

sinclair user

Issue No 27

Only
85p

INCORPORATING SPECTRUM USER

FREE
SOFTWARE
BOOKLET

**Keyboard comparison—
the facts at
your fingertips**

**Does QL software
live up to
expectations?**

**Chess
challenge—
Spectrum
versus
Sensory 9**

**Victory beckons in the
1984 Cambridge Awards
more than £4,000 in prizes**



THE CHALLENGE IS WITHIN YOUR GRASP



Compatible
with
Atari
Commodore
Spectrum

With the vast range of games now available for home computers each holds a different challenge. Now there are three Competition-Pro Joysticks in the Kempston range that will come to your aid and improve your playing capabilities. Your movements will become quicker, with finger poised over the fire button at the ready, your scores will be out of this world. Playing will be so much easier! If you're serious about the challenge your computer presents then you shouldn't be without a Kempston Competition-Pro Joystick.

NEW

PRO 1000

Ergonomically designed handle and base • 8-way arcade quality leaf switches for precision control • 5 foot cable to allow more comfortable playing positions • Rubber return for smooth control • Rubber protector pads on base • Base fire bar for left or right hand control •

PRO 3000

All the winning features of the Pro 1000 plus top fire button for precision one handed play • trigger fire button for true arcade realism •

NEW

PRO 5000

Again all the winning features of the Pro 1000 but incorporating true craftsmanship plus large 1 1/4" control knob for comfortable play • Unique tapered shaft for maximum sensitivity • Dual independent fire buttons • Nylon covered steel shaft for maximum robustness

KEMPSTON JOYSTICK INTERFACE FOR THE ZX SPECTRUM

Allows the use of any Atari/Commodore type joystick with the popular ZX Spectrum computer. With well over 100 games on the Spectrum now compatible with the joystick this is a must for any Spectrum owner who wants the power of a joystick added to the power of the Spectrum. Simply plugs into the edge connector at the back of the Spectrum. No modifications necessary.

Some games you can buy were produced before Joysticks were available for the ZX Spectrum. With the aid of Kempston conversion tapes these games can now be played with any of the Kempston range of joysticks.



SEE US ON STAND 135

AT THE COMPUTER FAIR
- LONDON.

SPECTRUM
JOYSTICK
INTERFACE
£11.50

PRO 5000
£13.50

PRO 3000
£12.75

PRO 1000
£10.99

CONVERSION TAPE I

- Converts: Horace Goes Skiing, Hungry Horace, Flight Simulation (Sinclair), Arcadia, Penetrator, Spectres

CONVERSION TAPE II

- Converts: Orbiter, Escape, Tanx, Centipede, Spectral Invaders, Cruising on Broadway, Frenzy

CONVERSION TAPE III

- Converts: Ah Diddums, Jumping Jack, Molar Maul, Androids, Horace And the Spiders, Space Raiders, Winged Avenger, Muncher

ALL £4.95 each



TRADE
ENQUIRIES
WELCOME

Most items are available from W H Smith, Boots, Spectrum Computer Centres and good computing shops or direct from:

KEMPSTON
MICRO ELECTRONICS LTD

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

sinclair user

incorporating Spectrum User

Editor

Bill Scolding

Deputy editor

John Gilbert

Consultant editor

Mike Johnston

Managing production editor

Harold Mayes MBE

Staff writer

Chris Bourne

Illustrator/designer

Craig Kennedy

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

MEMBER OF THE ASSOCIATION OF PUBLISHERS

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

Original 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

24 SHERLOCK HOLMES We
unmask the culprit in our classic
who-dunnit.

40 CAMBRIDGE AWARD De-
tails of the competition to find
the programmer of the year.

45 KEYBOARDS John Lambert
reviews add-on keyboards.

51 CHESS Bryan Whitby of the
British Chess Federation plays
the Spectrum against a rival machine.

62 ARCADE MIND GAMES A
new trend on the arcade scene.

86 MACHINE CODE In the final
instalment of the series John Ker-
rigan moves graphics in all directions.
SOFT CENTRE Our software pull-out.



The 1984 Cambridge Awards, page 56

REGULARS

16 SINCLAIR SIMON Further ad-
ventures with the QL.

30 HARDWARE WORLD Re-
views of the latest peripherals for
Sinclair computers.

33 SPECTRUM SOFTWARE
SCENE Games and utilities.

37 ZX-81 SOFTWARE SCENE
Adventures and strategy games.

56 HIT SQUAD Chequered Flag
Steve Kelly gets into first gear.

97 USER OF THE MONTH Jean-
Pierre Struye uses a Spectrum for
cataloguing helmets.

109 SINCLAIR BUSINESS USER
Mike Wright assesses software
for the Sinclair QL.

118 EDUCATION Theodora Wood
talks to teachers about the way
ahead for computer education.

125 HELPLINE Andrew Hewson
answers readers' questions.

133 MIND GAMES Quentin Heath
travels backwards in time.



The right track, page 40



The educational view, page 118

PLUS

5 SINCLAIRVOYANCE

9 SINCLAIR USER CLUB

13 NEWS

21 LETTERS

67 PROGRAM PRINTOUT

101 STARTER PACK

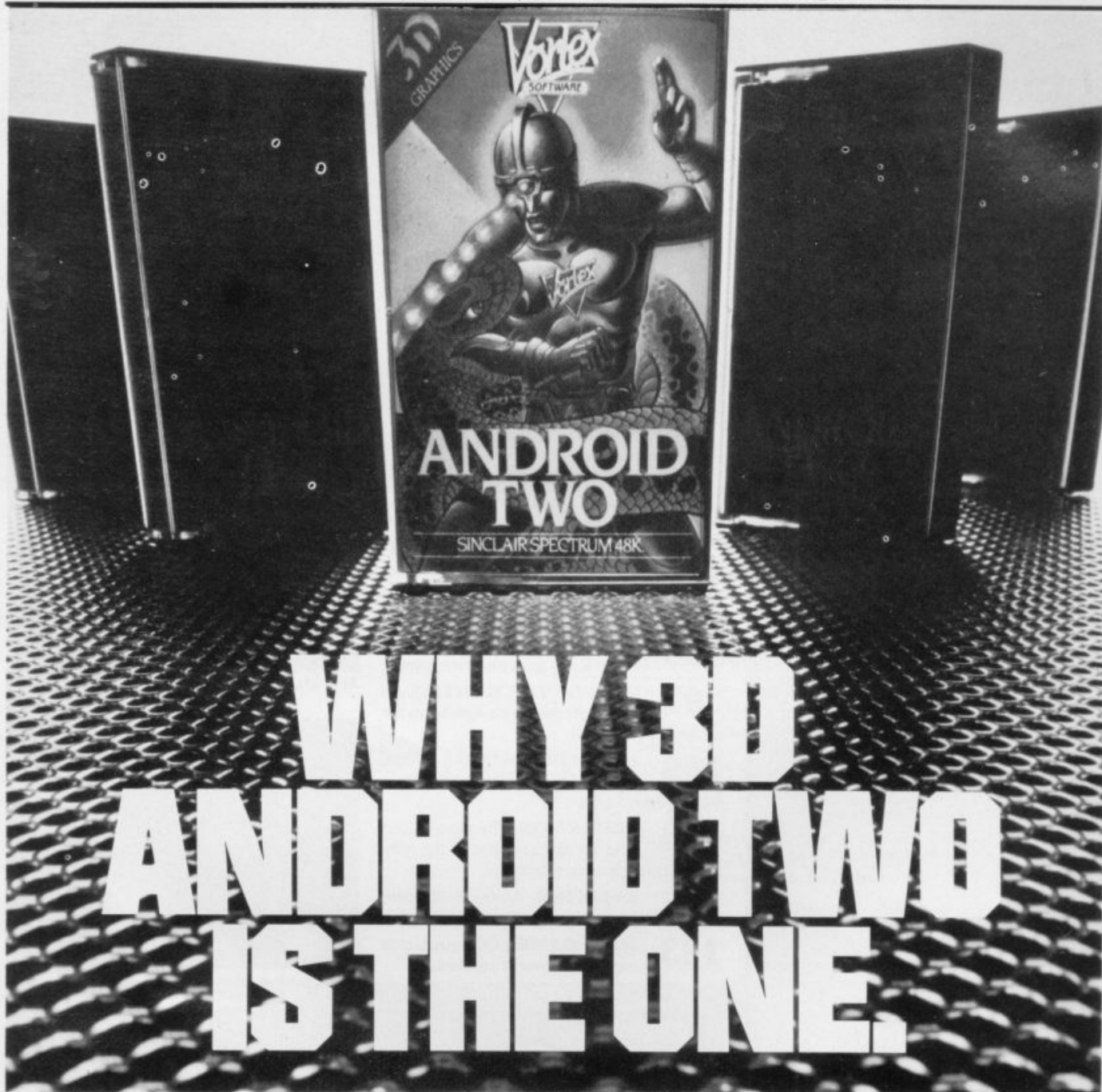
139 SOFTWARE DIRECTORY



QL complaints, page 21

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

SU/6

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

DEALER ENQUIRIES · CALL 061 973 9580

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

1982 revisited

WHEN THE QL computer was launched at the beginning of this year, Sinclair Research announced that the first deliveries were expected to take place at the end of February. Only a week or two later a spokesman for the company admitted that the demand was already greater than anticipated and they were "beginning to think about delivery problems and how to avoid them".

In March the company had, presumably, stopped thinking about avoiding those problems and had started to think of suitable excuses to explain the delays already incurred. Last-minute hitches in the operating system were disclosed, together with faults in one of the integrated circuits. By mid-April the company was talking, not too confidently, of deliveries at the end of the month, or possibly May or June.

As the French say, *plus ça change, plus c'est la même chose* or, to put it another way, have we not heard that before somewhere?

It was, of course, less than two years ago when the ubiquitous Sinclair spokespeople were being wheeled out, rather like ventriloquists' dolls, to utter exactly the same vague excuses for Spectrum delivery delays. Two months after the Spectrum launch the official word from Sinclair was that delays had been caused "by the time needed to have production running smoothly" and problems had been exacerbated by the discovery of "a very obscure fault" in the design.

As the waiting period lengthened the excuses grew more feeble. In the October, 1982 issue of *Sinclair User* Clive Sinclair, as he then was, replied to the critics and apologised to his customers: "We are confident that our present backlog will be cleared by the end of September and hope that you will see

its belt, Sinclair Research appears even more determined not to look back and learn from the mistakes of the past. In all respects save one, the company policy has remained the same, presumptuously assuming that customers are content to await the delayed delivery of the QL and attempting to placate the irate with promises of a gift as compensation. Remember that £10 voucher given to those who suffered the Spectrum delays?

Only in its advertising has the company acknowledged past errors. Heedful of the ASA breathing down its neck, it has inserted in recent advertisements for the QL the phrase: "Due to demand, delivery may take more than 28 days". At least the uninitiated now know what to expect.

One thing, however, is certain and that is that the computers on show at the January press launch were not fully operational and were only representing ideas-in-progress. Time will tell whether those ideas have come to fruition.

In all the excitement it is hardly surprising that little attention has been paid to the problems which currently beset the Spectrum. The 1983 pre-Christmas boom in Spectrum sales and the subsequent shortfall in supplies have apparently, and unexpectedly, carried over into 1984. Sales have remained high and many people are even now finding new Spectrums hard to come by.

'Little attention has been paid to the problems which currently beset the Spectrum'

While some retailers are claiming that they are receiving as many machines as they can handle, others report that they can obtain only a percentage of their requirements, a percentage which in some cases is as low as one-fifth the quantity ordered. The small independent computer stores are the worst affected, with some unable to get any at all.

There is also reason to believe that the number of faulty Spectrums has increased and retailers have estimated that returned Spectrums could be as high as 25 percent of the total sold, considerably higher than the normal failure rate anticipated by Sinclair Research. *Sinclair User* has received many complaints from new Spectrum owners who are having to wait two months or more for faulty machines to be repaired or replaced.

All areas of industry suffer problems from time to time and the computer industry, being relatively new and continually covering fresh ground, is more susceptible than most. All the more reason, then, for computer manufacturers and their supporting companies to be circumspect in releasing new products and to improve their methods of handling unforeseen hitches.

On the other hand, a cynic might argue that the marketing strategy of companies like Sinclair Research is not only justified but also highly successful. New products are launched months before they are ready and in the intervening period interest is generated and orders pour in. When production eventually gets under way it can be geared carefully so that supply always falls a little short of demand and the products are endowed consequently with the added attraction of having rarity value.

'The computers on show at the January press launch were not fully operational'

current delays in the context of our successful delivery of more than 500,000 computers in the last two years".

In the event, delays continued until the end of October, with some customers complaining of waiting more than 20 weeks for their Spectrums to arrive. Since the launch six months had elapsed before Sinclair Research could ensure smooth production of the machine and yet throughout that period the company had continued to advertise the Spectrum with a promise of a 28-day turnaround on orders.

When the Advertising Standards Authority made its report later in 1982 it declared a record number of complaints received concerning non-delivery of Spectrums and went on to criticise the company for repeatedly advertising a product which it could not supply within the specified time.

Sinclair User, too, was inundated with letters from furious readers and in *Sinclairvoyance*, in October, 1982, we summed up the feelings of the public: "The company can advance any number of excuses but the fact remains that it has not been able to substantiate the claims made at the time of the launch... Sinclair Research has had experience of two previous machines yet still seems unable to profit from experience".

Eighteen months later and with yet another computer under



Jet Set Willy £5.95

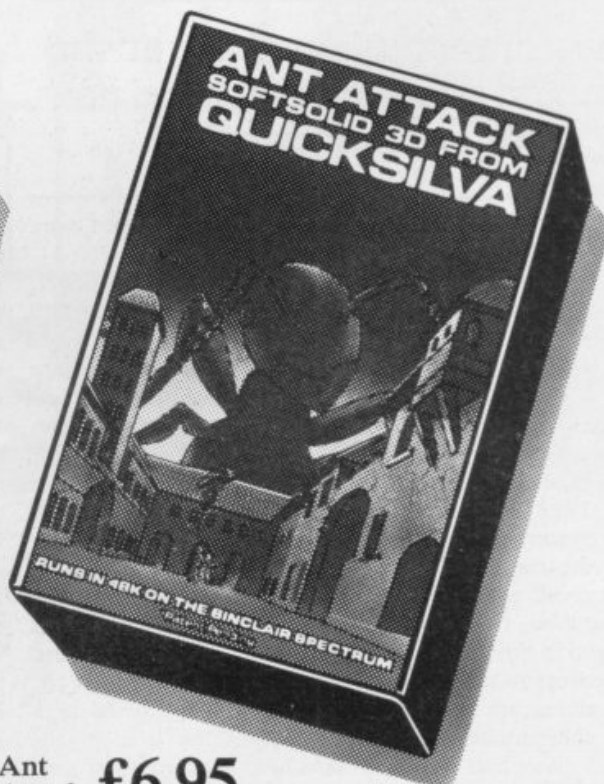


Bear Bovver £6.95

Thousands of Spectrum



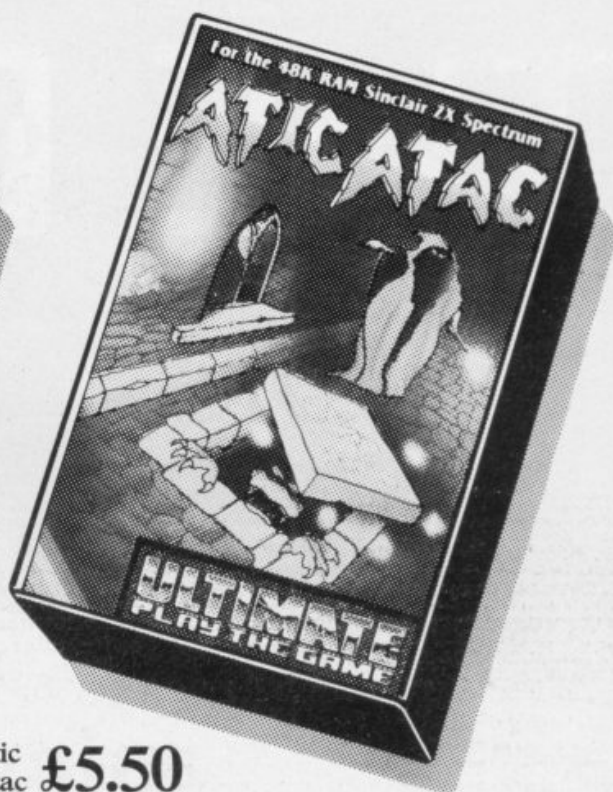
Chequered Flag £6.95



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

THE CODE

CIA MOST URGENT MESSAGE STOP.

DECEMBER 1st RUSSIAN TOP SECRET CODE STOLEN STOP.

COPIES NOW AVAILABLE STOP.

BREAK CODE ESSENTIAL, £2,500 TO FIRST CODE BREAKER.

REPEAT £2,500 PAID TO FIRST BREAKER STOP.

"The Code" is probably the most original 48K Sinclair Spectrum computer game yet. Simply break the Code and £2,500 can be yours. Copies can only be obtained by filling in the reply coupon below.

NO COPIES WILL BE RELEASED UNTIL JULY 1st SO EVERYBODY HAS AN EQUAL CHANCE. (ALLOW 7 DAYS DELIVERY)

Please supply copies of "The Code" at £9.95.

Name

I enclose a cheque/Postal order for £ made payable to "The Code".

Address.....

Bankers Card number must be printed on reverse of cheques.

DO NOT SEND CASH.

The Code, P.O. Box 65, Warwick CV34 4JY.

This month we report on a Sinclair user who was in at the beginning

Mark 4 memories

WE FEATURE this month one of our members, Jeff Davis of Chichester. His interest in computers was sparked some years ago by the first Sinclair machine, a Sinclair Mark 4.

He says he had to assemble and solder the components on the printed circuit board and it was a very rudimentary machine by today's standards, with no luxuries such as resident Basic — not even a QWERTY keyboard, just a hex keypad.

Many a day was spent entering even a short, simple program. Luckily Davis had a friend who was an engineer and between them they managed to fit a keyboard to replace the hex keypad. That speeded things up and he was able to write simple utilities to enable him to program the machine more easily.

Eventually, Mark 4 was retired and Davis bought a ZX-80. That machine was a great step forward and while being comparatively slow it had a

resident Basic which was the forerunner of the Sinclair Basic used today.

Commercial programs were written which heralded the tremendous range now available for Sinclair machines. Davis' latest machine is the Spectrum. He reckons he would have had to pay several thousand pounds for a machine of similar capability when he started four years ago — such is the unparalleled progress in computing hardware.



CLUB BENEFITS

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

Best-seller bargains

THIS MONTH the Club can offer even more in the way of software and hardware. The classic game **Manic Miner** and its sequel, **Jet Set Willy** from Software Projects, are just two of the Spectrum bargains. In the former you must guide Willy through a mine shaft, picking up keys from bushes and stalagmites while avoiding robots and aliens. In the latter you must get him past his housekeeper into the master bedroom where he can fall asleep.

Quicksilver offers three new games, including **The Snowman**, a non-violent program in which you must build your friend the snowman. **Blue Thunder**, from Richard Willcox Software, provides

an aerial challenge where you must fly your helicopter through the defences of a nuclear power plant and destroy the core.

Finally for the Spectrum, **Postman Pat** and **Laser Warp**, both from Mikro-Gen, provide space and more down-to-earth action for arcade fans.

Sinclair **Vu-File** and **Vu-Calc** are among the software offers for the ZX-81, so that owners of the computer can keep track of their financial situation and store necessary information on computer.

For those ZX-81 owners with leisure in mind, the Club can offer Sinclair **Backgammon**, **Flight Simulation** and **Chess**.

All the offers can be obtained only by Club members and are available until the end of June. If you are not a



member but intend to join this month, you can take advantage of the hardware and software by sending an order form with your membership fee.

Spectrum hardware
Quickshot Two Joystick
dK'Tronics joystick interface
Alphacom printer

List price	Offer price
£10.95	£9.95
£12.95	£12
£59.95	£55

Spectrum software
Manic Miner
Jet Set Willy
Tribble Trubble
3D Ant Attack
Snowman
Traxx
Blue Thunder
Postman Pat
Laser Warp

£5.95	£4.95
£5.95	£4.95
£5.95	£4.95
£6.95	£5.95
£6.95	£5.95
£6.95	£5.95
£6.95	£5.95
£5.95	£4.95
£6.95	£5.95
£6.95	£5.95

ZX-81 software
Vu-File
Vu-Calc
Backgammon
Flight Simulation
Chess

£7.95	£6.95
£7.95	£6.95
£5.95	£4.95
£5.95	£4.95
£6.95	£5.95

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, Stapley, 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 NG16 3BJ.

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. Twice weekly meetings, Monday and Friday.

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 Slagelse, post giro 1 46 24 66. ZZ-Brugergruppen i Danmark, Boks 44, 2650 Hvidovre, Gratis medlemskab og gratis blad til enhver interesseret.

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, Jkukg, 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).

DOWN, DOWN AND DOWN AGAIN

The deeper you dive, the deeper the danger. Through cavern after cavern to find the pearls and the treasure. (It's different every game!) Sharks, octopuses and jellyfish are everywhere; and look out for your oxygen level! Staggering graphics, fantastic colour – a true arcade adventure.

Another great quality game from the house which brought you
"Harrier Attack!" and
"Jungle Trouble!"

DURELL SOFTWARE

available from

W. H. SMITH • LASKYS •
GREENS at DEBENHAMS •
BOOTS • MARTINS •
COMPUTERS FOR ALL •
SPECTRUM CENTRES
and many other
retail outlets

or order direct from
CASTLE LODGE, CASTLE GREEN,
TAUNTON, SOMERSET. TA1 4AB

Spectrum Oric/Atmos Commodore

MAIL ORDER

SPECTRUM software £5.95 all other software £6.95
Price includes postage and packing.

TYPE OF COMPUTER:

CASSETTE TITLES:

1)

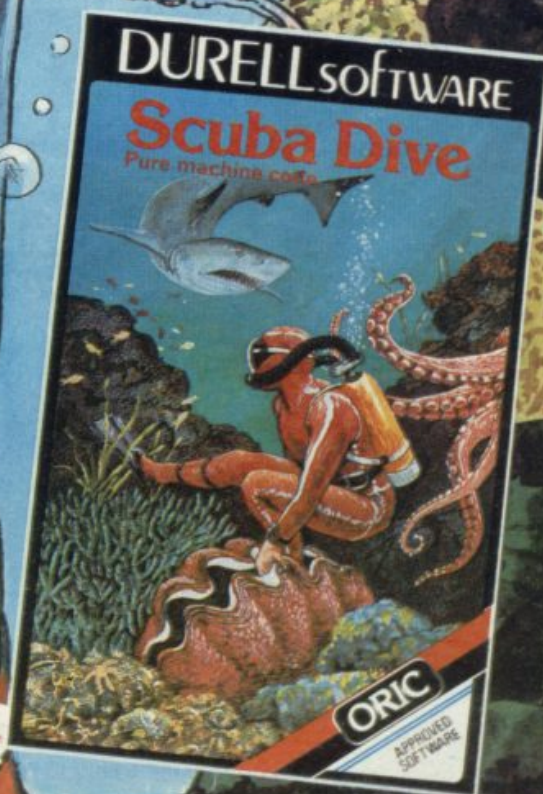
2)

3)

NAME:

ADDRESS:

Overseas customers please allow £1.00 extra



CheetahSoft

Soft we're not



FOR SPECTRUM 48K



CONQUEST

CONQUEST A tactical game which even veteran players will find both challenging and rewarding.

Mediterranean Europe is divided into grid squares. Your aim, as Emperor, is to gain 100 squares of territory as quickly as possible – at the same time dealing with Barbarian counter-attacks, plagues, civil war and rival Emperors.

5 levels of skill, plus a continuous 'Conquest' game where all the difficulty levels are thrown in together.

3D BAT ATTACK An all action, 3 dimensional maze game where you gather up blocks of gold, at the same time pitting your wits against vicious vampire bats whose only purpose in life is to locate, hunt and kill you.

4 levels of skill. At each level the game gets faster and more complicated, and the vampires more dangerous.

CheetahSoft

Soft we're not



FOR SPECTRUM 48K



3D BAT ATTACK

AFTER THESE, THE REST IS KIDS STUFF.

Are you ready for CheetahSoft?

There's only one way to find out.

But be warned: these vampire bats know a good meal when they see one. And our friend with the scythe has had years of experience ...

CheetahSoft

Soft we're not



So don't play unless you're ready to play the game for real. Because you'll find there's one sure thing about CheetahSoft: Soft we're not.

£6.95 at all good stores.

