player
QL/Commodore 64 Backgammon

ANY OFFERS?

NOW 3RD GREAT YEAR!

HIRE

SPECTRUM and ZX81 PROGRAM TAPES

FREE ILLUSTRATED QUARTERLY MAGAZINE WITH TIPS, NEWS, REVIEWS, DISCOUNT OFFERS PLUS OUR TOP 60 TAPES CHART BASED ON THOUSANDS OF SCORES!

JOIN OVER 3,000 DELIGHTED MEMBERS!

UP TO 2 WEEKS FROM ONLY 64P + P/P & VAT!

ADVENTURE GAMES
ARCADE and SIMULATION GAMES
BUSINESS and PRACTICAL PROGRAMS
UTILITIES
M/C COMPILERS
EDUCATIONAL

FROM OVER 50 TOP SUPPLIERS ALL WITH PERMISSION!

YOUR FIRST TAPE FREE IF YOU JOIN NOW!

Formerly Sinclair Owners' S'ware Library

NOW READ THE FACTS

We were the first Sinclair library, and have since built up a vast stock—apart from over 200 different programs costing up to £15 each, we maintain a supreme service with up to 30 copies of the most popular ones. We're run not from a back-room but from our own shop and offices which members can visit or phone. Six staff give prompt, friendly help. Plus our free magazine and guaranteed satisfaction;

WHY SETTLE FOR LESS?

To: SOFTWARE LIBRARY, Farnham Road, West Liss, Hants GU33 6JU.

NAME..... Machine.....

ADDRESS.....

THE ORIGINAL SINCLAIR LIBRARY

Special offer from this issue: LIFE MEMBERSHIP £6 (normally £9.50). Overseas (Europe only) £10, or join a local branch: Scandinavia: Peder Lykkesvej 33, 2300 Copenhagen S. Benelux: Jacobsmitslaan 75, B-2400 MOL, Belgium. W. Germany: Postfach 7809, 4800 Bielefeld. S. Africa: PO Box 1769, Manzini, Swaziland. Eire: 122 South Circular Rd., Dublin 8. SU

WANTED!

**Got a good program?
Come to the experts**

We are looking for original software titles for National and International Distribution for the following Machines:

Any Atari Home Computer
 Sinclair Spectrum/QL
 BBC 'B'/Acorn Electron
 Commodore '64

We are also interested to hear from capable freelance programmers.

Please contact in writing only:

Jon Dean
 Software Acquisition Centre
 Atari International (U.K.) Inc.,
 Atari House, Railway Terrace
 Slough, Berks SL2 5LS

TACTICAL WARGAMES FOR YOUR SPECTRUM & ZX81 CONFRONTATION



The build-on game that offers a basic format for any modern non-nuclear conflict. This master tape contains your base European scenario, using air and land forces. 2 players. Look out for more campaigns.

SPECTRUM 48K £7.95

DREADNOUGHTS



Suspense-filled high seas drama as The German Grand Fleet is locked in battle with The Royal Navy. Secret orders, battle graphics, torpedoes, guns etc. 2 players. **SPECTRUM 48K £5.95**

ORDER NOW!

'WARMMASTER' FULL GRAPHICS WARGAMES ARE AVAILABLE FROM selected stores of JOHN MENZIES, NSS, CO-OP, SPECTRUM, MAKRO, TIGER Traders, LIGHTNING Dealers and better record shops, OR DIRECT BY POST.

CONFRONTATION

Spectrum 48K £7.95 ☐

DREADNOUGHTS

Spectrum 48K £5.95 ☐

also JOHNNY REB

All full-graphics battlefield captures the spirit of the American Civil War.

Spectrum 48K £5.50 ☐

RED BARON

Tactical full-graphics action over Flanders in 1917.

Spectrum 48K £5.95 ☐

I enclose a cheque/P.O. for £

Please debit my Access A/C No

Name

PARAS

All-graphics game based on a World War II Campaign.

Spectrum 48K £5.95 ☐

Also for Spectrum and ZX81

TYRANT OF ATHENS, WARLORD, ROMAN EMPIRE, SAMURAI WARRIOR

Spectrum £5.50 ☐ ZX81 £4.50 ☐

and PRIVATEER Spectrum & ZX81 £4.50 ☐

PELOPONNESIAN WAR ZX81 only £4.50 ☐

made payable to M C Lothlorien.

Signed

Address

SU 5/84

Send to: M C Lothlorien, 56a Park Lane, Poynton, Cheshire. SK12 1RE
 Tel: Poynton (0625) 876642

LOTHLORIEN  *the mind stretchers*

The Quill

48K Spectrum

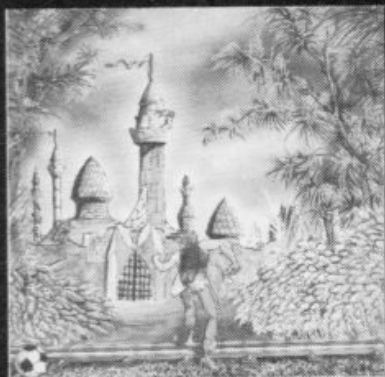


£14.95

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.

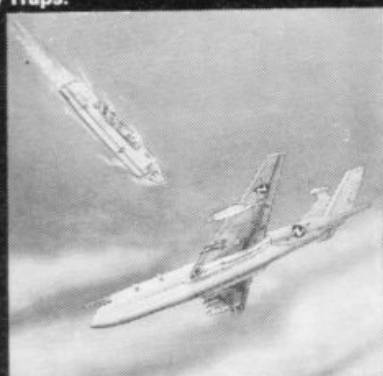
Using a menu selection system you may create well over 200 locations, describe them and connect routes between them. You may then fill them with objects and problems of your choice. Having tested your adventure you may alter and experiment with any section with the greatest of ease.

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.



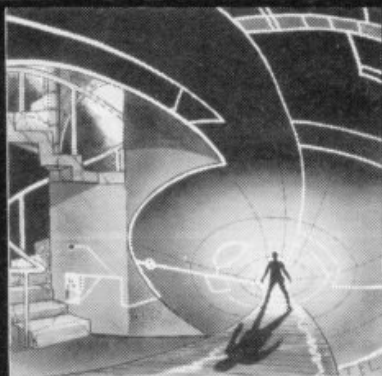
Magic Castle

Rescue the Princess from the Magic Castle but beware of Vampires and Booby Traps.



Spyplane

Can you survive and complete your mission high in the sky over enemy territory?



Mindbender

Only you alone can save the world from the terrible power of the Mindbender.



Barsak The Dwarf

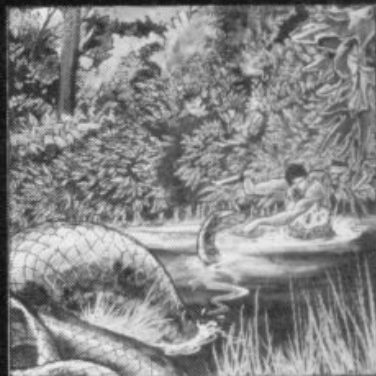
Help Barsak recover the treasures of his ancestors from the underworld of mythology.



Diamond Trail

Where in this city of death and intrigue is the stolen Sinclive Diamond?

**From The Golden Nib Of
The Quill
Comes a Gourmet Feast
for
Hungry Adventurers
Volume 1
of the
GOLD COLLECTION**



Devil's Island

Escape from the infamous prison maybe impossible, but what alternative have you?

A Superb collection of adventures for the 48K Spectrum written with the Quill.

From the fertile imaginations of many authors, we have selected this fine volume of adventures for you to collect. Each adventure is complete in itself and is presented in the distinctive livery of the series to grace your software shelf as you build up the collection.

The adventures are priced at only £5.95 each.

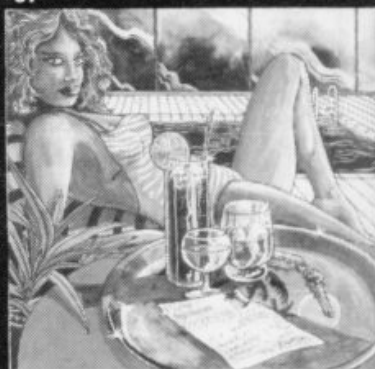
Selected titles available from good computer shops nationwide including:-

W. H. Smiths, Boots, Menzies

Or direct from us by post or telephone

SAE for full details of our range

Dealer enquiries welcome



Africa Gardens

What is the secret of the deserted Hotel and where are all the guests?

Credit Card Order Line

Personally Manned for 24 hours

☎: 0222 41361 Ext 430



GILSOFT

**30 Hawthorn Road
Barry
Soth Glamorgan
CF6 8LE
☎: (0446) 732765**

Upgrade your 16K ZX SPECTRUM Now!

The "CHEETAH" 32K Rampack simply plugs into the user port at the rear of your computer and increases the memory instantly to 48K.

- Fully compatible with all accessories via rear edge connector.
 - No need to open computer and invalidate guarantee.
- Why send your computer away and wait weeks for upgrade.
 - Fully cased, tested and guaranteed.

ONLY

Why wait any longer? £39.95
inc. VAT and p&p



Now make your SPECTRUM and ZX81 Talk!

The CHEETAH "Sweet Talker" just plugs into the back of the computer using the existing power supply. Based on an allophone system you can easily program any word, sentence or phrase. Fully cased, tested, guaranteed and compatible with all accessories via rear edge connector. Complete with demonstration cassette and full instructions. No more lonely nights!

Terrific Value at £29.75

when ordering please quote whether Spectrum or ZX81 owner.

Also available:

16K Rampack for ZX81 **£19.75** 64K Rampack for ZX81 **£44.75**

Prices include VAT, Postage and Packing. Delivery normally 14 days. Export orders at no extra cost. Dealer enquiries welcome.

Send cheque/PO now to:-

CHEETAH MARKETING LIMITED

Dept. SU5, 24 Ray Street, London EC1. Tel: 01-833 4909

Cheetah, products available from

branches of



WHSMITH



John Menzies

Rumbelows

and all good computer shops

GLOSSARY

Basic — Beginners' All-purpose Symbolic Instruction Code. A programming language resembling English which is used by beginners because most popular microcomputers have it as standard.

Bug — an error in a program.

EPROM — Erasable Programmable Read-Only Memory. Semi-permanent storage. Information is not erased if the power is turned off in the computer. Programs can be erased by subjecting the memory chips to ultraviolet light. The memory can then be re-programmed using an electrical device called an EPROM blower.

Interface — RS232 and Centronics. A device which enables other computers or add-ons, such as printers, to be connected to the computer. It converts non-standard signals from add-ons to the standard signals of the computer in use.

Kilobyte — (K). A measurement of memory size. Most machines use 16K as a minimum but 48K is generally agreed to be necessary for serious work.

Machine code — an electronic pulse code used by the computer to perform functions and communicate with memory and other devices.

Mnemonics — abbreviated instructions — for example LD for Load — used in machine language programming.

Motherboard — an external printed circuit board which is used like a multi-way plug planner. It enables other printed circuit boards, such as graphics boards and colour boards, to be slotted-in.

Port — a link to the outside world which can be used by programs and the computer.

PCB — printed circuit board. A board which has on it the electronic circuits of the computer.

RAM — Random Access Memory. Information and programs can be stored in this type of memory as electronic pulses which conform to a set of numbers — machine language — in which programs are represented in the computer. When the power is turned off the information will be lost.

ROM — Read Only Memory. Information stored in this type of memory is not lost when the power is switched off.

Software — programs which control the operation of the computer.

Syntax error — a bug caused by incorrect use of a programming language.



Our easy-to-follow guide for new owners

The basic route to a habit-forming hobby

BUYING a Sinclair machine can be the start of a life-time's obsession with home computing. It is easy, however, to become discouraged if everything does not go according to plan from the beginning.

For those with only a little knowledge of computers and their capabilities, the best way to approach the machines is to abandon any ideas for special uses. While the 48K Spectrum is big enough for simple uses in small businesses, the range of Sinclair computers does not contain machines for major uses. It is better to become accustomed to the many facilities and then decide how you wish to use them.

Begin by unpacking your machine, overcoming your surprise at its size and weight and, following the manual, set up the system. If you cannot get the K on the screen, check that everything is plugged into its correct socket and re-set the machine by pulling-out the power plug for one second and try tuning-in again. If still nothing appears, check the power supply unit by shaking it. If it rattles, return it. If it is satisfactory, check your system with that of a friend.

If you have a Spectrum you will have received an introductory booklet which explains what the computer can do and giving detailed instructions on how to set it up. Also included is a fault-finding guide.

Once the K appears you are ready to begin learning about your machine. It can prevent family arguments if you can afford a separate television set for your system. It also makes life easier if you find somewhere to leave your equipment

set up permanently. You will find that a few power sockets are needed and a four-way block connector on a short length of extension cable will help to tidy trailing leads.

When using a Spectrum, a television set has to be more finely-tuned than when using a ZX-81 because of the added dimension of colour. If the set is not tuned properly, the colours will look hazy instead of sharp and clear. If no colour can be seen when it is switched on, the power supply or the television set may be at fault.

Some users have experienced some difficulty with some television sets, which include Hitachi, Grundig and Toshiba. Sets which many people have found compatible include the Sony Trinitron, Fidelity and Ferguson. Recent changes in the ULA should make more sets compatible.

The manuals are written in great detail and are reasonably easy to follow. Some of the chapters may not seem immediately relevant but it is worthwhile reading them as you might miss something important.

Patience is needed at that stage to learn the ways in which the computer will accept information. It is tempting to try to enter programs before you are ready but that is likely to lead to errors. For example, words like AND, THEN and AT should not be typed-in letter by letter.

By the time you have reached chapter 11 in the ZX-81 manual and chapter 19 in the Spectrum manual you should have accumulated sufficient knowledge to be

continued on page 96

Starter pack

continued from page 95

able to type-in other people's programs, such as those in *Sinclair User* and *Sinclair Programs*, without too much difficulty.

It is important when using the ZX-81 that it is not jolted. Some of the connections can easily work loose and everything which has been entered will be lost.

The manuals are not to everyone's liking and if you find them difficult to follow a number of books on the market can help you. Find the one which suits you best.

As a way of relaxing you can buy some of the growing range of commercially-produced software. That can be loaded directly from cassette but make sure that your machine is big enough to take the tapes you buy.

For the ZX-81 there are a few tapes for the unexpanded 1K machine but the majority require the 16K RAM pack. Similarly on the Spectrum most companies are taking advantage of the possibilities provided by the larger 48K machine rather than providing cassettes for the 16K.

The tapes can vary in quality and it is advisable to read the reviews in *Sinclair User* and use your judgment to find the best.

An alternative method to learn about both the ZX-81 and the Spectrum is to plunge in at the deep end and see what the machines will do. Refer to the manuals when you have difficulties. You can ignore the functions and calculations initially and experiment with PRINT statements to obtain the feel of the machines.

You may already have heard about the problem involved in SAVEing and



LOADing your own cassettes. The manual gives detailed instructions but many of the early ZX-81s would not accept tapes from some recorders. That problem is said to have been overcome but there can still be difficulties.

Usually they occur when LOADing tapes recorded by other people. One simple method to overcome this is to wind the tape to the middle of the program and type LOAD "" followed by NEWLINE; then increase the volume of

the recorder slowly with the tape running until the television screen shows four or five thick black bands. If you then rewind the tape, the program should LOAD normally.

LOADing and SAVEing on the Spectrum is much easier and faster than the ZX-81. One difference is that when SAVEing on the Spectrum the LOAD lead must be disconnected either at the recorder or the Spectrum.

Finally, a health warning. Apart from any practical uses, computing with your Sinclair machine can be a very entertaining hobby and is almost certainly habit-forming. You may easily find yourself crouched over your machine, red-eyed, in the early hours of the morning thinking that in another five minutes you will solve the problem. Try to break that habit by getting into the fresh air and meeting other Sinclair users.

By obtaining a Sinclair computer you find that you have joined a not very exclusive club with many thousands of members, many of whom would be only too happy to advise you if you have difficulties.

Make sure of your regular copies of *Sinclair User* and *Sinclair Programs* and you can be guaranteed many happy hours.

SNAP

SNAP IS A GAME for two players in which the screen and border continually change colour. When the colours match, player one should press 0 and player two should press 1. The player to press first gains a point but a point will go to the opponent if you press at the incorrect time. Written for the 16K Spectrum by Bill Lythgoe of Shelvington, Wigan.

VARIABLES used by the program:

- a\$ 1st player's name
- b\$ 2nd player's name
- a 1st player's score
- b 2nd player's score
- w Winning score
- bo Border colour
- pa Paper colour
- n used to vary the note in BEEP statements
- 10- 60 Prints the opening titles
- 70 Waits for a key to be pressed
- 100-120 Input the players' names and winning score
- 130 Sets players' scores to zero



```
10 PRINT AT 1,12; FLASH 1;"!SNAP!"
```

```
20 PRINT ""This game is for 2 players.""
""The screen and its border keep changing colour. When they are both the same colour, the first player tries to press "; FLASH 1;"1"; FLASH 0;"The second player tries to press "; FLASH 1;"0"
```

```
30 PRINT ""If you press first you get a point."
```

```
40 PRINT ""If you press at the wrong time your opponent gets a point."
```

```
50 PRINT ""First to the winnin
```

- 150 As the paper colour keeps changing, this command ensures that anything printed can still be read. If the paper is dark, the ink will be white; if it is light, the ink will be black. See page 111 of the manual
- 170-180 Picks random paper and border colours and clears the screen to those colours
- 190-200 Prints the players' names and scores
- 210 Pause for a random amount of time
- 220-250 If either player is pressing a key and the colours are the same, their score is increased and printed. If the colours are not the same, their opponent's score is increased
- 260 Clears the message printed in lines 220-250
- 270-280 Alters the value of n and limits it to 13
- 290-300 If either of the players has reached the winning score, print it and GOTO the end of game routine
- 310 GOTO start of game
- 500-530 Print instructions to play again
- 540 Wait for key to be pressed
- 550-560 If you have chosen either option, GOTO the correct line. If not, the program will run out of lines and STOP

This is a fairly straightforward game but as it might be used by people who know nothing about computers it should be error-trapped — that is the program should not stop if an incorrect key is pressed. When one player presses a key in lines 220-250, if that is the winning press the program goes to line 500 and waits for another keypress, if the player has not released the key quickly enough the program stops. By adding the new line 500, the program waits for the key to be released before continuing.

```
500 IF INKEY$ <> "" THEN GOTO 500
505 CLS
```

Lines 100-120 can also be error-trapped, for example:

```
100 INPUT "1st player's name?"
a$: IF a$="" THEN PRINT AT 20,4
;"You must enter something": GOTO 100
105 CLS
```

There is more error-trapping you can do — that is for you to decide.

If the program is to be used by very young children it would be useful if they had to press only their half of the keyboard rather than one key. For example, add:

```
210 PAUSE 50+RND*50
212 LET st=(IN 65278<>255 OR IN 65022<>255)
OR IN 64510<>255 OR IN 63486<>255)
214 LET nd=(IN 61438<>255 OR IN 57342<>255)
OR IN 49150<>295 OR IN 32766<>255)
216 IF st=1 AND nd=1 THEN PRINT AT
10,12;"TIE": FOR t=1 TO 100 NEXT t: CLS: GOTO
160
```

If you have an Issue 3 Spectrum, alter all the 255s to 191. Alter the beginning of the following lines to:

```
220 IF st=1 AND ...
230 IF nd=1 AND ...
240 IF st=1 AND ...
250 IF nd=1 AND ...
```

```
g score wins."
60 PRINT "Press any key to co
ntinue."
70 PAUSE 0
80 CLS
100 INPUT "1st player's name? "
;a$
110 INPUT "2nd player's name? "
;b$
120 INPUT "Winning score? ";w
130 LET a=0: LET b=0
140 LET n=0
150 INK 9
160 BEEP .05,n
170 LET bo=INT (RND*8): LET pa=
INT (RND*8)
180 BORDER bo: PAPER pa: CLS
190 PRINT AT 1,1;a$;AT 2,1;a
200 PRINT AT 19,1;b$;AT 20,1;b
210 PAUSE 1+RND*50
220 IF INKEY$="1" AND bo=pa THE
N PRINT AT 10,12;"!SNAP!": BEEP
.1,19: BEEP .7,16: LET a=a+1: P
RINT AT 2,1;a
230 IF INKEY$="0" AND bo=pa THE
N PRINT AT 10,12;"!SNAP!": BEEP
.1,0: BEEP .7,4: LET b=b+1: PRI
NT AT 20,1;b
240 IF INKEY$="1" AND bo<>pa TH
EN PRINT AT 10,12;"WRONG!": BEE
P .8,-18: LET b=b+1: PRINT AT 20
,1;b
250 IF INKEY$="0" AND bo<>pa TH
EN PRINT AT 10,12;"WRONG!": BEE
P .8,-18: LET a=a+1: PRINT AT 2,
1;a
260 PRINT AT 10,12;" "
270 LET n=n+1
280 IF n=13 THEN LET n=0
290 IF a=w THEN PRINT AT 2,1;a
;AT 12,1; FLASH 1;a$;" WINS!": P
AUSE 200: GO TO 500
300 IF b=w THEN PRINT AT 20,1;
b;AT 12,1; FLASH 1;b$;" WINS!":
PAUSE 200: GO TO 500
310 GO TO 160
500 CLS
510 PRINT "To play again with
the same two players press s."
520 PRINT "To play with diffe
rent players press d."
530 PRINT "To stop press any
other key."
540 PAUSE 0
550 IF INKEY$="s" THEN GO TO 1
20
560 IF INKEY$="d" THEN GO TO 1
00
```

MAZE

A MAZE is a beginner's program written for the 1K ZX-81 by Antony Joyner of Emsworth, Hampshire. Once LOADED the program will auto-run and draws some interesting patterns which can be printed or connected to a printer. After the pattern has been completed you can press any key to see another pattern. Do not break into the program as it will have to be LOADED again.

```

10 FOR G=1 TO CODE "-"
20 LET A=RND*CODE "="
40 FOR F=VAL "1" TO A
50 PLOT G,F
55 PLOT U-G,F
56 PLOT U-G,U-F
57 PLOT G,U-F
60 PLOT F,G
65 PLOT F,U-G
66 PLOT U-F,U-G
67 PLOT U-F,G
70 NEXT F
80 NEXT G
90 PRINT AT
Q,(Q+VAL "1");"PRE
SS A KEY"
100 PAUSE I
105 CLS
106 GOTO Q
107 SAVE "M"
109 GOTO Q

```

SEQUENCE

COPY the number sequence as shown by the computer without making mistakes.

Sequence was written for the 16K Spectrum by David Bond of Hornchurch, Essex.

```

4 DIM s(100): LET x=1
6 PRINT AT 10,10;"PLEASE WAIT
";AT 12,2;"SEQUENCE BEING CALCU
LATED"
10 FOR i=1 TO 100
20 LET s(i)=INT (RND*4)+1
30 NEXT i
35 CLS
40 PRINT AT 8,6;"ME";AT 8,16;"
YOU"
60 PRINT AT 5,9;"SEQUENCE"
90 PRINT AT 10,6;"1234";AT 10,
16;"1234"
95 INPUT "Press Enter To Start
";z#: PAUSE 50
100 FOR i=1 TO x
110 LET a=s(i)
120 PRINT AT 10,5+a; INVERSE 1,
; INK a;a

```

```

130 BEEP .8,a
140 PRINT AT 10,5+a;a
150 NEXT i
170 FOR J=1 TO x
180 LET u=CODE INKEY#
190 IF u=0 THEN GO TO 180
200 LET u=u-48
201 IF u>4 OR u<1 THEN GO TO 3
00
210 PRINT AT 10,15+u; INVERSE 1
; INK u;u
220 BEEP .8,u
230 PRINT AT 10,15+u;u
240 IF u<>s(j) THEN GO TO 300
245 NEXT j
250 FOR q=0 TO 300: NEXT q
260 LET x=x+1
270 GO TO 100
300 PRINT AT 13,10;"WRONG";AT 1
7,7;"YOU MANAGED ";x
310 BEEP .1,-12: BEEP .8,-13: B
EEP .2,-12
320 INPUT "ANOTHER GO (y/n) ";a
#
330 IF a#="N" OR a#="n" THEN S
TOP
340 RUN
350 SAVE "Sequence" LINE 340

```

Trapping the errors will ensure first-time running

THE FIRST error code encountered by most Sinclair users is the flashing "S" on the ZX-81 or "?" on the Spectrum, which indicates a syntax error in a sentence. Experience and the manual soon show that it is caused usually by typing-in a keyword letter by letter, or by bad punctuation, for example omitting a semi-colon or an inverted comma.

The most frequently-occurring error code is "2" — variable not found. A variable is a letter which has been given a numeric value. When you enter "LET a=2" you are defining a variable. Error code 2 results when the computer reaches a variable in the program to which you have so far given no value.

Check the line which the computer specifies. If it is your program, give a value to the variable or remove it. If you are copying the program, look back in the listing to see which line you have missed.

Although the majority of error codes are explained adequately in the manuals, the report "B-Integer out of range" can be confusing. An integer is a whole number — 1 is an integer, 1.5 and 1½ are not. That code occurs most frequently when you try to print something beyond the limits of the screen.

PRINT AT 0,31; "a" is acceptable and will print a letter "a" at the top right of the screen. PRINT AT 0,32; "a" would not be possible. The integer 32 would be out of range, resulting in error code "B". That would also happen if the computer were instructed to PRINT AT 0,31;"ab". It would still be trying to print a character beyond the limits of the screen.

That error is more difficult to detect if variables have been used as co-ordinates and your character, or series of characters, is being printed in varying positions. If the instruction PRINT AT 0,x;"a" produces report code B, make sure that the value of x never increases beyond 31.

On the Spectrum "B-integer out of range" is also often found when you are POKEing-in user defined graphics. The biggest number which can be POKEd-in this case is 255 or BIN 11111111. In that case the error code

will occur in the line containing the POKE statement. In most cases, though, the error will have occurred in one of the DATA lines in the program.

A very frequent error code produced on the Spectrum is "E-Out Of Data". That will occur in a line containing a READ statement. The error code, though, will have occurred in one of the program DATA lines, which may be nowhere near the READ line. A READ command sends the computer to a DATA line to collect the next piece of DATA contained there. That is often done using a FOR, NEXT loop, especially when graphics are being set up.

FOR n=1 TO 8: READ n will send the computer to the DATA lines eight

words such as LN or EXP as keywords.

On the ZX-81 especially it is easy to forget that pressing "π" will produce the word PI.

Make sure that when the "is not equal" sign, "< >" appears in a listing you always enter it as one character and not as "is less than", "<" followed by "is greater than", ">".

Technical problems can also cause errors in programs. Any alteration to the power supply can cause a program to CRASH. In that case the screen display may change dramatically and using the keyboard will have no effect. The only solution is to unplug your computer and begin again, making sure that your power supply and RAM pack

'The error need not be on the line which produces the report; that is simply the line where the computer meets the problem'

times, for eight separate pieces of information. If there are only seven pieces of DATA there it will return to the READ line and produce the code OUT OF DATA. When there are several DATA lines they will all have to be checked, because the piece of DATA you have omitted was not necessarily the last.

In some cases the computer will follow the program correctly, without producing an error code, but from the programmer's point of view the program contains an error. In that case BREAK into the program at the moment it goes wrong. That will produce report code 9 and the line on which you have STOPped the program. That method makes it easy to locate the area of the program which contains the error.

Programs which you copy from magazines, books or from friends can be difficult to error-trap because they contain programming techniques which you have not yet learned, or simply because it is often difficult to follow another programmer's logic.

The flashing "S" or "?" indicating a syntax error may appear frequently. In that case check carefully what you have copied. You may not have recognised

are both connected firmly. That error is caused by the computer and not by the program.

Sometimes a program listing in a book or magazine will contain what seems to be a very obvious error. If it contains key words or symbols which are not on your computer, check that it is intended for your machine. Programs for the Spectrum, the ZX-81 and the ZX-80 are not usually directly interchangeable. If a program contains the command GOTO or GOSUB — a non-existent line number — the computer will simply go to the next numbered line after that one. That is a sign that a program has been developed and improved and is rarely an error.