The winning answers that prove to be educational

WINNERS of the Micro Master and *Sinclair User* Competition were Andrew Trowbridge, Manor Farm, Dorset; Mrs A Ledger, Erdington, Birmingham; C Jackson, Formby, Liverpool; O Dunn, Poplar, London; and J Penn, Huddersfield, Yorkshire.

The correct answers to the questions were MICroCOM-PuteR, siLicoN cHiP, edUcational SoFTware, MacHine coDE, CliVe sinClair. The most popular anagram from the word SPECTRUM was CRUMPETS.

Each of the winners will receive £25 worth of educational software from Micro Master.

Intelligent Algernon gives the answers

A NUMBER of points were made to us about 'Thinking of Algernon' in last month's issue.

The corrections to the program listings are:

```
75 PRINT Q$: IF N<2
  THEN GOTO 125
125 LET D=M+N
100 INPUT "Press ENTER for my move"; R$
```

Sinclair announce QL Mark Two

THE QL bears little resemblance to the machine launched in January.

It now has an EPROM which contains part of the operating system sticking out of the ROM socket at the back of the computer. The code would not fit into the planned 32K so the designers had to include an extra 16K ROM. Customers who re-

ceive the first production machines will not be able to use the ROM socket until they return their machines for an on-board upgrade.

As a result of the upgrade Sinclair has been able to incorporate turtle graphics commands into SuperBASIC. The language also has been changed which means the manuals, currently

at the printer, are incorrect. The hardware, too, has been altered. The battery clock will not appear on any model.

Asked whether the machine showed to journalists would be the same in six months a spokesman for Sinclair declined to comment.

The company nevertheless hopes that deliveries of the QL will soon be under control. It has promised that all dates given to customers will be fulfilled but has refused, however, to confirm the dates for deliveries.

The company has stated that it will be including an RS-232 cable in every QL order for customers who have experienced delays and whose money is in a holding account until delivery.

Imagine increase

IMAGINE SOFTWARE has increased its prices to £5.50 again in an amazing turnaround in marketing strategy. Within two weeks of reducing prices to £3.95, the company was under attack from retailers who would have lost profit. Threats were made not to stock Imagine games.

Now it appears that Imagine has bowed to the pressure and agreed that it is the dealer, and not the customer, who is always right.

Meanwhile Studio Sting, the Imagine advertising agency, has gone into liquidation. The company, in which Imagine directors Mark Butler and David Lawson held shares, was set up to cover art and promotions. Reasons for liquidation include a suggestion by the company that Imagine owes it a substantial amount of money, a claim which Imagine disputes.

more news on page 15

Providing Hobbit help

THE SUCCESS of *The Hobbit* adventure game for the 48K Spectrum has prompted Melbourne House to publish a book giving a solution to the game called *A Guide To Playing The Hobbit*.

It is divided into three sections. The first provides general strategies and tactics to be used, the second and third offer detailed solutions. A spokeswoman for the company says:

"The book provides only one solution to *The Hobbit*, so you can play through it and solve it using that guidance. There is, of course, more than one solution so the book does not spoil the game for the player. The user will still be able to explore other ways of completing *The Hobbit*."

The Guide costs £3.95. More information can be obtained from Melbourne House, Castle Yard House,

Castle Yard, Richmond TW10 6TF.



VTX modem is offered by Prism

PRISM Microproducts has announced a special offer through which Spectrum owners are given a VTX 5000 modem, one year's subscription to Micronet and Prestel, free user-to-user software and quarterly hardware and software discounts — all for £11 a month. In the second year the subscription falls to only £20 a quarter.

The scheme is expected to provide a much-needed boost to Micronet membership as it enables users to join who previously found the cost prohibitive.

Top Ten

Program	Last month	Company	Memory
1 Atic Atac	2	Ultimate	48K
2 Lunar Jetman	4	Ultimate	48K
3 Ant Attack	6	Quicksilver	48K
4 Chequered Flag	1	Psion	48K
5 Jet Set Willy	—	Software Proj.	48K
6 Scuba Dive	7	Durrell	48K
7 Pogo	—	Ocean	48K
8 Bugaboo	—	Quicksilver	48K
9 Jetpack	—	Ultimate	48K
10 Flight Simulation	3	Psion	48K

Figures supplied by W H Smith.



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!

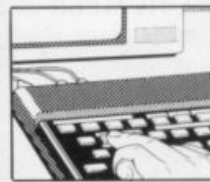
- Durable stay-flat plastic NOT cardboard.
- Pre-printed labels for a professional finish.
- Matt-black panels look super on your SPECTRUM.



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 _____

Micro sales double as the market booms again

HOME COMPUTER ownership has more than doubled in Britain in the last year and looks set for more growth in 1984, according to a survey published by Gowling Marketing Services of Liverpool.

More than one home in 10 had a computer last January, which is more than 11 per cent compared to 4.9 at the same time last year.

The report states that last year market growth exceeded all projection but the signs are that after 1984 the hardware market will enter a maturity stage and growth will begin to slow.

Sinclair Research and Commodore dominate the hardware market and the top six models account for 87 per cent of computers in use. The report states that it is difficult to see any long-term future for less popular models or for new entrants unless they can offer some important advantage.

Despite the gloom on the hardware front, prospects are bright for software. The industry looks set for its best year ever, with arcade and adventure games likely to take 70 per cent of total sales.

More information about the survey can be obtained from Gowling Marketing Services Ltd, Britannia Buildings, Fenwick Street, Liverpool L2 7NA.

Search for the ultimate game

YORKSHIRE Television and a new company, Ventech, have launched into a venture to take interactive computer arcade games to the television screen. The signals from a video game will be merged with studio film and pre-shot locations so that viewers will see a 'believable arcade game' using real characters and backgrounds, which will also have a plot which viewers can follow.

The pilot episode of the new series of television programs was filmed in January and will never be seen by the public. It was called *Quest*

For Abigail, which bore some resemblance to the quest for the Holy Grail, and for which Insight Software prepared an adventure game to fit around the plot.

The shows will feature computer games for which Yorkshire and Ventech are to market the software.

The advent of *The Game* has set independent television thinking even more seriously about the development of computers on television. One idea is to have a limited version of a multi-player arcade game where each player has a television

set and a control keyboard or joystick with which to play the game from home. The techniques used would follow from those used by Prestel and Micronet 800.

The independent networks are also thinking about having a microcomputer compete with the BBC microcomputer.

Suggestions which have been made are that the companies use either the Wren business system from Prism Business Computers or the Sinclair QL.

Independent television has yet to decide.

Sinclair wheels in new car base

SINCLAIR VEHICLES Ltd, the company which is to produce Sir Clive Sinclair's first commercial electric car, has moved to new headquarters at the Universi-

ty of Warwick Science Park.

Staff at the new centre will concentrate on the development and marketing of a family of vehicles which, Sinclair says, is due for introduction

in the next three to five years.

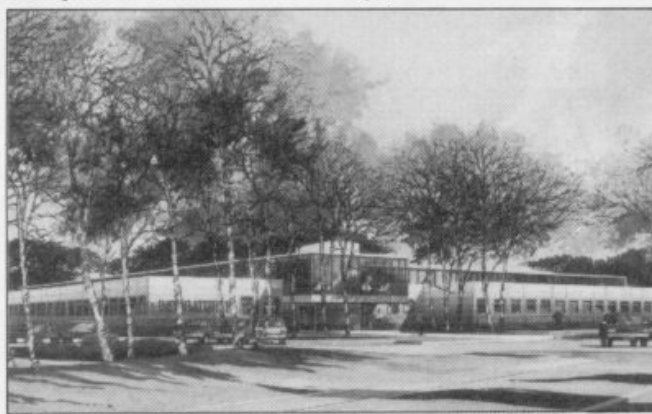
The first of the new electric vehicles will be for low-cost town and commuter use and will be ready in late 1984 or early 1985. Assembly will be sub-contracted to Hoover plc at Merthyr Tydfil. Barry Wills, managing director of Sinclair Vehicles Ltd, says:

"The Science Park is an ideal location for the various research and development facilities in the Midlands. It also enables us at the same time to draw on university expertise in manufacturing, automotive engineering and electric traction."

The company has also been attracted by the expansion potential of the Science Park and expects to move into one of the larger technology units. Science Park director David Rowe says:

"I can think of no better project for the Warwick Science Park. The university has an outstanding history of involvement in the automotive industry and the Sinclair style of operation makes it eminently suitable for the Science Park."

more news on page 16



Games firm masters prices

NO SOONER has Imagine announced that it cannot drop its software prices after all, than two new companies launch a number of cut-price games cassettes effectively turning the software market on its head.

From the beginning of April, Pulsonic has been selling its Spectrum games for only £2.95, while Master-

tronic has released an extensive range of titles for the Spectrum and the Commodore computers at an unprecedented £1.99 each.

In the past software houses have claimed that prices cannot be lowered if reasonable profits are to be maintained. Frank Herman of Mastertronic disagrees, and says the secret of low pricing lies in

direct mass marketing. Mastertronic took more than 100,000 orders in the first week of operation from outlets which included the small independent retailers as well as W H Smith and other major chains.

What is the reaction of the major software houses to this strategy? Herman sums it up precisely: "They hate us."

Prism modem wins award

THE VTX-5000, the Spectrum modem link to Micronet 800, won the Peripheral of the Year prize in the British Microcomputing Awards.

The modem enables Spectrum users to download software from Micronet via the telephone, and was developed by Prism Microproducts. A short time ago the VTX won a RITA Award at the Which Computer? Show.

Zap around the clock

AN ATTEMPT to set a world record for non-stop playing of computer games was linked to a medical research of the craze at a recent computer exhibition. Derek Creasey, a 14-year-old schoolboy from Stockport, aimed to play arcade games for 24 hours while hooked-up to medical equipment which would measure body functions. Mick Cowley, a spokesman for the organiser,

Database Publications, says:

"Children all over the country are now playing these games for hours and some people have suggested that it might be creating medical problems for them.

"At the end of 24 hours, we will have a full read-out ready for analysis and will be

able to establish whether or not the current craze is potentially dangerous as some people suggest."

Unfortunately Creasey did not fulfil his ambition to set the 24-hour non-stop record. He fell asleep at the computer 55 minutes before the record would have been set.

New interface ROM

SINCLAIR RESEARCH is to change the ROM in the Spectrum Interface One. According to the company there would be no side effects as a result of the switch. Software which has already been produced to use the interface should not be affected by the change so long as the recommended machine code hook points are followed.

Late last year a change in the Spectrum ULA caused difficulties for some software manufacturers when users found that they could not use certain products with mark three machines.

Sinclair Research anticipates no such difficulties with the modification of the Interface One ROM.

Sinclair software

WEBSTERS SOFTWARE has been appointed non-exclusive U.K. wholesale distributor of software for the ZX-81 and Spectrum by Sinclair Research. The deal will provide a merchandising service to chain stores and computer shops and the first shipments were made at the beginning of April. Anton Boyes, Sinclair retail sales manager, says.

"We wanted to improve the availability of our own-brand software and to give

retailers a choice of distributors.

"Software represents an increasingly significant proportion of our business — around eight percent against two percent two years ago — and we aim to increase our share of the Spectrum software market considerably during the next year."

Websters Software Ltd is part of the Websters group, which also includes Felix Learning Systems and Websters book shops.



Try pulling a stunt like this on your Spectrum

Leap on a moving train... jump from carriage to carriage... duck under fast-approaching bridges.

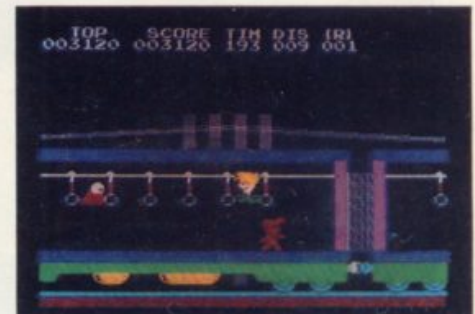
But before you do *anything*, make sure it's with Sinclair's new action-packed game – 'Stop the Express'.

That way, you can try dramatic feats like Buster Keaton's – without risking your neck!

'Stop the Express' is one of five exciting new games from Sinclair. Its graphics are superbly fast and sharp. The action is non-stop. And the challenge is a very tough one.

On top of a racing express, you're chased by knife-throwing bandits. And inside the express, there's even more trouble.

Will you ever get to the front and halt the train? Or will you be well and truly bumped off?



All five new Sinclair titles – Stop the Express, Bubble Buster, Zipper Flipper, Eric and the Floaters, and Driller Tanks – are for a 48K Spectrum. You'll find them in the shops – today.

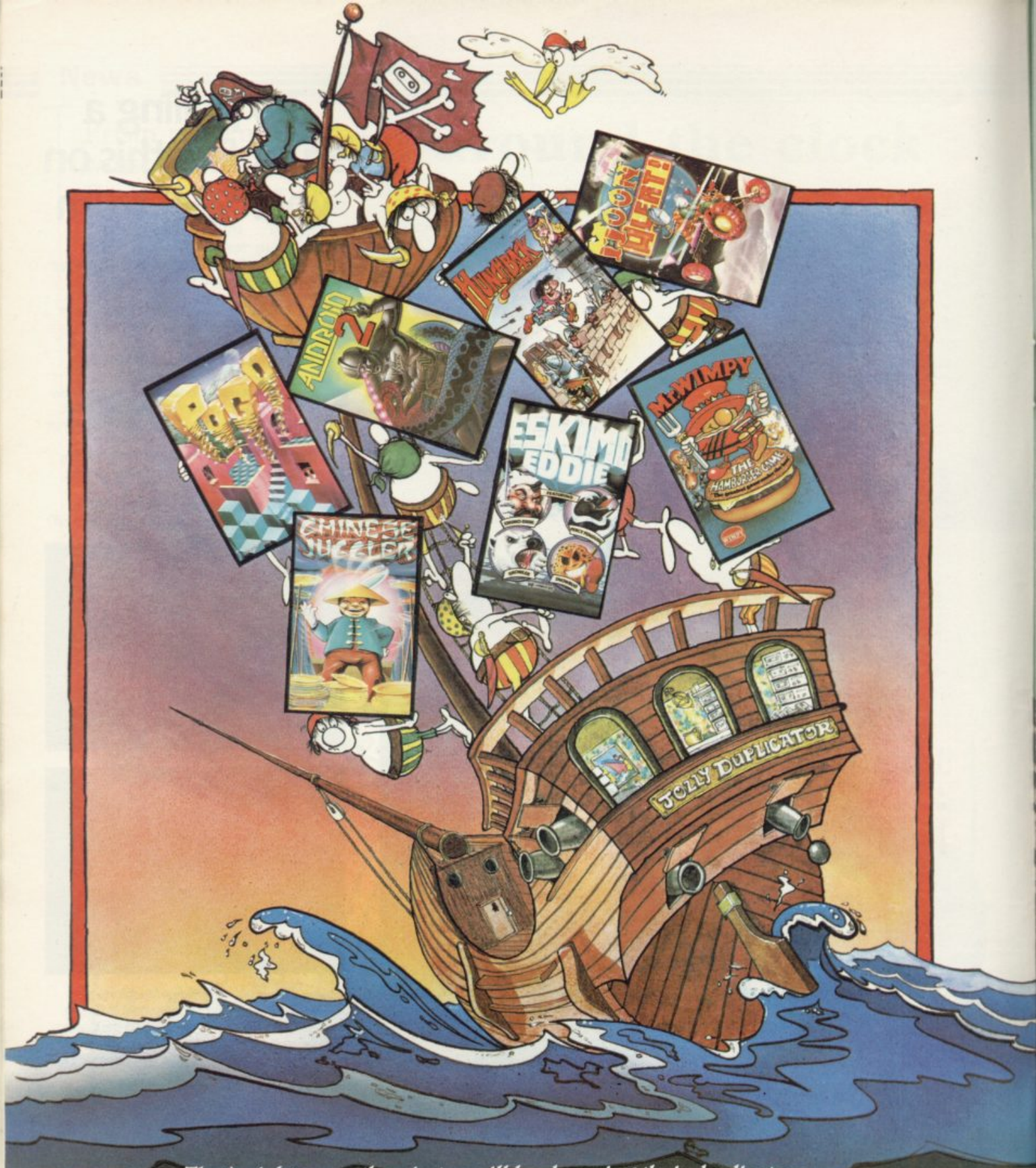
At only £5.95 each, they're destined to be big stars on the small-screen!

Selected Sinclair software lines are available from W.H. Smith computer stores, larger branches of Boots, John Menzies, Greens and most other software stockists nationwide.


Sinclair Research Ltd, Camberley (0276) 685311.

© Sinclair, ZX and ZX Spectrum are trade marks of Sinclair Research Ltd.

sinclair



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 cunning of pirates will find the exploits of **Gilligan's Gold** giving him fever and if they are still game for action then the excalibur's magical powers in **Cavelon** will improve even the sharpest of swash-bucklers. They'll all be fighting to save the beautiful maiden in the chart-



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

topping Kong, and Transversion will keep the best of 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 Spectrum 5-90 Comm. 64 6-90
Eskimo Eddie Spectrum 5-90

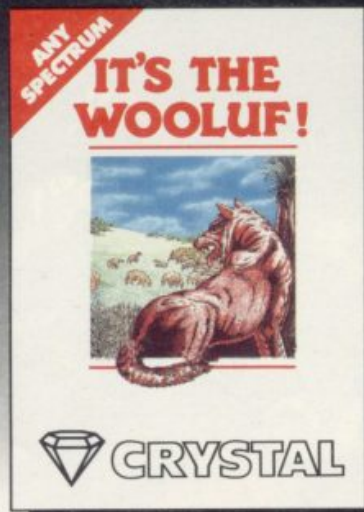
Mr. Wimpy Spectrum 5-90
Gilligan's Gold BBC, Comm. 64, Oric 6-90
Cavelon Spectrum 5-90 Comm. 64 6-90
Kong Spectrum 5-90
Transversion Spectrum 5-90

ocean

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

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

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.



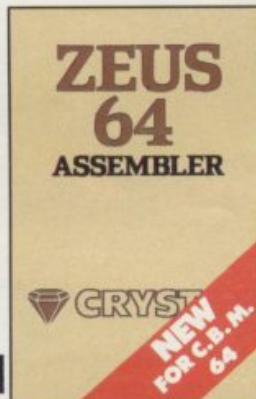
HALLS OF THE THINGS

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.

Sinclair service record

IS IT really the big demand for the QL which is causing the delays in delivery? If that were true, those orders which were within the estimated demand would have been met and there would be a number of QLs in the hands of users.

When my order was placed I was assured that delivery would be within 28 days; 14 days later I was advised, in writing, that the order was being processed for delivery, but the day after delivery should have been made I was informed, in writing, that delivery would be delayed until the end of June.

It would seem that Sinclair is somewhat careless concerning contracted obligations. If Sinclair is to be considered as trustworthy, it should be more forthcoming with information which must be accurate and credible.

Sinclair service is appalling. My Spectrum has been replaced several times and on the most recent occasion the need was very urgent but Sinclair refused to speed the extremely slow turnaround time in its workshops; it would have paid me to have had the job done at an independent workshop.

After the Spectrum was eventually returned it was discovered that the Microdrive and Interface 1 had more bugs than a hedgehog's skin; again, help from Sinclair was conspicuous by its absence.

The RS232 interface, part of Interface 1, is sending out spikes which upset the printer and the Microdrive snatched an almost completed tape out of the cassette and wound it round the mechanism; then I discovered that tapes processed on one Microdrive are not compatible with tapes loaded on another Microdrive — there seems to be a speed differential between different Microdrives. In a telephone conversation,

a representative of Sinclair denied the possibility. Letters to Sinclair have not been answered, including a recorded delivery letter to Nigel Searle.

In the last two months my Spectrum, Interface 1 and Microdrive have cost more than the original purchase price of the equipment and caused considerable problems. My son was unable to submit his A level examination project by the due date and as a result may be unable to enter the A level computer



The QL seems to have generated a lot of interest . . .

studies examination this year. That is a most appalling consequence of using Sinclair equipment.

The Sinclair products are innovative and meet a particular market need and the

QL would seem to be following that tradition but unless Sinclair puts its service department in order and tells the truth about broken contracts to supply QLs, it will eventually go into well-deserved oblivion. It is no wonder that foreign countries are making substantial inroads into British manufacturing and service industries.

**John Cargill,
Southport.**

The long view

AS A ZX-81 owner for only four months I have noticed a fair sprinkling of complaints letters, aimed chiefly at the poor reliability record and poor back-up provided by Sinclair.

What long-term international future can there be for a firm with a questionable record of quality control? When the Japanese enter our market seriously I suspect many will feel a cold wind blow. My next computer may not be a Sinclair, despite my complete admiration for the capabilities and potential of my little ZX-81, simply because of mixed reliability and dismal service.

Sir Clive Sinclair is often quoted as saying that once a product is launched he loses interest in it. That is a dismissive insult to those who

have placed their faith in his products. In an ever more competitive market that can only be described as a 'head-in-the-sand' attitude which has often led to U.K. firms losing valuable markets. To maintain the ZX-81 as the best beginners' micro I would add three modifications — some kind of colour capability; a revised keyboard — nothing too special, my Filesixty stick-on job is admirable and cheap; and Microdrive compatibility. The Spectrum does not need much work on it; just more quality — that word again — and a decent keyboard. If Oric can do it and Timex can do it, why can't Sinclair?

The QL? Surely Sinclair has lost goodwill by marketing a machine which seems to be non-existent; not having the specification finalised at the launch; taking money without being able to provide the goods in the 28 days stipulated.

Like most readers of your magazine I would like Sinclair to be world-beaters and to remain world-beaters for years. That will not happen unless fundamental flaws in its operation are set to rights and only pressure from you and the customers can tell it when change or improvement is required.

T P Hancock, Leeds.

How many days make 28?

I HAVE been a reader of your excellent magazine for 18 months and owner of a Spectrum for 15 months. Your March magazine had an article entitled, QL demand . . . delays. That is an understatement. Within a day of Sir Clive's statement launching the QL I telephoned to order it. Three days later I paid £407 for it — I did not know about the QLUB then. My cheque was cashed on

February 1 and my VAT receipt dated February 13. I am still waiting. I understand no QLs have been despatched.

Yet in the advertisement/order form it stated "Despatched within 28 days of your order." After endless telephone calls to Camberley and three letters to top management, all of which have failed to generate a response, I write hoping you can get a satisfactory answer from Sin-

clair Research. I even have a computer printed postcard dated February 7 saying "your (QL) is being prepared for despatch." So much for computers.

Previously I waited patiently for 13 months for two Spectrum Microdrives. When they arrived nobody even said sorry.

**Robert Macmillan,
Southampton.**

more letters on page 23

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



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
Booth

Politics and Sinclair User

AS A TEACHER and a Conservative supporter, I take exception to some of the remarks made in your April article, No Time For Complacency. I cannot speak for the present Government but I would like to put my views as briefly as I can.

The profligate spending of the last Socialist Government, or "Labour" as it calls itself, for some unknown reason, left this country in a very difficult financial position. The International Monetary Fund had refused to lend it any more money because of the extravagant way in which it was spent and the Socialists had to impose a freeze on spending which affected education and other services very severely.

It has cost practically all the revenue from North Sea oil to pay the interest on that debt and pay off some of the blank cheques left behind when they were put out of office in 1979. Under their Minister of Education, none other than Mrs Shirley Williams who was then a Socialist, we suffered equally from shortages of books and materials at a time when schools were full. She was too busy trying to impose comprehensive education on all and sundry to bother about such mundane things.

The present Government has put things back into perspective. You just cannot go on spending other people's money for ever, soaking the "rich" — who are usually not Labour supporters — to give to those they consider are the "poor" — who are usually good Labour party members, otherwise they do not exist — forever. What happens when there are no more "rich"?

I bought a 48K Spectrum last July after a long wait until I could afford one, as I

wanted to assess its capabilities as a teaching machine, which I found to be limitless. I also wanted to keep one step ahead of the little horrors I teach and to be able to hold my own in discussions. As I find it a pleasant relief from work and politics, I did not welcome the intrusion of this in your otherwise excellent magazine. I shall, of course, continue to read it, despite all.

I cannot afford many things just now, like a daisy-wheel printer to go with my Tasword II and replace my 30-year-old typewriter; I shall buy one when I can afford it. The Government would dearly love to issue each school with two dozen computers and keep them up to date but there is the debt to pay and all manner of pressure groups demanding their

share of public funds which are only just beginning to exist again.

**J R Murray-Bligh,
Formby, Liverpool.**

● The article discussed the speech made by the Junior Industry Minister, Mr John Butcher, in which he claimed the present Government has established a 'world lead' in educating the first generation of computer-literate school children. In view of the inadequate computer resources in today's schools, that claim should not be allowed to pass unchallenged.

Running into problems

IN THE GAME Cross Country in the April issue there is a mistake at line 30. It should read "PRINT AT 21, INT (RND * 32)", not "AT 21, INT (RND * 31)". As the game is printed you can move the runner to column 31 and so avoid all the cows without moving again.

**John Coulthard, aged 8,
Newcastle-on-Tyne.**

Sadistic games

IN REPLY to the letter from John Cockbill I regret to inform him that I, and probably many other readers, including the seven-year-old son of one of my friends, escaped from Atic Atac many months ago.

Aficionados of the game should not be misled by the clues he has given as the location of some of the door keys varies between games.

For a test of real skill I suggest the game designed by a sadist for play by masochists, i.e., Chuckie Egg. Levels 1-8 are comparatively easy and levels 9-16 where one has only to cope with the mad duck are also plain sailing. Levels 17-32 involving chickens and the mad duck are slightly more difficult.

The really sadistic element, however, appears at

level 33, where the format is the same as for the previous eight levels but the speed of the chickens is increased. The main disadvantage to the game is the inability to save a successful run and as it takes me more than an hour to reach my current limit of level 40, I suffer from lack of practice at high speeds. Is there life beyond level 40?

**Harry Leeson,
Broxbourne, Herts.**

So simple

IN REPLY to John Cockbill — April issue — sadly he did not make history by cracking Atic Atac. I cracked it in 1983 — it was so simple I did not consider it worth writing about.

**J B Cole,
Salisbury.**

Adventure helpline

I WRITE to inform you of an adventure helpline club I have started. I would be grateful if you could inform your readers of it. If any reader wishes to join they can contact me for more information.

**Christopher Tihanyi,
2 Victoria Square,
Clifton, Bristol 8.**

Do not adjust your set?

I AM WRITING with reference to a problem one of your readers had with obtaining colour from a Spectrum on a Contec 14in. portable TV.

First remove the five screws from underneath the Spectrum casing and turn the computer upright. Then carefully lift the top part of the casing so that it is just clear of the circuit board. Move it down over the rest of the casing but do not stretch the keyboard ribbon cable. Between the ULA and PAL encoder are four adjustable screws, used to tune the two separate outputs of the ULA. Then connect the computer to the TV as normal and create a border and paper colour. It is important that you note the positions of the screws mentioned. Use a screwdriver to adjust the top three of those screws until the colours appear on the TV, starting with the resistor marked 2.2 K Ω . If after a time the colour disappears, further adjustment is needed. The bottom screw may also be adjusted if necessary. If that method fails, return the screws to their original positions.

**G. Saunders,
Southampton.**

● We remind readers that if a computer is still under guarantee, operations such as those suggested will invalidate the guarantee. If in doubt, consult your local dealer.

more letters on page 24

The house is bugged

I HAVE managed recently to get my hands on a copy of the long-awaited Jet Set Willy. This game struck me as an example of the very finest games design possible and is a good target for other software houses but I was rather annoyed to find that there are one or two severe bugs in it.

After playing the game for

some time I found a room by the name of "Dr Jones will never believe this".

From the time I left the room I found that unusual things began to happen in certain rooms. For a start, all the nasties in the chapel disappeared, the UFO in the bridge disappeared, and if you enter either the kitchen or the east wall base or inside the mega trunk one by one all your lives disappear.

Another rather less cataclysmic bug is that when on the rope hanging over the beach, if you swing until the rope is at full swing and then jump off, so that you hit the top of the screen, you suddenly re-appear half way under the sand. Surely this could be corrected?

Of course, I realise that Matthew Smith was under tremendous pressure to release the game and far be it

from me to criticise someone of his skill and talent for writing brilliant games, but I think I would rather have waited a few more weeks for the builders to finish Willy's mansion before I bought it.

Joseph Robson,
Sheffield.

would benefit from the peace of mind of knowing that such good service is available. The company is Computa-Fix, Unit 2B, Albany Park, Frimley, Camberley, Surrey. Telephone 0276 66266

A F Anslow,
Willingdon,
Sussex.

Baddies are sdrawkcab

IN THE MARCH issue, a review of 3D Seiddab Attack from Hewson Consultants was given in Software Scene. The question was posed as to what Seiddab(s) are, as the game requires the commander to shoot them down.

I suggest you try reading the word backwards which may answer your question.

Neil Cowlshaw,
Bicester, Oxon.

Good service at a price

RECENTLY I had problems with my computer caused by a faulty interface and the slot bar was missing. It caused a series of faults which rendered the computer useless. Feeling depressed, I posted my Spectrum to a repair company on a Monday and had it back in good working order the following Friday, for £16.10 inclusive.

I am sure most readers

Yes, another program bug

I HAVE been buying Sinclair User for the last few months and I have found it very enjoyable to read and to test the programs but in the February edition I found in the program Starship Epsilon a number of mistakes.

On line 1525 it stated Print "(33*ISP)" and it should have read Print "(32*ISP)" also inverted commas were missed at the end of the statements.

Ian Marshall,
aged 12,
Daventry.

The Puzzle of the Pirated Software

The solution to the mystery published in the April issue

LATER THAT DAY, after the police had arrested the hapless Terry Dactill, Sherlock Holmes elaborated on his chain of reasoning.

"This morning, when Penny Traitor gave Dactill the cassette of **Lord of the Rungs** to load into the Spectrum, he made no attempt to switch it on. His first action was to rewind the tape. That was inconsistent with his account of the events of the previous evening, in which he stated that he had rewound the cassette before handing it to Mel Bourne and had then unplugged the equipment. It was clear that he was lying.

"The all-important clue, however, was the hi-score chart displayed at the end of the game. The scores themselves were irrelevant, but the surprising fact was that the scores were there at all, as they could not have been an integral part of the original program and would have been lost when the computer was switched off after play.

"It follows that the cassette which was found in the rifled desk drawer was not the original but a copy which had

been SAVED from the Spectrum after the game had been played.

"Let us now imagine the probable sequence of events. Dactill had been approached by Moriarty Micros and paid to steal the game. He assumed that Bourne would lock the cassette in the safe as usual, and the only way he could steal the game was to SAVE it from the computer itself. While the others chatted in Bourne's office Dactill pretended to unplug the equipment, planning to return later.

"He did so that night and immediately SAVED the game. He then went to Bourne's office and set about faking a break-in. His plan was to create the impression that an unknown agent had forced an entry to the building, ransacked the office, opened the safe and copied the master cassette, finally replacing it in the safe before leaving.

"If suspicion should fall on Mel Bourne, as the only person who knew the combination of the safe, or, indeed, a professional safe-cracker, then all well and good.

"His first mistake, however, was to

smash the window from the inside, scattering glass outside on the fire escape. That indicated an inside job, and eliminated Miss Traitor and Horace Goetzski as neither had keys.

"To provide further evidence of a burglary Dactill then forced open the desk drawer and found, to his surprise, the master cassette, which he had believed to be in the safe.

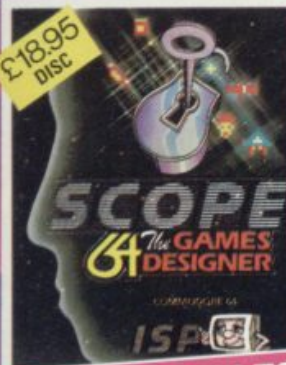
"It was then that he made his second error of judgement. He exchanged the cassette for the copy he had made, knowing the quality of the original recording to be superior. He assumed that no-one would notice the substitution, forgetting that the copy would contain the hi-score chart.

"He then left the building, neglecting in his haste to switch off the computer, which explains why it was so hot when I picked it up. Dactill had to rewind the cassette this morning because, as he knew only too well, it was the copied version and not the master cassette. Simple, eh Watson?"

A list of the prize winners will appear next month.

Unlock Your Imagination

£18.95
DISC



SCOPE 64
(tape or disc)
Not just a games designer - this remarkable product will revolutionise programming. Easy to use, supplied with bumper instruction manual - tells you everything you need to know.
COMMODORE 64

£17.95
TAPE

£17.95



SCOPE II

48K SPECTRUM

A complete update of the original award winning product - with many Fantastic extras. Sprite routines - Machine code Peek & Poke. Will run your original program totally independently.
Original SCOPE owners - send in your old tape & £6.00 for a complete update and new bumper size manual.

NOMINATED
PROGRAM
OF THE
YEAR

SCOPE COMPILES TRUE MACHINE CODE TO RUN TOTALLY INDEPENDENTLY
- not just a games designer - with SCOPE you can write truly original machine code & publish your own games!

ALL THIS PLUS Free Membership to the SCOPE User's Club PLUS the unique Programmer's "hot-line".



SPECTRUM SPRITES
Today's games need sprites. Here's everything you need to know about designing and handling sprites. All in a single pack with full instructions. Handle 8 sprites simultaneously - collision detection. It's all here!

£7.95



The CHARACTER GENERATOR

48K SPECTRUM

Another product essential for that unique and professional finish so important in today's programs. Design your own UDG's and complete character sets. 8 x 8 Pixel grid for easy design. Includes 6 specially designed character sets. Compatible with virtually all other machine code software. Big manual tells you all you need to know. Too many extras to list here.

£8.95



The SCREEN MACHINE

48K SPECTRUM

The definitive screen editor for building and assembling graphic layouts & title pages. Includes many facilities essential to produce really professional screen layouts. Supplied with big manual with full instructions.

£8.95



The MULTIFILE

48K SPECTRUM

The ultimate user friendly database. You design as many tailor made filing systems for whatever purpose. Each protected by your own secret security codes. Full instructions manual includes FREE TAPE for your first file.

£9.95



MONSTERS & MAGIC

A classic adventure game requiring hard thinking & quick reflexes. Puzzles to solve and monsters to defend all in real time. Being modular - treasure and experience can be carried forward. The first two modules are Tregilth, Stronghold of The Giants and Temple of Citishtar King of the Undead. Enter at your peril

£6.95



BATTLE PLANET

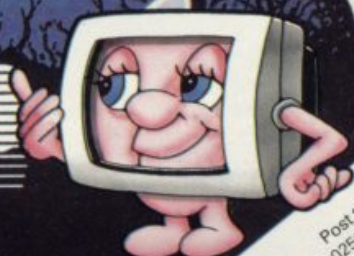
Your mission is to fly into the trench & launch a plasma bolt into the Battle Planets' heart. You must avoid Robot Fighters. Other Robot Fighters will bombard you, then the Robot commander joins the fight. He is invincible! Save Mankind!

Superb 3-dimensional graphics - only for the most competent player - This game is one of the best.

£6.95

BBC B

ISP



CLIP THE COUPON NOW AND UNLOCK YOUR IMAGINATION
Post to: ISP Marketing Ltd., 15a Castons Yard, off New Road, Basingstoke, Hants.
Tel. 0256-79 6559. Please allow 30 days for delivery.
Please rush me ☐ SCOPE 64 tape ☐ SCOPE 64 disc ☐ SCOPE II
☐ SCREEN MACHINE ☐ CHARACTER GENERATOR
☐ SPECTRUM SPRITES ☐ MULTIFILE
☐ MONSTERS & MAGIC ☐ BATTLE PLANET
(Cheques payable to ISP Marketing Ltd.)
Name _____ Address _____
Block capitals please

Inter

NOT JUST A PRETTY FACE!

Light pen and Interface

Our new generation light pen and interface is designed specifically for your Spectrum and works down to pixel level for complete accuracy.

Now you can produce high resolution illustrations with the 16 pre-defined instructions, selected from the screen controlled menu. Change colour, border, paper, ink. Draw circles, arcs, boxes or lines. You can fill in objects with colour, insert text or draw freehand, save and load completed or partially completed screens onto and from a tape and with a 48K Spectrum retain screens in memory and animate.

You can also use the machine codes in your own programmes for selecting from a menu, playing games etc. (all entry points supplied).

The interface fits neatly into position and comes complete with software cassette.

ONLY
£19.95



Please rush me the following
..... Light pen and interface(s) @ £
Please add post and packing £ 1.25
I enclose cheque/PO/Cash for Total £
or debit my Access/Barclaycard No.

☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐

Signature _____

Name _____

Address _____

dktronics

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

The Spectrum Connection

NOT JUST A PRETTY ^{Inter}FACE!

Programmable Joystick Interface

This superb new interface is one of our very latest developments for your Spectrum. Offering even more features, and as it's programmable from the keyboard or with the cassette supplied you can now use it with any software.

Features include

- Eight directional movement
- Keyboard fully functional
- Rear connector for other add-ons
- Microdrive compatible



ONLY
£22.95

Quickshot Joystick I®

- Super positive response
- Stabilizing suction caps
- 2 fire buttons
- 4ft lead

ONLY
£9.99



Please rush me the following

..... Programmable joystick interface, @ £
 Quickshot Joystick I @ £
 Quickshot Joystick II @ £
 Please add post and packing £1.25
 I enclose cheque/PO/Cash for Total £
 or debit my Access/Barclaycard No.

Signature

Name

Address



Quickshot Joystick II®

Incorporating all the features of 'Quickshot I' plus

- Improved control grip
- Trigger fire button
- Rapid fire option

ONLY
£12.95



dk'tronics

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

The Spectrum Connection

HE KNOWS OUR SECRET!

A new professional Microdrive compatible keyboard that offers more keys and functions than any other in its price range.

Constructed from high density black ABS our keyboard will transform your humble Spectrum into the "professional league."

It has 52 "stepped" keys plus space bar. A separate numeric key pad consisting of 12 red keys facilitates fast numeric data entry.

The 15" x 9" x 2½" case will accommodate your Spectrum and other add-ons like interface I, power supply etc. and forms and attractive self-contained unit.

All connections, Power, Mic, Ear, T.V., network RS232 and expansion port are easily accessible at the rear.

A few minutes, a screw-driver and the simple instructions supplied are all you need to fit your Spectrum.

ONLY
£45.00

**No Price
Increases!**

Guaranteed 10 day delivery
Please rush me the following
..... Keyboards @ £
Please add post and packing £1.25
I enclose cheque/PO/Cash for Total £
or debit my Access/Barclaycard No.

Signature _____
Name _____
Address _____

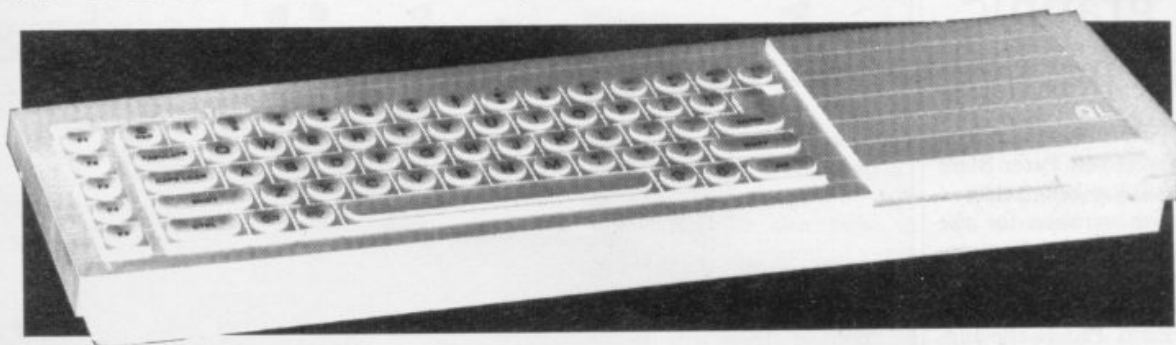
**And it's
Available
NOW!**

dk'tronics

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

The Spectrum Connection

Calling all SPECTRUM OWNERS how would
you like to own, ABSOLUTELY FREE a new
SINCLAIR QL COMPUTER!



dk'tronics offer you this unique chance
Plus **FREE MEMBERSHIP**
to the **dk'tronics** SPECTRUM OWNERS CLUB!
And the opportunity to win
one of four great prizes!

1st THE NEW SINCLAIR QL
2nd £100 CASH!
3rd £50 CASH!
4th £25 CASH!

Complete the coupon and send it to us and by return you will receive your
FREE MEMBERSHIP CARD. Don't delay post today!

I would like to become a member of the **dk'tronics** SPECTRUM OWNERS
CLUB plus the chance to enter the FREE DRAW.*

*(Free Draw for QL Computer plus other prizes to be held on August 1st 1984).

NAME: _____

ADDRESS: _____

POST CODE: _____

TELEPHONE NUMBER _____

AGE _____

MY SINCLAIR SPECTRUM SERIAL NUMBER IS: _____

dk'tronics

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

The Spectrum Connection

New lease of life for graphic designers

THE ORIGINAL Pixel Pad, now marketed by Peter Blanford & Co, has been released again, with versions for the BBC, Spectrum and Commodore 64, along with a new Graphic Grids pack.

The Pixel Pad is the biggest pad available, being 43cm. x 29.5cm. overall. It has a full screen grid, 29cm. x 21.5cm. of 24 lines by 32 columns, each character square being sub-divided into 8x8. Both the character squares and the plot positions are marked. At the bottom of the pad are eight 8x8 grids marked from 1 to 128 for UDGs. At the side is a summary of all the commands you are likely to need.

The Graphic Grids are A5 size and have 16 8x8 grids and a 13x4 screen grid. The pads are aimed mainly at educational users but a 50-sheet Pixel Pad can be obtained from Peter Blanford & Co, 10 Barley Mow Passage, Chiswick, London W4 4PH. Tel: 01-994 6477. It costs £4.95 plus £1 p&p. Graphic Grids are priced at £2.45. They are also available through the Spectrum chain of shops.



To hear is to obey with Micro Command

SPEECH recognition is a growing area of interest and the new Micro Command from Orion Data looks set to help. It is supplied with a microphone and a demonstration tape which allows Spectrum users to teach their computers up to 15 words and then to have words recognised when repeated.

Users of 48K will also be able to play Sheeptalk, a game where the dog is controlled by spoken commands.

Normally, speech recognition for a computer is very expensive; a look inside Micro Command shows why. It contains a Z-80A CPU, as used in the Spectrum, ROM and RAM, buffers and audio circuitry.

The demonstration tape takes you through the process of learning to use the unit in easy stages. Starting with up and down and then adding left and right it allows you to continue only if you score

more than 80 percent. You must pronounce each word very carefully. Once past that stage you can play Sheeptalk. The game, produced originally by Virgin Games, is in Basic and hence fairly slow. It shows the limitations of the unit, as it is difficult to keep the same careful tone when the dog starts driving the sheep into the river.

Included with Micro Command are comprehensive instructions for its use, plus an additional information booklet which lists the basic teaching program and a disassembly of the machine code which is used. It also gives details of the variables used by the code and shows how to include Micro Command in your programs.

Micro Command costs £49.95. That may seem expensive to Spectrum users but considering its contents, the work which must have gone into it, and the price of other similar units, it is reasonable. Orion Data is at 3, Cavendish Street, Brighton, East Sussex BN2 1RN. Tel: 0273-672994.

Executive Spectrum

IF YOU often carry your Spectrum the S1 Computer Case by Treetop Designs could be useful. The case is a standard size, 480mm. x 380mm. x 110mm. executive briefcase with an ABS insert moulded to accept the computer, power supply, Sinclair printer and a cassette deck.

The moulding inclines the Spectrum to a comfortable working angle and includes a



small panel which has a LOAD/SAVE switch and a re-set button. When in use the lid of the case can be removed.

The unit ensures that all the leads are out of sight and, when you upgrade your Spectrum by buying an Interface One and Microdrives, you can also obtain a new moulded insert — S2 — to house them.

Both versions of the case cost £47.95 with extra inserts at £15.45 and can be obtained from Treetop Designs, 61, Widmore Road, Bromley, Kent BR1 3AA.

Improved memory for upgrading Spectrums

EAST LONDON Robotics has improved its SP48 kit which upgrades Issue 2 and Issue 3 Spectrums from 16K to 48K. The new kit, SP48b, has been introduced because Issue 3 Spectrums need an additional link to be made on the PCB. The kit includes a small metal clip which solves that problem.

The instructions supplied with the kit are clear and straightforward, most useful being a photocopy of the inside of a Spectrum with the positions of the chips marked and also showing the way they go.

If care is taken, fitting the kit can be attempted by anyone, whether having electrical knowledge or not.

To test the kit fully we obtained a 16K Issue 3 Spectrum and fitted it and, as always seems to happen when a number of people are watching, it did not work. We telephoned the ELR panic number and the problem was easily pin-pointed and a replacement chip sent.

It should be pointed out that the error was not due to ELR but a mis-match between two of the chips.

The offending chip was swapped temporarily with one from another piece of equipment and both worked after the transplant.

Also included with the kit is a free software tape entitled **Beyond Horizons**. It is a very basic program giving a few pointers on how the Spectrum works.

The SP48b costs £23, the kit for Issue One Spectrums is £35 plus 65p p&p, and is available by mail order from East London Robotics Ltd, Gate 11, Royal Albert Docks, London E11. Tel: 01-474 4430.

Trojan pen makes light work

TROJAN PRODUCTS specialises in making light pens for a range of computers, one being the 48K Spectrum. The pen is supplied with driving software on tape which allows you to draw pictures or to choose from a menu.

Once the software has loaded, the pen plugs into the EAR socket of the Spectrum. It takes its power from a PP3 battery which is also supplied. On-screen you are

given the option of drawing or instructions. The instructions show you how to use the pen and also how to modify it if you want to use it in your programs as a menu chooser.

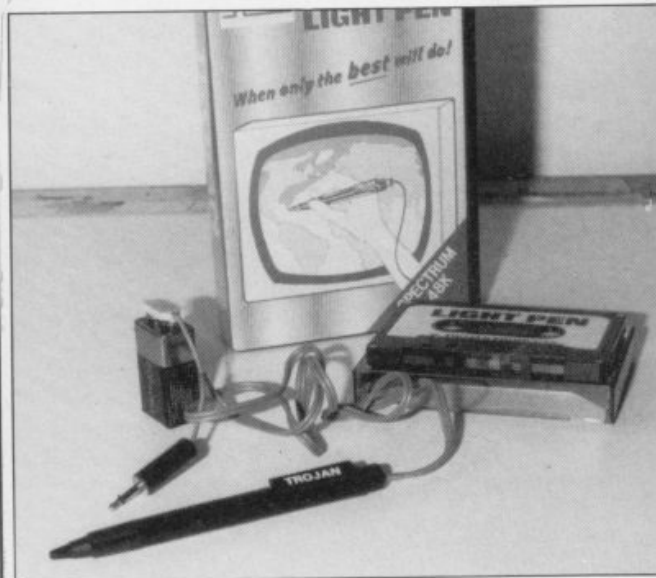
All that needs is about 20 lines of Basic and 200 bytes of machine code, both of which are given. When using it that way the code gives a number which corresponds to the line number to which the pen is pointing. In that

way it is easy to choose from a list of options.

The drawing program has two movable points and by using them you can draw lines, circles and boxes, fill areas with colour or even draw free-hand. It takes time to grow accustomed to the last option. It is very good with horizontal lines but not so good at vertical ones — they tend to 'wobble' slightly. Other options allow you to load and save pictures, change colours, insert characters or copy the screen to a Sinclair printer.

The pen worked well and was easy to use — overall a well-thought-out product. The only difficulty which might arise is that due to changes in the Spectrum, older versions of the pen might not work with the latest version of Issue 3s. Trojan will exchange software if you experience difficulties.

The pen is reasonably priced at £17.25 inc. VAT and p&p and is available direct from Trojan Products, 166 Derlwyn, Dunvant, Swansea SA2 7PF or local computer shops.



Rainbow interface

A NEW joystick interface has been released by Rainbow Electronics. It has a built-in beep amplifier. The interface has one good point in that it can be programmed as a game is running. Other than that not much can be said for it.

To program it, you have to hold down a key, move the joystick, and then release the key. You must do that for each of the normal four positions, then again for the four positions while also holding the fire button and again if

you want to move diagonally, a feat which would need at least three hands.

Once programmed, a switch on the front of the interface is moved to the play position; it disables the keyboard. Finally there is no volume control for the sound amplifier.

The interface is also poorly made. The 28-way edge connector normally has a plastic locating blank to line it up. In this case it is merely a blob of solder. The connector, and

the joystick socket, are stood off from the interface PCB by about 1in.

The unused pins are left hanging. That is very unstable and could short out. There are also some resistors soldered in mid-air rather than via the PCB.

At £24 plus £1 p&p the interface is competitively priced but could not be recommended. Rainbow Electronics is at Glebe House, South Leigh, Witney, Oxfordshire OX8 6XJ.