When you have errors in a program, first check the report codes listed in Appendix B of the manual. It may then be necessary to read the appropriate section of the manual. Remember that the error is not necessarily on the line which produces the report code; that is simply the line where the computer meets the problem for the first time.

Always check carefully every line connected with the line containing the error code and the mistake should be easy to locate.

BEHIND THIS SCREEN THERE'S A WHOLE

MICROSPHERE

WAITING TO GET
OUT



*** WHEELIE (48K Spectrum)**

As proud owner of the ultimate racing motorbike, you find yourself in a strange world — a world full of double-decker buses to leap and where even the hedgehogs are out to get you! Your only hope of escape is to find the elusive ghost rider and then beat him in a life-or-death race.

100% machine-code action, keyboard and joystick options, demonstration-mode, and amazing graphics combine to make WHEELIE one of THE games for 1984. . . only £5.95

CBM 64 and BBC owners — WHEELIE and THE TRAIN GAME will soon be ready for your micros.

*** THE TRAIN GAME (16/48K Spectrum)**

The game that starts where model railways left off. Full graphics featuring passenger, goods & express trains; tunnels; stations; turntable bonus games; irate passengers; collisions derailments; and everything else you'd expect from a major railway! just £5.95

" . . . an excellent game which is original, well thought-out and full of action" (S. User Nov 83)

"Fun, fun, fun to play . . . (Home Computing Weekly 27/9/83)

OMNICALC (48K Spectrum)

The best Spectrum spreadsheet you can buy. Written in machine code, to be faster, to give you more space for data, and to include more features, it is guaranteed uncrashable. Complete with comprehensive manual £9.95

"If more programs shared the quality of OMNICALC then we might see more Spectrums in offices" (Home Computing Weekly 3/6/83)

EVOLUTION (48K Spectrum)

Meet Tyrannosaurus Rex, Podopteryx, Brontosaurus and many more fascinating creatures on the journey from the start of life to man. See 3500 million years of evolution compressed into half an hour £6.95

Items marked * are available from selected branches of



Available at good computer shops everywhere, or by mail order from MICROSPHERE, 72, Rosebery Road, London N10 2LA (Tel: 01-883 9411)

Sinclair User
50% savings
special readers offer

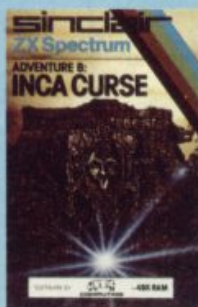
FANTASTIC HALF-PRICE SPECTRUM SOFTWARE OFFER

Yes — we have negotiated an exclusive deal with Sinclair Research Limited for five of their most popular Spectrum software cassettes. Order any two or more and you can save over 50% on the usual selling price. But hurry, because stocks are limited and at such amazing prices, demand is sure to be heavy.

So choose your favourites from these best-sellers and send your order today.



Adventure A
— Planet of Death
Normal price £6.95
our price £3.45



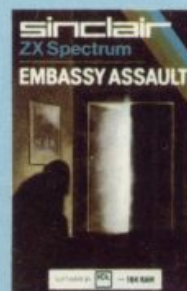
Adventure B
— Inca Curse
Normal price £6.95
Our price £3.45



Adventure C
— Ship of Doom
Normal price £6.95
Our price £3.45



Adventure D
— Espionage Island
Normal price £6.95
Our price £3.45



Embassy Assault
Normal price £4.95
Our price £2.45

ORDER FORM

Send to: Sinclair Research Ltd., Computer Division, Camberley, Surrey, GU15 3BR

Please supply the following Spectrum software cassettes:

Qty	Title	Unit Price	Total
	Adventure A	3.45	
	Adventure B	3.45	
	Adventure C	3.45	
	Adventure D	3.45	
	Embassy Assault	2.45	
	Post and packing		0.50
	Total due		

I enclose a cheque/postal order made payable to Sinclair Research Ltd., for £ _____

Please charge my Access/Barclaycard/Trustcard Card number: _____ Sum due £ _____

Name _____

Address _____

Signature _____ Date _____

N.B. We regret this offer applies to U.K. readers only. Allow 28 days for delivery. Orders must be received by 31st March 1984. Offer applies while stocks last.

Remember. You must order at least two cassettes — any combination — to qualify for this special offer. Please add 50p post and packing (irrespective of size of order).

TASWORD TWO

THE WORD PROCESSOR

48K
SPECTRUM

64 CHARACTERS PER LINE ON THE SCREEN AND TO PRINTERS!
MICRODRIVE COMPATIBLE — instructions supplied

"The number of on-screen prompts, together with the excellent manual, make it ideal — even for an absolute beginner."

PERSONAL COMPUTER WORLD September 1983

"What makes a word processor more or less versatile is its control features. Tasword Two offers an impressive selection and the tutor program succeeds in demonstrating them admirably."

ELECTRONICS AND COMPUTING November 1983

"Tasword is showing a degree of sophistication that business computers took many years to develop."

WHAT MICRO? October 1983

TASWORD TWO The Word Processor*

Your Spectrum becomes a **professional** word processor with TASWORD TWO. TASWORD TWO gives you an amazing **64 characters per line** on your screen. This is ideal for standard A4 paper and TASWORD TWO prints your text just as it appears on your screen.

Tasword Two drives the following interfaces:

Cobra RS232 I/O Port	Kempston Interface
Euroelectronics Interface	Morex Interface
Hilderbay Interface	Tasman Interface
Sinclair ZX Interface 1	ADS Interface

The same program drives these interfaces. A short easy to follow set of instructions takes you through setting up your Tasword Two to drive the interface you have or choose to buy. Tasword Two also drives the ZX printer.

Tasword Two is readily adapted for the microdrives to give super-fast saving and loading of both program and text. The microdrive instructions are supplied with the Tasword Two manual.

£13.90 fully inclusive mail order price.

TASWORD TWO TUTOR

TASWORD TWO comes complete with a manual and a cassette. The cassette contains your TASWORD TWO and TASWORD TWO TUTOR. This teaches you word processing using TASWORD TWO. Whether you have serious applications or simply want to learn about word processing, TASWORD TWO and TASWORD TWO TUTOR make it easy and enjoyable.

TASWORD TWO £2 Demonstration Cassette

See for yourself the powerful features of TASWORD TWO. Send just £2 for the Tasword Two demonstration cassette. A voucher is included which gives you £1 off the price of TASWORD TWO.

All prices include VAT and post and packaging

* Available from larger branches of Boots

For further information on all these products send an s.a.e. with "Tasman Brochure" written on the flap.



Send cheque/P.O. or Access number with order.
Telephone Access orders: Leeds (0532) 438301

TASWIDE — 64 characters per line!

A machine code utility program, TASWIDE **doubles** the information that your own programs can display. Make a simple change to your print statements and your output appears on the screen at 64 characters per line instead of the normal 32. Both print sizes can be mixed on the screen. 16K and 48K versions supplied on the same cassette.

£5.50 fully inclusive mail order price

TASMATH 1

Mathematics education. Three programs on one cassette:

TASIMEQ — simultaneous equations

TASQUAD — quadratic equations

TAS-TRIG — trigonometry of right angled triangles.

Available for the 16K and 48K Spectrum and for the BBC model B.

£5.95 fully inclusive mail order price

TASPRINT

A must for dot matrix printer owners! Print your program output and listings in a choice of five impressive print styles. Drives all the printer interfaces listed under Tasword Two and all dot matrix printers with bit image graphics capabilities. You can also use TASPRINT to print Tasword Two text files. TASPRINT gives your output originality and style! Send s.a.e. for brochure which includes TASPRINT output.

£9.90 fully inclusive mail order price

TASMAN PARALLEL PRINTER INTERFACE

Plug into your Spectrum and drive any printer fitted with the Centronics standard parallel interface. Supplied complete with ribbon cable and driving software. The cassette includes LLIST, LPRINT, and text screen copy software for all centronics printers. The user changeable interface software makes it easy to send control codes to your printer using the method so successfully pioneered with Tasword Two. The cassette **also** contains fast machine code high resolution screen copy software for Epson, Star, Seikosha, Shinwa, and Tandy Colour Graphic (in colour!) printers. Send s.a.e. for brochure which includes sample print-outs and a full list of printers supported by screen software. Compatible with microdrives/ZX Interface 1.

£45 fully inclusive mail order price

TASMAN RS232 PRINTER INTERFACE

Specification and software as above but drives printers fitted with the RS232 standard interface. A low cost route to printing — especially suitable for use with the Tandy Colour Graphic printer and the Brother portable typewriter/printers. Supplied complete with cable — please specify whether 4 pin DIN or 25 way D plug required.

£38 fully inclusive mail order price

TASMAN SOFTWARE

Dept. SU

17 HARTLEY CRESCENT LEEDS LS6 2LL

BIG K IS THE NEW GAMES MAGAZINE THAT BREAKS ALL THE RULES

At last a games magazine that doesn't go by the book!

BIG K is the name and BIG K is the game and from the very first pixel-poppin' page you'll know that no other sheet on the street looks like it or sounds like it.

Whatever BIG K gets in its sights — whether it's news, reviews, listings, or hardware, it always **plays** it a different way and **says** it a different way. BIG K is technical, BIG K is tactical but BIG K is never typical.

BIG K isn't afraid to shoot from the hip —

and it's always hip when it shoots.

THIS ISSUE:

Falklands victor General Sir Jeremy Moore reviews the latest war games.
1984 giant test — 3 forthcoming British versus 3 American micros.
Adventure X — a superb adventure game for you to type into your Spectrum.
Amazing games for Dragon, BBC, Vic 20, Spectrum, Atari.
Spectrum graphics special — how to program great graphics into your micro.

FREE FLEXIDISC —

3 great utility programs to help you get even better games out of the BBC and Spectrum.



After your first byte of BIG K — the game will never be the same.

Go get it!

**SECOND ISSUE ON SALE
19th APRIL: 85p**

Rock band Mensana is making sounds with the Spectrum. John Gilbert talks to the group and opens the musical box.

New ROM antics

FROM OUTSIDE, Studio 15 looks uninspiring and not like the place where a new development in music technology is being tried.

The studio, in West Acton, London, lies behind buildings owned by a group of electronics companies and if you walk along the road from West Acton underground station you might not give it a second glance. Yet it contains the haunt and rehearsal room of Mensana, one of the most unusual rock bands on the music scene.

The five members of the group are all long-established members of Mensa, the organisation chaired by Sir Clive Sinclair to which only people with high intelligence quotients can belong and, stranger still, the group controls the sounds it makes using a 48K Spectrum.

The band members are shy about their IQ figures. Barry Conner, the main spokesman, explains why the other musicians are as guarded about the IQs as they are about their ages.

"We are a group and we don't think we should talk about our separate IQs. We are all members of Mensa but we don't regard one IQ as better than another."

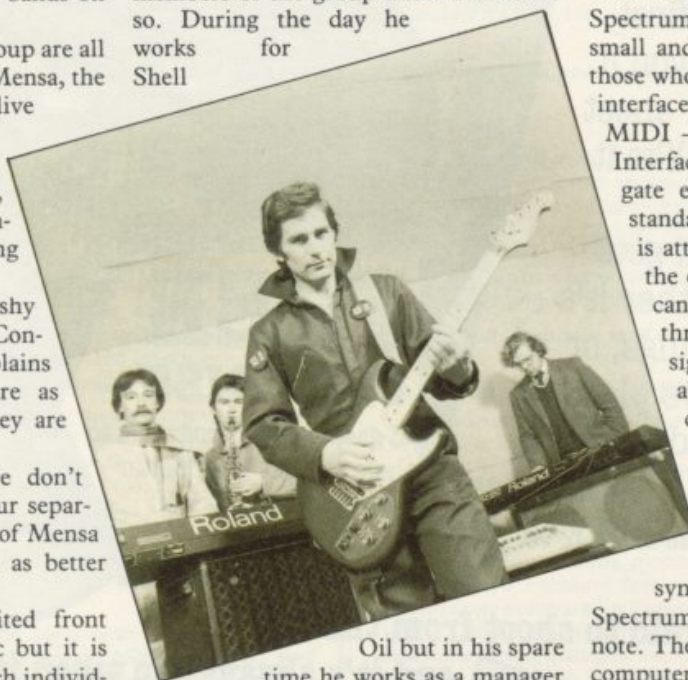
They may present a united front while they are making music but it is easy to see the character of each individual as soon as you meet them. Conner is a good example. He plays guitar and synthesiser but his full-time job has nothing to do with music of any kind. He is a London bus driver on route 52 from Victoria. From the start he is clearly the leader and ideas man, although he is in no way a dictator. His fellow members are happy with that.

Greg Houlgate is another guitarist and his full-time job is just as unusual as playing for Mensana. He has launched a board game. He says: "The game is called G-1 and it takes place in a space scenario. I have my own company which markets the game and it is doing very well. I even have badges which promote the product."

Chris Tusheer is the funny man of

the group. He says he is on "keyboards and valium". At the moment he is taking a TOPS electronics course. He has a great interest in the technical side of Mensana's music as well as being a music-maker.

At 24, Steve Oglevie is the youngest member of the group to play a traditional instrument. He can play a range of instruments, including saxophone, guitar and even keyboards when the other members of the group allow him to do so. During the day he works for Shell



Oil but in his spare time he works as a manager and presenter of Radio Lollipop, a hospital radio service.

He says: "It is all very interesting. I have my own show and I also work behind the scenes. We produce all kinds of shows and discos for children's charities."

The most important member of the band, from the technical point of view, does not play an instrument for Mensana, although he can work wonders with a church organ. Rupert Goodwins created the interface for the Spectrum on which Mensana bases its musical act. Goodwins says:

"I have a great interest in music which, because of the interface for the Spectrum, has been combined with my interest in electronics. I would not say

that either one of my interests features more strongly than the other."

Electronics and computers feature large in Goodwins' life, as he is training at Marconi for a year, after which he will go to university. He also works on Prestel and Micronet 800 as a Micro-mouse on the systems clubs pages.

Goodwins may be the technical expert behind Mensana, and a young one at that, but the real star of the electronic show is Upstream, an interface for the Spectrum which will be a blessing to small and large rock groups alike. For those who are in the music industry, the interface would be better known as a MIDI — Musical Instrument Digital Interface. The MIDI interface, Houlgate explains, is a music industry standard. Its operation is simple. It is attached to the Spectrum and to the other instruments so that they can input music to the computer through the interface as digital signals. The signals can then be altered by the operator at the computer and output to other instruments the group is using.

For the technically-minded, Houlgate says that each note played by, say, a synthesiser can be put into the Spectrum, using three bytes for each note. The tune can then be stored in the computer memory or on cassette tape. Several tunes, using instruments, can be input and stored in that way and the sounds all of them contain can be merged so that a sound-track is made.

It would be possible, using the interface in that way, to produce an instrument track sounding like a full orchestra. With the development in synthesiser technology it should also be possible to add singers, something Mensana does not need in machine or human form.

As well as being able to save and merge tunes produced by various interfaces, Upstream can also alter the nature of the notes entering the Spectrum. It is possible to transpose the keys in which music is produced to make them either higher or lower. It is also

possible to produce special effects on a sound-track, such as echoing. It seems as if there is nothing the interface cannot do. A black box which is about twice the size of a Spectrum power supply, it contains nothing but a few wires and microchips. Houlgate says:

"That is one of the great advantages of Upstream. Until now MIDI interfaces cost a great deal of money and to produce a set-up such as the one we have would cost thousands of pounds. Our interface is cheap to produce and easy to manufacture. It will mean that groups which cannot afford expensive equipment will still be able to produce music using the MIDI standard."

Although the interface can accomplish an amazing number of feats for a musician, Goodwins insists that it did not take much time to develop and get working. He says: "We started planning it last August and it was more or less finished by the beginning of this year. I took about two weeks to do the development work on the software."

The interface will benefit Mensana immediately. After the group's appearance on the BBC science programme *Tomorrow's World*, it has been featured in the music press and has also been approached by record companies to produce an album. Conner says:

"If we produce an album, Upstream would be useful. We could record the tracks for each instrument separately, using the interface and storing the results on tape. We could then take the tape to the record

company and have it mix the tracks on its master tape."

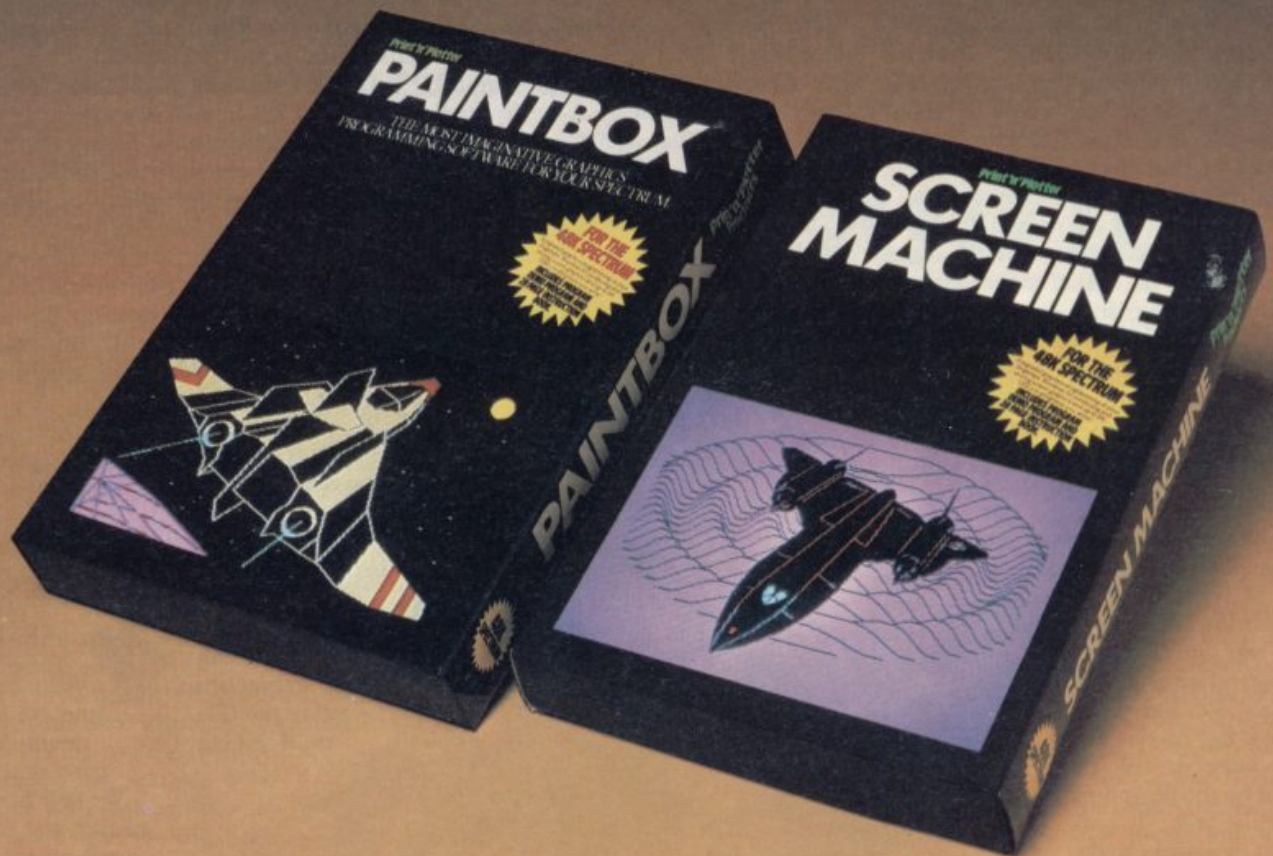
Using Upstream in that way would mean that fewer mistakes are made in creating a master tape from which a record can be cut and released. Record company studios are expensive to operate, so the fewer mistakes made the better. If the tracks for an album were already recorded using Upstream, there would be no nervous tension for the groups involved and only one run-through of a particular track would be necessary.

So far as the future of Upstream and Mensana is concerned, Goodwins plans to develop the interface even more. He says:

"Upstream can be adapted to run on other microcomputers but I don't think we will be doing any work for other micros except the QL. I can increase the storage space using the QL multi-tasking for tunes and use its ability to good effect. We will have to wait and see until we get a QL."



The Software.



The Hardware.



The Facts.

PRINT 'N' PLOTTER

PAINTBOX

Superb Graphics
— without expensive hardware!

PAINTBOX gives the 48K Spectrum owner *every* facility to produce excellent graphics — easily, quickly and professionally.

There's no need for expensive hardware. PAINTBOX is flexible, precise and incredibly simple to use!

Just take a look at some of the facilities available:

UDG EDITOR

The facility to define up to 84 graphics characters which can be stored in your BASIC programs for instant recall from its own built-in machine code!

UDG DRAWING BOARD

UDG planner for the 4 banks of characters. Facilities include: MIRROR IMAGE, ROTATE, INVERSE, FILE. SKETCHPAD

Experimentation 'window' that allows you to try-out your UDG ideas under development.

PRECISION PLOTTER

Amazing versatile high-resolution drawing board which includes PAPER choice, PLOT, DRAW, DRAW RADIALLY, CIRCLE, ARC, OVER, FILL, instant change of INK and BRIGHT, multi-function ERASE and STORE.

Cursor is controlled by keyboard or Joystick with FAST, SLOW, and Cursor size choice!

SCREEN PLANNER

For the best of both worlds! PRECISION PLOTTER and UDG CHARACTERS! For complete screen planning of graphics. A multi-purpose facility to enable you to produce superb screen graphics!

All results can be sent to a printer, saved as SCREEN\$ or SAVED as CODE with its built-in machine code routine for instant recall from BASIC.

The program is complete with a cassette demo and a 28 page booklet describing in easy-to-understand language how to use it, plus many tips for storing and using your graphics in programs.

PRINT 'N' PLOTTER

SCREEN MACHINE

Instant machine code
for graphics and text.

SCREEN MACHINE is an invaluable graphics utility to use with PAINTBOX or any other graphics hardware or software!

It gives a wide range of facilities to enable you to manipulate graphics and text, saving time, memory and giving truly professional results.

For instance: SCREEN MACHINE COMPRESSES Screen Files to cram even

more into the memory!

It **COMPILES** text, graphics characters or UDG's instantly into machine code giving fast smooth access to the screen!

It **CREATES** re-callable Multiple Screen Files automatically with its own built-in machine code!

It **ENLARGES** screen sections in 2X steps!

It **REDUCES** the whole screen in 2X steps!

It **RECOLOURS** your screen graphics either globally or selectively!

It **MIRRORS** the screen left to right making flip-action animation easy!

It **RELOCATES** your screen graphics to any other part of the screen with block or high-resolution scrolls!

It **SUPERIMPOSES** screen graphics giving incredible 'mixing' results!

It **SAVES** everything to tape or Microdrive for use within your BASIC programs!

There's no doubt that SCREEN MACHINE is a major graphics toolkit for the 48K Spectrum. It is completely menu-driven and comes complete with demo program and fully-documented instruction booklet.

Another first from Print 'n' Plotter!

PRINT 'N' PLOTTER

ZX SPECTRUM JOTTER

Pre-planning your screen
made easy . . . and precise!

Print 'n' Plotter JOTTERS have become a household word for the Sinclair enthusiast.

Despite various imitations our original ZX SPECTRUM JOTTER is still the one people prefer!

Of course it could be because it is professionally produced . . . the quality is superb.

And the fact that it is BIG SIZE A3 (16½" x 11¾") is a distinct advantage when working in high-resolution.

It's also 100 pages thick. 50 pages of PLOT grids showing each numbered pixel co-ordinate and 50 pages of PRINT grids showing every character and graphic character position and INPUT lines.

Each page also contains 24 UDG planning grids (2400 per pad).

Consider also the fact that it is printed on Artist's Detail paper . . . thick enough to take any writing, drawing or colouring, yet thin enough to overlay onto a drawing and trace-off.

For pre-planning graphics, text, tabulation or anything to produce 'on screen' a Print 'n' Plotter JOTTER won't be beaten.

The complete package comes with a set of coloured pens, a Pixel ruler and a handy corrugated storage tray.

If you use PAINTBOX, SCREEN MACHINE or any other graphics utility . . . you'll do things better with the ORIGINAL Print 'n' Plotter JOTTER!

PRINT 'N' PLOTTER

KEYBOARD OVERLAYS

The simple answer to
"Which key?"

Print 'n' Plotter KEYBOARD OVERLAYS for the standard ZX Spectrum keyboard are the economic answer to "Which key does what?"

If you program, or buy commercially-produced software, sooner or later you'll be faced with a mind-boggling mass of keys that perform different functions.

This can be as simple as the "FIRE" button in a game or as precise as the "analysis" button in a scientific program.

Let's face it, the Spectrum keyboard is complicated enough so why not take the easy way to remember . . .

. . . lay over the keyboard a Print 'n' Plotter OVERLAY and write the function underneath . . . it's child's play!

Then keep the OVERLAY for the next time you use the program.

Print 'n' Plotter KEYBOARD OVERLAYS come in packs of ten. Punched to fit your Spectrum. Priced to suit your pocket!

PRINT 'N' PLOTTER

ZX PRINTER PAPER

Print 'n' Plotter Products also market ZX PRINTER PAPER that gives good, clear print, eminent feeding qualities — probably the best you'll find in the U.K.

FAST DELIVERY and economically priced . . . you won't find better!

CREDIT CARD 24HR. ANSAPHONE ORDERS

01-660 7231

(Phone 01-403 6644 for Dealer and other enquiries.)

Post to: Dept S, Print 'n' Plotter Products Ltd.,
19 Borough High Street, London SE1 9SE.

Please send me:

- "PAINTBOX" SOFTWARE @ £8.25
- "SCREEN MACHINE" SOFTWARE @ £8.25
- SPECTRUM JOTTER PADS @ £9.00
- SPECTRUM KEYBOARD OVERLAYS @ £2.95
- 5 ROLLS ZX PRINTER PAPER @ £12.50

All prices include U.K. postage and VAT.

- ☐ I enclose remittance in full
- ☐ Please bill my Access/Barclaycard/Visa/Mastercard No:

Overseas orders please add 25% on quoted prices, for additional handling.

NAME _____

ADDRESS _____

**Print 'n' Plotter
Products**

RICHARD SHEPHERD SOFTWARE

A HOME BUDGETING & BANKING SYSTEM THAT REALLY MAKES YOUR 48K SPECTRUM WORK!



A professional style multi function Cash Controller program that can load and make an entry in just **90 SECONDS** ... thanks to its **ZX MICRODRIVE COMPATIBILITY**. If you're not ready to upgrade to Microdrive yet, this easy to use cassette program can handle up to 400 transactions with your Spectrum, almost filling the 48K memory of your computer.

BANK ACCOUNT

- Statements on demand from any date to date.
- Holds up to 400 transactions.
- Standing order facility.
- All transactions can be automatically coded to allocate up to 16 budget headings.
- Search facility for any single item by description or amount.

HOME BUDGETING

- 16 budget headings, e.g. Gas, Rates, Car, Tax - you can choose the headings
- Highlights under/over spending
- Full budget expenditure breakdown
- Budget "re-think" facility

LOAN/MORTGAGE CALCULATOR

All you ever wanted to know but didn't like to ask! Calculates:

- Interest rates
- Payback periods
- Capital sum
- Period of loan

REMEMBER THIS CASSETTE CAN ALSO BE USED WITH ZX MICRODRIVE

● PRINTOUT FACILITY USING ZX PRINTER

● FULL SECURITY WITH PERSONAL PASSWORD

● FULL SAVE PROGRAM ONTO CASSETTE OR MICRODRIVE

Available from good computer stores or direct by mail order... **at a price that won't upset the Bank Manager!**



FIRST FOR MICRODRIVE

Dealer enquiries welcome. Generous discounts.

PRIORITY MAIL ORDER

Please send me _____ CASH CONTROLLERS at £9.95 each including post & packing (overseas orders add £1.50).

Name _____

Address _____

SUS

I enclose cash/cheque/P.O. payable to Richard Shepherd Software.

Or credit my Access/VISA Card Number

--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Signature _____

MICRODRIVE CARTRIDGE NOT INCLUDED

Credit Card Hotline (06286) 63531

RICHARD SHEPHERD SOFTWARE

ELM HOUSE, 23-25 ELMSHOT LANE, CIPPENHAM, SLOUGH, BERKS. TEL. (06286) 63531

Contents

On this page we publish the best from our post-bag; overleaf Mike Wright takes two financial packages through their paces.

SINCLAIR BUSINESS USER

May 1984

Why the lack of serious software?

I READ with considerable interest the recent correspondence complaining about the lack of serious applications software for the 48K Spectrum. My experience might be of interest.

I am a consulting engineer who recently retired early. On retirement I bought a Spectrum to assist me in the odd items of part-time work which I undertook from time to time and also to keep my mind active by tackling some of the programming problems I never had time to solve when in full-time employment.

My most recent program is, to my mind, a very good one for the analysis of rigid jointed frames which can handle large frameworks of up to about 60 joints and 100 members, and including automatic accommodation of member loading. I am now extending it into a grillage analysis for bridge decks.

I wrote to many software houses offering it and other programs I have written but received only rare responses. Such responses took the form that the programs were too specialised, were aimed at too small a market, but if I had written any original games with plenty of graphics they might be interested.

My view is that if I had wanted to play space invader games, using programs bought from software suppliers, I would have bought a

more efficient games machine, such as the Atari, and not bothered with what is a very good little computer.

Perhaps, given time, someone might start to produce serious routines for use in serious applications. Perhaps that someone might even be Sinclair Research. After all, people like Hewlett-Packard, Commodore, Apple and IBM, among others, provide such a service to their customers. Why not Sinclair?

**W C Carney,
Ryton, Tyne & Wear.**

Independent testing

MAY I SAY I am pleased to see the increasing interest shown by your magazine and its contributors in the use of the Spectrum for serious applications?

I AGREE strongly with two of the reservations expressed by Mike Wright in his review of QL. The first is about the lack of a cassette interface, for there must be a very large number of dedicated Sinclair users who have programs and, probably more important, data on cassettes.

Perhaps it will be possible to interface a ZX-81 or Spectrum with QL via the RS232 and, if so, I hope that an add-on or software firm will get

I suspect that many other owners, like myself, use their computers for solving design or business problems and would welcome software specific to their needs.

I am developing several such programs for use in the field of structural engineering. There seems to be a major bug involved in attempts to market such software, which probably accounts for its noticeable absence.

Say, for instance, a program to design a multi-span reinforced concrete beam was utilised by a purchaser and, subsequent to the building being constructed the program was found to be in error. Who takes the responsibility for the appalling financial loss involved?

I would suggest that the legal profession would be the only ones to gain financially

from that conundrum. There seems to be a need for some form of independent testing of programs, followed by the issue of a deemed-to-satisfy certificate which would satisfy the user and writer alike.

**D A Ryland,
Selsdon, Surrey.**

Program has a lotta bottle

I HAVE written a business program for a local milkman which allows him to store details of 700 customers' accounts. He runs it on his ZX-81 but I also have a version for the Spectrum. Do you know of anyone who would also be interested in it?

I should like to see more business-related programs and features in your excellent publication.

**C J Wigg,
Banbury, Oxon.**

QL—curiouser and curiouser

cracking on it promptly. The second objection is that, irrespective of costs, in the absence of some explanation from Sinclair Research of its rationale in the matter, it at first sight seems nonsense to have storage hardware with a unit capacity smaller than even the unexpanded RAM capacity. At the very least it will be inconvenient to have to save the contents of RAM bit by bit on to a series of Microdrive cartridges. There

must be something behind the apparent illogicality; could it be that Sinclair Research is already working at an advanced stage on a Winchester which will appear at an amazing decimated price, I wonder?

I should like to add a note of regret that Sinclair abandoned the dark-on-light display which corresponds with text on paper, an endearing feature of the ZX-81.

Ian Leslie, London N10.

A package for the small business

Accounting made simple

THE SMALL Business Accounts program from Willden Services under the Sinclair banner contained some bugs and was quickly withdrawn. The corrected version is now available and is in almost identical packaging to the original.

A comprehensive 32-page A6-size manual includes sections on the arrays and variables and notes for an accountant. The cassette holds a training version of the program on one side and the working version on the other, with only minor differences between the two.

The programs are both driven from a main menu which is split into three sections — Data Entry, Data Access and Special Procedures — see figure one.

In the working program, Option 12 becomes Load Data and Option 13 is not used.

It is worth running the training program several times to get the feel of it before starting. Once loaded, the program prompts for a password and allows two attempts at getting it correct. To change the password the program must be broken into and the variable for the password changed. That is explained in the manual. As a security device it seems about as useful as an open safe.

The next prompt is for the date. The format is of the form 1984 FEB 24 rather than the more usual 24/02/84. The program compares that to its in-built financial year — initially set as January & December — and uses it to determine depreciation. Despite requiring capitals the program permits lower-case letters as part of the string. Doing so affects the depreciation routines and

gives an erroneous reading. A safety check is built-in with the string displayed and the program prompting for a yes/no response to whether the information is correct.

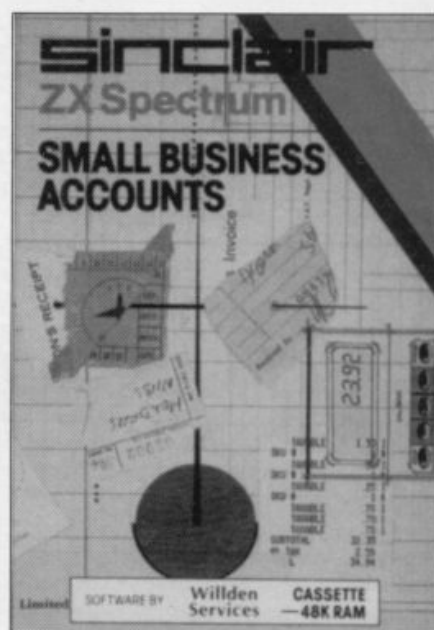
To get a feel for the program, Option 12, Training should then be taken. Before starting, the user is given a warning that it will erase any data already in memory, with the option of backing out. Once chosen, the option replaces any existing data with fictitious data and presents a balance sheet. The user has the choice either of having the balance sheet printed or of returning to the menu to try the different options.

Option 1 allows entries to be made into the cash book under eight headings — cash sales, own funds, loans, external loans excluding bank overdraft interest received, sales ledger, discount, amounts deducted by customers, settlement of amounts paid in under the sales ledger, sundry used for income which is not subject to VAT or which does not affect stock, and VAT received. An entry under cash sales is also added to the gross sales, the net-sales after 15 percent VAT has been deducted, and a percentage to the gross profit total — initially 30 percent but instructions on how to change it are in the manual.

The cash book out option allows a record to be made of the payments made by the payee and the amount and to assign it to one of nine pre-set allocations. They are the bought ledger, discount — they operate in a similar manner to the cash sales and discount entries in option 1; wages — the net figure after PAYE and National Insurance contributions have been deducted

— that program will prompt for them to be entered separately; VAT out — used for settlement of quarterly VAT account; interest out; petty cash — entries reduce the bank account figure and increase the petty cash figure; sundry; PAYE — used for the settlement of PAYE and National Insurance payments; and own use.

The sales invoice option allows the number of invoices entered at one time to be set. The size of the display limits that to a maximum of eight. Once the number of invoices has been set the program prompts for the gross value



and the VAT of each in turn. The amount of VAT due at a rate of 15 percent is also usefully displayed.

The purchase invoice option for invoices from suppliers allows the gross value and VAT to be recorded and the supplier. It also allows the invoice to be attributed to one of 15 accounts. A maximum of six invoices can be entered at one time.

Working in a similar way to purchase invoices, option 5, petty cash, deducts the amounts from the cash-in-hand entry on the balance sheet. When showing the VAT the user is also reminded that it should be zero for wages and postage. The user is asked to confirm the gross amount and VAT before allocating the bill to one of six accounts. If wages is the selected account, prompts are also made for PAYE and National Insurance contributions.

The data access routines provide most of the information auditors are likely to require. The VAT return, option 6, shows the sales and purchase totals inclusive and exclusive of VAT

```

WILLDEN ACCOUNTS PROGRAM
Select a number from this list

DATA ENTRY  DATA ACCESS

1.Cash Book In      6.VAT Return
2.Cash Book Out     7.Trading a/c
3.Sale Invoices     8.P and L a/c
4.Purch.            9.Balance Sheet
5.Petty Csh a/c     10.Nom.Ledger

SPECIAL PROCEDURES

11.Cr.Notes         12.Training
13.Initialise       14.Save to tape
15.Close down       16.Stock adjust
  
```

Figure 1.

Figure 2.

1983		APR 15	
LIABILITIES		ASSETS	
OWN FND	50000	PREMS	36747.31
PROFIT	0	FUR.FIT	3428.29
LOANS	20000	VEHICLES	8248.78
		MACHNRY	1732.68
CURRENT		CURRENT	
CRDTRS	4854.26	CSH.HND	187.46
OWE BNK	0	CSH.BNK	4314.85
PREPAY	0	DEBTORS	8647.38
VAT OUT	0	STOCKS	11548.31
P.A.Y.E	0	PREPAY	0
		VAT IN	0
		LOSS	0
TOTAL	74854.26	TOTAL	74854.26

for the current quarter, the whole year and a baseline of how much the user owes the taxman, or vice versa. The trading account shows the opening stock, purchases, closing stock, consumption, sales and gross profit, while the profit and loss account and the balance sheet — figure two — are presented in the traditional manner.

The nominal ledger covers some two-and-a-half screens showing a breakdown of a company's trading into the relevant accounts. That is the only one of the data access routines which does not allow the user the option of taking a copy. A copy can be obtained by pressing N in response to the scroll? question and following it with COPY — the Z key — and ENTER. Once the printer is finished the program can be returned to the same point using CONTINUE — the C key — and ENTER.

There are two differences in the working and training programs. The function of option 12, training, has already been described while the same option on the working program, Load, is self-explanatory as is option 14, save to tape.

Option 13 is spare on the working side but on the training side it is used for the initialisation of the accounts before regular use of the system. Again the user thoughtfully is provided with an escape route and a warning that any previous data will be erased.

The user is then taken step by step through entering the liabilities and assets as they appear on the balance sheet. Next are the prompts for the outstanding VAT figures. If you should be lucky enough for the VAT quarter and your financial year to coincide they will be zero. Once that is done the balance sheet is displayed and the data should be saved to tape before closing the training program. Once the initialisation routine is completed it is impossible to return to any data entry routine

without first saving and verifying the data.

The remaining two options are 11, credit notes, and 16, stock adjustment. The credit notes routine deals with the situation when goods are returned, either by you or your customer, and asks for the gross value, VAT and whether a sales or purchase note. If it is a purchase note an allocation to one of the accounts must also be made. The stock adjustment routine allows the user to change the value of stocks, after which a revised balance sheet is shown.

Accounting procedures are something with which all businessmen are familiar to one degree or another. The computerisation of these records is less familiar. One reason is the inability of programs and programmers to meet the multiplicity of criteria required by differing businesses and yet at the same time remain simple.

Willden Services has attempted to overcome that with Small Business Ac-

'The program has a high level of error-trapping'

counts and has succeeded to a remarkable degree.

The program also has a high level of error-trapping to avoid the input of obviously ridiculous entries. To achieve the flexibility to meet an individual company's needs it is necessary for someone in the company to have at least a rudimentary knowledge of programming to set some of the variables. Although the manual explains the steps necessary, unfortunately it makes the program a great deal less user-friendly.

Small Business Accounts is available from Sinclair Research, Stanhope Road, Camberley, Surrey GU15 3BR.

Budget control

Keeping track of personal expenditure

RICHARD SHEPHERD Software is a company well-known for its range of adventure games. Cash Controller, a home budgeting and banking system written by Richard Shepherd for the 48K Spectrum, is probably the first program written specially as Microdrive-compatible.

The program is designed to keep track of personal expenditure and its breakdown into any one of up to 16 user-definable accounts. It permits transactions to be entered with the date, details and the account. It also allows standing orders to be set up and implemented and will print-out statements. Another feature is the ability to define budget limits for the accounts and to compare them against expenditure.

Once loaded the program displays the master menu: 1, Budget menu; 2, Bank account menu; 3, Mortgage loan calculator; 4, Update password; 5, Save program to cassette; 6, Save program to Microdrive; 7, Delete program; 8, Entry search.

Obviously the majority of use will be from options 1 and 2. To take any option, press the appropriate number key followed by ENTER. If keys are mis-hit the program replies 'INVALID RESPONSE' and the user is left to re-enter the option, except for the odd occasion when the mis-hit keys give a number first then letter combination. In such a case the program crashes and is re-started with GOTO 9900.

Selecting option 1 brings up the budget options menu: 1, Enter new budgets; 2, Update budgets; 3, Print budgets and variances; 4, Breakdown budget actual; 5, Clear all budget details and enter new budgets; 6, Return to master menu.

Enter new budgets allows the user to define the account title using up to 10 characters and set the budget. Although a name is given the accounts are referred to usually by a code number — 1-16 — but it is not shown at that stage. If a mistake is made in the last entry, pressing ENTER moves the cursor back and allows the mistake to be corrected.

continued on page 112

continued from page 111

Return to the budget menu is by pressing xx and ENTER. If you wish to change the budget of an account, option 2 is used. That asks for the budget title and the new amount. Once that is done the program prompts for whether there are any more budgets to be updated.

One of the better features about Cash Controller is the provision for comparing budgets and expenditure. That is done using option 3, which prints the account name, its code number, the budget, the expenditure and the variance, together with the totals for all accounts. A permanent copy can be obtained by pressing Z, and ENTER returns to the menu.

In selecting the Breakdown budget actual option the user is asked for the account to be examined. The program will then display those transactions made on the account, the date, the amount and the balance remaining in the budget.

The same facilities for printing the details exist as for option 3. Option 5 is self-explanatory but beware — there is no escape route. Should you select the option accidentally the budgets are cleared instantly and new ones requested as for option 1.

The Bank Account Options menu is reached by selecting option 2 on the master menu: 1, Enter transactions; 2, Statement request; 3, Clear transaction files; 4, Clear transaction files and set balance to zero; 5, Enter opening balance; 7, Delete standing orders; 8, Return to master menu.

By choosing option 1, transactions can be entered. They consist of the date, the details — e.g. cheque no. or payee name — in a six-character field, the account code and the amount. All amounts are debits unless "credit" is specified — in lower-case only — as the details.

Also worth noting is the fact that a 17th account code of 0 is available if you wish to make an entry without assigning it to a budgeted account.

The transactions do not have to be in date order, nor are they arranged into date order in that section of the program. They are ordered only for the printing of statements in option 2. Before working out the statement the user is asked to enter the starting date and then tomorrow's date, although that could be any date, plus one, at which the statement is to finish.

Once it has those dates the program scans the data for each date in turn looking for any transactions which may have taken place on that day. When one

is found it is displayed in the same way as it was entered.

The program scans the whole data for each day in the period. When it finishes the user is given the option of printing the statement — using C — or deleting the first entry on the statement — using D — or continuing with any other key. The delete option allows an incorrect entry to be deleted by obtaining a statement starting at the date of the incorrect entry and using D. The correct entry can then be re-entered using the enter transaction routine. That seems like a complicated way of amending an entry, especially if the one you want to change is the fourth or fifth on that day.

The next two options are similar, in that both clear the transactions and reset the budget expenditure totals to zero, although option 3 keeps the bal-

code and the amount. The details are then entered automatically to the transaction data.

Deleting the standing order is done by choosing option 7 and giving the details of the standing order. It would be useful if the details for all the standing orders were printed but unfortunately they are not and deleting a standing order which does not exist apparently has the same effect as deleting one which does.

The loan/mortgage calculator is a routine for working out the unknown factor given any three of four — principal, interest rate, time and repayments. The program prompts for each entry in turn and the unknown is entered as 0. Once the details have been entered the user is asked whether it is a bank loan or mortgage and the full details are displayed, including the missing factor.

A password can be specified by choosing option 4 on the main menu and entering the choice in response to the prompt. That is then saved with the program in both the save options and requested when the saved program is loaded. The save-to-Microdrive routine thoughtfully displays a warning that the program will crash if the Microdrive and cartridge are not connected.

A useful facility to search the data for an entry is included at option 8. The subsidiary menu allows the data to be searched by either its details or by the amount. One annoying point is that although when entering a transaction the amounts are positive, when searching the minus sign must be included for debits. Once the characteristic has been specified the program displays the data, details and amount of all entries.

With Cash Controller, Shepherd has produced a useful package for the home finance market. The error-trapping is good and allows bad errors to be corrected without causing damage to the data or program, although there are one or two areas for improvement.

Perhaps the biggest disadvantage is the statement request routine which needs to scan the whole data day by day for the specified period. For large amounts of data or long periods that takes an inordinate amount of time.

One point which the more astute may have already realised is that although Cash Controller is loaded as a machine code program, it can be listed as a Basic program. That seems to be because of Microdrive compatibility.

Cash Controller can be obtained from Richard Shepherd Software Ltd, 22 Green Leys, Maidenhead, Berkshire. It costs £9.95.



ance brought forward. Selecting either option returns immediately to the same menu. The enter opening balance routine allows the opening balance to be set and to be re-set at any stage in the program should it be necessary. Once the figure has been entered the user is given the choice of backing out and re-entering the correct figure by pressing N, or continuing with Y.

The menu also allows standing orders to be set, using option 6. The user is asked for the date on which the order is to begin and then for the frequency of payments — 1 for monthly, 2 for quarterly, 3 for annually.

Irregular payments must be entered as individual transactions. Prompts are then issued for the details, the account

WE'VE GOT IT DOWN IN PRICE. YOU GET IT DOWN IN BLACK AND WHITE.



Get more out of your Spectrum with a printer. Not just for the help it can give you with preparing and debugging programs, but also jobs like cataloguing, file listing and word processing.

A printer needn't cost you the earth, either.

The new Seikosha GP50S (available soon) with its 5" paper width, graphics capability, intermixing of all modes on a single line and alternative colour ribbons costs only £138. Including built-in interface for your Spectrum.

Or if you're looking for something more sophisticated, there's the Seikosha GP500A. A development of the highly popular 100A, it's got a 50 cps printing speed, full graphics capability, paper width adjustable up to 10". Plus a lot more for a price of only £249.00.

Get into print NOW - phone for details and the address of your nearest dealer.

SEIKOSHA DRG

DRG Business Systems, Peripherals Division, 13/14 Lynx Crescent, Winterstoke Road, Weston-super-Mare, Avon BS24 9DN.
Telephone: 0934 419914. Telex: 444761.

BETA BASIC

ENHANCED BASIC FOR THE
ZX SPECTRUM 16/48K

26 NEW KEYWORDS — 10 NEW
FUNCTIONS — MANY EXTRA FEATURES

Keywords include:

ALTER	— allows extensive manipulation of the attributes file.
AUTO	— for automatic entry of line numbers.
CLOCK	— controls a digital clock with alarm and alarm-initiated GOSUB facility.
DELETE	— any block of lines.
DO	— DO...LOOP structure, with WHILE, UNTIL and EXIT IF.
DPOKE	— double POKE.
EDIT	— a specified line number.
ELSE	— used with IF...THEN.
GET	— waits for keyboard entry; doesn't use ENTER.
KEYWORDS	— shifts between new keywords and normal graphics mode.
ON	— GOSUB or GO TO a line number from a list of line numbers.
ON ERROR	— allows trapping of most reports; has available ERROR, LINE and STAT variables.
POP	— removes data from BASIC's stack.
PROC	— named procedures, with DEF PROC and END PROC.
RENUM	— renumber part or whole program with specified start line and increment. Handles GO TO, GOSUB, ON, etc.
ROLL	— pixel movement of part or whole screen in any direction, with wrap-round.
SCROLL	— as ROLL, but without wrap-round.
SORT	— sorts part or all of string or numeric arrays according to specified substring or column. SORT INVERSE sorts in reverse order. One hundred strings can be sorted in about one-fifth of a second!
TRACE	— allows display of line and statement numbers as a program is running. Display of selected variables, single stepping, and reduced speed are also possible.
USING	— used with PRINT; formats numbers.

Functions provide:

Conversion between decimal and hexadecimal — conversion between integers and two-character strings (allows "integer arrays") — formatting of numbers — INSTRING and STRING\$ equivalents — amount of free memory — double PEEK — current time.

Features include:

Single-entry keywords (in graphics mode) with syntax check on entry — seven new error messages — compatibility with Spectrum BASIC — program occupies just 5.6K — cursor can move in all directions in a line being edited — flashing current line pointer — BREAK gets you out of even machine code lock-ups — PLOT lets you plot string anywhere on the screen — PLOT and DRAW scale and offset values can be set using XRG, YRG, XOS and YOS — 16K and 48K versions on same tape — comprehensive manual.

Only £11.00 inclusive!

Please send me copies of Beta BASIC.

I enclose cheque/p.o. for £.....

Name:

Address:

BETASOFT

92 Oxford Road, Moseley, BIRMINGHAM B13 9SQ

Why do so many Spectrum users run 16/48 every month?

Is it the games? The editorial?
The reviews? The machine code
routines? The competitions? The
adventure help page? The educational
programs? The Long Way Home?
(Not the trip back from the newsagent,
but our serialised adventure with state
of the art, instant graphics in 48K.)

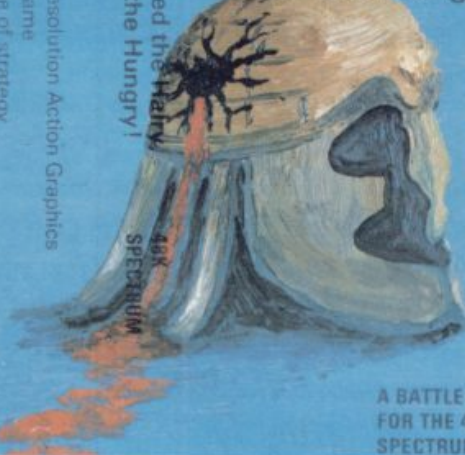
We're not sure, but you can find out for
only £2.99 at branches of W H Smith,
John Menzies and leading newsagents.



High resolution Action Graphics
Solo game
A game of strategy

Wilfred the Hairy,
Olaf the Hungry!

Wilfred the Hairy,
Olaf the Hungry!



A BATTLE GAME
FOR THE 48K
SPECTRUM

WILFRED THE HAIRY, OLAF THE HUNGRY!

It is the age of the Vikings!, the world is constantly under attack by the power-mad army of 'Wilfred the Hairy'. You have a castle to defend and continents to capture, but beware! plagues of RATS destroy your supplies and send you scurrying home. Rampant FLEAS infest Wilfred sending him to his castle to delouse.

You control Olaf's army but watch out! Wilfred analyses every move you make and so creates a STRATEGY for attack. A game of high resolution action graphics to stretch your powers of LOGIC to the limit — you can only win by lateral thinking!

A SOLO game for the SPECTRUM 48K

£5.50 (inc. VAT & First Class Postage)
Despatch within 48 Hrs. (Overseas add 10%)

please send me	Quantity	I enclose a Postal Order/Cheque payable to MICROBYTE
Wilfred the Hairy	£5.50	Name
	Total	Address
£.....		Postcode

MICROBYTE 19 WORCESTER CLOSE, LICHFIELD, STAFFS WS13 7TD

Play the game right...

...with the *Intelligent Joystick Interface*
from Cambridge Computing!

£34.90
JOYSTICK INTERFACE
AND TAPE COMPLETE

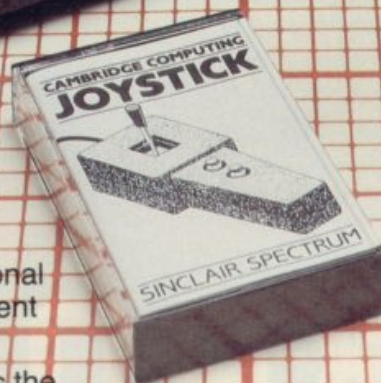


Also available from
John Menzies

Interface Easy to program
● 1K on board memory ● Own
rear edge connector ● Compatible
with all standard joysticks
● Now Microdrive compatible

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 Ditton Walk, Cambridge CB5 8QZ Telephone 0223-214451

Please allow up to 28 days for delivery

Please send me
Name
Address

Joystick, Interface and Tape at £34.90
Joystick only at £27.90
I enclose cheque/p.o.
for £.....
made payable to
Cambridge
Computing

Can you meet Laserwarp's infinite Challenge?

Be a real game lord – imagine the quest for the ultimate high score!

At last – a real challenge for the arcade ace: Laserwarp, the most exciting arcade-style game around, in full, high-res graphics. It's got everything – fight your way through the ramships, space mines, homing droids, hyperspace chickens, interstellar pogos, and more, till you challenge the Master. Can you beat him? Can anybody beat him? Comes complete with Hall of Fame, coded verifiable high score – send yours in and see if you can win the £100 Mikro-Gen are offering every month (full details in instructions)

High scorers names will be published in a Hall of Fame in the computer press – and they will be invited to join in a Battle of the Champions.

NB – if you have the earlier version of Laserwarp, Mikro-Gen will replace it with the new version – FREE!

£100
EACH & EVERY MONTH
for Laserwarp
highest score!

*** Star Trek**

AND NOW



You won't find a more exciting version of this superb tactical role-play game – save the star systems from the Klingon attack. Runs in real time – so you have to make the right decisions fast. Comes complete with Captain's Log & Operating Manual



FOR 48K SPECTRUM

£7.95

Just part of Mikro-Gen's great range – look out for Paradroids, Mad Martha II, Cruise Attack, Land of Sagan, Galakzions, Deffendar and many others. Available from WH Smith, Co-op, Boots, Menzies & other leading retailers, or direct from Mikro-Gen (Please make cheque/PO payable to Mikro-Gen & add 40p post & packing



LASERWARP £6.95



**PHONE YOUR
VISA/ACCESS
NUMBER**

MIKRO-GEN

44 The Broadway, Bracknell, Berks RG12 1AG Tel: 0344 427317

Decision-makers

Strategy and adventure games introduce children to problem-solving. Theodora Wood explores some educational worlds

MANY EDUCATIONAL programs produced so far rely on the question-and-answer format, using the computer as a vehicle to test a child's competence in a certain area and, by imaginative use of colour, graphics and sound, sugar the pill of mental arithmetic and spelling and act as revision notebooks. Doing that they echo the traditional methods of teaching using textbooks and workbooks.

There is, however, an alternative method of using the computer, creating situations whereby the user has to determine the best method of solving the problem and, in so doing, is involved in a decision-making process rather than reiterating answers learned by rote. In such situations a child's approach is dominated not so much by finding the correct answer as by testing various strategies which might work to a greater or lesser degree. In those situations incorrect answers are as thought-provoking as their correct counterparts and provide a basis from which to work towards a better solution.

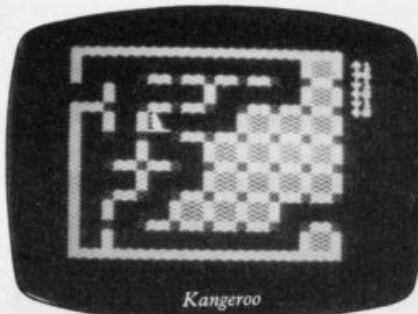
Pathfinder — Spectrum 16/48K, Widgeit, £5.95 — is an introduction to problem-solving techniques for younger children. All the programs reinforce left/right orientation, an important pre-reading skill, as all four involve moving an animal/monster from the left to the right of the screen. Children as young as three years old will appreciate **Rabbit**, where the rabbit has to be moved through a simple maze by means of the cursor keys, without CAPS SHIFT, which makes it simpler.

As the rabbit moves, additional visual stimulus is provided by the fact that it eats the carrots in its path and thus delineates the moves already taken, and each movement is accompanied by a clicking sound different for each direction. The mazes are generated at random, so there is no opportunity to learn the way through by memory and that is the case for other programs.

Kangaroo poses a slightly more difficult problem as the kangaroo has to be programmed to move through the maze by means of the cursor keys, followed by the number of steps in any direction. Any number of moves can be pro-

grammed before pressing G to execute the program. If there has been an error, the program which is listed on the side of the screen returns to the place before the mistake, so no editing is required. Kangaroo introduces the concept of a program and RUNNING it in a visually-stimulating context and enables a child to conceive very simple programs with no need for text entry.