SABRE WOLF

ULTIMATE
PLAY THE GAME

48K SINCLAIR ZX SPECTRUM
£9.95

Sam Spade strikes the manic mines

THE MINER or explorer being chased through subterranean caverns by monsters of many kinds is now a common motif in computer entertainment and it would take a vastly superior program to oust *Manic Miner* from its place at the top of the pile. **Sam Spade** from Silversoft, which will run on any Spectrum, is yet another version on the theme and is no real contender against *Miner Willy*. Sam, our hero, is a miner

digging kryptonite in the usual multi-layered cave. The precious ore is guarded by small, fast-moving monsters of red, green and yellow varieties. Sam is moved up and down the cavern using the keyboard or a Kempston joystick and climbs ladders to move from one level to the next.

To survive and to score he must dig holes with his hammer through which the monsters will fall, provided they

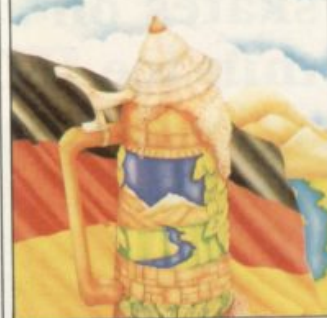
are helped by a few taps on the head as well. Red monsters will die by falling only one level but to kill the others the player must dig sets of holes, as the green and yellow baddies must drop two and three levels respectively to be destroyed.

That takes some doing — the monsters are fast and voracious and it is all too easy to paint Sam into a corner. There is the added difficulty of a decreasing air supply.

While the program ran smoothly, the format became rather repetitive after a time, even though one's ingenuity is taxed by putting the proper holes in the correct places. The game is no match for the ever-moving, ever-changing caverns through which Willy has to struggle and leaves Sam as an average kind of miner, undistinguished by comparison.

SAM SPADE
Memory: Any Spectrum
Price: £5.95
Joystick: Kempston
Gilbert Factor: 5

GERMAN IS FUN



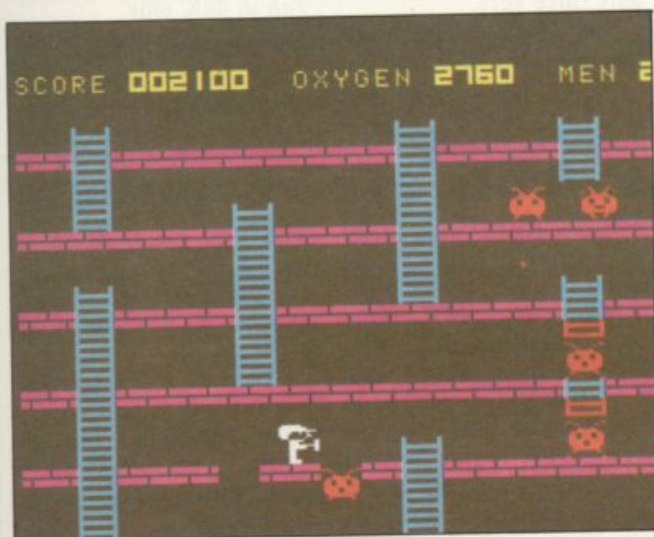
Gentle German

USING a combination of graphic displays and word drills, **German Is Fun** presents German vocabulary and phrases for beginners in a way reminiscent of a standard idiomatic phrase book. The program is divided into nine main topic sections which deal with the areas most likely to be of use to the holiday-maker or basic student.

The main menu provides a simple selection procedure for each topic. When a selection is made a set of options is offered which will allow the student to choose the picture only, the picture with test, phrases only or picture with phrases. The first option sets up a picture, item by item, showing the corresponding English and German words, while the second will test you on those words.

The program is very user-friendly, allowing exit from any section at will and, in the word-test section, providing the next letter in response to a question mark. The graphics are cheerful and well-drawn with some movement at certain points. It is a meticulously-devised program and, for anyone who has a basic grasp of German pronunciation will be extremely useful as a supplement to oral experience.

GERMAN IS FUN
Memory: 48K
Price: £5.95
Gilbert Factor: 8



Arcturan mind match

MIND GAME enthusiasts should find **Arcturus** from Visions Software Factory just the thing to occupy a few spare hours — or days. At the start of the tape are about 20 screens recounting the saga of how the Arcturans' ultimate mental challenge formed part of a plot to take over the free world and, although there seems to be no harm in it, it is not clear why it was included, since it has no bearing on the game. So, unless you have nothing better to do, skip the saga and start with the demonstration of the game, which could be described as a complex form of noughts and crosses.

Each player attempts to place noughts or crosses in a line of four on either one single squared board or across the four which are shown in perspective, superimposed one above the other on the screen. What constitutes a line, difficult to grasp at first, becomes clear after a few bouts against the computer, which can operate on 10 levels of skill.

Apart from that, the game incorporates a number of other choices and refinements. You can play against another player instead of the computer, with or without sound effects, and with the clock switched on or off. You

can also replay a game, load and save one, or consult the computer for help.

The screen display is clear and the method of making moves is simple and convenient; you use the cursor keys to move round the squares and press ENTER for the square you want. For those who like to pit their wits against a computer rather than human opponents, it is a well-presented version of an unusual and interesting game.

ARCTURUS
Memory: 48K
Price: £6.95
Gilbert Factor: 7

Eskimo skates on thin ice

ESKIMO EDDIE from Ocean Software invites the player into the Arctic. Eddie must battle against Growler the polar bear in his attempts to rescue Percy the penguin. On the second screen the penguin must defend itself against deadly snowbugs by pushing ice-blocks into their paths.

That is rather a dramatic description of the action on-screen which gives the impression of a frosty Frogger. In the first part the player must steer Eddie up the screen by keys or a variety of joysticks. Two polar bear figures and three jagged icefloes march across and Eddie will be killed if he makes contact with them.

After a few tries the graphics display is not very gripping or colourful. The repetitive quality of the tasks will not appeal to those fond of complex games, though it is possible younger children will enjoy it for a time. All in all, a disappointing production from Ocean Software.

ESKIMO EDDIE

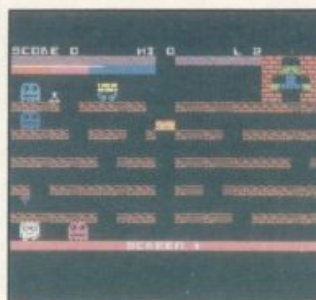
Memory: 48K
Price: £5.90
Joysticks: Kempston, Sinclair, Protek
Gilbert Factor: 4

Dr Franky falls foul of the ghastly ghosts

IT IS FORTUNATE the reviewer of **Dr Franky and the Monster** already had his own copy of the program. The game provided for review loaded perfectly, displaying the initial Manic Miner-style cavern, a few ghosts, the flask of elixir and the famous monster waiting for life to be poured into him. There it stopped, as the motion keys failed almost completely to obtain response on-screen. Irritation replaced interest after a dozen or so attempts to play.

There appeared to be no data corruption, however, and the second copy functioned perfectly. Whether it was one bad tape or a potential bug is yet to be seen so, if you buy the game and have similar problems, refer it to Virgin Games.

The aim is to bring the bolt-necked monster to life by collecting a flask of chemicals which must then be given to the lifeless hulk at the top of the tiered caverns, nine in all. The gloomy dungeons are also populated by the ghosts of the wretches whose spare parts have been used to manufacture the monster. They will hunt you as you attempt to move and jump along the



passageways. There are other hazards such as mine wagons and bridges to negotiate. Movement is simple using only three keys.

The graphics are bright, fast and clear and you will need to move with some speed to avoid the vengeful

ghosts. The monster comes to life with a satisfying electrical glow once the flask has been taken to him by the bizarre Dr Franky and good timing and judgment are needed to do that successfully. Dr Franky is an enjoyable and attractive game but, in view of the problems experienced by the reviewer, it may be wise to check that your copy runs well before you leave the shop. Dr Franky and the Monster will run in 48K only.

DR FRANKY

Memory: 48K
Price: £5.95
Gilbert Factor: 6

Robots are revolting

ROBOT RIOT from Silversoft centres on a revolt of the robots in which the only way to regain control of the building is to lay bombs over the entire floor area and thus force the King robot to escape from his central control room. That is not the end, however, as it will escape only to another floor, where you must start laying bombs again.

Anyone who has played Pac-man or any of its many derivatives will be familiar

with this game, where the main difference from the original is that instead of eating dots you are laying a trail of them.

You lose a life whenever you run out of power but in yet another familiar touch the regular consumption of power mites will prevent the disaster.

One interesting feature is the way the game starts with an introduction to the various robots, with details of their speed, intelligence and destructive powers. Apart from that, **Robot Riot** can in no way claim originality but it manages to be absorbing and addictive, especially if you enjoy maze scenarios, and the robot graphics are lively.

Experienced players may find it slow and it is a pity that each time you lose a life you have to return to the start, instead of continuing from where you left off, making the game more frustrating than it need be.

REACTOR

Memory: 48K
Price: £7.95
Joystick: Kempston
Gilbert Factor: 7

ROBOT RIOT

Memory: 48K
Price: £5.95
Joystick: Kempston
Gilbert Factor: 6

Nuclear reactor risk increases

READING the playing instructions to **Reactor** from Gemini might lead you to believe that you have to be a nuclear physicist to play, but in practice the game is not so complicated as it sounds.

The object is to control a nuclear reactor by moving a control unit in such a way that the metal elements bounce from it at right angles and hit the central discharge unit, a tricky manoeuvre until you get used to it. Each time you accomplish it successfully, the power of the

reactor increases and radiation is kept under control.

There are neutrons to take into account; whenever they hit a piece of metal it splits into two, increasing radiation. Further, if you collide with metal after having absorbed neutrons, you lose one of your four lives.

Keeping power up and radiation down for the required time leads to the next stage of the exercise, which involves laying a trail of concrete to box-in every metal element in sight. You can then go on to

try your hand at controlling a new and more difficult reactor, knowing that sooner or later nuclear power will inevitably get the better of you.

The graphics are relatively simple but the game offers a new and original concept and its degree of difficulty is well-judged to keep you playing for a long time.



Cross words

WORK FORCE appears to be attempting the impossible with its **Computaword**, with predictable results. It is difficult to think of any advantages a computerised crossword might have over the simple but much-loved printed variety and Computaword fails to demonstrate any. Not only would you have difficulty in taking it on the train but it presents all kinds of other obstacles, such as the time it takes for the grid to display, the difficulty of consulting clues, and the laboriousness of entering answers. All of those difficulties could be abolished by using paper and pen.

The program might have offered a crossword which was more intelligent than an ordinary one but that is not the case. Computaword accepts incorrect answers; if you ask it for help it fills-in the whole crossword rather than answering one clue; and, to top it all, it even plays *Congratulations* after it has supplied the correct solution for you.

There are 10 puzzles which adds to the variety but also to the total amount of loading time needed before you can play. The crosswords are straightforward but difficult to solve, so that the program would not even be suitable for introducing newcomers to crosswords.

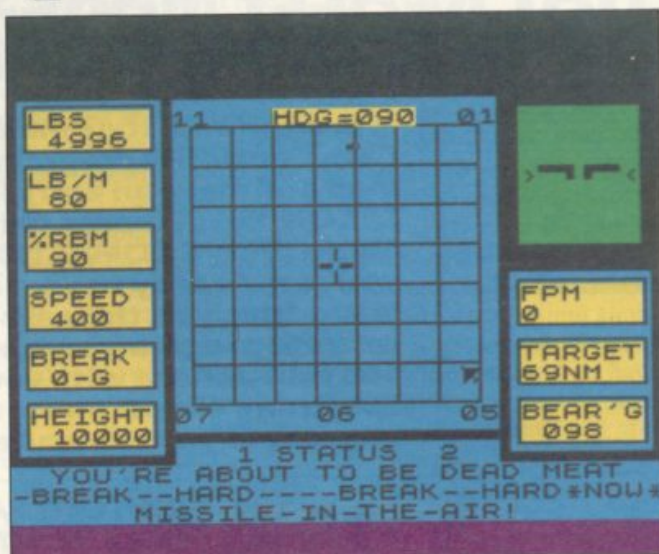
COMPUTAWORD
Memory: 48K
Price: £6.95
Gilbert Factor: 2

Phantom NATO strike on the Spectrum

THE CASSETTE cover of **Strike Attack** from Micro-mart for the 48K Spectrum claims that the program is the ultimate simulation, which might lead a potential buyer into thinking that the program has similarities to the Psion or Hewson programs which feature visual representations of cockpit views. The instructions enclosed are more explicit and tell you that you will be provided with all the information you would have obtained by instrumentation or by visual means.

In fact, the player is cast in the role of the navigator of a NATO Phantom attempting to destroy an enemy base with bombs and is provided with a set of readings indicating flight status. The situation outside the aircraft is represented solely by a grid in centre screen on which graphic symbols depict target, hostile fighters and the Phantom.

Using the keyboard, the player moves the aircraft across the grid, paying attention to the various instrument readings and hoping to avoid missiles and other attacking aircraft by breaking. That is



meant to represent the tight turns necessary in air warfare to escape attack. Warnings are flashed on-screen to describe the type of attack. There is a training mode and an operational level.

The instruction manual is rather impenetrable but after a few practice runs you will appreciate the general idea if you are not deterred by witty comments like "You jerk, you didn't break hard enough". The program seems to run very slowly and the response time to commands is slow. That becomes a real

disincentive to continuing after a time and there is little feel of controlling an aircraft — more the sense that you are obeying the computer orders.

Because of that the game is not compelling enough to make you want to get back in the air. Two or three attempts after the training sequence convinced the reviewer to seek pastures new. The program did not live up to the packaging.

STRIKE ATTACK
Memory: 48K
Price: £6.95
Gilbert Factor: 4

Pi-man's gold gamble

ANYONE concerned about the fate of the Pi-man will be relieved to hear that after the alcoholic excesses of Pi-eyed, he is now utterly reformed, even to the extent of entering for five events in the Olympic Games.

That, however, is probably the best piece of news about the latest game from Automate, **Olympimania**. Apart from the usual excellent graphics — the most spectacular sequence is the Olympic stadium with its rostrum and wildly waving crowds — the

game has a limited amount to offer in the way of entertainment. The five events — Pi-jump, Alpi skiing, Pitathlon and so on — are all similar, with a series of obstacles to jump and some unlikely hazards to overcome, such as rival competitors who dig holes beneath the Pi-man, or fish and alligators in the case of the swimming event.

In all the events, it is extremely difficult to win a bronze medal, let alone a gold, and as a result the interest soon palls in spite of the

amusing graphics. The reverse side of the tape, true to Automata traditions, has a pop music track, described as a choral extravaganza of the Piland International Anthem. The kindest thing to be said about it is that by comparison it places its companion game in a favourable light.

OLYMPIMANIA
Memory: 48K
Price: £6
Gilbert Factor: 6

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 _____

SU 6

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

Favourites of yesteryear

THE ZX-81 may leave much to be desired as an arcade games machine but it is perfect if you want to play adventures. A good keyboard is not necessary and high-resolution colour graphics is not an integral part of adventures which are, in most cases, text only. The ZX-81 also has 16K of usable memory, so a programmer is not restricted by RAM requirements.

It is not surprising therefore that many good adventures have been developed for the machine. One of the first to be produced was **Ship of Doom** from Artic Computing. It has a text-only format and follows the usual space plot where your player-char-



acter is stranded on a strange and alien ship which you have gone to investigate. You have to suffer the perils of ice and metal rooms while trying to find the key to the control room of the spaceship.

As one of the first adventures it was accepted with glee by the addicts. Few people have managed to solve it, although it is one of the easiest adventures in the Artic series.

Ship of Doom can be obtained from Artic Computing.

The area of graphics adventures has not been left unexplored by eager programmers. Carnell Software was the first to exploit that

field with **Volcanic Dungeon**. The major part of that adventure consisted of text but the player is given a map of the caverns in which play takes place. The map is not very helpful and it is all too easy to be burned to a crisp, frozen, or blasted by the evil witch Magra and her denizens.

Play in the dungeon is undemanding, as nearly every turn is taken up with fighting monsters. The monster conflicts are so random that one of every three or four is likely to end your life and leave you waiting for the game to be initialised again. The game is slow in execution — most of it is written in Basic — and death is always too swift. It is as if the computer is playing the player and not the other way around. Our experience shows that Magra gets the better of an adventurer. The Volcanic Dungeon is available from Carnell Software.

Pimania is another graphics adventure from Automata. The graphics are short intervals between moving or solving problems but they contain some important clues as to how to solve the central problem and find the Golden Sundial of PI.

The Pi-man is an irritating little character who appears at seemingly random moments during the adventure or when you ask for help. In return for some favour, he will give you a clue as either a riddle or a jig which he dances in classic cartoon style.

You might feel as if you could do without the Pi-man but he is necessary for the completion of the adventure, so you should keep on the right side of him.

Pimania is a clever and classic graphic adventure. Whether you want to buy it is

another matter. You might be drawn by the prize in the competition but is a game which could take more than two years to solve worth playing?

The Trader Trilogy, from Quicksilver, could be loosely termed a graphics adventure. In the set of three games you are in charge of a spaceship which roams the galaxy in search of adventure. You are a trader and in your planet-hopping experiences you meet many types of alien creature. The monsters include a fluff-ball which survives on your brainwaves, a whole population 'high' on a drug with effects like Mescaline, and robots giving way to rust.

On the first run of the adventure, which has to be played in a sequential format, the graphics and plot are entertaining and you will keep playing until you are killed or find sufficient supplies to make a profit. On the second and succeeding runs you will become less pleased with the game.

The Trader Trilogy may be of some interest to children but even they, if they are discriminating, will grow tired of always answering the same mathematical problems to find cargo. The trilogy is the least promising of Quicksilver games for any machine and deserves to be zapped into space.

Continuing the coverage of strategy games, **Football Manager** from Addictive Games puts you into the seat of a team manager looking for

division in which it starts to the first division and make sure that you are not relegated. success or, on the other hand, failure, on the pitch and bankruptcy.

There are seven skill levels, although we found the first three difficult enough. You have to make sure that your team moves from the

Dallas is another strategy game but more down-to-earth than the others in the roundup. As you might expect, it contains all the elements necessary to turn you into an oil baron who wants to take over the Ewing empire. You have to prospect for the best land and build a pipeline and production plant on it.

All kinds of problems will crop up including tornados, heavy rain and earthquakes. If you are not quick enough you will find the Ewings have taken over your little empire.

Dallas is an excellent strategy-simulation which improves the more you play it. The game is addictive, which is a comment which could not be applied to many games of its type. If you fancy a trip into the world of the Ewings, Dallas can be obtained from Cases Computer Simulations.

SHIP OF DOOM

Memory: 16K
Price: £6.95
Gilbert Factor: 7

VOLCANIC DUNGEON

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

PIMANIA

Memory: 16K
Price: £10
Gilbert Factor: 6

TRADER TRILOGY

Memory: 16K
Price: £6.95
Gilbert Factor: 6

FOOTBALL MANAGER

Memory: 16K
Price: £5.95
Gilbert Factor: 7

DALLAS

Memory: 16K
Price: £5
Gilbert Factor: 6



COMPUTER REPAIRS.

AT LAST!

A comprehensive repair facility for SINCLAIR products using genuine SINCLAIR parts

ZX81

£17.50

**ZX
PRINTER**

£21

**ZX
SPECTRUM**

£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. _____

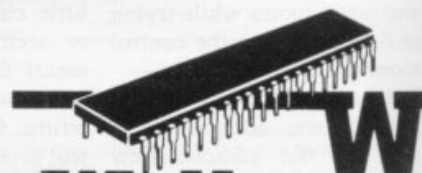
Signature _____ Tel No. _____

Name _____

Address _____

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

SU/6



Walkers
COMPUTER SERVICE
AND REPAIRS

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

"THE BEST AND FASTEST SERVICE ON THE SOFTWARE MARKET"

(B. Strasser, Jordan)

CONFUSED by the vast choice of Spectrum programs? We can help. We've played hundreds to choose the best (some are on this page). Full details in our catalogue, free with your order. It's the only catalogue to describe the best, omit the rest and quote all the reviews!

All games work with keyboard control and with joystick as shown. Of course, we have the classics, too, like BLACK CRYSTAL (48K: £7.50), JET-SET WILLY (48K: £5.95) and PHEENIX (16K: £5.50). All games are in stock - and tested by us - BEFORE they are advertised.

WE TRY TO SEND YOUR PROGRAMS THE SAME DAY WE GET YOUR ORDER. Access/Visa card holders call 01-789 8546, 24 hrs, from any country where your own laws allow this.

HUNTER-KILLER *AN EXCELLENT SIMULATION* (PersCompNews). Captain your own S-Class sub as you hunt down and kill the enemy sub! 18 control keys (PROTEK stick helps); dive, surface; chart your course; watch through your 3D periscope as your torpedoes run towards the target. Quick-kill practice mode. Full-screen control room; chart room; periscope view. Very good graphics. **48K Protek £7.95**

DUNGEON BUILDER This amazing program contains 15K of pure machine-code to teach you to **WRITE YOUR OWN GRAPHIC ADVENTURES!** It was two and a half years in the making, but now you can easily learn to write - and illustrate - machine-code adventures. 100-page manual helps. **NO STIX. 48K Dream £9.95**

PAINTBOX "If you've been looking for a Spectrum graphics aid, this seems like one of the best." (PopCompWkly). As they claim, even a child can use Paintbox to define up to 84 User Definable Graphics, draw all of them on-screen, save them for your programs; then there's the 2-speed hi-res drawing program and the 28-page manual ... the most useful utility we've ever used. **KEMPSTON/CURSOR STIX. 48K Print&Plotter £7.70**

FIGHTER PILOT "A superb simulation ... as a piece of programming it's impressive, as a game it's not to be missed." (CompChoice). **THE FLYING IS THE BEST I'VE COME ACROSS!** (PCGames). 3D cockpit view, 3D air-to-air combat, stunning instrumentation. 7 Options include landing practice, flight training, combat practice, actual combat. 4 skill levels. **KEMPSTON, INTERFACE 2, AGF STIX. 48K Digital £7.95**

DENIS *Rapid-response, superbly complex game ... great fun to play ... excellent.* (PopCompWkly). Funny, friendly text adventure. As Denis Thatcher you travel up to 95 locations, seeking peace in the pub. You must find a drink every few moves, while dropping in on the Royals, the MPs and maybe the Pope (wearing a truss and carrying a lawnmower). Written with THE QUILL (£14.95). **NO STIX. 48K Applications £5.50**

LORDS OF TIME "Some of the most intriguing puzzles ... if you enjoy text adventures, this is not to be missed." (HomeCompWkly). Defend history against 9 evil Time Lords, from the Ice Age to the Space Age. 200+ locations; 200+ vocabulary. **NO STIX. 48K Level 9 £9.90**

SKULL "The best, smoothest and cleverest maze game I've ever seen ... the skulls are wonderful." (Crash). Brilliant 3D maze with 9,999 levels as you search for treasure, avoiding the wandering skulls! **SAVE OR PRINT OUT HI-SCORE TABLE.** **NO STIX. 48K (Games Machine) £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 irate hijacking passengers. 30 command keys; 2 track layouts; 7 skill levels, 14 sub-levels. Demo and Pause while you strike! **NO STIX. 16/48K Microsphere £5.95**

SCUBA DIVE *FABULOUS UNDERWATER WORLD ... if you fancy settling back for a long nail-biting adventure, SCUBA DIVE is very special.* (S. User). Dive overboard and seek your fortune; the way the fish move is incredible! Beautiful full-screen animated graphics; but you'll need strategy as well as tactics to get past all the octopuses! **ALL STIX. 48K Durell £5.95**

WHEELIE *EXCEPTIONALLY GOOD GRAPHICS ... smooth, very detailed, with loads of animation.* (Crash). "The crash sequence is a little too graphic." (S. User). Jump buses and cars on your SuperDream bike; avoid hedgehogs, but find the ghost rider. Will you beat him? Demo mode. Great sound, too. **ALL STIX. 48K ONLY Microsphere £5.95**

TRASHMAN "Technically, the game is superb with smooth scrolling and movement ... wonderful." (PopCompWkly). The most playable game ever from Malcolm Evans. For 1 or 2 players. Collect the bins - and the tips - avoid the grass - and the dogs! Superb animated graphics. **KEMPSTON/PROTEK/INTERFACE 2 STIX. 48K New Generation £5.95**

BLUE THUNDER *SUPERB GRAPHICS and smooth pixel-scrolling through six screens - hugely exciting and very frustrating.* (Crash). Take off from a destroyer, fly your helicopter to a remote island. You will only rescue your comrades if you discover how to destroy the nuclear reactor! 5 skill levels. **KEMPSTON STIX. 48K Wilcox £5.95**

GO TO JAIL *EXCELLENT GRAPHICS are used to make a very impressive display indeed - highly recommended.* (ZXComp). 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 Automata £6.00**

SPRING SUPER SAVERS

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

E.T.X. (Abbex)	NOW £5.00	SAVE £1.00
PENETRATOR (Melbourne)	NOW £4.95	SAVE £2.00
GROUCHO (Automata)	NOW £8.00	SAVE £2.00
SPLAT! (Incentive)	NOW £4.00	SAVE £1.50
TIMEGATE (Quicksilver)	NOW £4.95	SAVE £2.00
NOWOTNIK PUZZLE (Phipps)	NOW £3.45	SAVE £1.50
MAD MARTHA 1 AND 2 (Mikrogen) FOR BOTH!	NOW £8.90	SAVE £5.00
GROUND ATTACK (Silversoft)	NOW £3.95	SAVE £2.00
MOLAR MAUL (Imagine)	NOW £4.00	SAVE £1.50
ZZOOM (Imagine)	NOW £4.00	SAVE £1.50

ONE PROGRAM FOR £1.00!!