A hungry monster must find its way through the park, picking up food in a certain order in **Picnic**. There are two levels of difficulty and the monster can-



not retrace its steps, so some forward planning is required. Successful completion of the task is accompanied by the screen filling with monsters and food, together with appropriate sounds.

Frogs is similar to Picnic but there the problem is to pick up other frogs and avoid the water lilies without retracing the steps taken.

Pathfinder is an excellent introduction to spatial concepts and logical pro-

'The programs lend themselves to group usage and by discussing the next move children can learn from each other'

cesses for children aged between three and eight. It has two qualities which make it more useful than its pen-and-paper equivalent; the mazes are generated at random and there is no possibility of wandering across the walls with a pencil, as young children are prone to do.

Widgeit continues to develop a learner-orientated strategy with **The Humpty Dumpty Mystery** — Spectrum 48K £6.25 — produced in collaboration with Gordon Askew. The object

EDUCATION

is to discover who pushed Humpty Dumpty off the wall. Humpty Dumpty falls from the wall together with the nursery rhyme and then the 12 suspects appear on the screen. They are all soldiers, each with various coloured hats, jackets and badges.

The child has the choice of a question or guess. If Q for question is ENTERed the words "Did he have" appear at the bottom of the screen and the child has to finish the question with, for example, a red jacket. If the answer is no, all the soldiers with red jackets are eliminated from the screen. By that process the guilty party can be found.

The game can be played on two levels of difficulty, either easy or difficult. The easy mode allows for single-key entry so that colours can be ENTERed using the Spectrum colour keys and nouns by their initial letter; the difficult mode requires whole words to be typed in. Thus the game can be played by children who may find difficulty with spelling and use of the keyboard. A score appears at the end of the game and the best score in the playing session is displayed.

Game two can be LOADED from an option in the first game. This time the child has a glimpse of the culprit behind the wall and then has to fill in the colours of his hat, badge, eyes, mouth and jacket. Single-key or whole-word

entry and two levels of difficulty operate as in game one. The format encourages observation and memory skills in an entertaining way.

Who Killed Cock Robin? uses the nursery rhyme as a basis for an opportunity for children to play detectives, working out clues and going through the logical process of deduction required to solve the mystery. A choice can be made of three, four, five or six suspects, locations or times, and 10

continued on page 119



SPECTRUM USERS

**NOW AVAILABLE—THE ULTIMATE
IN GAMES ACCESSORIES**

THE FOX PROGRAMMABLE JOYSTICK INTERFACE

The Interface with:

- ★ Total compatibility with **all** games.
- ★ Proven compatibility with the Microdrive.
- ★ Built in memory to store up to 16 different game keytops.
- ★ Battery back up so no loss of memory after power off.
- ★ Trickle charge batteries used so they recharge whilst in use (no replacement needed).
- ★ Only one two-position switch for simplicity of use (no loose wires or clips to attach).
- ★ Accepts any Atari type joystick.
- ★ Fully cased with through port for further expansion.
- ★ Can be used as a pseudo ROM for personal tool kit.



Just plug in switch on and play the game with Fox only **£34.95 INCL.**

Due to demand delivery will be 4 weeks

ALSO AVAILABLE—THE FOX 48K SPECTRUM UPGRADE

UPGRADE YOUR 16K to 48K

The kit reviewed as 'Easiest to Fit' and "Best value for Money"
Simple insertion, no soldering required, full instructions and guaranteed.

Move on up to 48K

only **£20.99 INCL**

**The above interface was reviewed
as the easiest program of all
joystick interface on the market
Feb Sinclair User.**

Send now to:

Fox Electronics Ltd,
Foxhouse, 35 Martham Road, Hemsby,
Near Great Yarmouth, Norfolk.
Tel: 0493 732420

Please send me

☐ Interface

☐ Upgrade

Name
Address

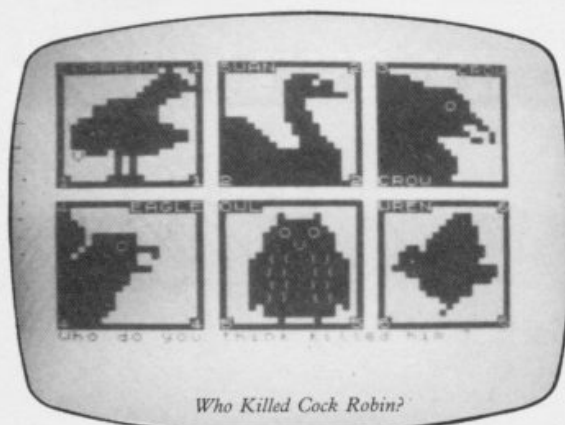
I enclose £

or please debit my Barclaycard

No.

Callers welcome by
Appointment





continued from page 117

attempts are given for each game. At each attempt the child is asked to guess the culprit from among the suspects.

Named and numbered pictures of each animal or bird appear on the screen, each well-realised in silhouette form. The locations appear next, each its own little gem of a picture, and then the time by means of clock faces. Each run through the options and the number of correct guesses is recorded, for example RAT FARMYARD 12PM, one correct.

A clue can be taken, after each attempt, for who, where and when. A score is shown after each game and the best score is displayed. Groups of children find it particularly entertaining and much heated discussion can take place about the clues and the strategy for the next attempt.

Pirate — Spectrum 48K, Chalksoft, £8.25 — introduces the strategy-solving possibilities of an adventure game to children who are too young to cope with the rigours of an adult adventure game. The adventure is in two parts and entry to part two is dependent on gaining sufficient jewels and magic objects — all the ingredients of a full-blown adventure.

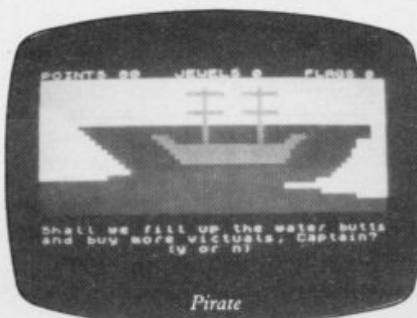
Instructions are shown before the adventure begins; the child is the captain of a pirate ship and has to steer round the ocean; to win jewels it is necessary to win battles with other pirate ships or find them in one of the islands.

The captain is responsible for making decisions at each move, so that each move involves a strategic choice. The main difference between *Pirate* and adventures such as **The Hobbit** is that, instead of being asked 'What next?' the player has only to decide a direction north, south, east or west operated on the cursor keys, or is presented with a question such as 'Pirate ship dead ahead, do you want to give chase? y/n'.

Hazards include rocks, squalls, mut-

iny by the crew, being captured by the other pirates and being made to walk the plank; in the latter case that means the end of the particular game and the player has to return to the beginning of the game, which is different every time.

Positions in part one of the game can be **SAVED** on to tape, which allows the player to retain jewels, flags and points. Each move is presented with a graphic portrayal of the situation; some of the rocks look particularly nasty and battles are shown by multi-coloured changes in the top half of the screen accompanied by a flurry of beeps. Other sound addi-



tions include renderings of *A Life on the Ocean Wave*.

All instructions for **SAVEing** the position on tape and continuing to part two are given on-screen in a clear way and children who have regular access to a Spectrum should find no difficulty in operating those parts of the program.

Pirate is essentially a maze program with the added difficulty of acting virtually blindfold and involves a child not only in strategic decision-making but also in visualisation techniques and direction finding — at the least learning the points of the compass and their relation to one another.

While *Pirate* operates in the fantasy world of pirates and magic objects, **Inkosi** — Spectrum 48K, Chalksoft, £5.95 — is a simulation game operating in the world of ancient Africa. The object is for the tribe to survive and prosper under the king's leadership for 10 years and the user is the king. Decisions have to be made at the beginning of each year based on the number of people in the tribe, the amount of maize and the number of living cows.

Maize can be either planted, sown or traded for cows, and cows can be killed for food. One sack of maize will feed one person for a year while a cow will feed two. Once those decisions are taken, the year runs its course with random happenings occurring, such as lion attacks and the witch doctor demanding to kill cows in a fertility rite.

The game is finished if the tribe grows to more than 3,000 or if more than one-third die of starvation in one year. The outstanding lesson to be learned is that however good the planning at the beginning of the year, all can disappear if there is a drought or the fertility rites are too successful. Prosperity is dependent on luck as much as if not more than good management.

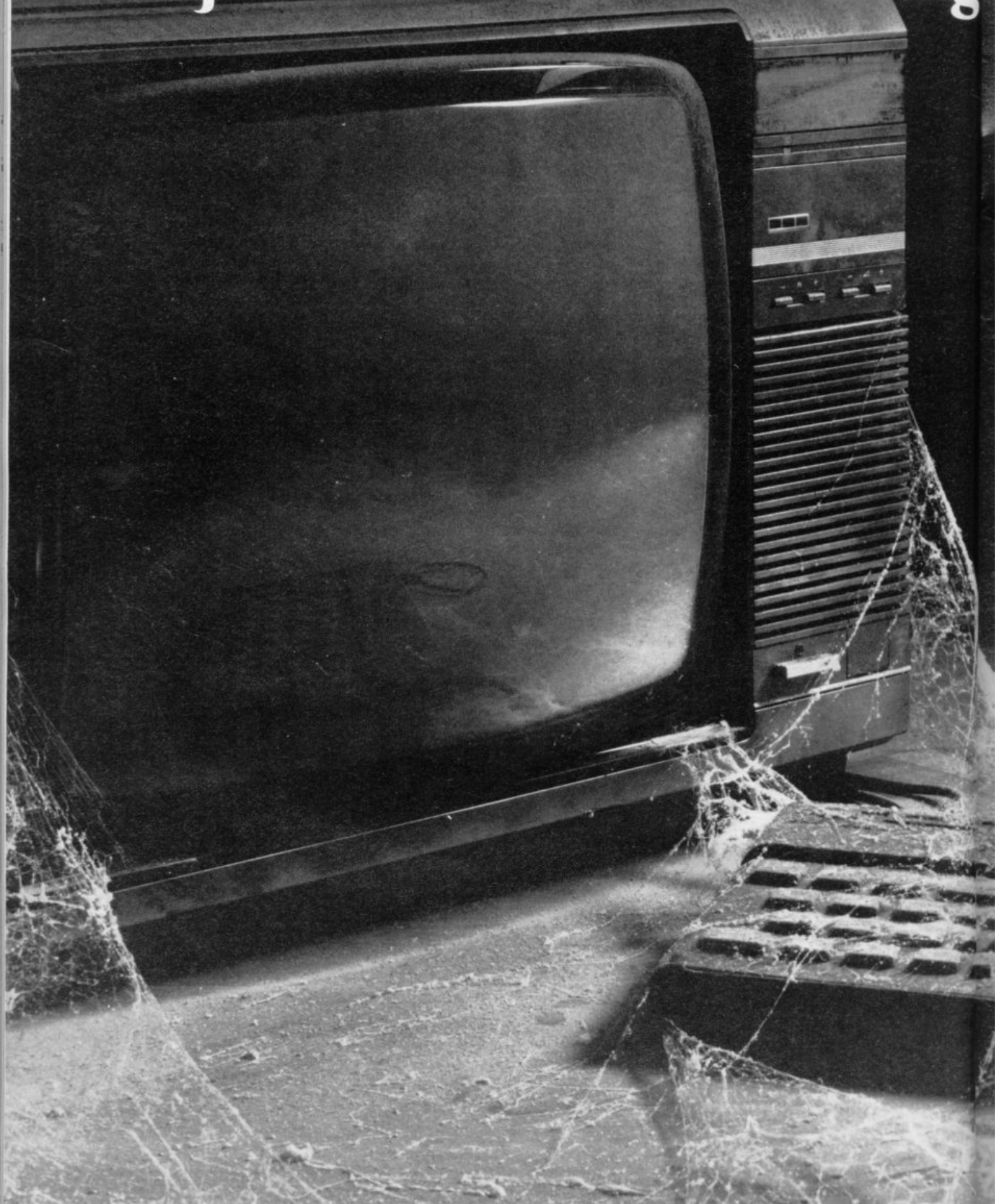
Relying as it does on text with few graphics and with little interaction apart from the planning phase, *Inkosi* offers a poor learning situation in comparison with simulation programs such as the Heinemann **Ballooning**. The use of a stereotyped situation such as ancient Africa, witch doctors, fertility rites, is not to be particularly recommended either.

The programs reviewed demonstrate various ways in which the Spectrum can be used to encourage children to develop the problem-solving strategies exemplified by Logo, requiring a learner-orientated technique not found in rule and drill packages. They also lend themselves to group usage, stimulating social interaction in a learning situation, and by discussing the next move children can learn from each other as much as from the program involved.

With the advent of the QL with its bigger memory, we can expect to see vastly more complex and imaginative uses made of the ability of the computer to present such situations and develop an interactive learning formula.

Title	Machine	Publisher	Price	Gilbert Factor
Pathfinder	Spectrum 48K	Widgit	£5.95	7
Humpty Dumpty	Spectrum 48K	Widgit	£6.25	8
Pirate	Spectrum 48K	Chalksoft	£8.25	7
Inkosi	Spectrum 48K	Chalksoft	£5.95	5

We've just won an award for blowing



g away the cobwebs.

You know the story, the Micro you thought would give endless hours of fun soon becomes a five minute wonder. You get bored and dump it on the shelf to gather dust.

With the introduction of Micronet 800 you now have access to a vast mouth-watering menu of facts, figures and fun.

If we said it was a major breakthrough in microcomputer technology we wouldn't be going over the top.



Just recently at the Which Computer Show we picked up the prestigious RITA award for Systems Innovation of the Year.

RITA is the 'Oscar' of the computer industry. Judged and sponsored by the major forces in related institutes, associations and publications.

Incredibly all it costs is just a pound a week to take up a subscription to the Micronet system. Plus, for most of you, a local telephone call whenever you want to connect up.

Then you've got 30,000 pages at your fingertips, including Computer News Flashes, all that Prestel has to offer, and Micronet's SwapShop. Where you can buy anything from joysticks to second-hand computers.

Interact with our daily news update. You can even take over the world; competing against hundreds of other subscribers on the system, in our 'Starnet' game.

If we haven't won you over with that then try downloading our wide selection of free games and other tele-software.

Naturally, you can run household accounts, manage businesses, talk to other subscribers nationwide using the system.

The list is endless and so is the fun.

The only addition you need to connect with Micronet 800 is a modem unit.

Apart from that all you'll want is a pen to fill in the coupon for more information. Then we'll have you linked up in no time.

Before the dust settles, in fact.

Please send me the full facts about Micronet 800.

Name _____

Make/Model of Micro _____

Address _____

Telephone _____

MICRONET 800, Scriptor Court, 155 Farringdon Road, London EC1R 3AD.
Telephone 01-278 3143.

SU 5/84

micronet
800

MICRONET 800, Scriptor Court, 155 Farringdon Road, London EC1R 3AD. Telephone 01-278 3143.
*Prestel and the Prestel symbol are trademarks of British Telecommunications.

ONLY ACES SURVIVE IN ...

NIGHT GUNNER

48K SPECTRUM

BY R.J. SWIFT

JOYSTICK COMPATIBLE
(Kempston, AGF, Sinclair,
Protek and Others)

£6.95

— THE AMAZING AIR BATTLE THAT STRETCHES YOU TO THE VERY LIMIT — GUNS BLAZING, ENEMY FIGHTERS ATTACK FROM ALL DIRECTIONS — 3D GROUND ATTACK SORTIES AND THERE'S STILL THE FLIGHT BACK HOME.

OTHER AMAZING FEATURES
* 30 GROUND ATTACK MISSIONS
* REALISTIC 3D EFFECTS
* EXPLOSIVE SOUND
* 1 OR 2 PLAYERS EACH WITH 4 LEVELS OF DIFFICULTY
* HIGH SCORE TABLE
* SELF DEMONSTRATING TITLE PAGE

TAXI
£5.50
Any Spectrum



Become a Taxi Driver and test your skills — but beware the Reckless Drivers! Fun for all the family.



FOOTBALL
£7.95
48K Spectrum

League Analysis — Easy to use Pools Prediction. With 9 methods of team performance analysis — let your Spectrum guide you to your pools selection.



FIGHTER PILOT
£7.95 48K Spectrum

Joystick compatible.

A spectacular flight simulation of the world's most exciting jet fighter with stunning 3-D cockpit view and the most realistic air to air combat ever seen on the spectrum!

Please send me the following games for the Spectrum

Night Gunner 48K ☐ £6.95
Fighter Pilot 48K ☐ £7.95
Football 48K ☐ £7.95
Taxi (Any Spectrum) ☐ £5.50

VAT and p. & p. inclusive within UK (Overseas inc. 55p. per cassette)

Trade and Export enquiries welcome.

Please send to Digital Integration, Dept SU3
Watchmoor Trade Centre, Watchmoor Road, Camberley, Surrey GU15 3AJ

Selected products available from:

Boots, Woolworths, H.M.V.,
Menzies, Greens, Lasky's,
Rumbelows, Selfridges,
Spectrum Dealers,
Video Palace, Zappo,
and all good Computer shops

DIGITAL
INTEGRATION

Watchmoor Trade Centre,
Watchmoor Road,
Camberley, Surrey GU15 3AJ

Lifetime Guarantee Cheques payable to Digital Integration
I enclose a cheque/P.O. for _____ Total.
Name _____
Address _____

Or debit my Access Account No. _____

Tele Sales Camberley (0276) 684959

WIZARDS OF
COMPUTER GAMES
SOFTWARE



GRAFPAD

for Sinclair Spectrum ... Drawing into the future!

Now you too can have the benefit of drawing your own applications by the simple use of our NEW ZX Spectrum version of Grafpad!

THE GRAFPAD comes complete with Cassette Programme, Special Keyboard Overlay, Plug, Light Pen and, of course, a comprehensive manual full of tips and instructions ... all at the usual high quality expected from **BRITISH MICRO!**

STARTING UP is simple. Connect the Grafpad, switch on your Spectrum and connect the cassette player, type "LOAD" and press ENTER, then start the cassette player, place the keyboard overlay, and by the time you are ready, the "MENU" will flash on to your screen! Usage? Well there is ...

AS MANY USES AS YOU CAN IMAGINE by first following our easy manual, then, in no time, you will be able to utilise as you Think best!

A UNIQUE PRODUCT that will improve your skills and give you endless hours of excitement!



Size
25mm height
15mm width
250 depth
weight 1.2k (gross)



HOW TO ORDER

BY TELEPHONE: (0923) 48222
If you are an American Express, Barclaycard, Diners Club or Access Card Holder simply telephone us giving your Card No., Name, Address and item(s) required and your order will be despatched within 48 hours!

BY POST:

Simply fill in the coupon enclosing your cheque/P.O. made payable to: BRITISH MICRO or use the special section for Credit Card Holders and post to the address below.

OVERSEAS ORDERS:
Please add £10 per item ordered.

- ★ Dealer inquiries welcomed
- ★ Special discounts to educational authorities & government departments
- ★ Export inquiries invited



BRITISH MICRO

A HEGOTRON GROUP COMPANY

Unit Q2, Penfold Works,
Imperial Way, Watford, HERTS WD2 4YY
TEL: (0923) 48222. TELEX: 946024



Post to: BRITISH MICRO, UNIT Q2, PENFOLD WORKS, IMPERIAL WAY, WATFORD, HERTS. WD2 4YY.

Please send me GRAFPAD for: SINCLAIR SPECTRUM
☐ BBC MODEL B ☐ COMMODORE 64
If you require details of the above versions, please tick.

Qty.	Item	Ex. VAT	Inc. VAT	Total
	Grafpad Complete	£125.00	£143.75	
Postage, Packing & Insurance				£5.00
TOTAL				£

I enclose my cheque for /P.O. £.....

I prefer to pay with my American Express, Barclaycard, Diners Club, Access Card.

(Please delete whichever is not applicable)

Card No.

Signature

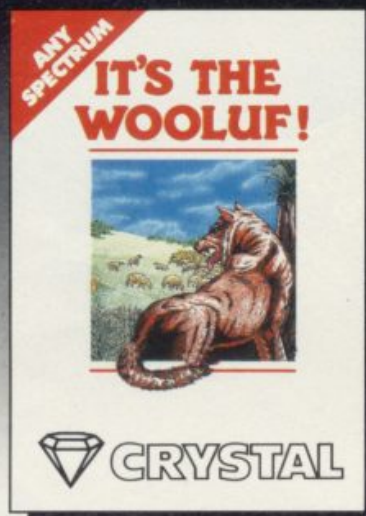
Name

Address

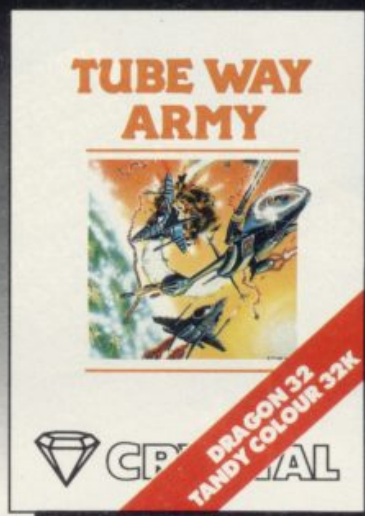
Address above must be the same as Card Holder



TWO NEW RELEASES FROM CRYSTAL IT'S THE WOOLUF! TUBE WAY ARMY



Written by: Martin Buller



Written by: Rainbow Software

From the creators of 'Halls of the Things', 'Invasion of the body snatchas', and many other software classics come these exciting new games.

Games to tax your judgement and puzzle and frustrate you for months on end.

Don't forget our other titles, which have attracted enthusiastic reviews like

"Spectacular, one of the best games I've seen"... POPULAR COMPUTING WEEKLY and

"Excellent, dangerously addictive, could change the Spectrum games scene overnight"... SINCLAIR USER.



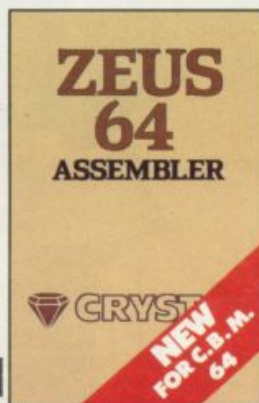
HALLS OF THE THINGS

Written by: Neil Mottershead,
Simon Brattel and
Martin Horsley



INVASION OF THE BODY SNATCHAS

Written by: Simon Brattel
and Neil Mottershead



Written by:
Graham Stafford



ROMMELS REVENGE

Written by: Martin Horsley



THE DUNGEON MASTER

Written by: Graham Stafford

COMING
SOON
RETURN
OF THE
THINGS

All titles for
48K Spectrum
unless
otherwise
stated

Selected titles available from:-



spectrum

John Menzies

**HMV
WOOLWORTH**

other large department stores and all good major
software retailers. Alternatively, send the coupon to:-



CRYSTAL

CRYSTAL COMPUTING, 2 ASHTON WAY,
EAST HERRINGTON, SUNDERLAND SR3 3RX.

TRADE ENQUIRIES WELCOME:- Tel: 061-205 6603.

CRYSTAL COMPUTING IS THE TRADING NAME OF CHANDREX LTD.

The name Crystal is used under license

**PROGRAMMERS! WRITTEN ANY SOFTWARE THAT COMES UP
TO OUR STANDARDS? IF SO SEND IT TO US FOR EVALUATION.
WE OFFER GENEROUS ROYALTIES.**

Please supply: **INVASION OF THE BODY SNATCHAS** ☐ £6.50
HALLS OF THE THINGS ☐ £7.50 **THE DUNGEON MASTER** ☐ £7.50
IT'S THE WOOLUF ☐ £6.50 **ROMMELS REVENGE** ☐ £6.50
TUBE WAY ARMY ☐ £7.50 **ZEUS 64** ☐ £9.95
CATALOGUE OF LATEST SOFTWARE ☐

NAME _____

ADDRESS _____

I enclose cheque/p.o. for
P & P included. Overseas orders, please add £1.50 per item.



Difficulties with odd characters

Andrew Hewson intrigued by printer buffer

ONE OF the difficulties of writing a regular column on a popular subject is that if I make a mistake my letterbox reverberates as correspondents from far and near hasten to correct my error and I have to hide from a postman weighed down with mail. So will all those readers who have been POKEing their Spectrums to determine whether they have Issue 2 or Issue 3 machines according to my advice in the January issue of *Sinclair User* please cease writing to ask what I was talking about? What I wrote was incorrect and I apologise for the confusion.

I was attempting to describe the difference between the most recent form of the Spectrum, the Issue 3 machine, and its predecessor in terms of a subtle difference in their response to the IN command. In fact, a much more straightforward method is to look through the slot in the rear where the edge connector is situated. In the latest models an aluminium heatsink about 12cm. long and 2cm. wide is clearly visible situated above the printed circuit board. That heatsink is absent from Issue 2 machines.

Incidentally, the 48K form of the first version of the Spectrum, Issue 1, made use of the space now occupied by the heatsink for a 32K memory board. In the re-design which resulted in Issue 2, sufficient space was found on the

main board for the extra memory.

Doreen Fusco of Swindon has brought an unusual effect to my attention. She writes: **I was poking about in the printer buffer of my ZX-81 when I discovered that if I altered the contents of the final byte my printer produced double-height characters. I knew this could be done in machine code but I was surprised to discover it was possible from Basic, too. What is happening?**

I was intrigued by the letter and I soon discovered that a simple ZX-81 routine of the form:

```
10 POKE 16476,0
20 LPRINT "DOUBLE HEIGHT"
would produce double-height printer output.
```

The reason is that the relevant ROM routine uses the newline character—CODE 118—which is held at address 16476 to indicate the end of the information to be posted to the printer. The routine scans through the printer buffer eight times, working out, with the aid of the character table, the form of the top eighth of each character, then the second eighth, then the third eighth and so on.

In between each line of eighths the routine sends a signal to the printer causing it to slow the rate at which the printer motor turns. When the routine

has gathered all the information for the next line of eighths, a second signal is sent, causing the motor to increase speed again. It is that staccato effect which causes the printer to sound like an asthmatic old man.

Changing the contents of 16476 causes the ROM routine to omit, among other things, to send the slow-down

'Unfortunately the routine picks up other information'

signal to the printer, hence more paper is wound past the printing head in between eighths, giving the appearance of double-height characters. Unfortunately in the absence of the newline character, the routine picks up other extraneous information which results in nonsense characters also appearing on the output. I can see no way round the difficulty and I would be interested to hear from anyone who can. In the meantime, however, there appears to be no way of putting the effect to good use.

John Heritage of Ashford, Kent, is clearly using his computer for financial calculations. He asks: **How can I reduce the answer to a calculation to two decimal places and how can I ensure that the decimal points in a vertical line of figures always lie below one another?**

As is so often the case, the answer to each of the questions is straightforward, once the general principle is understood. In the first case the INT function, which rounds down a decimal number to the nearest whole number, can be used to round down to two decimal places, simply by multiplying beforehand by 100 and dividing by the same number afterwards.

In the second case, the number can be converted to a string using the STR\$

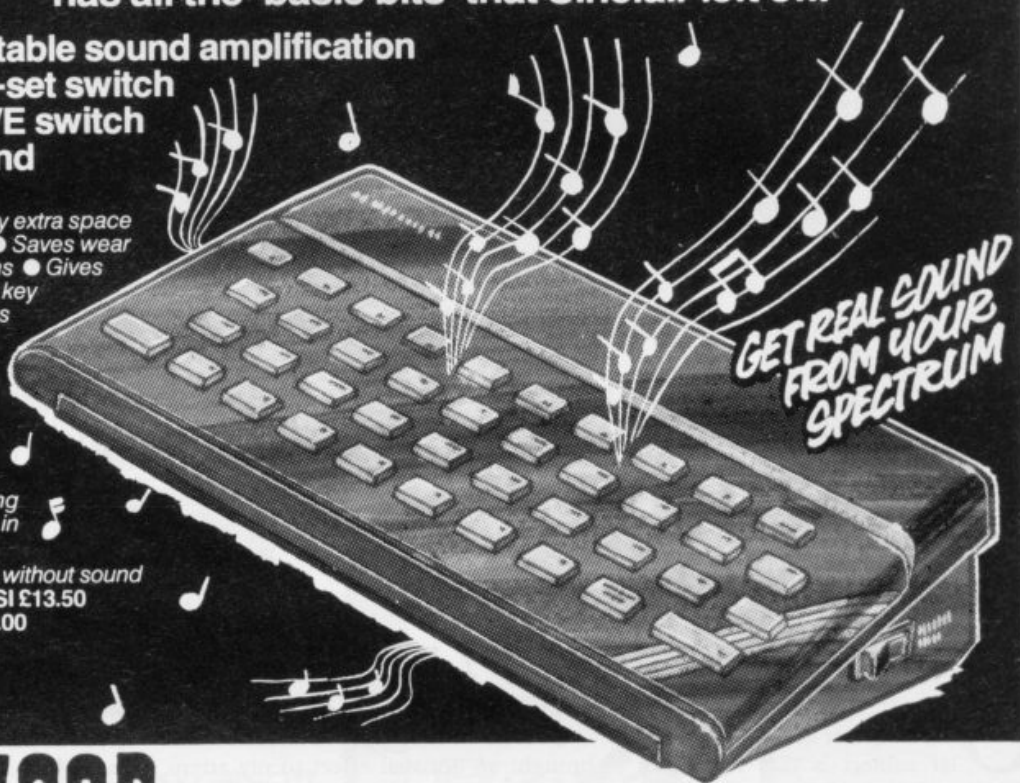
continued on page 127

```
10 LET D$ = ""
20 INPUT I
30 LET I = INT (100 * I + 0.5) / 100
40 LET Z$ = STR$ I
50 FOR J = 1 TO LEN Z$
60 IF Z$(J) = D$ THEN GOTO 80
70 NEXT J
80 PRINT AT 21, 16 - J; Z$
90 INPUT "33 spaces";
100 GOTO 20
```

Table 1. A Spectrum routine which rounds the contents of I to two decimal places and PRINTs the result with decimal point in column 16. To adapt the routine for the ZX-81, change line 90 to read 90 SCROLL.

with the
sensational

- Standard Power Base without sound**
SPECTRUM REF PBSI £13.50
ZX81 REF PBZXI £13.00



GET REAL SOUND
FROM YOUR
SPECTRUM

add-its for Sinclair addicts

Six versions of this indispensable unit complete your computer. All have SAVE/LOAD and ON/OFF switching and a housing for the transformer. Compatible with interface one. Ideal for use with cased keyboards.

Ref. BP1 - Fully variable sound amp - 3 x 13 amp sockets, switch and neon indicator - cable and plug £27.50

Ref. BP2 - as BP1 but no sockets, cable and plugs. Has room to fix your own 'Duraplug' sockets £19.50

Ref. BP3 - as BP1 but no sound £21.50

Ref. BP4 - as BP1 but no sound or sockets £13.05

Ref. BP5 - ZX81 version inc. sockets, mains switch neon, cable and plug £20.85

Ref. BP6 as BP5 but no cable or sockets £12.85

Flat: Ref **SW** £5.25. Tilted: Ref **STW** £6.25
Extra long for printer – Flat: Ref **LW** £5.75. Tilted: Ref **LTW** £6.75

Cool-it units built into other Kelwood add-its
Power Base (Spectrum) Ref **PSBIC \$18.55** • **Power Base (ZX81) Ref **PBXZIC** \$18.05** • **Sound Power Base (Spectrum only) Ref **SPBIC** \$25.00** • **Back Pack 1 Ref **BPIC** \$32.55** • **Back Pack 2 Ref **B2PIC** \$24.55** • **Back Pack 3 Ref **B3PIC** \$26.55** • **Back Pack 4 Ref **B4PIC** \$18.60** • **Back Pack 5 Ref **B5PIC** \$26.90** • **Back Pack 6 Ref **B6PIC** \$18.90** • **Wearsave (Spectrum) Ref **WSSC** \$16.00** • **Wearsave (ZX81) Ref **WSZXC** \$15.80**

WEAR SAVERS
 ● Cuts out wear and tear on plugs and sockets ● Switching for SAVE/LOAD and 9 volts ON/OFF. ● Simply plugs in
 Spectrum Ref **WSS** £9.95
 ZX81 Ref **WSZX** £9.75



MICROSTAT
The compact way to work
for all essential peripherals
for use in restr
spaces

● Allow
computer etc to be

● Allows the computer etc to be moved around with the minimum of effort

● Mains ON/OFF switch ● 3x13 amp sockets inside ● Supreme quality ● All wires stow away
 ● Carrying handle ● Easily stored ● Sturdily built in stove enamelled steel
 ● Ideal for schools ● Suitable for most micros including Sinclair and BBC ● Acres of room for all peripherals

Desk top model
 Ref CW1 £49.00
 Legs Ref LCW £11.00

All Prices include VAT



QUANTITY	REF	AMOUNT
Items under £10 plus 60p P&P		TOTAL

Items under £10 plus 60p P&P
Items over £10 plus 95p P&P
Workstations plus £3 P&P

TOTAL
ENCLOSED

KELWOOD COMPUTER CASES Downs Row, Moorgate, Rotherham *PERSONAL CALLERS WELCOME* Software

us 95p P&P
us £3 P&P
ENCLOSED
PERSONAL CALLERS WELCOME

We stock
Software



● Please address problems and queries to Andrew Hewson, Helpline, Graham Close, Blewbury, Oxfordshire.

continued from page 125

function and then the string can be searched to identify the position of the decimal point. A simple calculation will then ensure that the number is PRINTed with the decimal point in the correct column.

The program in table one shows those principles in practice. Notice that the variable I is increased by five in the equivalent of the third decimal place in line 30 to counteract the effect of the INT function rounding downwards. Thus, for example, a value of 3.648 is rounded up, correctly, to 3.65 by that line, whereas 3.642 is rounded down to 3.64.

Incidentally, a number should be rounded only immediately before it is PRINTed and not at intermediate stages of a calculation. If the number is to be used on a subsequent occasion the unrounded form should be stored in a

separate variable. Alastair Baird of Hartfield raises an interesting topic. He writes: **I wish to store some information above RAMTOP on my 48K Spectrum and to clear out the user-defined graphics, I entered CLEAR 65535: NEW: CLEAR 60000: NEW. Imagine my surprise when I found that the lowest 104 bytes were set to zero but the remaining 64 bytes — 65472 to 65535 — still contained non-zero values. Can you explain?**

Computer memory is rather like a blackboard; it is of limited size and to accommodate new information it is usually necessary to erase information which has become redundant. There are two principal methods which a computer can use to update its blackboard. Either it can erase information as soon as it has become redundant and move all current information into one block, so as to accumulate all spare memory in one place, or it can ignore the problem and over-write redundant information

'Computer memory is rather like a blackboard'

the next time it wants to use the space.

The first method has the advantage of minimising the total amount of memory required but the disadvantage that current information is forever being shuffled around in memory — in the jargon of the computer trade that activity is called garbage collection. The second method has the advantage of speed but the disadvantage that unless the software keeps a careful note of the

```
10 FOR I = 23296 TO 23551
20 INPUT Z$
30 IF Z$ = "S" THEN STOP
40 PRINT Z$
50 LET Z$(1) = CHR$(CODE Z$(1) -
7*(CODE Z$(1) > 57))
60 LET Z$(2) = CHR$(CODE Z$(2) -
7*(CODE Z$(2) > 57))
70 POKE I, 16*CODE Z$(1) + CODE Z$(2)
- 816
80 NEXT I
```

Table 3. A Spectrum program to load pairs of hexadecimal codes into the printer buffer.

situation, portions of memory can become clogged with redundant information.

The ZX-81 and the Spectrum use the first method to an obsessive degree, fussing around like a nervous squirrel hoarding memory at every opportunity. As a result, Basic programs tend to run slower than on other machines.

In the case of Baird's problem, the Spectrum omits to re-set a portion of memory which it will not be accessing in future. The two instructions CLEAR 65535 : NEW delete the user-defined graphics area as required but the machine then establishes its stack at 65535 working downwards; the machine stack is used to hold the return addresses of ROM routines being executed and other vital but temporary information.

Entering CLEAR 60000 : NEW subsequently moves down the stack but leaves a frozen copy of it in the 64 bytes at 65472 to 65535, as Baird discovered. The only solution is for the user to delete the data, a fairly simple matter using either a Basic or a machine code routine.

Wim Gulpen of the Netherlands brings an international flavour to the column. He asks: **Can you provide a Spectrum machine code routine to scroll the top eight lines of the display only? I have written a Basic routine but it is too slow.**

To answer the question I have adapted two routines which appear in *40 Best Machine Code Routines for the ZX Spectrum*, a book I wrote with John Hardman. The routines are listed together in table two. The first part scrolls the display file and the remainder scrolls the attributes. The eighth line of the display is cleared and its attributes set to the value held in the system variable ATTR P.

The routines can be loaded into the Spectrum printer buffer using an assembler or the Basic hexadecimal loader program listed in table three. Call the routines by entering:

RANDOMIZE USR 23296

Hexadecimal	Assembler	Comment
11 00 40	ld de,16384	Top lhs of first line
21 20 40	ld hl,16416	Top lhs of second line
06 08	ld b,8	Number of lines
C5	push bc	Save number of lines
01 E0 00	ld bc,224	7 lines each 32 characters long
ED B0	ldir	Copy (hl) to (de)
06 20	ld b,32	Length of last line
3E 00	ld a,0	Clear a register
12	ld (de),a	Clear last line
13	inc de	
23	inc hl	
10 FB	djnz LASTLIN	
C1	pop bc	Recover number of lines
10 EE	djnz NXTBLK	Decrement and jump if not zero
01 E0 00	ld bc,224	7 lines each 32 characters long
11 00 58	ld de,22528	First line of attributes file
21 20 58	ld hl,22560	Second line of attributes file
ED B0	ldir	Copy (hl) to (de)
3A 8D 5C	ld a,(23693)	Value of ATTR P to a register
06 20	ld b,32	Length of last line
12	ld (de),a	Clear last line
13	inc de	
10 FC	djnz LASTATTR	Repeat if not zero
C9	ret	Return

Table 2. A Spectrum program to scroll the top eight lines of the screen display.

Bridge on your home computer

Bridgemaster is a series of bridge tutors professionally prepared with world expert Terence Reese. The computer deals the cards supplies your partners and you will bid and play just as you would at the card table. The audio commentary explains the bidding and the play so you learn as you play bridge.

A complete learning package for the beginner at bridge

The package contains everything you need to learn bridge - 2 commentary tapes, computer tape, instruction booklet and a useful reference book.

"...recommended to the highest degree - absolutely excellent, and well worth the money"...ZX Computing

"As a teaching aid for the bridge novice, Bridgemaster could hardly be bettered"...Personal Computer World

For the Spectrum 16/48K, Commodore 64, BBC B and Electron - £24.95. For the ZX81 - £19.95.

Introduction to expert bridge

Ideal for any player who wants to improve at bridge. The package explains many advanced techniques and contains a commentary tape, computer tape and instruction booklet.

For the Spectrum 16/48K - £12.95. Available soon for other computers.

BRIDGE MASTER

Available from Boots and other leading stores or direct from Serin Software, Freepost, Dept SU5, PO Box 163, Slough SL2 3YY

Prices include VAT, post and packing. Remittances payable to Serin Software.

Just released

AUF WIEDERSEHEN

SUPER GERMAN VOCABULARY TEST
& SUPER FRENCH VOCABULARY TEST

Chérie

Tutorial Software have greatly improved their successful German & French language tutors.

These Programs provide an extensive basic vocabulary. By using the 'Add New Words' facility the range of vocabulary that can be learned becomes limitless.

If you are studying for G.C.E. 'O' level or just interested in languages let these programs take the pain out of learning.

Programs £6.95 each and are only available for the 48K Spectrum.

Features:-

- * 550 Foreign Words.
- * Nouns, Verbs, Adjectives & Adverbs.
- * Gender & Accents.
- * Learn Mode & Test Mode.
- * Add New Words Facility.
- * Score Record And Average Score.
- * Words Checked By Language Teachers.

Cheques or P.O.'s to:-

Tutorial Software
P.O. Box 43,
Enquiry Office
22 - 29 Mill Street,
Newport,
Gwent,
NPT 3XZ.

The ALPHACOM 32 high-speed, thermal printer is compact, lightweight and quiet in operation. No maintenance is required for the life of the machine (i.e. no ribbons to change). Fully interfaced to the SPECTRUM and ZX81, this printer operates at 2 lines per second, with full 256 x n dot graphic capability, 32 column line width. It uses the standard Sinclair print commands (COPY, LLIST, LPRINT). Paper rolls only £1.00 per roll - 25 metres long.

Alphacom 32

This thermal printer, now available in the UK, is the standard printer which has sold in tens of thousands for use with the American version of the ZX 81.

DEAN ELECTRONICS LIMITED
Glendale Park, Fernbank Road,
Ascot, Berkshire SL5 8JB
Tel. 0344 885661 Telex 849242



Or from selected branches of W H Smith, John Menzies, Greens, Laskys, Spectrum Group.

£69⁹⁵
inc VAT

ADD £2 P&P

Please send me Printer(s) at £71.95 and boxes of paper (10 rolls per box) at £12 per box - all inclusive of post and packing.

Total £ cheque/PO enclosed or debit my Access/Barclay card account No.

Name and address

SPECTRUM COMPATIBLE PRINTER



Also available - Alphacom 42 compatible with Commodore 20/64, BBC Centronics, Dragon, Atari at £99.95 (+£2 p/p) includes selected interface.

The dream makers



CRL brings a whole new world of excitement right into your living room!

Games that test your skills to the ultimate – whether it's zapping down invaders or playing a whole game of cricket.

Only CRL offers such a wide choice of computer programs for the world's most popular micros.

... catch one today at Menzies, Boots, W. H. Smiths, Spectrum Group and all good computer shops or send direct to CRL.

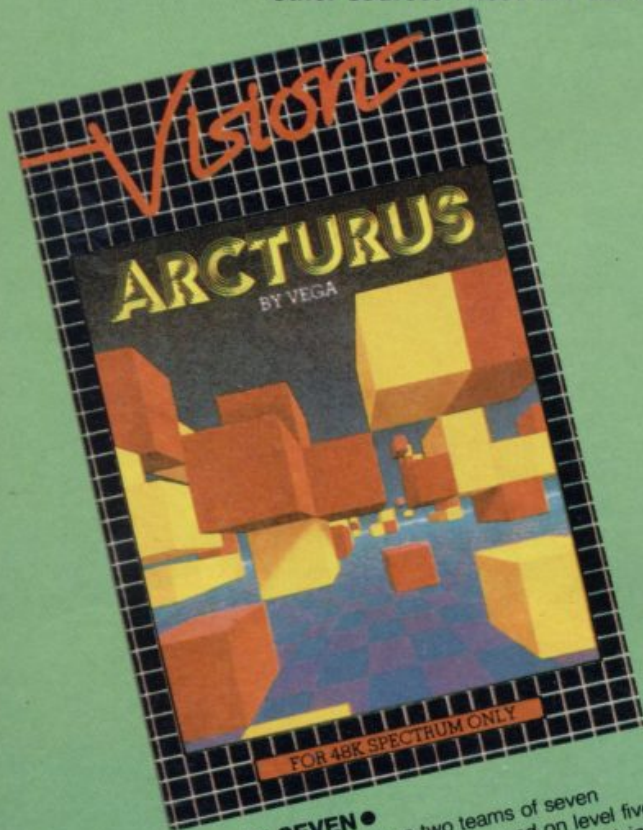
Never has so much excitement been contained in a cassette!

CRL

CRL House, 9 Kings Yard,
Carpenters Road, LONDON E15 2HD.
Tel: 01-533 2918

ALL THE

Here's a sure-fire way of making certain 1984 is packed full of fun for you and your friends. We've searched for brilliant new program sources throughout the U.K. and North America to find an exciting collection of new games—and business programs—many of which cannot be bought by mail order from any other source! These are our latest exclusive offerings.



PITMAN SEVEN ●
Your mission is to rescue two teams of seven desperate men, trapped underground on level five. You must bring each man to the surface, surviving the dangers you meet en route.
ZX Spectrum 48K.
Cassette price: £6.95
Ref. No: 2-52



FLIGHT SIMULATION ●
You are the pilot of a light aircraft. Pay careful attention to the many cockpit instruments to take off, bank, dive and climb. Touch a button, your display is a navigational chart: work out your flight path, choose a runway, prepare to land!
Full-colour high-resolution graphics. Written by Psion for a 48K RAM Spectrum.
Cassette price: £7.95.
Ref. No: 2-54

FREE BLANK C15 COMPUTER CASSETTE WITH EVERY TWO CASSETTES YOU ORDER!

Remember there's no limit to the number of free cassettes you receive if your order justifies them — so why not get together with friends or user group members and share the freebies?

GREAT VALUE! TREMENDOUS SELECTION! PLUS A FREE OFFER EVERY TIME!

Fill in the order form right away — we're guaranteeing fast delivery, quality and satisfaction (after all, we want you to come back for more!)

**The Software Workshop, Yew Tree, Selborne,
Hants GU34 3JP**

Order with
not enter
your p
days an

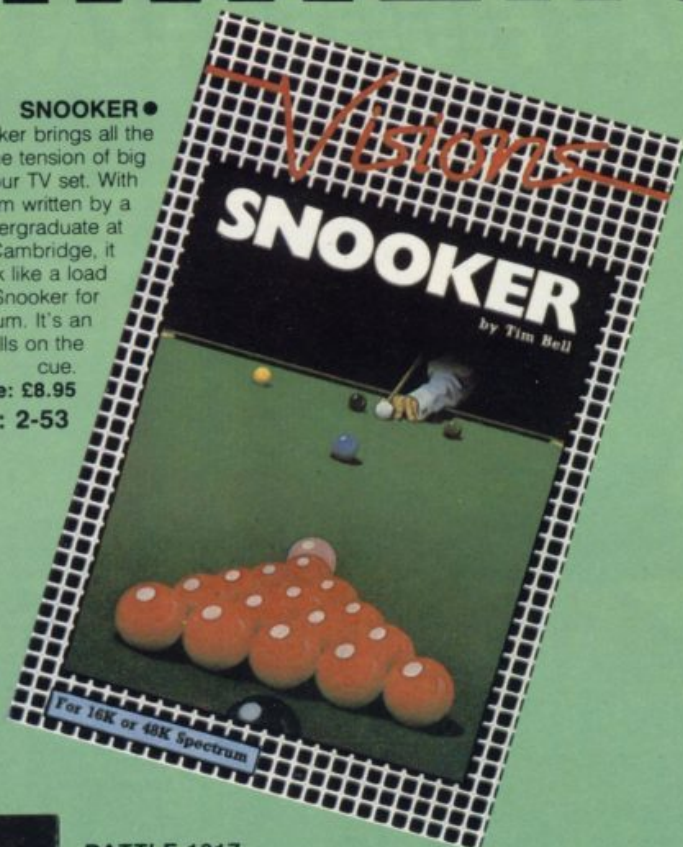
WINNERS

SNOOKER ●

Visions Snooker brings all the excitement and all the tension of big time tournaments to your TV set. With an advanced program written by a 19 year old undergraduate at Queens College Cambridge, it makes Pot Black look like a load of old balls. Visions Snooker for the 16K ZX Spectrum. It's an exciting test of your skills on the cue.

Cassette price: £8.95

Ref. No: 2-53



And here's a further selection of the latest games, the best value software for your Spectrum

Spectrum Software

2-13 Sentinel

Guard your mother ship against alien attacks. 48K RAM

£4.95

2-14 Meteor Storm

Spectrum version of the ever-popular arcade game. 16K or 48K RAM

£4.95

2-15 Star Trek

Popular space program brought to life by excellent graphics. 48K RAM

£4.95

2-21 Frogger

Manoeuvre the frog across the road avoiding heavy traffic. 48K RAM

£5.95

2-23 Arcadia

The expert's version of the popular invaders' game. 16K or 48K RAM

£5.95

2-24 Golf

The finest of golf handicap games. 48K RAM

£5.95

2-26 Derby Day

This favourite has to be a winner. 48K RAM

£5.95



BATTLE 1917

Winner of the 1983 Cambridge Awards sponsored by Sinclair User. The game is played by two players on a board 21 x 32 showing a map which changes with every game. Each player has 29 pieces including infantry, cavalry, tanks, artillery and a King. The object of the game, like chess, is to kill the enemy King. The game will appeal equally to all ages and all skills. This is the computer age's answer to Chess.

Cassette price: £6.00

Ref. No: 2-57

To: The Software Workshop, Yew Tree, Selborne, Hants GU34 3JP

I wish to order the following programs. I understand that:

- * I will receive a FREE blank cassette with every 2 programs ordered
- * I can return products within seven days if not entirely satisfied and receive a replacement.

Ref No	Qty	Title	Price

Postage, packing and handling: add 45p for the first cassette, and 25p for each additional cassette. Non-UK orders add extra 50%

I enclose a cheque/postal order for _____

Name _____

Address _____

Total



(Allow 28 days MAXIMUM FOR DELIVERY)

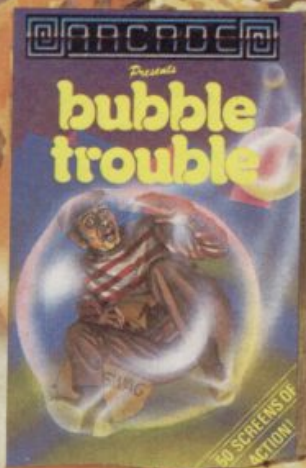
GUARANTEE

Buy with complete confidence. If you are not entirely satisfied with the quality of your purchase return it to us within 7 days and we will provide a replacement.

@ARCADE@

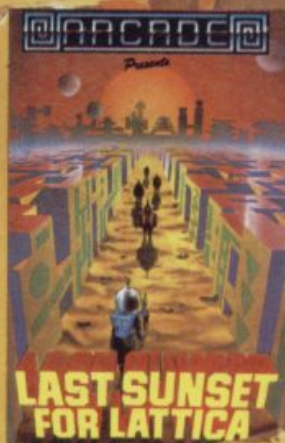
GAMES THAT FIGHT BACK!

YES THEY'RE TOUGH — BUT YOU'VE GOT TO ADMIT — THEY'RE FUN...



COMING SOON!

THE ZONE



SO FAR YOU HAVE RACED FOR YOUR LIFE AGAINST ANDROID CARS: YOU HAVE BEEN STRANDED MILES UNDERGROUND SEARCHING FOR DIAMONDS, YOU HAVE TAKEN ON THE MAFIA SINGLE HANDED AND SAVED A PLANET FROM EXTINCTION.

..... NOW IN OUR LATEST GAME YOU ARE A BURGLAR IN SEARCH OF LOOT — IN HOT PURSUIT ARE THE MOST FEARFUL SECURITY FORCE EVER ASSEMBLED!

EVEN IF YOU SURVIVE ALL THIS — BEYOND, LIES THE TERROR OF THE ZONE!!

All these games are available for ZX Spectrum 48K for the incredible price of only £5.50 each including P&P VAT etc. Just complete the mail order form for prompt dispatch by return of post.

Arcade are committed to original game concepts so look out for new titles in the Arcade range. TRADE ENQUIRIES WELCOME. Phone Orpington 35639 10 a.m. — 6 p.m. or write to Arcade Software Ltd, Technology House, 32 Chislehurst Road, Orpington, Kent BR6 0DG.

TO: ALL MAIL ORDERS

Qty.	Item	Item Price £	Total £

DON'T FORGET YOU CAN ALWAYS ORDER ON THE TELEPHONE WITH YOUR CREDIT CARD. TRADE ENQUIRIES WELCOME.

*I enclose a cheque/postal order payable to **ARCADE SOFTWARE LTD.** for

£..... *Please charge to my Access/Barclaycard account no.

*Please delete/complete as applicable

Signature:

Name: Mr/Mrs/Miss

Address:

University Software

LIBRARY OF ADVANCED MATH/STAT/ECON FOR SINCLAIR ZX81 AND SPECTRUM

TAPE 1: MATRIX OPERATIONS (*), (+) **£9.95**
SIDE A: Inversion, multiplication, addition, subtraction, scalar multiplication and determinants of matrices and vectors within one single program. Any output can in turn be used as the input of the next operation without re-typing. Capacities: 16K ZX81: 25x25, 16K Spectrum: 15x15, 48K Spectrum: 48x48.
SIDE B: Determinants of square matrices.

TAPE 2: POLYNOMIALS (+) **£6.95**
SIDE A: Includes quadratic equations (as degree 2 polynomials) and Newton-Raphson and half-interval search methods for higher degree polynomials. Computes the real roots with 8 digits of precision. SIDE B: Plot of polynomials in any interval, values of real roots, extremum points.

TAPE 3: INTEGRATION (+) **£6.95**
SIDE A: Simultaneous integration of two functions by Simpson's and trapezoidal rules. Also computes the area enclosed between the two functions. SIDE B: Plot of two functions in any interval. Integrated area shaded.

TAPE 4: SUPER-REGRESSION (*) **£14.95**
SIDE A: A highly developed multivariate regression program with log/ln option on each variable, allowing for exponential and geometric regressions. Displays estimated coefficients, standard errors, t-statistics, R^2 , corrected R^2 , F-statistic, degrees of freedom, Durbin-Watson statistic, variance-covariance matrix, matrix of correlation coefficients, INTERPOLATION and PLOT of residuals. Capacity examples (var.xobs.): 16K ZX81: 2x400, 5x200, 10x100, 16K Spectrum: 2x75, 5x30, 48K Spectrum: 2x1650, 5x900, 10x500. SIDE B: Plot of bivariate regressions, slope, intercept, R^2 , standard deviation.

TAPE 5: PROFESSIONAL LINEAR PROGRAMMING (*) **£14.95**
SIDE A: A user friendly optimisation program capable of handling all sorts of linear programming problems (any combination of $<=>$ constraints and $X_i > 0$, $X_i < 0$, $\alpha < X_i < \alpha$ sign constraints). Displays the canonical equivalent of the primal, values of slack variables, dual problem and its solution. Capacity examples (var.xcons.): 16K ZX81: 10x21, 15x18, 20x13, 16K Spectrum: 8x8, 48K Spectrum: 10x45, 25x35, 50x25. SIDE B: Solutions of simultaneous equations.

TAPE 6: STATISTICS (*), (+) **£14.95**
SIDE A: STATISTICAL TESTS AND DISTRIBUTIONS. Chi-square, Students t, F, Mann-Whitney U, Wilcoxon's Signed Rank tests and Chi-square, Students t, F, Binomial, Poisson and Normal distributions. Data on many samples can be entered at once, sorted and basic statistics displayed. Capacity examples (samp.xobs.): 16K ZX81: 1x230, 2x110, 5x45, 16K Spectrum: not available, 48K Spectrum: 2x1300, 10x250, 20x125.

SIDE B: DESCRIPTIVE STATISTICS. Analysis of ungrouped or grouped data. Ungrouped data sorted and grouped. Output includes mean, mean deviation, standard error, skewness, kurtosis, moments, Pearson's coefficient, etc. A comprehensive histogram with up to 30 class intervals, class frequencies, midpoint values. Capacities: ZX81: 450, 16K Spectrum: 200, 48K Spectrum: 2000.

TAPE 7: BIBLIOFILE **£9.95**
An academic indexing program to keep record of books and articles. Loading and saving of files, printing and listing of up to 150 records in a file, searching for an entry and sorting records into alphabetical order. It is possible to modify, delete and add a record.

EDUCATIONAL SERIES

INTRODUCTION TO ECONOMICS SET (48K Spectrum only): Basic concepts are introduced by extensive use of graphics, examples and exercises.

MICROECONOMICS I (+) **£9.95**
SIDE A: Demand and supply analysis, demand theory, cost-benefit analysis. SIDE B: Budget line analysis, indifference curves, decision making in a market economy.

MICROECONOMICS II (+) **£9.95**
SIDE A: Cobb-Douglas production function, linear programming and exercises on linear programming. SIDE B: Theory of the firm, elasticity of demand, CES production function.

MACROECONOMICS (+) **£9.95**
IS/LM curves, national income determination, aggregate demand and supply analysis, multipliers.

ECONOMIC GEOGRAPHY (+) **£9.95**
SIDE A: Von Thunen's model of agricultural land use. Locational rent and principle of diminishing returns. SIDE B: Models of agricultural and urban land use.

(*) Programs with INPUT, CHANGE, LPRINT and SAVE-DATA facilities. Spectrum versions of tapes 4 and 6 also embody MERGE/READ DATA facilities. A common data file can be used with these programs.