If your order from this advertisement comes to £25 or more, excluding p&p, you may also buy any one of the 'Super Savers' above (except the 'Mad Marthas') for just £1.00 (plus p&p for foreign addresses.)

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: **SU19**

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	UK: Add 55p only per order £0.55p
AND	EUROPE: Add 55p for each program £
PACKING	OUTSIDE EUROPE: Add £1 for each program/airmail £
OUTSIDE EUROPE: ADD £1 TO TOTAL FOR REGISTERED MAIL	
TOTAL	£

SOFTWARE SUPERMARKET

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

MORE THAN £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 programs which present the player with a challenge in decision-making and tactical play. Games which graphically depict real-life situations, such as piloting an aircraft or driving a motor vehicle, will also be considered, as will games which have a particular appeal for girls. The categories of programs which, there-

fore, can be submitted include adventure, strategy, simulation and war games.

Entries will be judged for originality and innovation, playability and addictive quality, graphics and the use which is made of the computer. The presentation of the instructions and the program documentation will also be taken into account.

The award will be judged by the same panel of experts who judged the 1983 Cambridge Awards — Mike Johnston, consultant editor of *Sinclair User* and organiser of the highly-successful and long-running ZX Microfairs; Trevor Toms, author of many best-selling Sinclair computer books; and John Gilbert, deputy editor of *Sinclair User*. A representative of Websters Software Ltd will also be on the panel, which will be chaired by Bill Scolding, editor of *Sinclair User*, and Melvin Lloyd-Jones, a director of CCS.

The presentations of the awards will take place on October 4, 1984 at the Ritz Hotel, Piccadilly, London W1.

Rules

- 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.

- The entrant assigns CCS the exclusive licence with the right to sublicense, to copy, modify, sell and publish the original or modified program in any form and CCS undertakes to pay a royalty fee of 20 percent of the nett invoice price on the sale of such program(s) and further will pay a fee of £10 in respect of each publication of the respective program listing. CCS assigns ECC Publications the exclusive worldwide rights to publish the listings of all entries.

- The winning programs shall become the property of CCS, which undertakes to market the programs and to pay the winner a royalty and fees as detailed.

- The organisers retain the right to offer any entries for use by Micronet on an agreed royalty basis.

- 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.

1984 CAMBRIDGE AWARDS ENTRY FORM

Title of game

Description of game

Machine: ZX-81/16K Spectrum/48K Spectrum/QL (delete as applicable)

I agree to abide by the rules of the competition.

Name

Address

..... Tel

Send your entry to ECC Publications, 196-200 Balls Pond Road, London N1 4AQ to arrive not later than August 4, 1984.

Cambridge
Award



SUPERCHESS 3.0

ABSOLUTELY GUARANTEED ABLE TO CONSISTENTLY BEAT
ALL OTHER SPECTRUM CHESS PROGRAMS

★ Declared 'Champion of Champions'
by Computer Choice Magazine Chess
Championship (May 1984)

★ Achieved overall 50% against graded
human players at its local Chess Club!

Superschess 3.0 has been developed to bring you the strongest chess program yet for the Spectrum computer.

At the tournament level Superschess 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 Superschess 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, Superschess 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'.
- Programs 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
UPDATED VERSION NOW AVAILABLE

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.

CP software

DEALER HOTLINE:

0895 31579

Send Cheque, Postal Order or Access No. to:
CP SOFTWARE, Dept SU2
2 Glebe Road, Uxbridge
Middlesex UB8 2RD



AIRBASE INVADER

Non-sexist, non violent,
satirical, sprite graphic
all-action arcade adventure.

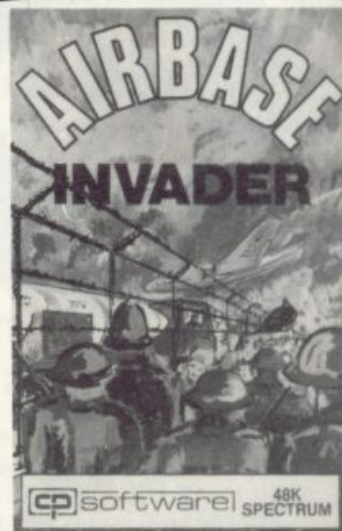
Featuring:

- Iron Lady
- Ronnie Raygun
- Old Bill
- Squaddies
- Gutter-press photographers
- Peace women

—and maybe the end
of the world!

Compatible Kempston and
Keyboard Joysticks

48K SPECTRUM—£5.95



SUPERCODE —for 16K and 48K Spectrum

100+ ROUTINES

MICRODRIVE VERSION NOW AVAILABLE

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	SUPERCHESS II (Lynx)	£8.95
INTEGER FORTH	£9.95	SUPERCHESS II (Jupiter Ace)	£8.95
SUPERCHESS II	£4.95	PINBALL WIZARD	
SUPERCHESS I (16K ZX81)	£4.95	(48K Spectrum)	£5.95
16K SUPERCHESS (16K Spectrum)	£6.95	PINBALL WIZARD	
REVERSI	£6.95	(Commodore 64)	£6.95
SPECIAL OFFER:		DRAUGHTS	£5.95
LOGO and FLOATING POINT FORTH	£20.95	BACKGAMMON	£5.95
SUPERCODE and EXTENDED BASIC	£17.95	SNAIL LOGO (Turtle Graphics)	£9.95
DRAUGHTS and BACKGAMMON	£9.95	GOLFING WORLD	£5.95
		SPECTRUM EXTENDED BASIC	£9.95

WANTED:

Interesting programs for Spectrum,
Commodore 64 and QL

ESPECIALLY WANTED:

QL/Commodore 64 Bridge Player

ANY OFFERS?

48k SPECTRUM OWNERS

READ THIS FROM



MACHINE CODE TEST TOOLS FOR SPECTRUM, ZX81 AND TS1000

The ultimate professional tutor and de-bug program, we wrote these to help us write our own machine code programs.

- **TEST** and display machine code instructions as they're written.
- **IDEAL** for both the novice and the expert.
- **FULLY** documented with a 32 page tutorial.
- **HEX/DECIMAL** conversion as standard.
- **CHARACTER GENERATOR** — of unbelievable quality!!! supplied free with the spectrum version.

MASTER TOOLKIT (16/48K)

YOUR BASIC WILL NEVER BE THE SAME AGAIN!

- This program adds a whole range of really powerful commands:—
- Real time clock and alarm with on/off/set and print commands.
- **BLOCK MOVE, COPY, DELETE** and **MERGE** two lines, **FIND** and **CHANGE** character string, **RENUMBER**, 10 programmable keys, **TRACE** with execution display, **VARIABLE** display and dump, **COMPRESS**, **REMKILL** and **PACK** to minimise program bytes, **CHANGE CASE** upper to lower and back.

FULL SCREEN EDITOR/ASSEMBLER (16/48K)

voted THE MOST POWERFUL MACHINE CODE PROGRAMMING TOOL YET SEEN by HOME COMPUTER WEEKLY

- Editing facilities comparable to the most sophisticated word processor with **MOVE, COPY** and/or **DELETE** lines or blocks of code.
- **LOCATE, CHANGE** or **DELETE** strings/characters, full 280 set supported, syntax check, powerful expression evaluator etc. and "SNAKE" a fully notated source code demonstration program.

ADDRESS MANAGER (16/48K)

Works on the 16K and 48K Spectrum, in 48K it will store, file, select and retrieve over 400 full addresses (over 1500 individual names). Dynamic Memory Management and compression techniques makes all this possible and there's a lot more: • **FULL SCREEN INPUT and EDITING** — see it as a page as it happens with insert, delete and TAB Commands. • **MULTIPLE INDEXING** — 3 way user-defined index enables you to define, catalogue, select and print entries as needed, (essential for the more sophisticated applications.)

- **INSTANT RESPONSE** — yes this program is very very fast.
- **SUPER FRIENDLY** — extremely easy to use and efficient in a way that BASIC can never be. Standard Program uses ZX Printer.

FINANCE MANAGER (48K)

FINANCE MANAGER is a powerful, flexible and fast MENU DRIVEN general purpose program carefully designed to handle up to 255 separate accounts for domestic and business accounting applications. The magic of MACHINE CODE has enabled us to produce the very latest "on the page" presentation which lets you enter and edit data naturally, as if with a pencil and paper. But that's not all, not by a long way. This program automatically raises a corresponding debit or credit for every entry, and will even open a new account if an entry features an unrecorded account name. Accounts can be **MERGED, DELETED, ANALYSED, MARKED**, as priority, **RENAMED, EDITED** and **SCROLLED**. Transactions can be **RECONCILED, AMENDED, DELETED, PRINTED, DESCRIBED** for analysis and **RENAMED**. Standing orders can be **APPLIED, REMOVED, DESCRIBED, AMENDED, DELETED** and even **DUMMIED** for planning purposes. Standard Program uses ZX Printer.

PLUS 80 VERSIONS

of ADDRESS MANAGER, FINANCE MANAGER and EDITOR/ASSEMBLER are available to give 80 COLUMN PRINTOUTS USING KEMPSTON'S INTERFACE AND CENTRONICS PRINTER.

CHESS — THE TURK (48K)

The original Turk was an eighteenth century automation, a life-size mechanical figure resplendent in Turkish costume and seated behind a wooden cabinet on which a chess board and pieces were placed.

OCP now offer you the twentieth century equivalent of that Turk — a chess-playing computer program.

The Turk challenges you to a game of chess!

- MANY OPTIONS INCLUDE:** • 6 LEVELS OF DIFFICULTY • DEMONSTRATION MODE • BOARD EDITOR • GAMES PRINTOUT FACILITY • BLITZ CHESS AGAINST THE CLOCK • TWO PLAYER MODE • UNFINISHED GAMES CAN BE STORED • RECOMMENDED MOVE OPTION • FULL INSTRUCTIONS PROVIDED

POST TO: OXFORD COMPUTER PUBLISHING LTD.
4a HIGH STREET, CHALFONT ST. PETER, BUCKS, SL9 9QB

Please rush me ☐ Machine Code Test Tool (Spectrum) £9.95 ☐ Machine Code Test Tool ZX81 £9.95 ☐ Master Tool Kit £9.95 ☐ Chess — The Turk £8.95 ☐ Address Manager £8.95 ☐ Plus 80 £19.95 ☐ Finance Manager £8.95 ☐ Plus 80 £19.95 ☐ Full Screen Editor/Assembler £9.95 ☐ Plus 80 £19.95 ☐

NAME.....

ADDRESS.....

ACCESS CARD NO..... EXPIRY DATE.....



WE DIDN'T SAY IT

... but it's true!!

"Super Toolkit cannot be recommended strongly enough . . . it fills a big gap in the market"

SINCLAIR USER

For 16/48K SPECTRUM

SUPER

FOR SPECTRUM BASIC PROGRAMMERS

Written by Adrian Jones

- SINGLE KEYPRESS ENTRY
- TRACE (WITH SINGLE LINE OVERFLOW)
- LIST VARIABLES • BLOCK DELETE
- TAPE HEADER READER
- "CRUNCH" PROGRAM
- RENUMBER (inc. GOTOs, GOSUBs etc.)
- FREE MEMORY • PROGRAM LENGTH
- MEMORY USED BY VARIABLES
- REPLACE KEYWORD

NECTARINE

What's more they also say . . .

It is very user-friendly and should help anyone . . . whether beginner or expert. It occupies 2.5K . . . that is an achievement for the author who has included 12 routines in the package.

The exceptional characteristic is the one key entry system. Toolkit helpfully prompts on screen for the information it needs . . . and is one of the most comprehensive on the market.

NECTARINE

837 Yeovil Road • Slough • SL1 4JH.

Complete this coupon now and PROFIT YOUR PROGRAMMING

Name.....

Address.....

Please send me a SUPER TOOLKIT at £10.70 incl p&p.

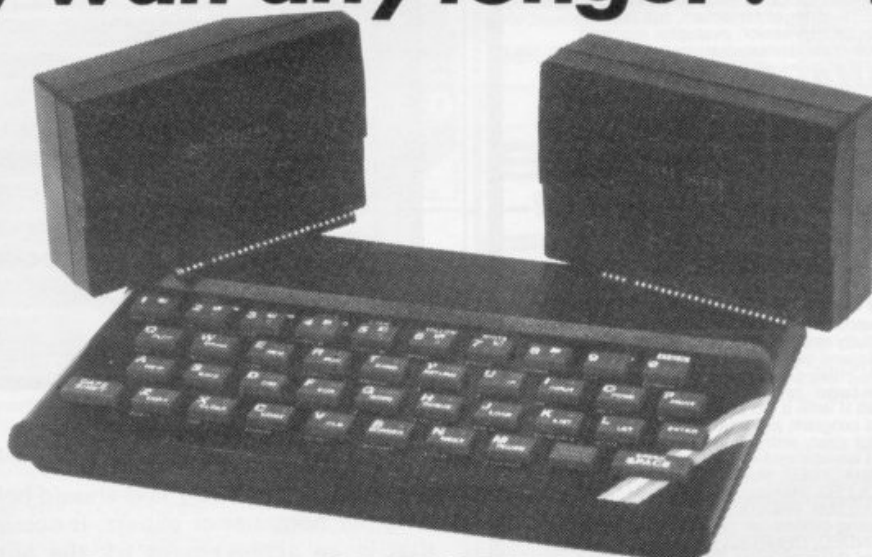
Upgrade your 16K ZX SPECTRUM Now!

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. SU6, 24 Ray Street, London EC1. Tel: 01-833 4909

Cheetah, products available from

branches of **Boots**

WHSMITH

John Menzies

Rumbelows

and all good computer shops

ONE OF the first add-ons for most Spectrum users is a full-size keyboard. While the original keyboard was a vast improvement on the ZX-81, it is still very limiting if you use your Spectrum a great deal. For professional use it is almost a necessity.

In the last few months six new keyboards have either been announced or appeared on the market. Of those, we managed to obtain four for review, one was seen in its prototype stage and we are still waiting for the other.

In each case we fitted a Spectrum and Interface One to the keyboards to see how difficult it was and also tried to fit a power supply inside, where there was either room or it was suggested in the instructions. We also tried to connect a Kempston printer interface, which is a fairly standard interface and did not fit on some of the older keyboards. Whether or not it fits can therefore be taken as a measure of how other add-ons will fit.

The feel and size of a keyboard are important; after all, they are the reasons for buying a new one. The sizes are given in the table but the feel is more difficult to measure, as it will differ from person to person. If possible, visit either a local computer shop or one of the Microfairs and try them yourself; if you cannot do that any of the keyboards should be satisfactory.

The Maplin keyboard, marketed under the name Mapsoft, is for the home hobbyist, in that it is supplied in kit form. It is also the only one which connects to the user port of the Spec-

'The Fuller FDS' probably started the sudden interest'

trum. There is an extender PCB which fits on to the Spectrum and a ribbon cable to the keyboard.

It has 47 keys, the normal 40 plus Delete, Graphs Lock, Shift Lock, Caps Lock, single key E Mode and two space keys. There is also one extra key which you can wire up to your own requirements.

Making up the kit is straightforward, provided that you are used to soldering; if not, it might be an idea to practise first. None of the chips is socketed and special care has to be taken with them.

The made-up board is fitted into a thin plastic moulded case, the top of which is held in place by pieces of Velcro and has the colour legends for keys 1 to 7 and 0. The legends on the



Give your machine the positive touch

John Lambert flexes his fingers over five professional keyboards for the Spectrum

keys are three colour cards which fit under a clear plastic top.

Unfortunately the keyboard was received late for review and we did not have time to test it fully. First impressions, however, were favourable, although the case appears to be fairly flexible. If you prefer making your own keyboard, this is perhaps the best, if not the only one available. The kit costs £44.95 inc. and can be obtained from Maplin Electronic Supplies, PO Box 3, Rayleigh, Essex SS6 8LR, or from its many shops.

The dK'Tronics model for the Spectrum is largely the same as the old, with the same stick-on legends. The case is made of plastic and there are extra holes in the back to allow connection to Interface One when fitted.

To fit the Spectrum in the keyboard it must be taken out of its case and screwed to the new base. If you have an Interface One, that is fitted first and the Spectrum PCB is slotted into it and then screwed down. As the PCB is fitted in the back right-hand corner, there is an extender PCB for the Microdrive lead which connects to Interface One by the solid connector supplied with the Microdrive. The lead is taken out of the case through a small slot in the left-hand side.

Also on the left-hand side are three pillars on which you can mount the power supply. To do that the power supply must be taken out of its case and should therefore be fitted only by people who have some electrical knowl-

edge. There are a number of problems fitting this power supply — the Sinclair power supply has gone through a number of design changes. If it is marked Made in U.K. on the base it will probably fit on the pillars.

When fitting Interface One it may make the back of the case bulge slightly. It is possible, however, to trim the case but that should not be necessary and is poor design. The Kempston interface will not fit unless you are using Interface One; again, it is possible to trim the case.

Despite those difficulties and the lack of a full-size space bar, the keyboard has been very popular in the past. The reviewer has used the old version for the last nine months and it has proved reliable. It is a pity that dK'Tronics did not put a little more thought into the new version, as it could have made a good keyboard even better. Overall, however, it is a good keyboard; it has a pleasant feel to it and can be recommended. It is available, price £45 plus £1.25 p&p, from dK'Tronics, Unit 6, Shire Hill Industrial Estate, Saffron Walden, Essex CB11 3AQ. Tel: 0799 26350, or through the Spectrum chain of shops.

The keyboard which probably started the sudden interest is the Fuller FDS. It has been a long time arriving and has had more written about it than any other keyboard — not all of it good.

As well as the usual 40 keys, it has an extra 11, including a full-size space bar. The extra keys are four direction keys —

continued on page 47

Set course for Britain's biggest ever home computer exhibition – The Computer Fair. Over 150 stands will be packed at the show with microcomputers, add-ons and software.

Earls Court
June
15-17*

Because it's held at Earls Court, The Computer Fair is easy to travel to by car, bus or tube. So program the co-ordinates and make sure you're locked on course for The Computer Fair, June 15 – 17, 1984 Earls Court, London.

'LOCK ON COURSE FOR THE COMPUTER FAIR'

It's a must for every experienced microcomputer user and it's the ideal way of seeing how useful and what fun home computers can be for visitors who would like an introduction to microcomputing, with expert advice on hand.

'Practical Computing' 'Your Computer' and 'Computer Choice' magazines are sponsoring the show, so you can be sure a visit is worthwhile.

THE
Computer
Fair *Personal computers*
Home computing
Small business systems

Opening times: 10 – 6 daily 10 – 5 last day

Admission prices: £3.00 for adults
£2.00 for children under 16 and O.A.P.'s.

* Trade day only, June 14



Sponsored by

YOUR
COMPUTER

Practical
Computing

micro
business

COMPUTER
CHOICE

continued from page 45

they are shifted 5, 6, 7 and 8, very useful when editing or using a word processor; two function keys which put the Spectrum into extended mode — f1 gives the red functions and f2 the green; extra Caps Shift and Symbol Shift; and single-key entry for Delete, Comma and Full Stop. All the keys have their legends printed on them, the main functions in white on the top and Extended mode functions on the front in red.

Fitting the Spectrum inside proved somewhat difficult, as the screw positions did not line up exactly with those on the Spectrum PCB; with a little effort it can be made to fit if one of the screws is omitted. When trying to fit Interface One more problems arose. In this case the Spectrum is fitted at the front and Interface One at the back, with a flexible connector between them.

Fuller does not supply that as standard. As the Spectrum is so far forward

'Saga could have a winner with the new Emperor keyboard'

the power, cassette and aerial sockets are inaccessible when the keyboard is put back together and would therefore either have to be fitted permanently or additional leads made up and brought out to the back, where holes would have to be drilled in the case to take them. Neither is there a slot for the Micro-drive lead and that would have to be cut out if required.

The Spectrum power supply is connected directly to the keyboard; a lead which goes to the Spectrum is only just long enough — if you have the Fuller Master Unit you may have to extend it. That also means that if you want to move your Spectrum, you have either to open the case to unplug it or take the power supply with you. It should be possible to fit it inside the case and Fuller has put four pillars in the back right corner for it. Unfortunately they do not line up with any of the holes on the power supply PCB on either version and would need a great deal of ingenuity to fit.

In use, the keyboard was reasonably good, the extra keys being a boon when using a word processor, particularly the arrow keys. Unfortunately it was impossible to get shifted Z, X, C and V. That would appear to be a design fault, as we had two keyboards for review and the fault was common to both. Other



than that, the keys were a little stiff but that is only to be expected with a new keyboard.

All-in-all, the keyboard could have been very good but it has too many little faults and a few major ones. If you can obtain one where the keys work correctly and are prepared to spend a little time customising, it would be worthwhile buying, otherwise do not bother. It is available, mail order only, costing £49.95 plus £2.50 p&p, from Fuller Micro System, 71 Dale Street, Liverpool 2. Tel: 051-236 6109. The emergency enquiry number is 051-709 9280.

The new Saga keyboard, the Emperor, is still in the prototype stage but was expected to be readily available by the latter part of April. We were able to have an exclusive preview of the new model which looks as if it will provide the first real competition to dK'Tronics.

There are 67 keys, the normal 40 in white, plus 27 beige function ones, including full-size space bar. They are four shifted arrow keys, 5, 6, 7 and 8; two unshifted ones, 6 and 7, plus 0, to be used in games; two extra Caps Shift

bolted to the bottom of the keyboard. In that way Interface One will not have to be taken out of its case and will fit directly to a Spectrum base. The Kempston interface will also fit if the strain relief bar is removed. On the top of the keyboard is a groove to hold pens.

Saga could well have a winner if the production model is anywhere near as good as the prototype. It will cost £54.45 plus £1.15 p&p and is obtainable, by mail order, from Saga Systems Ltd, Woodham Road Woking, Surrey GU21 4DL or in person at The Woking Computer Centre, 32 Chertsey Road, Woking, Surrey. Tel: 048-62 23845.

The Transform keyboard is aimed squarely at professional users. It is the only keyboard reviewed which had a metal case and also the only one with three-colour printed key caps.

There are 60 keys, including a numeric pad which has an extra Caps Shift and full stop, plus a full-size space bar. The other extra keys are Symbol Shift, Edit, Delete, E Mode, Colon, Semi Colon, Comma and another Full Stop.

Fitting is very straightforward. The base of the Spectrum is retained as an insulator and bolted through to the base of the keyboard. If Interface One is being used, the two long mounting screws have to be removed and the bolts then go through it and the Spectrum. There is provision to put the power supply inside the case and special connectors are used to wire up an on/off switch and a LED. That is also relatively easy. You need not worry about the leads shorting out as everything is

Make	Length		No. of keys	Price	Size in mm.
	Q-P	Space			
Sinclair	195	N/A	40	Free	230 x 140 x 30
Maplin	185	75	47	£44.95	370 x 165 x 50
dK'Tronics	200	N/A	52	£45.00	350 x 245 x 70
Fuller	185	150	51	£49.95	355 x 255 x 65
Saga	190	150	67	£54.45	370 x 180 x 50
Transform	188	150	60	£69.95	410 x 220 x 75

The length measured across the Q and P keys is the overall distance and is included to give an idea of the pitch.

and Symbol Shift; and single-key entry for Edit, Delete, Caps Lock and Graphics. In addition a number of keys which normally need symbol shift are now single-key entry; for mathematicians, plus, minus, divide, times and equals; for word processors, comma, full stop, colon, semi-colon and quote; and for programmers, greater than, less than, string and hash.

Fitting is very straightforward. Only the top of the Spectrum case is removed and the base, containing the PCB, is

well insulated; in any event the switch is on the 9V side and could not cause damage. The keyboard has a solid feel to it and is certainly the best-looking of the keyboards reviewed. The only problem which may be experienced is that some Issue 3 Spectrums are temperamental when used with it. Its price of £69.95 reflects the kind of use to which it will be put but it is certainly the top keyboard at the moment. Transform is at 41 Keats House, Porchester Mead, Beckenham, Kent. Tel: 01-658 6350.

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.

Get liquidated!

Introducing five great new games from CCS guaranteed to give you plenty of trouble.

You'll get no peace in the prohibition days of *Gangsters* — if the cops don't get you, your rivals will. Try keeping your head above water in *Brewery* — a game all about liquid assets. We'll try our hardest to sink you in *Plunder* — a world of Elizabethan piracy. And we're sure *Battle 1917* is more than a match for anyone — it should be — it won the Cambridge Award.

As if that's not enough, we've even created *Abyss* — a feast of excitement and hidden danger for those who dare defy the evils to be found beyond the Mountain of the Golden Lion.

So if you want trouble — we've got the games.

All available for Spectrum 48K at £6 (*Abyss* £5). Selected titles available from W.H. Smith, Boots, Rumbelows, Greens and all good computer shops or:

**Cases Computer Simulations Ltd.,
14 Langton Way, London SE3 7TL.**



CC Strategy Games.
They're no pushover.

Playmates

Can the Spectrum compete in the world of computer chess?

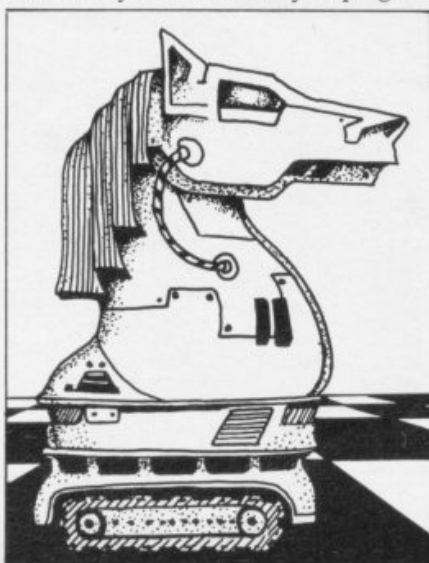
Bryan Whitby referees the battle of the micros

ARE THE chess programs available for home computers as good as programs inside the dedicated chess computer? Until now the answer has to be no. In fact, most serious chess players rate home computer programs as being very poor. Now, with the release of the **Cyrus-IS-Chess** program for the Spectrum, the gap has certainly narrowed. The one problem with chess computer tournaments organised between different chess programs is that they are always conducted under tournament regulations, i.e., 40 moves in two-and-a-half hours.

Most people who buy chess programs for their computers, or people who buy the dedicated chess computers, usually like to play against it at a fast rate of response, so all the tournaments which have been organised are of little interest to the average hobby player because of the great length of time the computers are allowed to take under the tournament time regulations.

One way to overcome that is to play each program against one another at

An interesting feature about the two programs was that in 1981 the Cyrus program had won the European Micro-computer Chess Championship and in the same year the Sensory 9 program



had won the World Championship. So with television, computers and chessmen set, battle began and the contest progressed.

The overall performance of the Sensory 9 was good. In the first half of the match it played steady but not very exciting chess but in the latter half it moved up a gear and duly outplayed its opponent. Game number 10 was the best game Sensory 9 played and was probably the best of the match.

Sensory 9, playing on level 4, and Cyrus, playing on level 6, the game quickly reached the middle game with Cyrus slightly better-positioned but Sensory 9 with Rook and Bishop teaming together started slowly, nibbling away at the Cyrus defence and by the time the end game was reached Sensory 9 had two very strong passed pawns.

It is at such moments that you can learn from chess programs because the way Sensory 9 pushes the pawns nearer the eighth rank, not even strong chess players could have played the ending better. So with both pawns reaching

'Cyrus end-game play raised a few eyebrows'

their goal and becoming Queens the Sensory 9 finished the job and picked up another valuable point.

As for the Cyrus program, the same weaknesses showed time and again. After playing the openings usually very well it seemed to lose its way in the middle game, making nonsensical moves which left its pawns hanging. Sensory 9 duly took them and therefore Cyrus usually reached the end game two pawns down and in an inferior position.

continued on page 52

'The performance of the Sensory 9 was good overall'

every level. That means that if there are six levels of play and you play the computer with both the black and white pieces, you will have 12 games against each computer. That way you will be able to see which chess program will best suit your needs at the response level you will require most regularly.

Being the owner of a Fidelity Sensory 9 chess computer and a 48K Spectrum I decided to obtain Intelligent Software Cyrus-IS-Chess and play one against the other at each level, with both the black and white pieces. Because there was a difference in response time between the computers, certain levels had to be omitted so a total of five levels was used by the Sensory 9 and six by the Cyrus program which gave a total of 12 games in the challenge match.

Game	Response	White	Black	Result	Moves
1	5/5 sec	Sensory 9	v Cyrus	0-1	76
2	5/5 sec	Cyrus	v Sensory 9	$\frac{1}{2}$ - $\frac{1}{2}$	59
3	15/10 sec	Sensory 9	v Cyrus	1-0	58
4	10/15 sec	Cyrus	v Sensory 9	0-1	49
5	15/20 sec	Sensory 9	v Cyrus	1-0	68
6	20/15 sec	Cyrus	v Sensory 9	1-0	41
7	30/30 sec	Sensory 9	v Cyrus	$\frac{1}{2}$ - $\frac{1}{2}$	55
8	30/30 sec	Cyrus	v Sensory 9	0-1	72
9	1 min/1 min 15 sec	Sensory 9	v Cyrus	0-1	91
10	1 min 15 sec/1 min	Cyrus	v Sensory 9	0-1	51
11	3 min/3 min	Sensory 9	v Cyrus	1-0	63
12	3 min/3 min	Cyrus	v Sensory 9	0-1	84

Running score													
	1	2	3	4	5	6	7	8	9	10	11	12	Total
Sensory 9	0	$\frac{1}{2}$	1	1	1	0	$\frac{1}{2}$	1	0	1	1	1	8
Cyrus	1	$\frac{1}{2}$	0	0	0	1	$\frac{1}{2}$	0	1	0	0	0	4

That was a resounding success for the Sensory 9, winning by seven wins to three with two games drawn.

Chess Challenge

continued from page 51

Cyrus end-game play raised a few eyebrows, especially in game seven, when around move 50 Cyrus had King, Rook and three pawns and Sensory 9 had only King and two pawns. All Cyrus had to do was to take another pawn with its Rook which was there for the taking and move its King up to

protect the Rook. Sensory 9 would not have been able to stop the passed pawn on the King's Rook file.

Would Cyrus take the pawn and move the King? In fact, Cyrus would not even take the pawn. It just kept moving its Rook away to a safe square, then back to the square it had just left. So the same moves were repeated three

times by each computer and Sensory 9 claimed a draw by repetition — very strange and extremely poor chess by Cyrus.

Another interesting feature of the contest was the number of passed pawns which achieved promotion to Queens. Sensory 9 managed eight and Cyrus three. Almost every game was concluded by passed pawns Queening.

I can only say it was enjoyable to watch the two computers do battle. On more than one occasion the clock crept into the small hours because the excitement was too great just to switch off and adjourn the game.

Sensory 9 won most of the middle games and thus won the match. Cyrus tried very hard and should have won both the drawn games, making the score much closer.

Chess programs for the home computer have not reached the standard of the dedicated chess computer but with the release of the Sinclair QL, who knows, the dawning of the first chess computer grandmaster may be upon us.

Probably the best game from the match is detailed on the left.

•Bryan Whitby is vice-president of the British Postal Chess Federation.

Game 10. Cyrus-IS-Chess v Sensory 9

1.	N-KB3	P-Q4	27.	R-KR2	B-N8
2.	P-QB4	P-Q5	28.	B-K2	RxP
3.	P-K3	N-QB3	29.	R-B2	RxR
4.	PxP	NxP	30.	KxR	P-KB4
5.	NxN	QxN	31.	K-N3	P-K4
6.	N-QB3	B-B4	32.	R-R5	P-KB5 ch
7.	Q-B3	Q-K4 ch	33.	K-N4	R-KB1
8.	Q-K2	QxQ ch	34.	R-R3	P-K5
9.	BxQ	0-0-0	35.	B-B1	P-K6
10.	P-Q4	P-K3	36.	B-B4	B-B7
11.	B-K3	N-KB3	37.	B-K2	K-B2
12.	P-B5	N-K5	38.	R-R7	R-B3
13.	NxN	BxN	39.	B-R6	B-B4 ch
14.	P-B3	B-KB4	40.	K-N5	B-B1
15.	P-KN4	B-N3	41.	B-B4	R-B4 ch
16.	P-KR4	P-KR4	42.	K-N6	RxQBP
17.	PxP	RxP	43.	B-Q3	P-B6
18.	P-KB4	R-R1	44.	P-N4	R-B6
19.	B-KB3	B-K2	45.	B-B5	BxB ch
20.	P-KR5	B-KB4	46.	K-N5	P-K7
21.	R-QB1	B-KB3	47.	KxB	P-B7
22.	R-QB4	P-QB3	48.	RxP ch	KxR
23.	R-QR4	B-B7	49.	K-K4	P-K8 (Q) ch
24.	RxRP	K-N1	50.	K-B5	R-KN6
25.	R-R3	BxQP	51.	K-B4	P-B8 (Q) checkmate
26.	BxB	RxB			0-1



Quality executive case, purpose built, with locks, special hinges and lift-off lid with foam lining. (plus p&p)

Now available with one of two alternative fitted consoles. Both allow neat installation of computer, power supply and printer in fitted recesses and incorporate an aluminium switch panel. This eliminates constant removal of plugs for both save/load and power off facilities and provides sockets for tape recorder leads, to allow operation in convenient position shown. Order console S1 for housing tape recorders up to 28cm x 15cm. Order console S2 if your spectrum is fitted with interface 1 and to house up to three microdrives in a fitted recess.

All internal wiring and leads supplied to allow easy plug-in installation.

- Solves storage problems
- Computer angled for convenient use
- Avoids lengthy setting up
- Hides most of wiring
- Case and console moulded in black grained ABS plastic

Treetop Designs, 61 Widmore Road, Bromley, Kent. BR1 3AA.

To: Treetop Designs
Freepost, Bromley, Kent. BR1 3UZ

Please supply S1 _____ cases at £47.45 each (incl. p&p and insurance)

Please supply S2 _____ cases at £47.45 each (incl. p&p and insurance)

My cheque/P.O. for £ _____ is made payable to Treetop Designs

PLEASE PRINT NAME AND ADDRESS

Mr/Mrs/Miss _____

Address _____

Please allow up to 28 days for delivery.

If you are not satisfied we shall of course refund your money, if you return the case undamaged within 14 days.

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

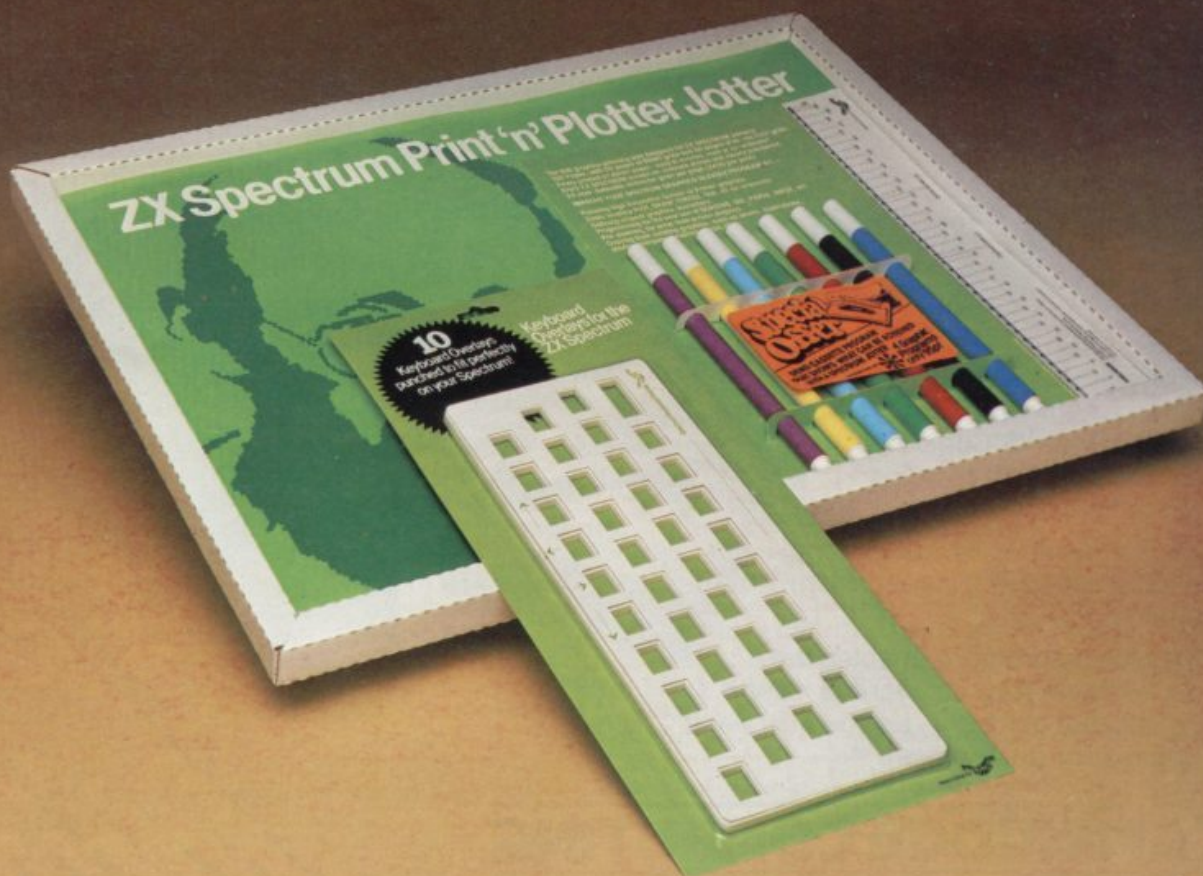
Joystick, Interface and Tape at £34.90
Joystick only at £7.90

I enclose cheque/p.o.
for £
made payable to
Cambridge
Computing

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**

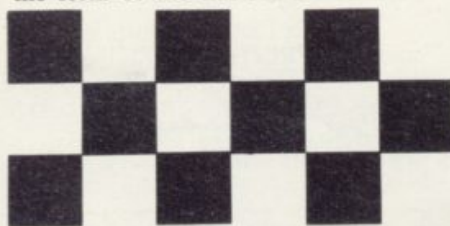
Chequered career

Chris Bourne talks to high-octane programmer Steve Kelly

ASK MOST PEOPLE about Aintree and they will probably tell you how they almost bet on Lucky Dancer in the Grand National. Ask Steve Kelly of Psion Software and he will tell you the story of his back.

Kelly is from Warrington, where Roy Jenkins lost a famous by-election and Vladivar makes vodka. With his long, hair and drainpipe jeans he looks like the boy next door, the one your parents said would never amount to anything. He left school at 16 and eventually obtained a job lifting heavy boxes. He might still be lifting them had he not injured his back at work.

When he left hospital, manual work was not an option and it was during a Manpower Services Commission rehabilitation course at Aintree that Kelly first had contact with computers — in the form of the ZX-81. He is full of



gratitude to the people at Aintree. "It was the best therapy I could have. They were really great people."

After he finished the course, he joined a Government TOPS course in computer programming, learning the training language PL1. It was during the course that he bought his ZX-81 and began programming it.

"I liked playing arcade games like Pac-man but there were no games for the ZX-81. I was learning Z-80 machine code programming from articles in *Sinclair User*. Instead of making the screen go black all over and things like that, I thought why not write a game?"

Kelly managed to sell some of those early games, such as his version of Pac-man, to Microgen, but at that stage he was still thinking in terms of using his programming skills in a business career.

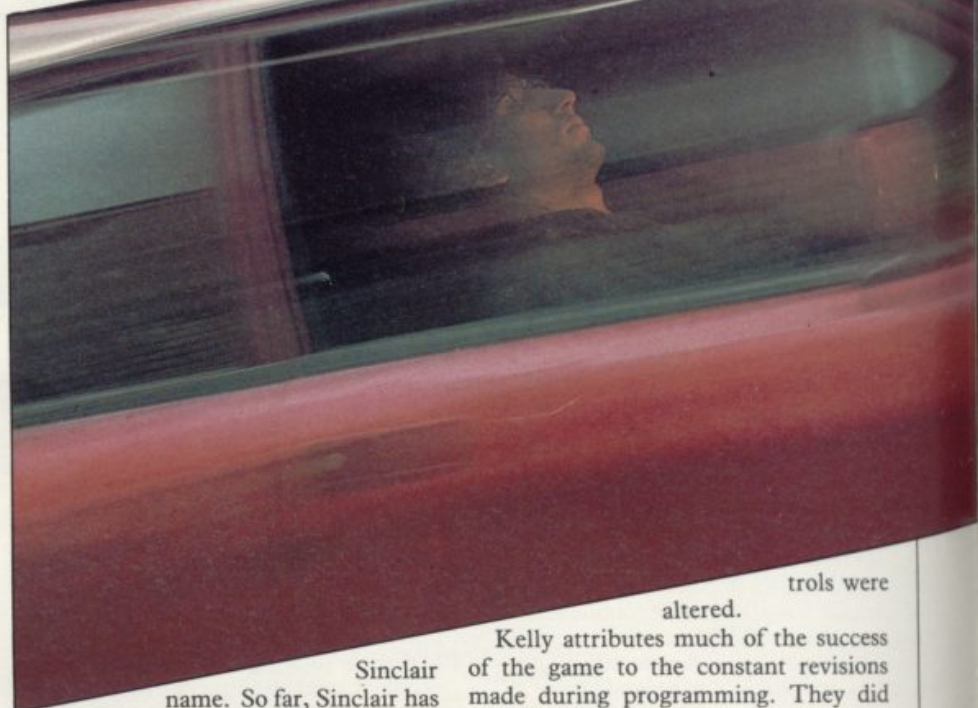
"I expected to go into business after the TOPS course but nobody wanted me. I lacked the qualifications. You need A levels and a degree and an IQ of nine million," he says.

David Potter of Psion, on the other hand, was not interested in A levels and

the like. Kelly says: "I wasn't trained but I thought I would have a go. I was interviewed on the Tuesday and the next Sunday Potter offered me the job. After two-and-a-half years out of work it was incredible."

Kelly joined Psion in October, 1982 when the company was putting the finishing touches to **Flight Simulation**. The company had been around for some time, linked closely to Sinclair Research, with which it had a deal. Any programs written by Psion for a Sinclair machine are first offered to Sinclair to be marketed under the

realistic simulation. It was obviously impossible for the team to drive Formula One cars round Brands Hatch but they hit on the idea of power curves to simulate engine performance. Programmer Steve Townsend designed the engine and, as speed of operation was the priority, the program used tables of data linking gears, speed and engine revolutions rather than set formulae which the computer would have had to work out every time the con-



Sinclair name. So far, Sinclair has not refused any of its products.

Kelly wrote the explosions for **Flight Simulation** but his big personal success at Psion came with **Chequered Flag**, the Formula One racing simulation.

"Potter had the idea on an aircraft and thought it would make a great game for the Spectrum," he says. He thrashed out the idea with Charles Davies and they went to Kelly. They told him they wanted a car race game with 3D graphics like those in *Flight Simulation*, with the car controls at the bottom of the screen. Kelly says he would have liked to have had other cars to race against in the game but that would have made it more of an arcade game and less of a

controls were altered. Kelly attributes much of the success of the game to the constant revisions made during programming. They did the road sections three times and were still not satisfied.

Kelly is scathing about companies which produce games without taking such care to have each stage exactly right. "Companies produce games which are not as good as they could be. Some clearly do not change halfway through. I see many games getting a lot of mouth and I am sure we could do better."

Apart from his new-found love of motor racing, Kelly is a keen photographer and regards himself as a connoisseur of bitter and tea. He also likes listening to music. "I like Killing Joke, the Sex Pistols, Tangerine Dream and

the Police." He also misses his roots — "It's good up North. I miss Warrington, I always look forward to going back home." He also likes playing arcade games but apart from a few early games which Sinclair wanted for the launch of the Spectrum, Psion has so far preferred to concentrate on simulations and what Kelly calls more refined games.

"We have never really gone into arcade games, mainly because they have to be very good to get anywhere. Jet Set Willy and the Ultimate stuff has set an amazing precedent. If you produce an arcade game you have to produce

though it assisted by providing action photographs.

He was coy as to whether Psion plans to write games for the QL but said there were ideas floating around.

He does think the machine would be ideal for an adventure game. "I would love to write one and the QL is the machine for an adventure. With two Microdrives and 128K of RAM, you don't need other attributes for an

designer are over. At Psion he uses a Digital VAX for all the games programming and says games of today's complexity and quality could not be programmed sitting at home on a Spectrum.

He believes the idea of a generation of children making millions with their computer skills is a myth. "I don't know much about how it affects children in schools but I know a kid who had a computer for Christmas and he spent the whole time in front of the television with it. It might be like any toy. You get something for Christmas; you huddle in a corner with it and play with it for ages, then leave it.

According to Kelly, parents are be-



coming much more involved than the children for whom the machines were bought.

"I know another kid who had a Spectrum for his birthday but he has not even attempted to learn programming. He has just bought a few games but his father is getting really into it. It seems to be the adults who are interested in learning. I suppose the kids get a bellyful at school."

Kelly hopes young people get a break like he did.

"Everything is getting multi-multi nowadays and the little person may be left out of it more but I think those people may be able to prove themselves anyway. They should still be able to go to a big company with a program and say 'Look what I've done' and the managing director will be impressed," he says.

Kelly obviously enjoys working for Psion and is full of praise for his employers. Was there a glimmer of regret at having turned professional and perhaps lost some of the fun of playing games?

"I have a Spectrum at home but I cannot handle playing it at night now. I used to play it a great deal — games like Manic Miner — but unless it is absolutely necessary I avoid touching it at home," he says.

Kelly has gone a long way from Warrington in the last three years. As far as losing his hobby is concerned, he says it is a fair swap.

adventure but so far as Psion writing an adventure goes, I do not know." His enthusiasm for the QL seems to have left his admiration of the Spectrum undimmed.

"It is perfect as a games machine. People talk about buying programs for the Atari costing £29 and say 'but they are better than the Spectrum games'. I do not think that is true nowadays. You can get just as good a program for the Spectrum. Atari has a tennis game but ours will be as good as that."

The game on which Kelly and Psion are working at present is a simulation of a tennis match. The graphics I saw were impressive, with very realistic tennis strokes. According to Kelly, the main difficulty is how to move a player round the screen and also specify particular types of shot with a single joystick.

The background picture of the tennis court is most attractive and instantly-recognisable to Wimbledon enthusiasts. Kelly says the company would like to call the game Wimbledon rather than Tennis, but the All England Club which stages the tournament is not enthusiastic about having it august name linked to a computer game, al-

it quickly. We do not have the time to do it at the moment.

"Potter always wanted something extra. When Flight Simulation appeared there was nothing like it — the same with VU-3D and Scrabble. With an arcade game you can always say 'there is something like that, it is not original'".

The game on which Kelly and Psion are working at present is a simulation of a tennis match. The graphics I saw were impressive, with very realistic tennis strokes. According to Kelly, the main difficulty is how to move a player round the screen and also specify particular types of shot with a single joystick.

The background picture of the tennis court is most attractive and instantly-recognisable to Wimbledon enthusiasts. Kelly says the company would like to call the game Wimbledon rather than Tennis, but the All England Club which stages the tournament is not enthusiastic about having it august name linked to a computer game, al-

He enjoys programming for the Spectrum Z-80 processor but he has a few criticisms of the Sinclair implementation. "It has a fantastic instruction set but why did Sinclair do the screen the way he did? I will never forgive him. It has a crazy screen organisation which makes my job difficult so far as speed is concerned. The sound is sickening as well but I stay away from the hardware," he says.

Kelly feels lucky to have entered the software industry when he did. He thinks the days of the individual games

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



*"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 Eeprom", 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.

DRIVE IT!

Can you be entrusted with the controls of one of the worlds fastest and most famous trains, with this stimulation you have the opportunity. The controls are yours, but you must obey signals and line speed along with a demanding schedule.

Will you get your train on time?