(+) Recommended for "A" Level, first year university and poly students.

PLEASE SEND A5 SIZE S.A.E. FOR INFORMATION ON MICRODRIVE-BASED PACKAGES.

Tapes 1-6: £60. Introduction to economics set: £35.

All inclusive prices for the U.K. For overseas orders add 50p per cassette. Dealers enquiries welcome.

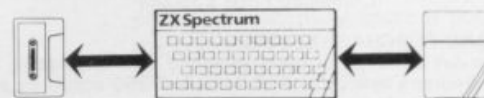
Cheques payable to: **UNIVERSITY SOFTWARE, 29 St. Peter's Street, London N1 8JP. Telephone: 01-359 0978**

DO IT WITH TRANS-EXPRESS

Would you like to transfer your Spectrum programs from

- 1) TAPE TO MICRODRIVE
- 2) TAPE TO TAPE
- 3) MICRODRIVE TO TAPE
- 4) MICRODRIVE TO MICRODRIVE

Then do it with the **TRANS-EXPRESS**



TRANS-EXPRESS will enable you to transfer any Spectrum program of any size up to the full 48.0K. It is user-friendly, reliable and efficient. It goes beyond where similar programs fail.

Just load the **TRANS-EXPRESS** and then follow simple screen instructions. No matter how many parts your program has, whether they are headerless or with header, written in BASIC or m/c, etc., it will transfer them all in one go. You can then verify, save again or load your next program(s).

For only **£5.50** you could transfer all of your software, provided you do not infringe copyright.

TAPE TO TAPE

Please send me _____ copies of **TRANS-EXPRESS** SU
at £5.50 each

I enclose cheque/PO for \$ _____

Name _____

Address _____

Send to:

ROMANTIC ROBOT 113 Melrose Ave, London NW2

CYBORGWARS

NOT ANOTHER TOY

BUT A COMPLEX SIMULATION OF FOUR MILITARY-INDUSTRIAL ECONOMIES LOCKED IN A DEADLY STRUGGLE FOR SURVIVAL. ONE TO FOUR PLAYERS COMPETE WITH EACH OTHER AND/OR THE COMPUTER. BALANCE OF POWER DEPENDS UPON SKILL IN DEVELOPING RESOURCES, USE OF ESPIONAGE, EXPLOITATION OF ALLIANCES, AND UTILIZATION OF MILITARY POTENTIAL. REQUIRES ZX81 OR TS1000 WITH 16K RAM. ALSO AVAILABLE FOR THE TRS-80 MODELS I & II.

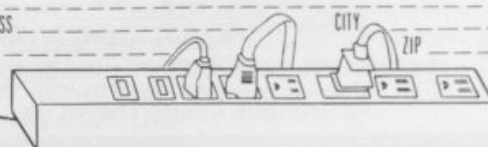
ORDER FORM FOR CYBORGWARS

Send \$15 (U.S.) Int'l M.O. to: **STRATAGEM CYBERNETICS, INC., 286 Corbin Place, 2E, Brooklyn, New York 11235.**

NAME _____

ADDRESS _____

STATE _____



BUSINESS USERS

SPECTRUM 48K

ACCOUNTS PREPARATION

Produces Prime Entry Listings, Nominal Ledger, Trial Balance, Profit and Loss Account and Balance Sheet with supporting schedules. 73 nominal ledger accounts and automatic VAT calculations.

Sole Trader/Partnership (Up to 4) £25.00
Limited Company £25.00
(Combined Price £35.00)

SALES AND PURCHASE LEDGERS

Produces day book, sales/purchases and VAT analyses, debtors/creditors listings and statements. 250 accounts and 1000 monthly transactions. Automatically calculates VAT.

£25.00

ZX-81 16K

ACCOUNTS PREPARATION

31 nominal ledger accounts

Sole Trader £17.50
Limited Company £17.50
(Combined Price £25.00)

SALES AND PURCHASE LEDGERS

Produces day book, sales/purchase and VAT analyses, debtors/creditors listings, statements.

50 accounts and 200 monthly transactions.
Sales £20.00
Purchases £20.00
(Combined Price £25.00)

All programs have been professionally developed and are being used by practising accountants and small businesses. Supplied on cassette with operating instructions.

Full details:

HESTACREST LIMITED

P.O. Box 19, Leighton Buzzard, Beds. LU7 0DG
Tel 052-523 7785



EASY INTRODUCTIONS TO BUSINESS SOFTWARE

COMMODORE 64 48K SPECTRUM

"Easy to Use" Personal Computer News.

"Remarkably good software" Microdecision.

"Very easy to use . . . very good" Soft.

"At last viable business software for the Sinclair ZX Computing."

Sales Ledger Up to 1200 entries per month

Purchase Ledger "

Stock Ledger "

Stock Control Unlimited entries

Suitable for limited companies, partnerships, etc. All programs supplied boxed with manual.

48K Spectrum £14.95 each.

Commodore 64 £24.95 (ring for availability)

Access/Barclaycard — Logic Sales 01-882 4942

Available at Spectrum, Selfridges and all good computer shops.

Cheques/P.O.'s to

Kemp Limited, 43 Muswell Hill, London N10 3PN

Distributed by Microdealer U.K., P.C.S. Distribution, and T.W. Distributors Ltd. (Eire).

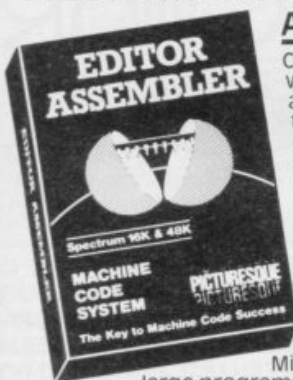
Hotline 01-444 5499

The Key to Spectrum Machine Code Success.

Picturesque's MACHINE CODE SYSTEM is used and recommended by professional software writers, yet the excellent documentation and the friendly, easy-to-use programs have been highly recommended for beginners.

You will only buy one Machine Code System, so buy the best, the one the professionals use.

NEW IMPROVED PROGRAMS — MICRODRIVE COMPATIBLE



ASSEMBLER

Completely self-contained with its own line editor, giving an easy-to-read 40 column tabulated listing. Auto line numbering, line renumbering and auto tabulation make this one of the fastest and easiest Assemblers to use. 5-character label names. Decimal, Hex or ASCII constants. SAVE/LOAD/VERIFY both the listing and Machine Code to cassette/MICRODRIVE/NETWORK. Assemble from cassette or

Microdrive into memory for very large programs. Customise to most Centronics printer interfaces, or RS232 (with Interface 1) for 80 column printout. FAST ASSEMBLY — 1k of code in 7 seconds. Assembler Directives:— ORG, END, DEFB, DEFM, EQU, DEFL. (Microdrive and Centronics facilities only operate with 48K machines.)

£8.50

INCL. VAT & P&P.

Programs supplied on cassette with option to Save onto Microdrive (cartridge not supplied.)

Existing owners can obtain the new programs by returning the **cassette only** to Picturesque, along with a cheque/P.O. for **£1.50 per program** incl. VAT & P&P. New cassettes will be supplied by return of post.

Available from the "SPECTRUM" chain of stores, branches of John Menzies and all good computer shops, or by mail order by sending cheque/P.O. to:

PICTURESQUE, 6 Corkscrew Hill, West Wickham, Kent, BR4 9BB. Send SAE for details.



MONITOR

The ideal tool to help the beginner get started, yet it contains all the commands for the experienced programmer to run and de-bug machine code programs. Inspect and alter memory contents in Hex or ASCII. Breakpoints and full Register display. NOW WITH SINGLE STEPPING through RAM or ROM. Disassemble any part of memory, RAM or ROM. Dec-Hex-Dec number converter. Printer output to ZX printer or via RS232 (with Interface 1) or customise to most Centronics printer interfaces. General memory management commands include Hex dump, Insert, Delete, Fill and Move. Can reside in memory with the Assembler (48K machines only) to give a complete Machine Code programming system.

£7.50

INCL. VAT & P&P.



Climbing the tree of knowledge

Quentin Heath reveals methods of making computers seem intelligent

SEVERAL MONTHS ago I promised an occasional series of articles about the programming techniques used in such games as chess, battle strategy and adventure. For those who have waited patiently for the series I fulfil the promise.

Every mind game has a definite structure. It is that structure which determines not only how good the game is but also the way in which it plays.

Many types of game have been explored in this column so it will be an interesting exercise to see the techniques in action and will also provide you with an excuse to polish your programming techniques.

The technique which is the most important in artificial intelligence games is tree structuring. It is the structure which is most used and most useful to the chess programmer. It is one way in which data concerning the state of the game and the usefulness of certain moves is contained in the computer. By manipulating the data, the computer will be able to see which move is best to force a win against a human player.

A typical tree is shown in figure one. It has been pruned for the sake of simplicity but as a game of chess is played it would grow longer. The tree is odd-looking because it has a root at the top and branches which creep down towards the bottom of the page. Each circle which connects one branch to another is called a node—a point where a decision has to be taken by the computer. It has to decide which branch it should take next in its quest down to the end of the structure.

Each level of nodes, on a horizontal plane, is called a ply and the first of those starts after the root. The tree in the illustration is only one example of the many arrangements which can be formed by a computer in its quest for the winning move.

The use of a tree is an involved process which only a computer could handle. An average tree can run into hundreds of plies and thousands of nodes. It would take a human several weeks to work through a tree but would take a computer only two seconds, depending on the skill level at which the

computer can be set. When a computer game starts, the tree structure does not exist. It is built in the RAM of the machine as the computer plays its strategy. All that exists is the root node at the top of the tree which usually points to the address at which the tree is stored in memory.

Two subroutines must exist in some form in a program, called the legal move generator and the evaluation module. Both units aid the computer to create a tree which will play a winning game.

When the computer starts to play, the first thing it seeks is a table of all the possible moves on the board from the legal move generator. The generator finds all the starting moves and produces the first ply of branches from the root of the tree. There may be only a few starting moves, like a game of Nim,

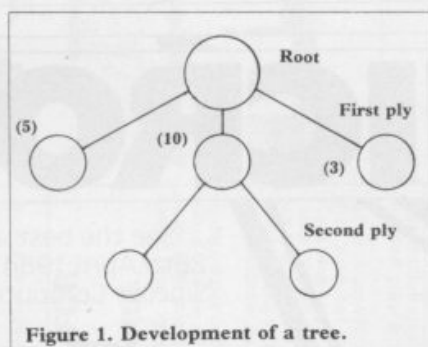


Figure 1. Development of a tree.

or many moves, as in chess, but the computer does not mind. In the fictitious game tree in figure one there are three possible starting positions. They will form the basis for the next move of the computer.

The evaluation module finds which move is closest to the best from all the possible moves. Usually it does so by giving each possible move a score. For instance, in figure one the left-hand node move has been given the score 5, the middle 10 and the right 3. That means that the most promising move is the middle one. The middle node of the first ply then becomes a new root and the computer moves down the tree.

When the evaluator has made its decision, the computer decides whether it has won the game. If it has, it can finish its tree, make the final move and

inform the user. If the winning move has not been found, the computer will return to the legal move generator, use the last move root, in the middle, as a root and produce branches again for the possible moves. Once found, those moves will be evaluated as with the first ply and if a winning move is not found, the computer will generate yet another ply of possible moves.

The representation of a tree in the computer memory does not look like that in the diagram. It would be represented as a table of numbers if the game is in machine code, or numbers in an array if the program is in Basic.

You might have guessed that as the computer could create some massive trees the program could run out of computer memory and be unable to continue the game. There is an easy way to circumvent the problem and that is to prune the tree.

The tree search is a heuristic technique. Using it the computer has to learn from its mistakes and make judgments on the data it has collected. There is another type of technique, an algorithm, in which a ready-made solution is built into the program and the computer follows that to the end and a win.

It is done by cutting away the branches of the tree which are no longer important. They would include all nodes before the current root and those branches and nodes which have been eliminated and not continued. The pruning would free space in memory for extra branches and keep the amount of data which the computer has to sort to a minimum. The computer usually will start its pruning procedures after a certain number of plies have been created. That depends on the type of game and more plies would be needed in chess than in Noughts and Crosses or Nim.

As you can see, the tree structure relies heavily on the legal move generator and the evaluation module. It is those parts of a game program which give the computer its strategic playing power and govern the rules by which the computer fights its duel with the human challenger.

In the next of this occasional series I will examine both those subroutines and see how they affect the performance of a computer which is interested in winning. I will also try to find whether the programmer or the computer makes a chess program a champion.

Next month I will step back into the past and investigate the myth of Perseus and Andromeda, as told by Digital Fantasia.

4

Emmanuel St.

**Our new Personal
Computer Centre
specializing in
the Sinclair Spectrum
with complete support**

we know computers

**1 Business &
Professional**
Tel: 0223 65335-4



**Home &
Educational 4**
Tel: 0223 358264

Cambridge Computer Store

1 & 4 Emmanuel Street, Cambridge

**ZX80/ZX81
and
Spectrum**



Fair
AT

on
Saturday
12th May

**BOLTON
SPORTS CENTRE
SILVERWELL STREET
(city centre)**

Admission: Adults 75p, Children 50p
10 am till 5 pm

HARDWARE, SOFTWARE, BOOKS AND
MAGAZINES - EVERYTHING FOR ZX USERS

THIS IS A FAIR EXCLUSIVELY FOR ZX COMPUTERS

For tables contact Mike Donnachie 0532-552854
after 4 pm

ZX MICROFAIR

**DON'T
FORGET TO
BE AT
ALLY PALLY
ON APRIL
28th**

See the best and see it ALL at Ally Pally on
28th April 1984. The ideal day out for every
Sinclair Computer owner!

Doors open at 10 a.m. and you
can stay all day for only £1.25
adults or 60p (kids under 14).

Of course we'll have to ask you to leave
at 6 p.m. when the exhibition closes, but
by that time you should have seen all the
new software, hardware, add-ons, books,
computers, user groups, and picked-up one of
those bargains that has become a regular
feature of the show!

So make a note of the date:

Saturday 28th April.

You'll kick yourself
if you forget it!

11th
ZX MICROFAIR

SPECTRUM

FOR 16K SPECTRUM

(will also run on 48K Spectrum)



CASSETTE A
GHOST GOBLER
Eat the ghosts before the ghosts eat you. Eat a star and you can chase the ghosts for a while.

ALIENKILL Control lasers, rockets and a force-field to stop the aliens from landing.

MOUSETRAP Trap the mouse in the corner 2 x 2 x 2 to 7 x 7 x 7.

REVERSI A game of skill with simple rules but sophisticated tactics. Play against the computer.

LASER DEFENCE Control the laser sight to shoot down the alien ships. Machine code sound routines.

Ten programs for £6

TANK BATTLE For 2 players simultaneously or play against the computer. Each player has 2 rotate controls and move and fire controls. The tanks fire steerable missiles.

PHOEBUS A puzzle.

BLACKSPOT Gobble the stars and avoid running into black spots created by crossing your own path.

CUBE Manipulate a cube any size from 2 x 2 x 2 to 7 x 7 x 7.

MINIFIELD Collect the crowns while avoiding the mines and the electrified fence.

plus an extra ...
GRAPHIC DEMO Did you know your Spectrum could do all this?

EDUCATIONAL COMPENDIUM FOR 16K/48K SPECTRUM £6

All these programs on one cassette.

These programs were developed for use in a Junior School and have been in regular use there for some time. Older people also find them interesting and fun.

TORTOISE GRAPHICS: an educational graphics language.
16K version commands include: forward, left and right through a specified angle, wipe, pen up and down, paper and ink colour, macro, edit.

48K version has extra commands including: backward, quit, cancel, printer and tape commands, auto, home, variables, loops.

TORTAIL & TORTMAZE: 16K games using the forward, left and right commands. These are good for learning a feeling for distances and angles and are fun to play.

REVEAL: an addictive 16K word game. A piece of writing has had its letters rubbed out and you have to find out what they are. You buy letters or try to predict them. Included are 20 textfiles to be solved and a textmaker which will let you input your own text and store it on tape for someone else to solve.

EQUATION INVADERS: a 16K game to make simple equations more interesting.

CENTIPOID PLUS THREE for 48K SPECTRUM. £6

CENTIPOID (machine code).

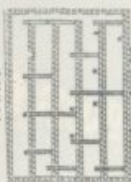
Centipoid is a full-feature arcade game with mushrooms, spiders, webs, scorpions, gobblers, indestructible dead segments of centipoids that drop down on you, and, of course, the centipoids themselves.

You can choose your own control keys. It is playable from the keyboard or using any joystick interface which, like AGF Interface II, makes the joystick behave like keys on the keyboard.

Plus these games in Basic for the 48K Spectrum on the same cassette.



PANIC



HOUND



3D TIC TAC TOE
A 3D game of skill played against the computer.

ORWIN SOFTWARE

ZX-81

<p>CASSETTE 1: eleven programs (including 7 in machine code): React, Invaders, Phantom Aliens, Maze of Death, Planet Lander, Bouncing Letters, Bug Splat, I Ching, Cobreak, Robots, Basic Hangman.</p> <p>for 1K ZX-81 £3.80</p>	<p>CASSETTE 2: ten games in Basic: Reversi, Awari, Laser Bases, Wordmaster, Pentagles, Crash, Roulette, Pontoon, Penny Shoot, Gun Command.</p> <p>for 16K ZX-81 £5</p>	<p>CASSETTE 3: eight programs (including 1 in machine code): Starship Trojan, Star-trek, Princess of Kraal, Battle, Cube, Kalabrias, Secret Messages, Martian Cricket.</p> <p>for 16K ZX-81 £5</p>
<p>CASSETTE 4: 8 games for 16K ZX-81 £6.</p> <p>GUNFIGHT (machine code)</p> <p>INVADERS (machine code)</p> <p>ZX-SCRAMBLE with 3 stages. Bomb and shoot your way through the fortified caves.</p> <p>GALAXY INVADERS (machine code)</p> <p>Fleets of swooping and diving alien craft to fight off.</p> <p>SNAKEBITE (machine code)</p> <p>Eat the snake before it eats you. Variable speed (very fast at top speed).</p> <p>LIFE (machine code)</p> <p>A ZX-81 version of the well known game.</p> <p>3D TIC-TAC-TOE (Basic)</p> <p>Played on a 4 x 4 x 4 board, this is a game for the brain. It is very hard to beat the computer at it.</p>	<p>CASSETTE 5: 8 games for 16K ZX-81 £6</p> <p>BREAKOUT (machine code)</p> <p>PLANETOIDS (machine code)</p> <p>Rotate, move, fire and hyperspace controls. Wide range of choice of speed and difficulty.</p> <p>DODGEMS (machine code)</p> <p>Dodge the computer's car while eating the dots.</p> <p>DRAUGHTS (machine code)</p> <p>Three skill levels.</p> <p>MERCHANT (Basic)</p> <p>Make your fortune on trading voyages in the Mediterranean and beyond.</p>	<p>"quantity as well as quality" <i>Sinclair User</i>, Oct '82</p> <p>"if each game was on a separate tape and selling for £5 each I would still recommend them" <i>ZX Computing</i>, Oct/Nov '82</p> <p>"Easy to operate, graphically impressive and good value for money." <i>The Times</i>, 11th Dec '82</p> <p>"Definitely good value for money at £6 ... A smooth clear display and a relatively fast response from the keys. Graphics are as good as you will ever get on the 81." <i>What Micro?</i> Nov '83</p>
<p>7 of the 8 games are in machine code, because this is much faster than Basic. (Some of these games were previously available from J. Steadman).</p> <p>BYTE-MAN (machine code) (previously available from Mindseye)</p> <p>SPACE RESCUE (machine code) (previously available from Mindseye)</p> <p>BLITZ (machine code)</p> <p>MERCHANT (Basic)</p>	<p>7 of the 8 games are in machine code because it is much faster than Basic.</p>	<p>"New polish on old favourites. ... the quality of the software and the smooth action displays created on the screen make the programs worthwhile for anyone who has a ZX-81 and plays games using it. ... It is pleasant to see that Orwin's kind of quality is available again." <i>Sinclair User</i>, Sept '83</p> <p>"Among the best reviewed was Cassette 5 from Orwin Software. For a mere £6, you get eight top-quality games ... All the games are of very high quality and would cost £4 or £5 if sold separately ... Many of the other software houses could learn a lesson from these." <i>What Micro?</i> Games supplement, Nov '83</p>

Member of the
Computer Trade
Association

Please make your cheques payable to ORWIN SOFTWARE and send your order to ORWIN SOFTWARE, Dept OSU, 26 Brownlow Road, London NW10 9DL.

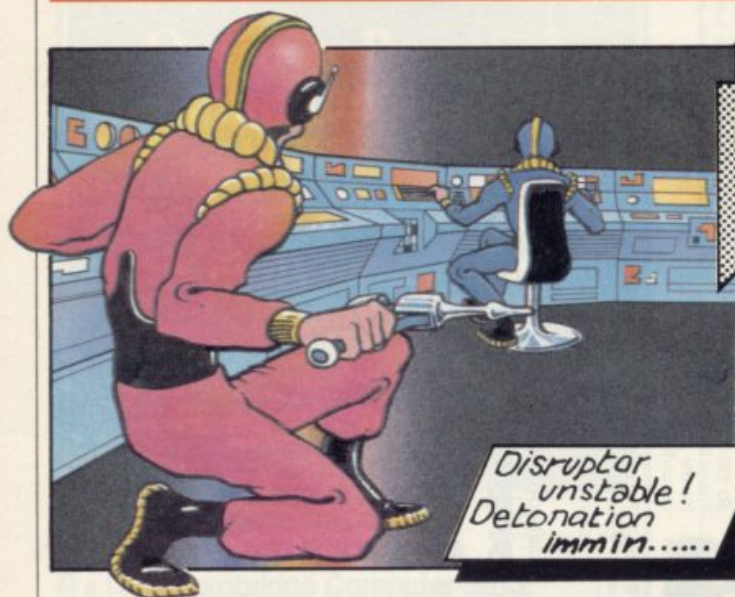
Send SAE for detailed catalogue (please state which computer)

Trans
Cash
5054362

For orders
placed at the
Post Office

BEYOND

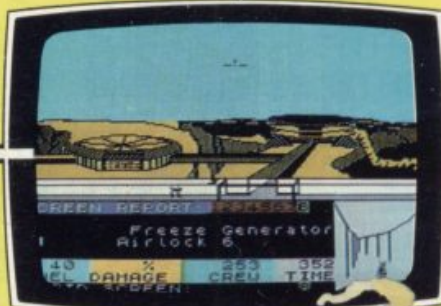
CHALLENGING SOFTWARE



NEW

PSYTRON

Matter Disruptor complex report terminated:
Estimate 75 personnel unaccounted for:
Repair and medi-crews alerted: Defence circuits detect
responsible alien
craft now locked
onto new target:
Saboteur
sighted in central
corridor Sector
7: Pursuit Droid
activated:
Switching to
visual:::



Spectrum

From the
Necromancer's Cauldron...

...Were conjured the ghouls, ghosts and outraged
spirits of centuries of sacrifices to the occult.
Hurled forth from who-
knew-when to
thwart your escape
down the perilous
fortress steps. An ill-
timed move will
plunge you into his
waiting spider's
tangled web. 12
levels of haunting
action.

Spectrum



NEW

Spellbound



NEW

The War of the Solstice
will commence!

the LORDS of MIDDLE-EARTH

Spectrum

Gather those you can to your banner. The
World's first Epic game. Not an adventure
but a living fantasy novel. And you
are the author of the action.



CASSETTE ROUND-UP

If we have reviewed a cassette we have given it a rating known as the Gilbert Factor. That factor includes value for money, the screen layout, the conciseness and speed of the program, the accomplishment of the task it aims to achieve, and the use it makes of the machine.

ZX-81

Adventure

Adventure 1 Abersoft
Barrow Quest Sherry
Black Crystal Carnell
Dr. Whom D. Biggs
Dungeons of Doom Woosoft
Espionage Island Artic
Greedy Gulch Phipps
Inca Curse Sinclair
Knight's Quest Phipps
Lost Island JRS
Magic Mountain Phipps
Merchant of Venus Crystal
Pharaoh's Tomb Phipps
Pimania Automata
Secret Valley Newsoft
Serpents Tomb Vortex
The Great Western New Soft
Time Bandits New Soft
Tomb of Dracula Felix
Volcanic Dungeon Carnell
World of Illusions Constrast

Arcade

Alien Dropout Silversoft
Asteroids Silversoft
Asteroids Software Farm
Astral Convoy Vortex
Bank Robber Romik
Bubble Bugs Romik
Byter Protek
Cassette 1 Orwin
Cassette 2-5 Orwin
Defenda Quicksilva
Door Slammer Cathedral
Froggy DJL
Full-screen Breakout New Generation
Galactic Trooper Romik
Galaxy Jailbreak Romik
Games P Teakle
Games 2 JRS
Games Tape 1 J K Greye
Games Tape 2 J K Greye
Games Tape 3 J K Greye
Gobbleman Artic
Gobbler Software Farm
Grand Prix dK' Tronics
Gulp 2 Campbell
Hang Glider S Electronics
High-resolution Invaders Odyssey
Invaders Abersoft
Invaders Bug-Byte
Invaders Odyssey
Invaders Selec
Invaders Silversoft
Krazy Kong PSS
Maze Death Race Abersoft
Maze Man Bug-Byte
Mazogs Artic
Namtir Raiders Digital Int.
Night Gunner Hewson
Puckman A Stubbs
Six Games Sinclair
Space Raiders JRS
Space Trek Howard
Swag + Voyager New Generation
3D Monster Maze McGraw Hill
Three Games Cassette DJL
Zuckman Artic
ZX Invasion Force Selec
ZX Panic Crystal
ZX-81 1K Games Pack Phipps
ZX-81 Pocket Book Phipps

Business

Accounts (Limited company) Hestacrest
Accounts (Sole Trader) Hestacrest
Business Bank Account Transform
Critical Path Analysis Hilderbay

Draft
Mailing List
Payroll
Payroll
Payroll
Personal Banking System
Purchase Ledger
Sales Day Book
Sales Ledger
Text

Education

Calpac 1-2
Four Rules of Number
Integration
Intermediate English 1-2
Intermediate Maths 1-2
Language Devel. Series
Language Devel. Series
Linear Programming
Matrix Operations
O Level Chemistry
O Level French Revision
O Level Maths Revision
Polynomials
Primary Arithmetic
Regression
Self-teach Program

Language

8 Forth
6 ZX Forth

Practical

Football Pools

Puzzle

8 Nowotnik Puzzle
7 Word Fit

Simulation

6 Fighter Pilot
6 Flight Simulation
6 Pilot
Print Shop

Strategy

Airline
Auto Chef
Bank Raid
Battleships
Conflict
Cyborg Wars
Dallas
Farmer
Football Manager
Fort Apache
Great Britain Ltd
The Settler

Traditional

Do Not Pass Go
Original Superchess
Othello
Tai
Tenpin
ZX 1K Chess
ZX-Chess I
Graphics
Graphics Toolkit
Machine Code Test Tool
MCode
Programme Enhancement
Package
Renumbr Delete
Sideways Copy
Trace

ZX Compiler
ZX Screenkit
ZX-81 Remload
ZX-Bug

Myrmidon
Hestacrest
Hilderbay
Soft Tech
Soft Tech
Hilton
Hestacrest
Transform
Hestacrest
Contast

Calpac
Micro Master
University
Rose
Rose
Glasson
Micro Master
University
University
Calpac
Rose
Rose
University
Rose
University
Anvil

Sinclair
Artic

Hartland

Phipps
Ram Writer

Digital Int.
Sinclair
Hewson
CCS

CCS
CCS
J M Senior
JRS
Martech
Stratagem
CCS
CCS
Addictive Gms.
Contrast
Hessel
BSS

Work Force
CP Software
M.O.I.
PSS
Phipps
Artic
Artic

IPA
JRS
OCP
PSS

R and R
Work Force
D King
Texgate
Silversoft
Picturesque
Picturesque
Artic

* ZX-sideprint
* ZXAS
* ZXDB

Microsphere
Bug-Byte
Bug-Byte

SPECTRUM 16K

Adventure

Android One Vortex
Escape New Generation
Mines of Saturn/Return to Earth Mikro-Gen
Moria Severn
Planet of Death Artic
Secret Valley Newsoft
The Great Western New Soft
Time Bandits New Soft