Your performance will be monitored for end of game percentage rating providing that you have not been relieved of the controls for endangering the lives of your passengers. A comprehensive booklet is provided giving full route information and details that will help you to drive the locomotives. There is a choice of engines besides the High Speed Train (HST), Deltic and Brush 47 with different handling characteristics for operating a slower schedule.

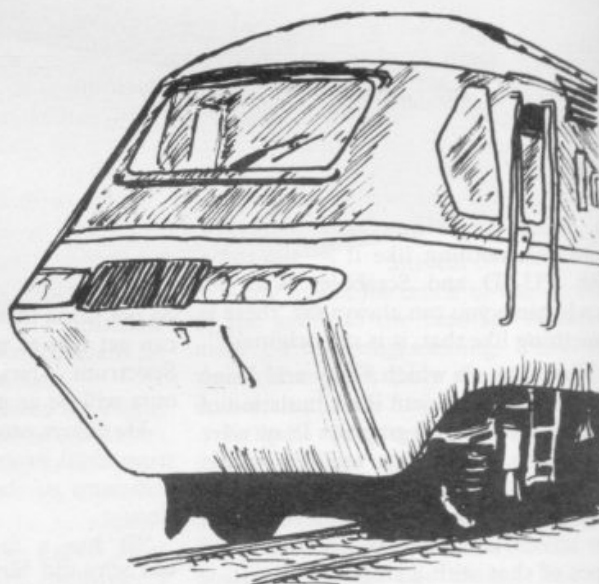
Flying Scotsman.

for 48K Spectrum (also BBC Model B) **£7.50** inc postage and packing

Also available MIDRAIL and WESTRAIL our specialist games for the railway enthusiast. Travel around the regions spotting Kings & Castles, Coronations and Scots and hosts of other engines graphically depicted along with their names and numbers, providing many hours of nostalgic pleasure. An armchair Railrover for £6.95 each game inc. P&P.

Available from

© **Dee-Kay Systems, 18, Salford Close, Woodrow South,
Redditch, Worcs B98 7UN.**



THE QL CLUB

**Special Offer
this month**

MICROVITEC I431
only £168.00+VAT
Free delivery



WHY SHOULD I JOIN THE CLUB?

One of the reasons is a microvitec colour monitor at an unbelievable price to club members.

Special offer this month on all monitors, details with your first newsletter.

The reasons to join are . . .

- a) Monthly issues of our Club news letter which will include up to date news on releases from Sinclair Research Packed with news reviews, tips, programming ideas, major articles plus programming features.
- b) A major consideration is low prices on all hardware and software. We GUARANTEE to be at least 10% below R.R.P. (only available to club members).
- c) Catalogue of over 50 products; Discs, Disc Drives, Printers, Monitors, Graphpads, Computer Desks plus a range of other products and associated software.
- d) All membership inquiries made will be handled on a personal basis.
- e) INSURANCE for all your computer equipment at competitive rates.
- f) HP or Lease Purchase all arranged.
- g) Professional, fast, efficient and we guarantee personal service.
- h) You do not have to be a Sinclair owner to take advantage of our CLUB MEMBERSHIP SPECIAL PRICE OFFER.

*One Year Membership
only £15.00*

ACT NOW AND FILL IN THE COUPON

Please tick the appropriate box

☐ I enclose a cheque made payable to I.C.L.
for £

☐ Please charge my Access/Barclaycard Account

Signature

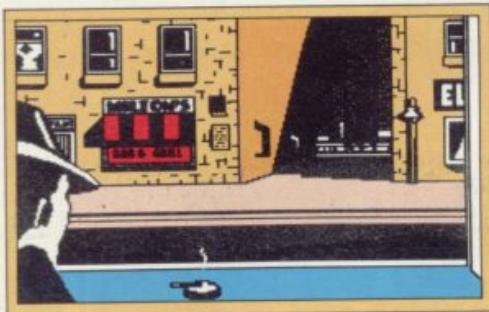
Mr/Mrs/Miss | | | | | | | | | | | | | | | | | | | | | |

Address | | | | | | | | | | | | | | | | | | | | | |

| | | | | | | | | | | | | | | | | | | | | |

I.C.L., FREEPOST, Wrexham, LL13 1BR
Tel. 0978 351555

TM Sinclair, QL, QDOS, QLUB and ZX Microdrive are trade marks of Sinclair Research Ltd.



Announcing Mugsy, the first interactive computer comic strip for your 48K Spectrum.

You are Mugsy, the Godfather to a gang of hoodlums and your aim is to be the toughest and most powerful gang leader in the city.

Your tasks involve managing the gang, making lots of money, organizing the protection rackets, buying weapons and ammunition but beware, your reign as the Big Boss is rather delicate. If you are too successful a contract will be put out by other gangs to get rid of you!!

You are the decision maker and one wrong move could mean the end! Mugsy gives a totally new direction for thrill-seekers — comic animation, stunning graphics and a full arcade game.

Remember — you are da boss!

Melbourne House Publishers

☐ Please send me your free catalogue
Please send me:

SPECTRUM

- ☐ Spectrum Mugsy 48K £6.95
- ☐ Spectrum The Hobbit 48K £14.95
- ☐ Spectrum Penetrator 48K £6.95
- ☐ Terror-Daktil 4D 48K £6.95
- ☐ Melbourne Draw 48K £8.95
- ☐ H.U.R.G. 48K £14.95
- ☐ Abersoft Forth 48K £14.95
- ☐ Spectrum Classic Adventure 48K £6.95

COMMODORE 64

- ☐ Commodore 64 The Hobbit £14.95
- ☐ Commodore 64 Hungry Horace .. £5.95
- ☐ Commodore 64 Horace Goes Skiing £5.95
- ☐ ACOS+ £8.95
- ☐ Commodore 64 Classic Adventure £6.95
- ☐ Commodore 64 Star Trooper £6.95

BBC

- ☐ BBC Model B The Hobbit £14.95

ORIC-1

- ☐ Oric-1/48K The Hobbit £14.95

Orders to:

Melbourne House, 131 Trafalgar Road, Greenwich London SE10.

Correspondence to:

Melbourne House, Church Yard Tring, Hertfordshire.

Trade enquiries welcome

All Melbourne House cassette software is unconditionally guaranteed against malfunction. Access orders can be telephoned through on our 24 hour ansafone (01) 858 7397.

All versions of 'The Hobbit' are identical with regard to the adventure program. Due to memory limitations, BBC cassette version does not include graphics.

SU/6

I enclose my cheque/money order for £	
Please debit my Access Card No.	Expiry date
Signature	
Name	
Address	
Postcode	

£
£ + p/p 80
Total
£

All prices include VAT where applicable. Please add 80p for post and pack.

M

UGLY

*Muscle
in on da
action!*



Melbourne House

The plot thickens

The frantic zap of arcade software has given way to calmer play and strategic thinking. John Gilbert investigates

THE 'ZAP-EM' type of arcade game, although still around, has undergone a transformation which started in earnest in the middle of last year. Games manufacturers with an eagle eye on the industry saw that the time would arrive when arcade games, such as **Space Invaders** and **Centipede**, would fade in popularity and that something had to be added to make them more appealing.

The one aspect which games such as those already had was strategy. In games such as **Space Invaders**, strategy is needed to evade the aliens and at the same time fire at them. A good game will infer a strategy to the player and a good player is one who can assimilate that method of play quickly.

Software houses decided that the most obvious way to increase interest in the arcade style of game was to emphasise the strategy aspect. That is done either by putting strategy games in an arcade format or by slowing the action to accommodate structured thought instead of quick-fire intuition. The move worked well and games like **Time Gate**, **Stonkers** and **Codename Mat** prove it.

Time Gate reached the market shortly after the Spectrum arrived in great quantities and it is one of the first games for the machine produced by Quicksilver. The game centres on a conflict between the peoples of the free universe and the incredibly evil and ancient race of Squarm.

At the launch Quicksilver promoted it as the ultimate sci-fi space adventure and, with its 3D representation of space through the window of a fighter and the depth of story deadline, it was at that time.

The strategy of the game is centred on finding the aliens using the instrument panel of your spaceship and then destroying them. It was given added depth by spreading the Squarm through space and time so that the player has to lock-on to a particular sector in space and spacewarp there.

In some ways Quicksilver produced a game which crosses **Space Invaders** with the mainframe computer game **Star Trek**. It was that aspect initially which drew customers who wanted

something different and who were ever-willing to part with their money.

Unfortunately, **Time Gate** is an example of how the software scene can change overnight. A few months after its release the game attracted much criticism and the Squarm have made many players squirm.

At the release, about a year ago, **Time Gate** was described as incredible but since then players and critics alike found that it had limitations, not least of which was the plot. The storyline is too much like a revamped version of **Star Trek**. **Time Gate** is still available from Quicksilver and costs £6.95.

Codename Mat, for the 48K Spectrum, is a new release from Micromega which could be described as an advanced version of **Time Gate** or an extremely good interpretation of the Atari **Star Raiders**. The strategy element in the arcade game is obvious, as you have to plot your way through the solar system, passing through star gates to spacewarp into another system.

The solar system is broken into sectors which have a planet or satellite as bases. The planets are taken from our solar system and include Mars, Jupiter and Earth. Each of those planets is under attack from the Myons and it is

build a battle strategy.

The arcade part of the game occupies about 50 percent of playing time and involves shooting through space and chasing the enemy fighters and mother-ships. It can only be described as classic arcade action combined with moments of strategic thinking to scan computer banks for information about the movement of hostile craft and about which planetary system are in danger.

Codename Mat could almost be described as state-of-the-art in software and it is close to a simulation in space-game terms. One of the most notable aspects is that the routine to generate the 3D graphics is only 200 bytes long. The compactness of the graphics routines means that the author has been able to concentrate on developing the depth and storyline of the game and that is obvious from the start.

Unfortunately, although the game is more advanced than **Time Gate**, the storyline is weak, as it seems to be a collection of unoriginal ideas. Luckily those ideas fuse together well and the plot stands on its own. **Codename Mat** can be obtained from Micromega and costs £6.95.

Manufacturers and authors have not limited arcade strategy games to the

'Time Gate is an example of how the software scene has changed overnight. A few months after its release the game attracted criticism'

your job, as a teenager with the knowledge of the universe, to stop them.

There are two levels of play depending whether you want to use a lone ship or whether you want to be the commander of a task force. The latter is the most difficult as you can engage in several conflicts at the same time by using subspace radio, which seems to have an immediate effect on the sector you have selected.

If all your ships in one sector are destroyed, the planet could be destroyed and you have lost part of the game. If you see the situation where you could lose ships in another sector you will need to use your cunning and skill to

depths of space. They have also done the opposite of giving arcade games a touch of strategy and given strategy games on arcade feel.

Stonkers, for the 48K Spectrum from Imagine, is a prime example of that type of game. The player is given command of land-based forces, including tanks and infantry, which are grouped in the top right-hand corner of the screen. The enemy is based across the river on the other side of the screen and to reach a suitable combat position one or other side has to cross the bridge.

When you start to play, a map of the whole theatre of war is displayed. You can issue commands to active units on

the map by positioning a cursor over the map position you require.

One of two actions will occur. If you are on the big map you will zoom in to a detailed display of the location specified. If you are already zoomed in you can position the cursor over a fighting unit and by moving the cursor to the position you want it to take up, it will start to move towards that locality.

The use of a cursor to plot strategy is inventive and Imagine has put much effort into the game. It should take weeks for a player to work out a plan of strategy to defeat the foe, mainly because of the immense landscape on which play takes place.

The game is a cross between the usual type of battle strategy game such as **Apocalypse** from Red Shift and the arcade game **Battlezone**. Imagine has succeeded in producing a game which

adventures' 'Halls of the Things started the craze for all-graphic

combines arcade quality graphics and strategic action. Stonkers can be obtained from Imagine for £3.95.

Maze games, such as **Pac-man**, have not escaped the eye of software houses keen to think of new plots. The munch-munch of the Pac-Man has been replaced by ponderings, such as 'Where is the treasure?' of the hero or heroine. That type of game is well-illustrated with such programs as **Ant Attack**, from Quicksilva, **Maziacs** from dk'Tronics and the irrepressible **Halls of the Things** from Crystal Computing, which still seems to be out-selling everything on the market.

Halls of the Things, in which the player has to collect a certain number of rings of power in a maze before being destroyed by the monsters, started a craze for the so called all-graphics adventures in which cartoon-style arcade graphics were combined with adventure plots. Most of those games take place in dungeons and feature magic and sword play. Several companies have followed the excellent crystal game, although unlike the state of play with arcade games nobody has copied original Crystal ideas as the area is so rich in concept material. Halls of the Things can be obtained from Crystal Computing and costs £7.50.

Maziacs, for the 48K Spectrum, is from dk'Tronics and is another example of the genre. It has a different graphics

style from Halls of the Things which some would say is bolder and better and is more in line with the graphics which Ultimate Play the Game produces.

The plot involves finding a treasure chest in a maze which you must drag back home without being killed by the Maziacs, which can get into terrible sword fights with your player-character. To find the way to the treasure you have to make contact with the prisoners who are strung along the corridors of the maze. The fight sequences are incredibly detailed. You will again need to develop a strategy over a period of time to win. Maziacs can be obtained from dk'Tronics and costs £6.95.

To succeed, arcade-strategy games must produce an effect for the player like that produced by an ordinary zap-'em game. It is the way the addiction is created which makes the difference. In an ordinary arcade game the effect is created through a need to destroy aliens and make a high score. Arcade-strategy games are different, as they rely on the user's mind. It is the strategy as well as the graphics which keeps the player returning for more.

The combination of arcade techniques and strategic thinking has made the arcade-strategy game very popular. The insurgence of that type of program means that the customer has two types of game in one and the reality of the plot, through the realism of the arcade graphics, takes the games industry one step forward. The main criticism for a long time is liable to be that the plots on which the games hang are not original enough. We are, however, just beginning to see a change in arcade style, where bang and zap are replaced by plot and thought.

TIME GATE

Memory: 48K
Price: £6.95
Gilbert Factor: 8

CODENAME MAT

Memory: 48K
Price: £6.95
Gilbert Factor: 9

STONKERS

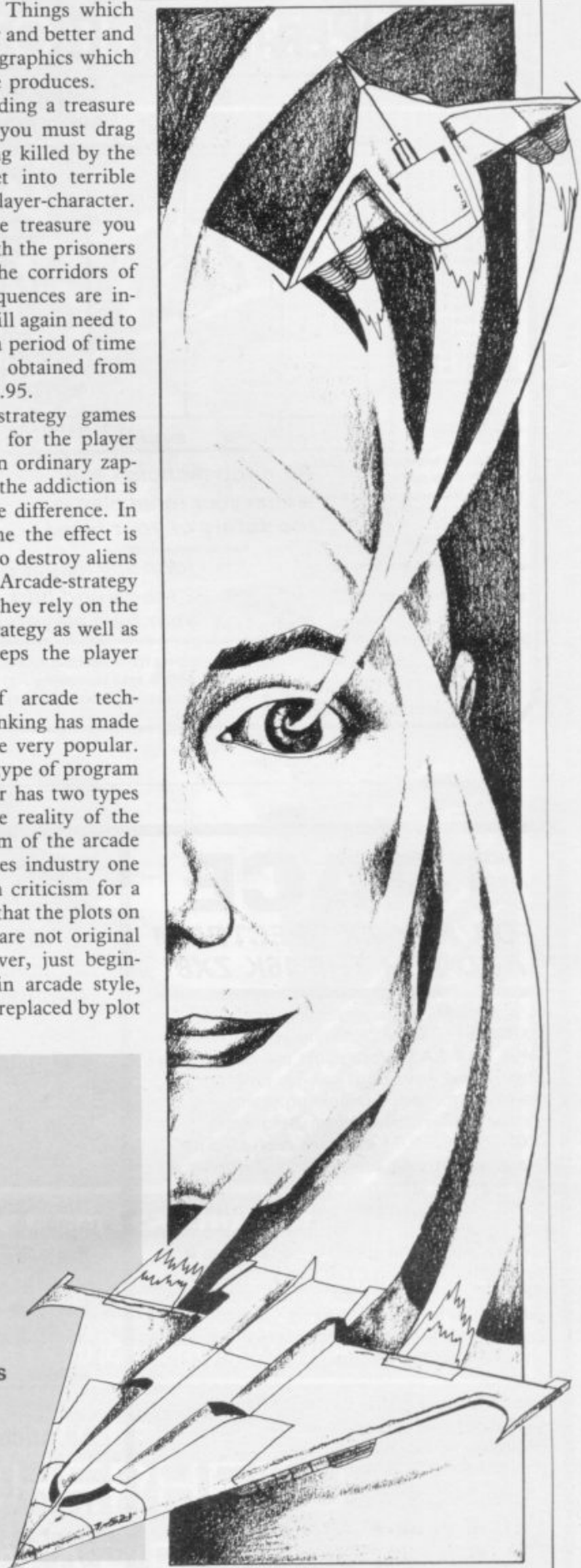
Memory: 48K
Price: £3.95
Gilbert Factor: 9

HALLS OF THE THINGS

Memory: 48K
Price: £7.50
Gilbert Factor: 9

MAZIACS

Memory: 48K
Price: £6.95
Gilbert Factor: 8



SUPER-LEAGUE[®]



	W	D	L	F	A	Pts
1 Ipswich T.	16	8	8	41	28	54
Liverpool	16	8	8	41	31	53
Notts. Coun.	13	9	8	46	19	48

For use on
48K
SPECTRUM



Dalglish Liverpool 2 Everton 1 46 minutes

- 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.)

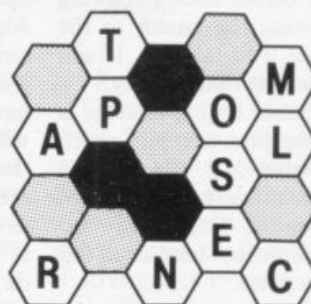
Order direct from
CROSS SOFTWARE,
36 Langford Crescent,
Barnet, Herts, EN4 9EH

Also available from selected stores
in the London area (including
Virgin Megastore, Oxford Street)

NEW! NEW! NEW!

SPECTRUM SOFTWARE

by **COMPUSOUND**



BLOCK BUSTER^{©1983}

BLOCK BUSTER will test your knowledge to the brink. The game starts off easy, but as you pass the 'commercial breaks', BLOCK BUSTER gets harder and harder.

48k SPECTRUM. ONLY £5.95 + 50p post & packing.

COMPUSOUND



Overseas and Trade Enquiries
Welcome



DEPT: SU6, 32-33 LANGLEY CLOSE, REDDITCH, WORCS.
B98 0ET. TELEPHONE: (0527) 21429 (21439 Answerphone).

TRACE

**FOR ANY ZX SPECTRUM
AND FOR THE 16K ZX81**

A superb aid to programming the ZX81/SPECTRUM, allowing you to watch what your BASIC programs are doing every step of the way. Bugs in your program will be easier to find. Example programs will almost explain themselves. Before the ZX81/SPECTRUM executes each BASIC statement in your program it will display the line number, statement number (SPECTRUM), and the statement itself in the input area (it will not overwrite the main display area). The speed is controllable from single step upwards. You can produce a TRACE listing on the ZX printer, stop your program at any point to print variables or correct errors, and start/stop tracing from anywhere in your program.

"an effective TRACE . . . a useful debugging tool . . . easy to use". S.U. 9/83 reviewing SPECTRUM version.
It might even help you find the errors in the magazine listings!

ZX81 (16K) — £5.95
SPECTRUM — £6.95

THE FUN WITH EDUCATION SERIES

Colourful, fast moving graphics, sound and controllable difficulty combine to provide a fun way to learn without the need for keyboard dexterity.

FUN WITH NUMBERS

Addition, subtraction, multiplication and division in a space game format. Shoot down the spaceship carrying the correct answer, while building a ladder to rescue the Man in the Moon!!

For the 48K Spectrum
— £5.50

FUN WITH WORDS

Spelling and Word Recognition. Use the overhead crane to pick the correct letter from the coal trucks while filling the steam engines tender with coal and collecting the passengers.

For the 48K Spectrum
— £5.50

All prices include P.&P., Mail Order from:-

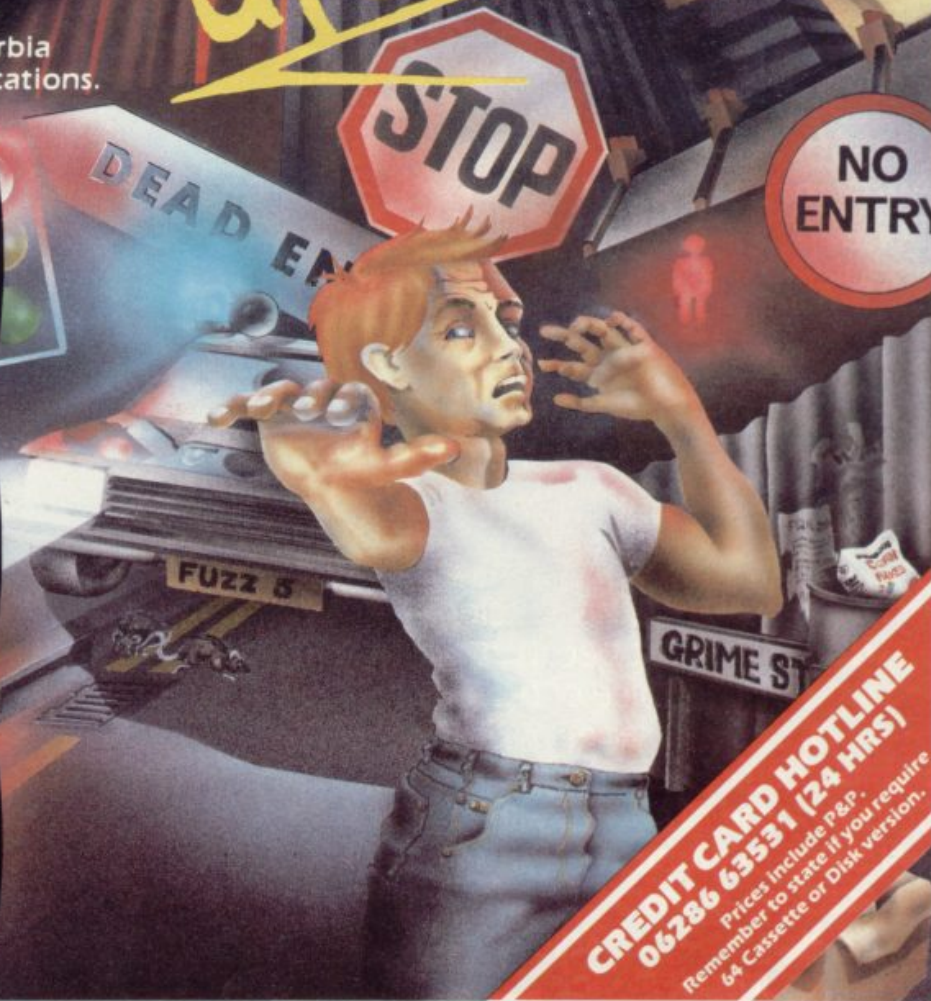
TEXGATE COMPUTERS LTD.,
Dept S., 14, Brook Lane, Corfe Mullen, Dorset BH21 3RD

"ADVENTURES INTO IMAGINATION"

"ADVENTURES INTO IMAGINATION"

URBAN UPSTART

An adventurous escape
from 20th Century Suburbia
with over 90 graphic locations.



CREDIT CARD HOTLINE
06286 63531 (24 HRS)
Prices include P&P.
Remember to state if you require
64 Cassette or Disk version.

Your Quest: To escape from Scarthorpe!

Scarthorpe is the sort of town where even the dogs carry flick knives! Where there's only one road in, and that's a one way street! The sort of town where rebuilding means a new coat of paint, and where people queue up to queue up for a job! Not many people come to Scarthorpe, and even fewer leave. The church bells chime three in the morning...the streets are deserted...now is your chance to Escape from Scarthorpe.

48K Spectrum £6.50 Commodore 64 £6.50 (Cassette) £9.50 (Disk)

RICHARD SHEPHERD SOFTWARE

ELM HOUSE, 23-25 ELM SHOTT LANE, CIPPENHAM, SLOUGH, BERKS.