Arcade

Aquarius Bug-Byte
Arcadia Imagine
Arcadian J K Greye
Assassin Spectrasoft
Attack on New York Fry
Avenger Abacus
Baltic Patrol E. Midland
Baron Temptation
Base Invaders Imagination
Black Hole Quest
Blind Alley Sunshine
Breakaway Procom
Bug Blaster Crystal
Cassette A Orwin
Caterpillar CDS
Cavern Fighter Bug-Byte
Centi-bug dK' Tronics
Children's Compendium Dymond
City Defence Mikro-Gen
Colour Clash Romik
Cookie Ultimate
Cosmic Guerilla Crystal
Creepy Crawler Mikro-Gen
Crevasse and Hotfoot Microsphere
Cruising Sunshine
Cyber Rats Silversoft
Death Chase Micromega
Demolition Comp. Rentals
Destroyer Winters
Digger Dan Ocean
Dymond Dymond
Earth Defence Artic
Eskimo Eddie Ocean
Family Games Pack Hornby
Fireflash Abacus
Froggy DJL
Fruit Line P A Hanson
Fruit Machine dK' Tronics
Galactians dK' Tronics
Galactic Trooper Romik
Galactic Warriors Abacus
Galaxians Artic
Games Pack 1 A Burnham
Games Tape 1-2 Sospan
Ghost Hunt PSS
Gnasher R & R
Gobble-a-Ghost CDS
Gobbleman Artic
Godzilla and Martians Temptation
Gorilla D Hornsby
Ground Attack Silversoft
Ground Force Zero Titan
Gulpman Campbell
Haunted Hedges Micromega
Hopper PSS
Horace and the Spiders Sinclair
Horace Goes Skiing Sinclair
Hungry Horace Sinclair
Invasion Force Artic
Jogger Severn
Labyrinth Axis
Leap Frog CDS
Light Cycle PSS

Luna Crabs	Micromega	7	Maths Tutor	AD Software	* Programmer's Dream	Work Force	8
Lunar Jetman	Ultimate	*	* Matrix Operations	University	7 Renumbr Delete	Work Force	*
Magic Meanies	CDS	2	Money	Poppy	* Slow Loader	ELR	9
Maze Chase	Hewson	8	Night Sky	Bridge	* Sound FX	dK' Tronics	6
Meteor Madness	Spectresoft	*	* Number 6	Prime	* Spec. Bug	Artic	*
Meteor Storm	Quicksilva	7	O Level Maths	Homestudy	* Spec. Editor/ Assembler	Picturesque	8
Meteoroids	dK' Tronics	7	O Level Physics	Homestudy	* Spec. Monitor	Picturesque	8
Meteoroids	Softek	6	Pathfinder	Widget	* Spec. Sound	M Afzal	*
Millypede	Add-on	7	Polynomials	University	8 Spec. Tape Copier	S Giza	*
Mined Out	Quicksilva	7	Pre/early school cassettes	Essex	* Spectrum Super Toolkit	Nectarine	8
Moon Buggy	Visions	*	* Primary Arithmetic	Rose	* Spectsound	PDQ	2
Muncher	Silversoft	*	* Punctuation Pete	Heinemann	* Supercode	CP	*
Muncher	Silversoft	6	Regression	University	8 Tape Breaker	Spectrasoft	*
Nanas	Mikro-Gen	*	* Self-teach Program	Anvil	* Tape Copier	Lerm	*
Orbiter	Silversoft	7	Shape Sorter	Widget	* Taswide-64	Tasman	*
Ostron	Softek	*	* Special Agent	Heinemann	* The Key	Keysoft	*
Pengy	Micromania	4	Spellbin	Startersoft	* Trace	Texgate	8
Pitman Seven	Visions	*	* Teacheraid	B Farris	* Trace	Zen	*
Planetoids	Sinclair	8	Use and Learn	MicroI	8 X Ray	Zen	*
Proteus	Abacus	5			ZXED	dK' Tronics	*
Rapedes	Visions	*	Language				
Repulsar	Softek	*	Beta Basic	Betasoft	9		
Rider	Virgin	6	Practical				
Road Toad	DK Tronics	7	Biorythms	Spectrasoft			
Robot Panic	Soft Mill	1	Countries of the World	Hewson			
Santa	Artic	*	Cycle Planner	Medidata			
Sentinel	Abacus	7	Shopping List	SD			
Shark Attack	Romik	5	Puzzle				
Sheer Panic	Visions	7	Flippit	Sinclair			
Shiva Special I	Shiva	*	Lojix	Virgin	7		
Sky Raider	C M Smith	*	Nowotnik Puzzle	Phipps	3		
Slippery Sid	Silversoft	8	Quazar	Rose	7		
Space Fighter	Winters	*	Simulation		4		
Space Intruders	QS	7	Air Traffic Controller	Hewson			
Space Lanes	Cathedral	*	Airliner	Protek	6		
Space Raiders	Sinclair	6	Golf	R & R	7		
Space Zombies	Mikro-Gen	*	Golf	Virgin	8		
Spec. Frogs/ Showdown	Artic	*	NightFlite	Hewson	5		
Spec. Gobbleman	Artic	*	Print Shop	CCS	8		
Spec. Invaders	Artic	*	Pro-Golf	Hornby	7		
Spec. Invasion Force	Work Force	7	Strategy				
Spec. Scramble	R and R	8	Auto Chef	CCS			
Spectipede	Bug-Byte	8	Big Match Soccer	Winters			
Spectral Invaders	Hewson	5	Dallas	CCS	6		
Spectral Panic	Bug-Byte	6	Dictator	Bug-Byte			
Spectres	Spectresoft	4	Farmer	CCS	*		
Strike Four	Bug-Byte	7	Football	Winters	*		
Styx	Romik	*	Heathrow	Hewson	8		
Sub	dK' Tronics	8	Las Vegas	Temptation	*		
Tank Battle	Carnell	3	Quincy	Seyern	*		
The Devil Rides In	Romik	9	The Settler	BSS	*		
3D Monster Chase	Microsphere	5	Traditional				
Train Game	JK Greye	6	Backgammon	Hewson			
Vortex	CDS	*	Bridge Tutor	CP	8		
Winged Warlord	Abersoft	7	Bridgemaster	Bridgemaster	9		
Wizard's Warriors	Virgin		Challenge	Temptation	*		
Yomp			* Gambling Tape	Dymond	*		
Business			* Odds-on	RSD	*		
Finance Manager	OCP	9	* Othello	CP Software	*		
Home Computer Pack	SD Micro	*	* Othello	M.O.I.	*		
Masterfile 16	Campbell	7	* Pinball	Winters	*		
Matcalc	Work Force	8	* Pool	Bug-Byte	7		
Vu-Calc	Sinclair		* Reversi	Sinclair	8		
Vu-File	Sinclair		* Roulette	Newsoft	*		
Education			* Solo Whist	Video Soft.	*		
Alphabet	Widget	*	* Spec. Microchess	Artic	*		
Alphabet Games	Sinclair	7	* Super Play I	Video	*		
Apostrophe	Sinclair	*	* Tennis	Winters	*		
Ballooning	Heinemann	*	Utility				
Calpac 1-3	Calpac	*	* Aspect	Bug-Byte	5		
Car Journey	Heinemann	*	* Audio Sonics	Work Force	4		
Cargo	Sinclair	*	* Character Generator	Spectrasoft	*		
Counting	Starter Soft	*	* Designer	Matrix	*		
Counting	Widget	8	* Dietron	Custom	6		
Education One	Lerm	*	* Disassembler	dK' Tronics	7		
Educational	Startersoft	*	* Display	Work Force	*		
Firework Music	Soft Cottage	*	* Editor/Assembler	Picturesque	8		
Four Rules of Number	Micro Master	8	* Extended Basic	CP	7		
French Voc Test	Tutorial	*	* FP Compiler	Softek	9		
Hidden Letters	Poppy	*	* KeySounder	S and G	*		
Hot Dot Spotter	Longman	*	* Machine Code Test Tool	OCP	7		
Integration	University	*	* Master Toolkit	OCP	*		
Intermediate English 1-2	Rose	*	* MCoder	PSS	8		
Intermediate Maths 1-2	Rose	*	* Micropen	Contrast	*		
Language Devel. Series	Glasson	*	* Peek	Zen	*		
Language Devel. Series	Micro Master	*	* Print Utilities	Sinclair	*		
Learn Basic	Logic 3	*	* Print Utilities	Sinclair	7		
Learning Read 1	Poppy	*					
Linear Programming	University	*					
Marks Book	Lerm	*					

SPECTRUM 48K

Adventure

Abyss	CCS	6
Ace in the Hole	Add-on	*
Adventure I	Abersoft	6
Adventure Island	Contrast	*
Alchemist	Imagine	*
Arcane Quest	Add-on	*
Black Crystal	Carnell	7
Black Dwarf's Lair	Newsoft	7
Black Planet	Phipps	7
Byte	CCS	*
Classic Adventure	Melbourne Hse	*
Colossal Caves	CP	8
Cry Wolf!	Add-on	*
Crypt	Carnell	6
Demon Lord	MCE	5
Detective	Arcade	7
Devils of Deep	Shephard	*
Diamond Quest	CCS	4
Diamond Trail	Gilsoft	7
Dragonsbane	QS	6
Dungeon Master	Crystal Comp.	8
Dungeons of Doom	Temptation	3
Espionage Island	Artic	5
Everest Ascent	Shepard	6
Fantasia Diamond	Hewson	*
Golden Apple	Artic	7
Gorgon	Phipps	*
Halls of Things	Crystal Comp.	9
Here comes the sun	Alligata	7
Hobbit	Sin/Melborne Hse.	9
Hole	Add-on	*
Horror Atoll	Add-on	*
Inca Curse	Sinclair	6
Invincible Island	Shephard	8
Island	Crystal	4
Island	Virgin	7
Jericho Road	Shards	*
Jungle Adventure	CCS	4
Knight's Quest	Phipps	6
Leopard Lord	Add-on	4
Lords of Time	Level Nine	8
Lost Over Bermuda	Add-on	*
Mad Martha	Miko-Gen	7
Mad Martha II	Mikro-Gen	*
Mountains of Ket	Incentive	8
Murder at Manor	Gemtime	7
Oracle's Cave	Doric	8
Pi-Eyed	Automata	6
Pimania	Automata	7
Quest	Hewson	7
Quetzalcoatl	Virgin	8
Roundsby Incident	Add-on	*
Satan's Pendulum	Minatron	7
Ship of Doom	Artic	7
Solaris	Softel	*
Superspy	Shepherd	5
Terror from The Deep	Add-on	*
The Castle	Bug-Byte	*
The Orb	Comp. Rentals	*
Time Quest	Mikro-Gen	*
Tomb of Dracula	Felix	*
Transylvanian Tower	Shepherd	7
Urban Upstart	Shepherd	*
Valhalla	Movisoft	7
Vampire Village	Terminal	4
Velnor's Lair	QS	8
Volcanic Dungeon	Carnell	6

Who Dares Wins
Wrath of Magra
Ziggurat of Dread

Arcade

Adven. St. Bernard
Android Two
Ant Attack
Armageddon
Atic Atac
Base Invaders
Bear Bovver
Birds and Bees
Blade Alley
Blue Thunder
Brain Damage
Bubble Trouble
Bugaboo
Chequered Flag
Chuckie Egg
Chuckman
Corridors of Genon
Cruise Attack
Cyber Zone
Deffendar
Defusion
Demon
Demon Chase
Devil Rides In
Di-Lithium Lift
Dimension Destructors
Dinky Digger
Dodge City
Elektro Storm
Fred
Freez Beez
Galaxy Attack
Hickstead
High Noon
House of Living Dead
Hunchback
Invasion Body Snatch.
Jackpot
Jet Pac
Killer Knight
Knight Rider
Krazy Kong
Last Sunset Lattica
Lazatron
Lazer Zone
Loony Zoo
Manic Miner
Maze Death Race
Maziacs
Monkey Biznes
Moon Alert
Mr Wimpey
Pat the Postman
Penetrator
Pi-Balled
Pssst
Pyramid
Raider Cursed Mine
Rescue
Rescue
Robot Riot
Rommels Revenge
Scuba Dive
Security Shelter
Skull
Space Station Zebra
Spectron
Splat
The Guardian
The Pyramid
The Snowman
3D Seiddab Attack
3D Star Wars
3D Tunnel
Time Gate
Tobor
Tranz Am
Traxx
Tube Train Terror
Tutankhamun
Warlock of Firetop
Mountain
Wheelie
Xadom

Business

Account Management

E. Midland
Carnell
Add-on

Carnell
Vortex
QS
Silversoft
Ultimate
Work Force
Artic
Bug-Byte
PSS
R Wilcox
Silversoft
Arcade
QS
Sinclair
A & F
Add-on
New Gen.
Mikro-Gen
Crystal
Mikro-Gen
Incentive
Microcosm
Mansfield
Carnell
Hewson
Artic
Postern
Phoenix
PSS
QS
Silversoft
Sunshine
CCS
Work Force
Phipps
Ocean
Crystal
Comp. Rentals
Ultimate
Phipps
Hewson
PSS
Arcade
Contrast
QS
Phipps
Bug-Byte
PSS
dk' Tronics
Artic
Ocean
Ocean
Mikro-Gen
Melbourne Hse
Automata
Ultimate
Fantasy
Arcade
Comp. Rentals
Ocean
Silversoft
Crystal
Durrell
Add-on
Games Machine
Beyond
Virgin
Incentive
PSS
Fantasy
Quicksilva
Hewson
Add-on
New Generation
QS
Add-on
Ultimate
QS
JRS
Micromania
Penguin
Microsphere
QS

* System
* Accounts (Limited
Company)
* Accounts (Sole Trader)
Address File
Address Manager
Bank Account System
Bank Verifier
Business Bank Account
Cash Controller
Collector's Pack
Critical Path Analysis
Database
DIY Book-keeping
Masterfile
Omnicale
Payroll
Personal Banking System
Personal Financ.
Management Syst.
Sales Day Book
Spreadsheet
Tasword
Tasword II
Utility File
Word Processor

Education

ABC Liftoff
Angle
Angle Turner
Astro Maths
Castle Spellorous
Chess Tutor 1
Countabout
French is Fun
French Mistress
French Voc Test
German Master
Guitar Tutor 1
Guitar Tutor 2
Handwriting
Learn to Read 1-5
Magnets
Make-a-Chip
Mansfield Park
Mathskills II
Mr. Men
Musicmaster
Nineteenth C. England
O Level Chemistry
O Level Physics
Party Time
Pirate
Quick Thinking
Sequences
Spanish Gold
Speak and Spell
Speech Marks
Teach Data
Teacher Data
Tense French
Whizz Kid

Language

Forth
Forth
Micro Prolog
Pascal Compiler
Snail Logo
Spec. Forth
Spec. Forth
ZX Forth

Practical

Beamscan
Diet
Diet Master
Dietician
Engine Diagnostic
Football Pools
I Ching
I Ching
Personal Reminder
Star Gazer
World Info

Puzzle

Hanoi King
Jumbly
3D Strategy

Fulwood

Hestacrest
Hestacrest
SD Micro
OCP
K Gouldstone
SD Micro
Transform
Shepherd
Sinclair
Hilderbay
Microl
RAMTOP
Campbell
Microsphere
Hilderbay
Hilton

Longman
Chalksoft
Arnold Wheaton
Scisoft
Sinclair
Sinclair
Longman
CDS
Kosmos
Tutorial
Kosmos
Harlequin
Harlequin
Chalksoft
Sinclair
Sinclair
Sinclair
Sussex
Griffin
Mirror
Sinclair
Sussex
Calpac
Think Tank
C. Tutor
Chalksoft
Mirror
Chalksoft
Chalksoft
S and G
Sinclair
B Farris
B Farris
Sulis
Comp. Tutor

Melbourne Hse.
Sinclair
Sinclair
Hi-Soft
CP
Abersoft
CP
Artic

Beamscan
dk' Tronics
Diet Master
Keysoft
Spectrasoft
Hartland
Salamander
Sirius
SD Micro
CRL
Wimsoft

Contrast
dk' Tronics
QS

Simulation

* Fighter Pilot
* Flight Simulation
* The Forest
7 Golf
8 Inkos
* Royal Birkdale
* Test Match
7 The Forest
7 Troon

Strategy

* Airline
8 Apocalypse
9 Battle 1917
9 Battle of Britain
* Brewery
* British Lowland
* Caribbean Trader
* Caribbean Trader
7 Conflict
8 Derby Day
9 Football Manager
* Galaxy Conflict
* Galaxy Conflict
Gangsters
General Election
Great Britain Ltd
Hunter Killer
Johnny Reb
King Arthur
1984
Oligopoly
* Plunder
5 Red Weed
* Sheepwalk
* Stonker's
* Tradewind
* War 70
* Warlord

Traditional

7 Backgammon
* Brag
* County Cricket
7 Do Not Pass Go
7 Draughts
* Evolution
6 Go To Jail
8 Grid run/Pontoon
* Original Superchess
* Pontoon
* Ramopoly
* Roulette
* Scrabble
5 Snooker
* Superchess II
* Superchess Three
7 The Turk
* Voice Chess
8 Yahtzi
7 ZX Draughts
* ZX-Chess II

Utility

9 Allsort S-1
7 Assembler
8 Beyond Basic
* Cartoon Animation
8 Compiler
9 Composer
8 DLAN
8 Football
FP Compiler
Games Designer
9 List File
* Melbourne Draw
6 Monitor/Diss.
4 Music Maker
* Paintbox
* Print Utilities
7 Quill
* Softalk 1-2
* Spec. Assembler
8 Spec. Compiler
* Spectadraw 2
Spectrum Extended Basic
Spectrum Super Toolkit
* Supercode
* Vu3D
8 Zeus Assembler

Digital Int.
Sinclair
Phipps
dk' Tronics
Chalksoft
Ocean
Comp. Rentals
Phipps
Hornby

CCS
Red Shift
CCS
Microgame
CCS
CCS
E. Midland
E. Midland
Martech
Comp. Rentals
Addictive Gms.
Martech
Martech
CCS
Bug-Byte
Hessel
Protek
Lothlorian
E. Midland
Incentive
CCS
CCS
Lothlorian
Virgin
Imagine
WDS
CCS
Lothlorian

CP
T Lebon
Allanson
Work Force
CP
Microsphere
Automata
Arcade
CP Software
Contrast
J Fletcher
Dymond
Sinclair
Visions
CP
CP
OCP
Artic
Work Force
CP
Artic

A Firminger
Artic
Sinclair
Fowler
Softek
Contrast
Campbell
Digital Int.
Softek
QS
SD Micro
Melbourne Hse.
Sinclair
Bellflower
Print & Plotter
Sinclair
Gilsoft
CP
Artic
Softek
McAlley
CP Software
Nectarine
CP
Sinclair
Sinclair

ZX-81, SPECTRUM, DRAGON, BBC, VIC 20 and COMMODORE 64 SOFTWARE LENDING LIBRARY

We have for hire programs for your computer. Hire charges start at 50p (ZX-81).

£5 life membership (less than the cost of a single game) brings you the **SOFTWARE LENDING LIBRARY** membership kit, including catalogue and newsletter.

We now have **over 300 hire titles**, mostly for the Spectrum. We deal with all orders by return of post. Overseas members are welcome.

All major titles which we cannot hire to our members are discounted at impressive rates.

Send cheque or PO for £5 to:
SOFTWARE LENDING LIBRARY
PO BOX 3, CASTLEFORD,
WEST YORKS.

Stating name, address and computer type.

All tapes used with manufacturers' permission.

SPECIAL QL SECTION NOW OPEN
£10 LIFE MEMBERSHIP

TWO GAMES FOR THE PRICE OF ONE!



**SPECIAL
INTRODUCTORY
OFFER**

**ONLY
£5.95**
inc. VAT & p&p

Sunken Treasure Graphics adventure—no other game like it on the market. Sail the seven seas, fight off pirate attacks, battle with gales—all in search of sunken treasure, which could be in any one of 3 million locations!

Smuggler Unique, fast-moving fantasy adventure game. International wheeling and dealing, smuggling, hijacking, etc. See how quickly you can make a million!

**Sinclair ZX81
16K RAM**



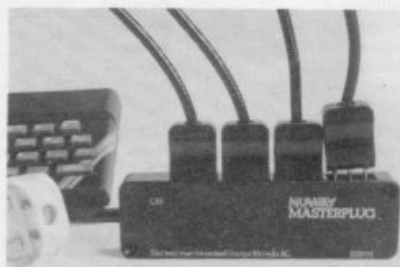
David Tudor Productions
40 Thames Avenue, Pangbourne, Berks RG8 7BY.
Tel: Pangbourne (073 57) 4562.

Prices include UK carriage and VAT. (Overseas: add 55p p&p per tape). Trade enquiries welcome. Please allow 21 days for delivery. All games guaranteed against malfunction.

Proven

MASTERPLUG ELIMINATES ALL THAT UNTIDY WIRING

TV/ MONITOR CASSETTE RECORDER COMPUTER SPARE



- ★ Neon on/off indication.
- ★ 1.5 metre lead with mains plug supplied.
- ★ Enables 4 appliances to be connected safely, compactly and economically into one mains outlet socket.
- ★ Complete with four special easy to connect plugs—no more to buy.
- ★ Safe—complies with BS 5733 and Electrical Equipment Safety Regulations 1975 (amended 1976).
- ★ Easily fitted to any surface with screws provided.

£8.49 + 50p p&p each
Buy 2 for £16.00 and save almost £1.00

PLEASE SUPPLY (state which computer)

QtyDescriptionPrice (inc p&p £

Send cheques/POs now to: **H & K Supplies, 27 Inglewood, Woking, Surrey, GU21 3HX.**

new

Spectrum keyboard

ENABLES ACCURATE DATA ENTRY

Simple modification for ZX-81



- ★ 46 keys plus full length space bar.
- ★ 6 user keys—wired for special functions of your choice.
- ★ Ergonomically designed for ease of use.
- ★ Key identity legends protected by transparent plastic keycaps—will never wear.
- ★ Reliable professional keyboard used by industry.
- ★ Keys incorporate cantilevered contacts isolated from key return dynamics, to ensure contact pressure is independent of key operation.
- ★ Contacts gold alloy inlay.
- ★ Keyboard designed to be used independently of housing if required.

**Keyboard with
Housing£59.95 + £2 p&p**
Keyboard only£39.95 + £1 p&p

low cost

ALPHACOM 32

SPECTRUM COMPATIBLE PRINTER

Full interfacing to Spectrum/ZX-81



- ★ Quiet, maintenance free.
- ★ High speed operation.
- ★ Uses low cost easily available paper.
- ★ Comes complete with user manual, one roll of paper, and power supply unit.
- ★ Self test facility.
- ★ Automatic feed.
- ★ Uses standard Sinclair print commands: COPY, LLIST and LPRINT OUT.
- ★ Paper available from us @ £12.00 including p&p (10 rolls, each 25 metres long).

£59.95 + £2 p&p

TRANSFORM LTD.

Business Software

FOR SMALL BUSINESSES AND THE SELFEMPLOYED

Business Bank Accounts

This program enables you to make debits under 17 sub-headings. Statements includes totals of all subheadings.
ZX SPECTRUM 48K £10.75

Sales Day Book

For all your invoices, this program will enable you to prepare statements of outstanding invoices. Program will also calculate VAT.

ZX SPECTRUM 48K £10.75

Purchase Day Book

Keeps a complete record of all your purchases under 17 sub-headings. This program will also calculate VAT.

ZX SPECTRUM 48K £10.75

Business Packs

Incl. Bank Account, Sales, Purchase programs.

ZX SPECTRUM 48K £25.00

Stock Control

Handles 900 lines, includes details of supplier. Program has full search facilities enabling you to search & update all lines from one supplier. It is also possible to deduct items from stock.

ZX SPECTRUM 48K £10.75

Invoicing

This Program will print out invoices, calculate discounts and VAT. The program will calculate totals from unit prices, giving the description of each unit price.

ZX SPECTRUM 48K £15.00

Word Processing by Tasman

Tasword Two is a powerful word processing program that will perform all the functions available on large word processors. The program will give you on screen 64 characters per line.

ZX SPECTRUM 48K £13.90

Masterfile by Cambell Systems

This is one of the best data systems available for the ZX Spectrum. This program has many uses in a small business.

ZX SPECTRUM 48K £15.00

Dlan by Cambell Systems

Use your Spectrum to sell your products. Dlan will display your message in up to 11 different typefaces. Will scroll in any direction.

ZX SPECTRUM 48K £7.95

64 Column Generator by Tasman

You can use this program within your programs to display 64 columns of screen.

ZX SPECTRUM 16-48K £5.50

Payroll by Byte One

This payroll program will handle up to 40 employees and can calculate NIC, PAYE, superannuation and many other deductions. This is a very user friendly program and extremely good value.

ZX SPECTRUM £19.95

Omnicalc by Micro Sphere

The best spread sheet for the ZX Spectrum 48K 99 columns 250 rows.

£9.95

All the above programs include VAT, post and packing. A VAT invoice will be sent with all purchases.

PROFESSIONAL KEYBOARD £69.95 add £2.00 p&p

PRINTERS

All the above programs will now run on a full size printer, we can now offer you a complete package including interface and printer.

Centronics interface for ZX Spectrum ... £39.14

Seikosha GP100A printer £178.25

Epson RX FT printer £265.00

Epson FX80 printer £381.60

Many other printers available send SAE for details on software and printers.

Please add VAT to the prices of printers and interfaces and £5.00 for postage of printers.



TRANSFORM LTD.

41 Keats Ho Porchester Mead Beckenham Kent

Tel: 01-658 6350

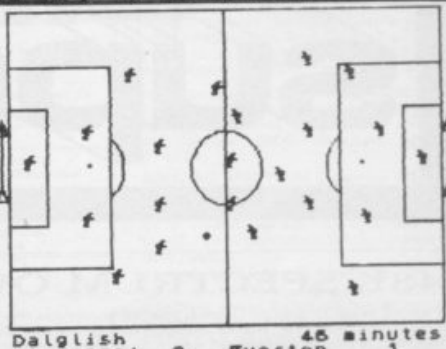
SINCLAIR USER May 1984

SUPER-LEAGUE



For use on
48K
SPECTRUM

		W	D	L	F	A	Pts
1	Ipswich T.	16	8	5	41	20	54
2	Liverpool	16	8	5	41	20	54
3	Notts Cptu	13	8	5	45	19	48
4	Birmingham						
5	West Ham						
6	Southam						
7	Leicester						
8	Notts.						
9	Uolves						
10	Tottenham						
11	Sunderl						
12	Q.P.A.						
13	Watford						
14	Everton						
15	Norwich						
16	Coventr						
17	Aston V						
18	Man. Uni						
19	Luton T						
20	U.B.A.						
21	Arsenal						
22	Stoke C						



- Full 22-team League
- 42-match season

- Full 11-a-side match action
- Scale 90-minute game
- On-screen commentary showing current score, name of player in possession, time played
- Individual player skills
- League table and results on screen and printer
- Save season to date on tape

Be a top tactician and watch your team play in the safety of your home!

Also form any league of 22 teams and pick your own players!

£6.50
(inc. p. & p.)

Order direct from

**CROSS SOFTWARE,
36 Langford Crescent,
Barnet, Herts, EN4 9EH**

Also available from selected stores in the London area (including Virgin Megastore, Oxford Street)

HIRE SPECTRUM SOFTWARE

CHOOSE FROM OUR VAST RANGE

FREE 26 page CATALOGUE with full details of our range of over 280 different programs for the ZX SPECTRUM. All hired with the consent of the publishers. Whether you prefer to ZAP aliens, get lost in an ADVENTURE game, EDUCATE your children, CALCULATE the family finances or COMPILE machine code programs WE HAVE THE RIGHT TAPES FOR YOU TO HIRE.

FAST SERVICE

We stock up to 60 manufacturers' original copies of each tape (over 3000 tapes in stock), and can normally despatch your tapes the day we receive your order, and we always use first class post.

LOWEST PRICES

We believe our prices are the lowest of any library, yet we offer the LARGEST range of titles. Hire up to 3 tapes at a time, for 2 weeks, for only £1.07 each (inc. VAT & p&p).

FREE TAPE HIRE

For a limited period, we will send your first tape (your choice) FREE, so join our library now. You can't afford NOT to! If you've tried another library and are wary of our claims send a stamp and we'll gladly send you a copy of our catalogue - we're confident you'll join when you see it!



**NATIONAL
SOFTWARE
LIBRARY**

200 Mulgrave Road,
Cheam, Surrey SM2 6JT

I enclose cheque for £6.00 for LIFE MEMBERSHIP and I understand that my first tape hire will be FREE. If, within 28 days, I'm not delighted with your service you'll refund my membership fee.

Name _____

Address _____

SUS

Sinclair Supermart

48K SPECTRUM OWNERS!

If you are sitting 'O' level (or Common Syllabus) Mathematics this June, then this Educational Software is a must. The Worked Examples package consists of a comprehensive suite of Mathematical programs devised and written by an Honours Maths Graduate with many years classroom Teaching experience. The programs will SHOW you how to interpret examination questions in each topic and how to obtain maximum credit for your answers.

(State GCE Board and syllabus reference when ordering)

The 'Worked Examples' package includes full documentation and costs £7.95 (including p&p)
Send cheque/PO to MATHMATIX, Freeport, West Glamorgan, SA2 9ZZ (no stamp needed)

SPECTRUM REPAIR SERVICE VERY FAST

Send your faulty Spectrum, briefly describing faults to:

Trident Enterprises Ltd,
37 Linden House,
Common Road,
Langley, Slough,
Berks SL3 8TT

or Phone Slough (0753) 48785 Monday to Saturday, Only £12.50 + Parts and Postage.
We also repair all Commodore Systems

SPECTRUM/ZX-81 REPAIRS

Fast efficient service

Acesure Ltd,
43 Old St,
Ashton-u-Lyne,
Lancs.

Tel: 061-339 8266

TEACH YOUR CHILD

ZX Spectrum 16 or 48K

(All programs include keyboard overlay)



HIDDEN LETTERS Reading comprehension and spelling game	Age 5 on	£6.00
MONEY 3 levels	Age 3-10	£6.50
TELLING THE TIME 7 Programs, including clock for child to set	Age 3-10	£7.00
LEARNING TO READ 1 4 All-graphics pre-reading games	Age 2-5	£6.50

POPPY PROGRAMS, Richmond House, Ingletton, Carnforth LA6 3AN
Computer Trade Association Member

3-D WORLD SERIES CRICKET

Captain England against a great world XI.

Make all the decisions to win, re:
toss, weather, bowler, strokes,
field settings, extras, run-rate.
Scorecards & Bowlers' Analysis.

Great Graphics. Truly realistic.

48K Spectrum £4.95

Basoft, Lyndbrook, Borth,
Dyfed SY24 5JA

DISCOUNT SOFTWARE

Save discounts off most computers

12 page catalogue including

SPECTRUM	ASP	Our Price
AIR ATTACK (ULTIMATE)	5.00	4.25
OMEGA RUN (CR)	5.95	4.50
COMMODORE 64 SCRAMBLE	7.00	5.00
VIC 20 META GALACTIC LLAMA (LLAMASOFT)	5.00	3.00
MAC CHUCKIE EGG (A+E)	7.00	5.00
NITE FLITE (HENSON)	6.95	4.50
DRAGON HUNGRY HORACE	5.00	4.00

C.M.S. P&P: 10p 1 Tape, 2 or more post free. S&E for 12 page catalogue to Discount Software, 45 Brunswick, Bracknell, Berks.

O LEVELS

48K Spectrum Tuition Software

Not just revision but full tuition programs for MATHS

TAPE 1: logarithms, modulo, square roots, fractions, decimals, rounding, areas, volumes, bases, indices, number sets, standard form, sets, probability frequency distribution, averages, interest, tree diagrams, basic algebra, set laws.

TAPE 2: Trigonometry, 3D trig, vectors, differential calculus, geometry, pythagorus, matrices, integral calculus, transformational geometry, rates of change, maxima and minima.

A TOTAL OF 80K ON EACH TAPE (4 PROGRAMS)

One tape £9.95 both tapes £16.95

GCE TUTORING: 40 BRIMMERS HILL WIDMER END HIGH WYCOMBE, BUCKS.

DISCOUNT GAMES! POST FREE! FAST SERVICE! SAE FOR HUGE LIST! BE AMAZED!

GI RECORDS, COCKBURN
STREET, EDINBURGH.

ACCESS/VISA ORDERS
031-225 9565

LOCATOR IS EDUCATION

Full range of programs for the SPECTRUM and ZX-81 from INFANT to GCE. Most makes in stock. GAMES TAPES: 3 for price of 2. SAE (9 x 4) for catalogue and Special Offers.

12 FERNHALL DRIVE, REDBRIDGE, ESSEX IG4 5BN. Tel: 01-550 5575

POOLS PREDICTION

Made easy on 48K Spectrum. Takes 1 1/2 hours per week to make predictions. Regular small wins possible. Outputs best draws, homes and aways. Features analytical draw finder which allows program to learn from it's own mistakes, however small. Comes with free permutation calculation program. Also - Porton (48K only) can you win the bank and beat the Spectrum? It's not easy.

Ask for:

British Pools 48K at £8.95
Australian Pools 48K at £8.95
Porton 48K at £3.95
ROMBEST: 9, Hawkstone Avenue,
Newport, Salop TF10 7SE

NEW!

DRIVING TEST (Part 1)

- ★ Simulated controls ★
- ★ Fault analysis ★
- ★ Good graphics ★

A useful game if you are learning or interested in driving.

ZX-81 (16K)	£5.95
Spectrum (16K)	£6.95
Electron	£7.50

TRADE ENQUIRIES WELCOME

Replies to:
Dept SU, ACE Services,
8 Ayrfield Road, Biggin Hill, Kent.

COMPUTER CABINETS

A range of Cabinets and Housing Units especially designed for your home computer system. Keep it dust free, tidy and secure.

Send S.A.E.
for Colour Brochure:

MARCOL CABINETS
PO BOX 69,
SOUTHAMPTON
Tel: 0703-731168

SPECTRUM M/C CODERS!

DON'T READ THIS IF ALL YOUR
PROGRAMS WORK FIRST TIME

However, the rest of us do make mistakes. But now, you can dramatically reduce debugging time. DEMON is a purpose built monitor that harnesses your M/C code program. DEMON constantly displays diagnostic information about your program, and allows you to stop, examine, change, and resume processing. Thus you can and debug simultaneously. DEMON features:

- Break key and/or Break points
- Step one instruction at a time, or run continuously
- Change registers/storage at any time
- Keep selected registers/storage on the screen continuously
- DEMON is load address independent (i.e. LOAD's almost anywhere)
- Compact size of DEMON ideal for 16K Spectrum
- Simple to use menu panels (no need to keep flicking through a lengthy manual)
- Slow down/Stop/Trace ROM (See exactly how those ROM routines actually work in action)
- Hex or Decimal input/display
- Diagnostics to any part of screen, or printer
- Switch DEMON on/off at will. Jump back to BASIC + more.

*****MICRODRIVE VERSION INCLUDED*****

All inclusive price of only £9.95

(16K or 48K Spectrum only).

Cheques and P.O.'s to:

MICROCOSM

48 The Glade, Clayhall,
Hford, Essex IG5 0NF.

HOMESTUDY LTD

TRELEIGH WOODS FARM
REDRUTH CORNWALL

48K SPECTRUM

PHYSICS 'O' LEVEL REVISION PROGRAMS
A.E.B. SYLLABUS 052 1984/5 £26 THE SET

MATHEMATICS 'O' LEVEL REVISION PROGRAMS
LONDON SYLLABUS B (361) 1984/5 £30 THE SET
CAMBRIDGE SYLLABUS D (4004) 1984/5 £30 THE SET

WE GUARANTEE YOUR EXAMINATION SUCCESS
OR WE WILL REFUND THE FULL PURCHASE PRICE

MATHS

48K SPECTRUM

Covers all aspects of maths from basic addition to fractions and decimal multiplication. Various levels of difficulty and timed exercises. Suitable both home or school use. £5.50.

EDUCATIONAL SOFTWARE

20 Beaufort Road,
Camberley, GU15 1NF.

SPECTRUM REPAIR SPECIALISTS

48 hour turn round on most machines

£12.50 plus parts and postage

Send your Spectrum together with description of fault to:

Micro Workshop, Repair Services,
273 Moston Lane, Moston, Manchester,
Lancs M10 9WJ.
Tel: 061-205 4974

SPECTRUM SURGERY

Electrical repairs rapidly fixed. Please send £15.50 (parts included), plus £3.00 for postage with description of fault to:

MELMARK MICROSYSTEMS
8 Kingsfield Road, Dane End,
Near Ware, Herts SG12 0LY.

Star Holidays
Managers:
Sally Mitchell
Dept SVI
Westward Ho!
Devon, EX38 1HP

Bring your computer with you, all our self-catering luxury caravans and chalets have a colour TV for your personal use, also all main services, shower, h.c. etc. Cleanliness assured, highly recommended. No dogs. For free colour brochure call Sally on (023-72) 2238 now, or write.

Specky
perms
24 SELECTIONS for 48K
Specky lets YOU choose 24 selections for the treble chance football pools. Shows you how to enter them, and then actually checks the results for you. Adds fun to doing your coupon whilst making winning dividends a real possibility. guarantees 6 draws if 9 within the 24 selection. Keeps stakes low for all 3 pools companies. (This is not a pools prediction program but an obvious MUST as a back up to one).

Cheques or Postal Orders for £12.95 to:
NEW DIMENSION
214 Elder Place, East Kilbride, Glasgow G75 8UD.

THIS'LL TEACH YOU A LESSON!!
(...or two)

GCE O LEVEL/CSE Cassettes for the 48K SPECTRUM with COLOUR and MOVING GRAPHICS

PHYSICS 6 Programs for £5.50

- Solids, Liquids and Gases
- Vectors and Scalars
- Acceleration
- Graphs of Motion
- Gravity, Weight and Friction
- Newton's Laws

CHEMISTRY 6 Programs for £5.50

- Chemical Change
- Types of Reaction
- Rate of Reaction
- Chemical Combination and the Mole
- Chemical Equilibrium
- Energy Changes

Cheque/PO (payee THINK TANK LTD)

think tank Educational Software
Dept SVI/51, 35 Wellington Road,
Wimbledon Park, London SW19 8EQ

OR BOTH for £12

CLOUD 9 software
CHEMISTRY REVISION AIDS

'A' Level: TITRATION PACKAGE (48K)
4 programs - PCN says "high standard" excellent teaching aid

NEW!

'O' Level: 1 FORMULA PACKAGE (48K)
2 REACTIONS (48K)
Rate of reactions explained

all at £8.50 each
S.A.E. for full details

Cloud 9, 4 Dolvin Rd,
Tavistock PL19 9EA



You can now buy a computer programme specifically designed to monitor your personal investments. It can handle equities, gilts or unit trusts, and share acquisitions, rights issues and sales can also be easily recorded — up to a total of 50 individual holdings.

This cassette is designed for the Sinclair Spectrum 48K and costs only £7.90 inc p and p. Cheques/Diners Club/Access with orders to:

**Salmon Limited,
Monkend Hall,
Croft-on-Tees,
Darlington DL2 2TN.
Telephone: (0325) 721368.**

TIME TUTOR - EDUCATIONAL
48K Spectrum £3.50 inc. post
Six levels, 24hr clock. Animated rewards
Traditional, digital and written times. Sort 5-12hrs
Move hands, change numbers - Working clock.
G.F. Software, 28 Hazelwood Lane,
Amthill, Beds. MK45 2HA

The rate for classified advertising in the

sinclair supermart

is only £10.00 per single column centimetre.

MUSIC PROGRAMS
Major distributor and publisher of printed music & video tutorial material seeks music orientated programs for SINCLAIR COMMODORE BBC MICRO ORACON & ORIC home computers. Programs should be original & preferably educational although music games with some teaching content will also be considered.

MUSIC SALES LIMITED
Attention of Neil Hammerton
Newmarket Road, Bury St Edmunds,
Suffolk. IP33 3YB

SUPER TEXT: Allows user to have over ten heights and widths per character at £3.50. Send cheques, P.O.'s + 50p p&p to: M. Barber, 41 Loxford, Felmores, Pitsea, Basildon, Essex.

16K ZX81 AND PRINTER for sale, £60 o.n.o. plus 12 games cassettes, all leads and manual. Phone: 0924-468173 for details.

SPECTRUM OWNERS: Protect your computer with a smart black anti static cover £2.25. Cheque, P.O. to S. A. Stockton, 11 East Green, Hemel Hempstead, Herts HP3 8AB.

FOR SALE 16K SPECTRUM perfect condition. Original package, over £20 of software incl. Hungry Horace, Spectral, Panic plus lots more £70 o.n.o. Phone: EK (03552) 28940; 41 Yarrow Park, East Kilbride, Glasgow.

BETTING TO FIGURES with ZX-81. Calculates stakes on two runners in same race to win your required profit. Say 5 to 1 and 6 to 1. Stakes £1.21 and £1.04 produces £5 profit from either: Cassette £5. W. J. Davies, 57 Davenport Road, Sidcup, Kent.

SPECBEEB OWNERS CLUB invite you to exchange your used Spectrum and BBC game for new ones. Free membership. S.A.E. for details: "SPECBEEB", c/o McLaughlan, 11 Craigpark Drive, Dennistoun, Glasgow G31 2NW. Tel: 041-556 4190.

SPECTRUM BIOLOGY, 48K, 2 tapes, 4 programs, O/CSE, complete study/revision course. TEACH and TEST modes, graphics and sound. Full instructions. £8.00. Blake-low Software, 242 Newcastle Rd, Nantwich, Cheshire CW5 7ET.

MENOTEXT WANTED. Phone: Davies, 0892 41629 office hours.

CASE YOUR SPECTRUM. Black moulded tray takes Spectrum, Printer, Cassette Recorder, Monitor, etc. Built-in on-off switch, with lid, £10. 01-828 8466.

SECOND-HAND Prism VTX 5000 Modem for use with Spectrum to connect with Prestel and Micronet - £50 including postage anywhere in UK. Nickels (telephone New Milton 618383).

INTERFACE 1 with two microdrives plus four cartridges - £120, or will sell single drive with four cartridges - £40. Tel. 061-620 9198, after 7 pm.

16K RAMPACK for ZX-81 with eight cassettes (3-D, Defender, etc.) and five program books, bargain at £10. Also Zon-X81 Sound Pack £10. Tel: Leigh (0942) 606438.

AUTORAM COMPUTERS need Programmers with Arabic knowledge to write programs and books for Sinclair Arab Ram ZX-81 and Spectrum. Please write to P.O. Box 147, Jeddah, Saudi Arabia.

DATA FILE. 48K Spectrum 100 records per file. Menu driven. Load and save to tape. Sort file. Search file. Free gazetteer £5.95 - Cheques/P.O.'s to: F. Mayers, 6 Brookside, Orpington, Kent.

SPECTRUM GAMES CASSETTE 16/48K includes Gobble Ghosts, Space Intruder, Hungry Horace, Gunfight, Cashflow. For 48K Lunar Jetman, Time Gate. Chq/P.O. for £4.50 to: D. G. Johnson, 25 Voysey Gardens, Pitsea, Basildon, Essex SS13 1QT.

48K SHARP MZ80K COMPUTER with MZ80 I/O unit driving P3 dot printer. System software and many games. Buyer collects. Will accept £600. Rhiwbina, Cardiff 616649.

AMAZING SPECTRUM Cassette. Lets you stop/study machine-code programs. Includes program to transfer Bytes to Microdrive. Send £3.50. ZX-GUARANTEED (SU2). 29 Chadderton Drive, Unsworth, Bury, Lancs.

16/48K 'CHARACTER-DESIGNER'. Create own GRAPHICS-superb colour, SAVEing, LOADING option £5.50 (P&P). **MUSCAS-SETTE** - enjoy MOZART-Sonata K 545, BACH's Air on G-String - £4.50 (P&P) and NOTES INCLUDED. CHIBUR, 3 Lonsdale Street, Leicester LE2 1BP.

SPECTRUM TRADE Secrets. New booklet includes making programs unstoppable, unlistable, invisible. How to reveal such. With hints/tips and Microdrive supplement. £3. ZX-GUARANTEED, 29 Chadderton Drive, Unsworth, Bury, Lancs.

SECOND HAND SPECTRUM TAPES: Escape, Tanx, Tunnel, Nightlife, £2.50 each; Combat Zone, Speed Duel, £3 each; VU-3D, £4.50. Tel: Cheltenham 516345 and ask for Tony (after 5 pm).

SERIOUS USERS. Transform your Spectrum into a powerful home/business management machine with our range of applicational software. Send s.a.e. for free details: SD Systems (SU), P.O. Box 24, Hitchin, Herts. Trade enquiries welcome.

MICRO-DRIVE order forms for sale. First £20 secures. Get your Micro-Drive next month, not next year. Send cheque to: Sean Wilson, 10 Green Road, Ardmore, Londonderry BT47 3RG.

SPECTRUM TOOLKIT. 16/48K. Traces step by step through your program displaying the line being executed. Full renumber and delete facilities. Just 841 bytes. £5. Lee, 26 South Avenue, Kidlington, Oxford.

PROGRAMS REQUIRED for Spectrum 16/48K. Original and imaginative games. Send tape (S.A.E. for return) for appraisal. No obligation to sell. E. Howard, PO Box 21, Felixstowe, Suffolk IP11 7LJ.

32K MEMOPACK. For use with ZX-81, mint condition. £25 o.n.o. Tel: 021-472 4617. Or Write to: John, 58 Winnie Road, Selly Oak, B'ham B29 6JX.

THE GOLDEN ARROW has been sent forth. Will its journey succeed? It depends on you! Spectrum 48K. Over 100 locations. £4.50 payable to: M. Price Kayem Partnership, 26 Tangmere Drive, Cardiff.

HORSE RACE PREDICTOR. Simple to use - enter form from daily paper. 67% success rate on top tips. For any Spectrum. Send £5 to David Jackson, 1 Osborne Place, Todmorden, Lancs.

TURN YOUR SURPLUS IC'S, transistors etc into cash immediate settlement. We also welcome the opportunity to quote for complete factory clearance. Contact: Coles Harding and Co., 103 South Brink, Wisbech, Cambs. Tel: 0945 584188.

PERSONALISED SHARE portfolio program 48K Spectrum 16K ZX-81 menu driven. Special features include, capital gains calculation, comparison with F.T. Index, graphic presentation. Professionally written program taking guesswork from investment. £6.00. 2 Solway Rise, Dronfield Woodhouse, Sheffield S18 5ZR.

48K SPECTRUM plus tape recorder, books, mags, and over £100 of software inc Manic Miner, Ant Attack, Doomsday Castle, Hobbit, etc. Bargain at £130 only. Ring: 736 8528 for details.

SECOND HAND Spectrum Games Wanted - Originals Only (with inserts, etc.) Disliked/Overzapped/Disappointing Games - We'll Buy Them! Send list for offer by return! G. Inglis, 37 Cockburn Street, Edinburgh EH1 1BP.

CAR won't start? Won't run properly? Get "Mechanic" for the 16K ZX-81. Fault diagnosis program on quality cassette. Send cheques, POs for £3.45 to C. Cullingworth, 16 Pamela Drive, Warmsworth, Doncaster.

SPECTRUM owners. Our software club has hundreds of games and business programs. No rental charges. Information for 50p (cheque/P.O.) from: Spectrumette, Windermere, Cherrywood Road, Loughlinstown, County Dublin, Ireland.

TO ADVERTISE IN THE SINCLAIR SUPERMART CALL AJAY ON 01-359 3525 NOW!



New action sports games feature a 3D view of the game. In football and tennis you play one side, the computer plays the other. The computer is fast and hard to beat. Different skill levels.

FOOTBALL

Each player can move, shoot etc. independently. Includes fouls if players collide, corners, throw-ins etc. Scale 90 minutes play. Any team of names can be used. Game can be suspended and player numbers shown at the press of a key. **Price £5.50.**

BIG MATCH SOCCER

Just like football game but for 2 players. Each player uses keys at his side of the keyboard to control his men. All men can be moved, shoot etc. independently. Practice with football then play your friends in the big match. **Price £5.50.**

SUPER SOCCER

A deluxe version of the football. Even faster action, harder to beat. Choose team colours etc. **Price £7.00.**

TENNIS

Each key plays a different stroke. Move your players anywhere on court. Computer plays a hard game. All tennis rules used, just like the real thing. Proper serving and scoring. Plays 3 sets. Animated figures. **Price £5.50.**

TANK BATTLE

3D view from the tanks' turret of woods, villages, attacking tanks etc. Shots can destroy buildings, trees and enemy tanks. 360 degree turret movement. **Price £4.50.**

CAR RACE

You drive one car, the computer the other. Control your car with steering and brakes. Choice of 2 circuits. Lap counters and time recorded. **Price £3.95.**

Buy any 3 games, get any game free

Please add 35p post and packing per order

Winters Ltd, Dept SU, 24 Swannington Close, Cantley,
Doncaster, S Yorkshire, DN4 6UA

Advertisement Index

Addictive Games	28	Micro-Gen	116
Arcade S/W	132	Micromega	83
Artic	36	Micronet	120, 121
Atari Int	91	Microsphere	100
Betasoft	114	Microvitec	59
Beyond S/W	138	National S/W Library	143
Bridge S/W	56	New Generation	52, 53
Bridgemaster	128	Northern Comp Fair	136
British Micro	123	Ocean S/W	18, 19
CCS	58	Opus Supplies	30
CP Software	90	Orion Data	12
CRL	129	Orwin S/W	137
Cambridge Computer Store	136	Phipps Associates	25
Cambridge Computing	115	Picturesque	134
Campbell Systems	22	Practical Software	38
Cheetah Marketing	94	Print & Plotter	106, 107
Cross S/W	143	Profisoft	89
Crystal Computing	124	Rabbit S/W	
DRG Business Machines	113	Ram Electronics	11
Datel	32	Rainbow	22
Dean Electronics	128	Richard Shepherd S/W	60, 108
Digital Integration	50, 122	Romantic Robot	133
ECC Ltd	146	16/48 Magazine	114
Fantasy S/W	84	Salamander Software	14
File Sixty	85	Scott, Ian	128
Fox Electronics	118	Sinclair Research	64, 65
GLC	57	Skywave	56
Gilsoft	92	Softach	62
Griffin S/W	17	Software Lending Library	142
H&K Supplies	142	Software Library	91
Hartland S/W	22	Software Supermarket	39
Hestacrest	134	Software Workshop	130, 131
Hornby Software	38	Stratagem Cybernetics	133
IPC	103	W H Smith & Sons	6, 7
Imperial Software	66	Tandy	57
Incentive Software	56, 57	Transform	143
John Wiley & Sons	38	Tudor, David	142
Kelwood Heating	126	Ultimate	20
Kemp Ltd	134	University S/W	133
Kernow Software Services	24	Vortex	8
Lothlorien	91, 93	Walkers Computer Services	26
Melbourne House	42, 45	Winters Ltd	146
Micro Byte	114	Zeal Marketing	93
Microfair	136		

FLIGHT DECK JOYSTICK for SPECTRUM AT LAST — a joystick that needs NO interface

The 'UNBREAKABLE' one

Don't be confused by pressing buttons any longer use the only Joystick that gives realistic sensation to flying — at a realistic price!



£9.95
inc. VAT P&P.



Clips directly onto Spectrum and gives complete operational control leaving hand free for other commands.

- Directly operates cursor keys 5,6,7 & 8.
- Operates all cursor keyed software for left/right, up/down movement.
- Ideal for graphic plotting & drawing.
- No electronics, wiring or modifications.
- List of at least 50 games using cursor keys supplied with each Joystick.

Obtain from your local computer retailer or from:—
E.E.C. Ltd., 1 Whitehouse Close,
Chalfont St. Peter, Bucks, SL9 0DA.

NAME _____

ADDRESS _____

POSTCODE _____

THE
LUNA Z5
FIGHTER



Will you accept this mission?

In your Z5 Luna Hover Fighter you must penetrate the 3 successive Seiddab defensive zones and destroy their command base.

The state of your fighter and its armaments along with status reports of the Seiddab defences is given below.

Good luck! May the power be with you.



• LASERS •

Short range weapon system. Iridium powered. Powered up and operational.



• MISSILES •

Long range weapon system. Radar homing duodec warhead. Armed and ready to fire.



• RADAR •

Long range, over the horizon sensors. Tuned to the plasma output of Seiddab hover fighters.



• NAVIGATION •

Locked on to the Seiddab command base. Head up path display.



• SHIELDS •

Di-lithium powered. Combat power level. Status all green.



• GAUGES •

Long range propelluene tanks. Status full. Combat shielded. Hull temperature status low.



£5.95

£7.95

£5.95

This is the latest and most difficult mission in the long running struggle against Seiddab aliens – are you prepared to accept this mission?

Available for 48K Spectrum from all leading software dealers including Boots, John Menzies, Spectrum Computer Centres, etc.

Available for other popular home micros soon.



Hewson Consultants
56B Milton Trading Estate,
Milton, Abingdon, Oxon OX14 4RX.

KNOW YOUR ENEMY



• DAB TANKS •

Robotically controlled. Ytsan missiles – armed. Susceptible to laser strikes.



• SEID HOVER FIGHTERS •

High power, low manoeuvrability strike craft Plodium missiles – armed. Susceptible to missile or laser strikes.



• AERIAL MINES •

Contain proximity fuses, explodes on detecting hoverfighter. Susceptible to laser strike.



• MISSILE SILO •

Final line of defence – self activating. Hewstron Warhead. Susceptible to laser strike.



• COMMAND BASE •

Your objective – heavily defended requires many strikes to destroy – you must not fail.

Microspeech
Compatible

3D LUNATAACK



NEW RELEASES!

COMMODORE 64 STING 64 £7.95

Author: **Anton Hinxman**
Hive-cave action!
Bertie Bee needs help
defending the hive. Fight off
the invading swarms, battle
the bees and defend your
Queen!

COMMODORE 64 BUGABOO (THE FLEA) £7.95

Author: **Indescomp**
Itchy action!
Jump your way out of the
caves with Bugaboo the flea
but beware of the fearsome
Dragon as you jump around
the exotic vegetation.

48K SPECTRUM RAYMOND BRIGGS' THE SNOWMAN £6.95

Author: **David Shea**
An enchanting game based
around episodes of Raymond
Briggs' amazingly successful
book.

48K SPECTRUM ANT ATTACK £6.95

Author: **Sandy White**
Battle the Ants in the soft
solid 3D city of Antescher.

48K SPECTRUM DRAGONS BANE £6.95

Authors: **M. Preston,
P. Hunt, R. Rose, D. Moore.**
A mythical graphic
adventure in the dark and
deadly halls of Earthstone
Castle. Battle Dragons,
Vampires, Sphinx, Zombies,
Skeletons, Gryphons and
other legendary beasts to
rescue the beautiful Princess
Paula.

48K SPECTRUM FRED £6.95

Author: **Indescomp**
Action beneath the
Pyramids!
Fearless Fred the Intrepid
Archaeologist searches the
creepy catacombs below the
torrid tomb of 'Tootiecarmoon'
for the terrible treasures
amidst monstrous mummies,
ghastly ghosts, bats and rats!

48K SPECTRUM • **TIME GATE** Author: John Hollis £6.95
COMMODORE 64 • **PURPLE TURTLES** Authors: Mark & Richard Moore £7.95
VIC 20 + 3K or 8K RAM • **SKYHAWK** Authors: Steve Lee/Chartec £7.95
DRAGON • **MINED OUT** Authors: I & C Andrew/Incentive £5.95
BBC MODEL • **THE GENERATORS** Author: Dave Mendes £5.95

All titles available from Quicksilva Mail Order
P.O. Box 6, Wimborne Dorset BA21 7PY.

Quicksilva programs are available from: Boots, W.H. Smiths, J. Menzies, Microdealer,
HMV, Hamleys, John Lewis, Computers for All and all reputable
specialist computer stockists.

SEND S.A.E. FOR
FULL COLOUR
CATALOGUE