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.

fantasy

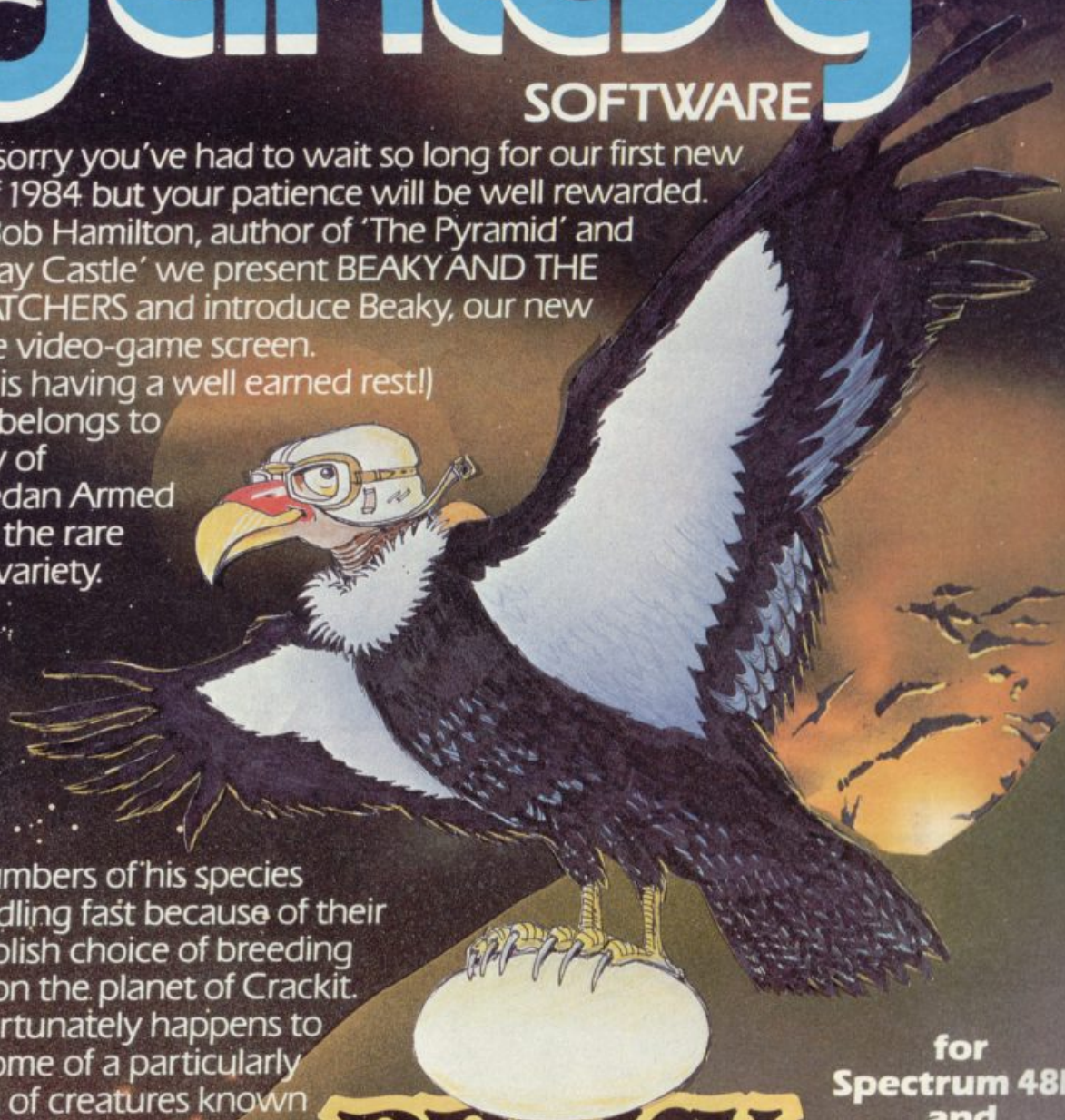
SOFTWARE

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 Eggs snatchers. 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 Eggs snatchers 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.

PROGRAM PRINTOUT



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.

YOU CONTROL a stretcher and have to catch the people jumping from the burning tower. The only way to save them is to catch them in the centre of the stretcher so that they bounce into the ambulance. Be careful not to kill an ambulance man.

Ambulance was written for the 16K ZX-81 by C Morton of Morpeth, Northumberland.

AMBULANCE

```

20 PRINT AT 0,11:"AMBULANCE"
30 PRINT AT 1,11:"-----"
33 PRINT "YOU MUST GUIDE THE
STRETCHER"
34 PRINT "AND BOUNCE THE PEOPLE
E (*) FROM
35 PRINT "FROM THE BURNING BUI
LDING TO THE
36 PRINT "AMBULANCE. (5=LEFT 5
RIGHT)"
37 PRINT "YOU LOSE IF 5 PEOPLE
DIE."
38 PRINT "YOU MUST NOT GO TOO
CLOSE TO
THE BUILDING OR AMBU
LANCE."
40 PRINT AT 20,10:"PRESS N L T
0=ANY"
50 INPUT A$
60 CLS
97 LET HS=0
99 LET Q=0
100 FOR A=4 TO 20
110 PRINT AT A,0:""
120 PRINT AT A,1:""
130 NEXT A
131 PRINT AT 0,2:"DEAD="
132 LET M=3
133 PRINT AT 0,26:"MEN=";M
134 LET S=0
135 LET Z=0
137 PRINT AT 0,14:"SAVED=";S
140 PRINT AT 21,0:""
150 PRINT AT 18,28:"";AT 19,
20:"";AT 20,28:"";
160 LET A=INT (RND*10)+4
161 LET B=2
162 IF S>10 THEN LET A=INT (RND
+9)+9
163 LET E=0
164 LET D=0
165 LET F=1
167 IF Z=1 THEN GOTO 220
200 LET X=20
210 LET Y=14

```

```

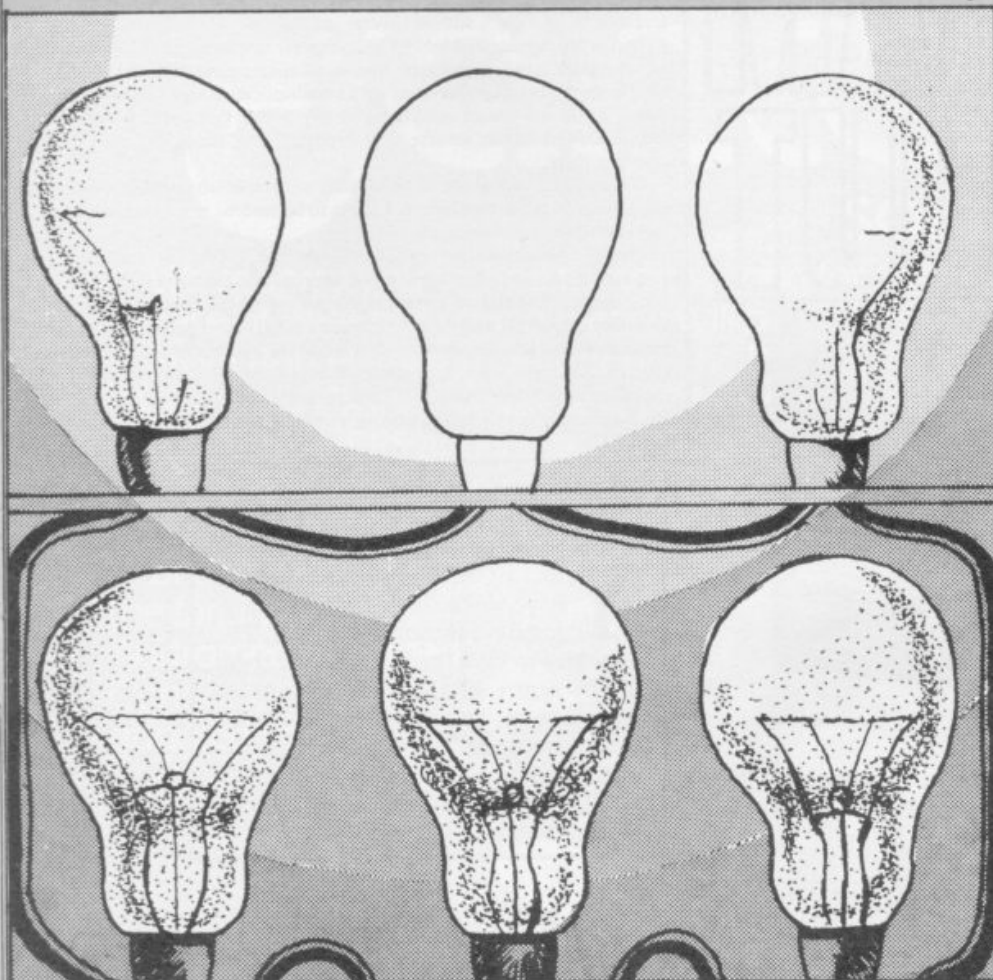
PRINT AT X,Y-2:" "
IF Y=3 THEN GOTO 300
IF Y=26 THEN GOTO 350
PRINT AT A,B:"*";AT D,E;" "
LET D=B
LET E=8
IF A=20 AND B=Y THEN GOTO 4
300 IF A=20 THEN GOTO 700
310 LET A=A+1
320 LET B=B+1
330 LET Y=Y+(INKEY$="8")-(INKEY
$="5")
340 GOTO 220
400 LET C=1
401 LET D=B
402 LET E=8
403 PRINT AT 20,Y;" "
407 LET A=A-C
410 LET B=B+F
420 PRINT AT A,B:"*";AT D,E;" "
425 IF B=27 OR B=26 THEN LET C=
0
426 IF A=13 THEN LET C=0
427 IF B=20 THEN LET C=-1
428 IF B=29 THEN LET F=0
429 IF B=29 AND A=19 THEN GOTO
500
430 GOTO 401
440 LET S=S+1
500 PRINT AT 0,14:"SAVED=";S
505 PRINT AT 19,29:"+";AT 18,29
515 LET Z=1
520 GOTO 190
700 PRINT AT 18,B-2;"SPLAT"
701 IF B=Y-1 OR B=Y+1 THEN GOTO
703
703 GOTO 740
705 LET M=M-1
706 PRINT AT 0,30;M
707 IF M=0 THEN GOTO 750
708 PRINT AT 15,3;"YOU KILLED A
N AMBULANCEMAN"
709 IF B=Y+1 THEN GOTO 730
712 LET H=4

```

```

714 PRINT AT 20,H;" "
715 LET H=H+1
716 IF H=Y-1 THEN GOTO 740
720 GOTO 714
730 LET H=26
731 PRINT AT 20,H;" "
732 LET H=H-1
733 IF H=Y THEN GOTO 740
734 GOTO 731
740 FOR P=1 TO 25
741 NEXT P
742 LET Q=Q+1
743 LET Z=1
744 PRINT AT 18,B-2;" "
745 PRINT AT 15,3;" "
746 PRINT AT 0,2:"DEAD=";Q
747 IF Q=5 THEN GOTO 750
748 IF B<Y-1 AND B<Y+1 THEN P
RINT AT 20,B;" "
749 GOTO 190
750 IF S,HS THEN LET HS=5
755 PRINT AT 3,8;"YOU SAVED ";S
PEOPLE.";AT 6,12;"HIGH SCORE=
";HS
758 PRINT AT 8,9;"ANOTHER GAME"
760 IF INKEY$="N" THEN NEW
765 IF INKEY$<>"Y" THEN GOTO 76
0
770 CLS
780 GOTO 98
800 PRINT AT 4,4;"YOU WENT TOO
CLOSE TO THE"
810 PRINT AT 5,3;"BUILDING AND
BURNED TO DEATH"
820 GOTO 750
850 PRINT AT 4,4;"YOU FORSOOK T
HE NEEDY YOU";AT 5,3;"WILL NOT C
ATCH ANYONE THERE"
860 GOTO 750
1000 SAVE "AMBULANCE"
1010 RUN

```

LIGHTBULBS

LIGHTBULBS is a game for two players written for the 16K Spectrum by N Higson of Heaton, Bolton.

A cannon runs along the bottom of the screen and the players take turn to

fire at the target. When the cannon runs from left to right the player on the left fires and when it runs from right to left the player on the right fires. The object of **Lightbulbs** is to be the first person to light six bulbs.

```

2 BORDER 0: PAPER 0: INK 7: C
LS
6 GO SUB 5000
8 GO TO 4000
10 BORDER 0: PAPER 0: CLS
20 FOR h=3 TO 21
30 PRINT INK 7: AT h,0:"H": A
T h,31:"J"
40 NEXT h
50 PRINT AT 21,0: INK 0: PAPE
R 2:"IIIIIIIIIIIIIIIIIIIIIIIIII
IIII"
60 LET p=0: LET b=0: LET t=0

100 PRINT AT 0,0:" "

102 PRINT INK 4: FLASH 1: AT 0
,14;a#
109 PRINT AT 2,t;" ": LET t= I
NT ( RND *24)+4: PRINT INK 4: A
T 2,t;"C"
110 FOR f=3 TO 28: PRINT INK 4
; AT 20,f-1;" A"
120 IF INKEY# ="1" THEN GO TO
150
130 BEEP .02,f
140 NEXT f: GO TO 1000
150 FOR g=20 TO 1 STEP -1
160 PRINT INK 4: AT g,f;"B"
170 BEEP .05,g
180 PRINT AT g,f;" "
190 NEXT g
200 IF f <> t THEN GO TO 1000

205 LET b=b+1
210 FOR a=0 TO 30
220 BEEP .01,a
230 NEXT a
240 IF b>0 THEN PRINT INK 1:
AT 4,1;"DE": AT 5,1;"FG"
250 IF b>1 THEN PRINT INK 2:
AT 7,1;"DE": AT 8,1;"EG"
260 IF b>2 THEN PRINT INK 3:
AT 10,1;"DE": AT 11,1;"FG"
270 IF b>3 THEN PRINT INK 4:
AT 13,1;"DE": AT 14,1;"FG"
280 IF b>4 THEN PRINT INK 5:
AT 16,1;"DE": AT 17,1;"FG"
290 IF b>5 THEN PRINT INK 6:
AT 19,1;"DE": AT 20,1;"FG"
295 IF b>5 THEN GO TO 2000
1000 PRINT AT 0,0:" "

1002 PRINT INK 5: FLASH 1: AT 0
,14;b#
1009 PRINT AT 2,t;" ": LET t= I
NT ( RND *24)+4: PRINT INK 5: A
T 2,t;"C"
1010 FOR f=28 TO 3 STEP -1: PRIN
T INK 5: AT 20,f;"A "
1020 IF INKEY# ="0" THEN GO TO
1060
1030 BEEP .02,f
1040 NEXT f: GO TO 100
1060 FOR g=20 TO 1 STEP -1
1070 PRINT INK 5: AT g,f;"B"
1080 BEEP .05,g
1090 PRINT AT g,f;" "
1100 NEXT g
1110 IF f <> t THEN GO TO 100

1115 LET p=p+1
1120 FOR u=0 TO 30
1130 BEEP .01,u
1140 NEXT u
1150 IF p>0 THEN PRINT INK 1:
AT 4,29;"DE": AT 5,29;"FG"
1160 IF p>1 THEN PRINT INK 2:
AT 7,29;"DE": AT 8,29;"FG"
1170 IF p>2 THEN PRINT INK 3:
AT 10,29;"DE": AT 11,29;"FG"
1180 IF p>3 THEN PRINT INK 4:
AT 13,29;"DE": AT 14,29;"FG"
1190 IF p>4 THEN PRINT INK 5:
AT 16,29;"DE": AT 17,29;"FG"
1200 IF p>5 THEN PRINT INK 6:
AT 19,29;"DE": AT 20,29;"FG"
1205 IF p>5 THEN GO TO 2000
1210 GO TO 100
2000 FOR m=0 TO 30

```



```

2020 BEEP .050,m
2023 NEXT m
2031 BORDER 0: PAPER 0: CLS
2033 IF b>5 THEN PRINT INK 6;
FLASH 1; AT 8,10;a$;" WINS."
2034 IF p>5 THEN PRINT INK 6;
FLASH 1; AT 8,10;b$;" WINS."
2035 FOR b=0 TO 10
2036 FOR a=0 TO 7
2038 PRINT INK a; AT 5,3;"G A M
E O V E R"
2040 BORDER RND *7: BEEP .025,
RND *55
2041 NEXT a
2042 BEEP .025, RND *55
2043 PRINT INK 6; FLASH 1; AT 1
0,8;"CONGRATULATIONS"
2045 NEXT b
2060 GO TO 4050

```

```

4000 BORDER 0: PAPER 0
4005 PRINT INK 6; FLASH 1; AT 0
,11;"LIGHTBULB"
4020 PRINT INK 4;"This is a ga
me for 2 people, the object of th
e game is to light the 6 light
bulbs on your side of the scree
n."

```

```

4030 PRINT INK 4;"The way you
do this is to hit the target w
hich appears at the top of the s
creen at a random spot."

```

```

4040 PRINT INK 4;"At the bottom
of the screen you will see a ca
nnon, when this runs from lef
t to right, the person on the
left will fire by pressing (1)
when it runs from right to left
the person on the right will fi
re by pressing (0)."

```

```

4050 PRINT INK 3; FLASH 1; AT 2
1,1;"PRESS ANY KEY TO INPUT PLAY
ERS"
4055 PRINT #1; INK 2; PAPER 6; F
LASH 1;" (NOT MORE THAN 7 LETT
ERS.) "
4056 PAUSE 0

```

```

4060 POKE 23658,8
4061 INPUT "ENTER NAME OF RIGHT
PLAYER ";a$
4062 IF LEN a$>7 THEN GO TO 40
61
4063 INPUT "ENTER NAME OF LEFT P

```

```

LAYER ";b$
4064 IF LEN b$>7 THEN GO TO 40
63
4070 GO TO 10
5000 FOR a=USR "a" TO USR "j"+
7
5010 READ user: POKE a,user
5020 NEXT a
5030 DATA 24,24,24,24,24,60,255,
255
5040 DATA 24,24,24,24,24,60,60,3
6
5050 DATA 255,255,231,231,195,19
5,195,195
5060 DATA 3,15,63,127,127,255,25
5,255
5061 DATA 192,240,252,254,254,25
5,255,255
5062 DATA 255,255,255,127,127,63
,15,3
5063 DATA 255,255,255,254,254,25
2,240,192
5065 DATA 248,0,184,0,248,0,232,
0
5066 DATA 170,85,170,85,170,85,1
70,85
5067 DATA 31,0,29,0,31,0,23,0
5070 RETURN

```



APR Calculator

THE PROGRAM is designed to enable you to work out your monthly repayments on items bought using plastic money. Enter the annual percentage rate and the cost of the item bought. The computer will work out the repayments and the number of months you have to repay the money, as well as the interest you will be charged.

APR Calculator was written for the 16K ZX-81 by Colin Moore, of Greenock, Renfrewshire.

```

9 CLS
10 PRINT AT 0,12;"A.P.R."
20 PRINT AT 1,12;"
30 PRINT AT 3,0;"WHAT IS THE A
.P.R."
40 INPUT APR
50 PRINT AT 3,19;APR
60 PRINT AT 5,0;"WHAT IS THE V
ALUE OF YOUR PURCHASE"
70 INPUT PUR
80 PRINT AT 6,18;"£";PUR
120 PRINT AT 10,0;"WHAT IS YOUR
REPAYMENT"
130 INPUT REP
140 PRINT AT 10,24;"£";REP
150 FOR Z=1 TO 100
160 NEXT Z
165 LET PURC=0
170 CLS
175 LET PURC=PUR
180 LET INT=APR/12
185 LET TCOS=0
190 LET MON=0
200 PRINT AT 0,0;"A.P.R. =";A
PR
210 PRINT AT 2,0;"VALUE =£";
PUR
220 PRINT AT 4,0;"REPAYMENT=£";
REP
230 PRINT AT 6,10;"THINKING"
235 LET INTR=(PUR/100)*INT
240 LET BAL=((PUR/100)*INT)+PU
R-REP
250 PRINT AT 6,10;"THINKING"
255 LET PURC=PURC+INTR
260 LET PUR=BAL
270 PRINT AT 6,10;"THINKING"
280 LET MON=MON+1
290 PRINT AT 6,10;"THINKING"
300 IF PUR<0 THEN GOTO 360
310 PRINT AT 6,10;"THINKING"
320 PRINT AT 6,10;"THINKING"
330 PRINT AT 6,10;"THINKING"
340 PRINT AT 6,10;"THINKING"
350 GOTO 230
360 PRINT AT 9,0;"YOUR PURCHASE
"
365 PRINT AT 11,0;"WILL COST YO
U £";INT (PURC*100)/100
370 PRINT AT 13,0;"IT WILL TAKE
YOU ";MON;" MONTHS TO PAY BAC
K"
380 PRINT AT 15,0;"DO YOU WANT
TO DO ANOTHER CALCULATION (
Y/N)"
390 IF INKEY$="N" THEN STOP
400 IF INKEY$="Y" THEN GOTO 9
410 GOTO 390

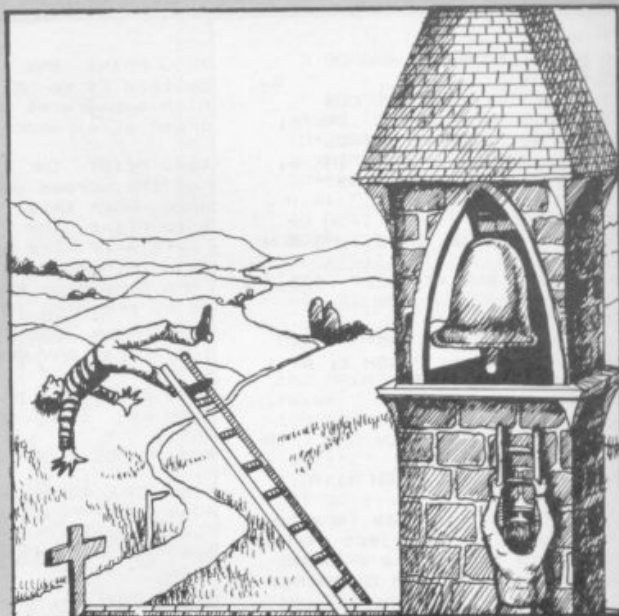
```



```

10 FOR x=0 TO 7: READ b: POKE
USR "a"+x,b: NEXT x
15 DATA 24,60,60,126,126,255,2
4,24
20 FOR x=0 TO 7: READ b: POKE
USR "c"+x,b: NEXT x
25 DATA 153,24,24,60,36,102,66
,195
30 FOR x=0 TO 7: READ b: POKE
USR "b"+x,b: NEXT x
35 DATA 8,8,8,8,8,8,8,8
40 FOR x=0 TO 7: READ b: POKE
USR "f"+x,b: NEXT x
45 DATA 20,62,42,62,20,20,54,1
19
47 FOR x=0 TO 7: READ b: POKE
USR "d"+x,b: NEXT x
48 DATA 124,4,4,4,124,4,4,4
50 FOR x=0 TO 7: READ b: POKE
USR "e"+x,b: NEXT x
55 DATA 63,32,32,32,63,32,32,3
2
70 PRINT AT 10,5;"(iD:iO:ig8:
iY:iO:iU:ig8:iW:iA:iN:iT:ig8:iI:
iN:iS:iT:iR:iU:iC:iT:iI:iO:iN:iS
:i?)"
80 IF INKEY$="y" THEN GO TO
5000
85 IF INKEY$="n" THEN GO TO
95
90 GO TO 80
95 CLS
100 LET t=3
110 LET s=0
120 LET a=11: LET b=19
130 BORDER 0: INK 7: PAPER 0
140 CLS
200 FOR p=0 TO 31
210 PRINT AT 0,p;"(ig8)"
220 PRINT AT 4,p;"(ig8)"
230 PRINT AT 8,p;"(ig8)"
235 PRINT AT 12,p;"(ig8)"
240 PRINT AT 16,p;"(ig8)"
250 PRINT AT 20,p;"(ig8)"
270 NEXT p
280 LET r=60
285 INK 2: PRINT AT 16,5;"(ig8
)"
287 PRINT AT 12,26;"(ig8)"
288 PRINT AT 8,9;"(ig8)"
289 PRINT AT 16,1;" "
290 PRINT AT 8,4;" "
292 PRINT AT 12,2;" "
294 PRINT AT 12,29;" "
296 PRINT AT 8,28;" "
300 PRINT AT 4,6;" "
330 INK 5: PRINT AT 17,28;"ED
ED
ED"

```



BELL RINGER

THE OBJECT of **Bell Ringer** is to ring the bell at the top of the church. On each floor is a ladder you have to climb but as time is limited you have to drop down the holes to gain extra time and then race back up the ladder to the next floor. You have three lives but touching a red square will result in instant death.

Bell Ringer was written for the 16K Spectrum by Paul Spencer, aged 13, of Basford, Notts.

```

350 PRINT AT 13,7;"ED
ED
ED"
360 PRINT AT 9,23;"ED
ED
ED"
370 PRINT AT 5,10;"ED

```



```

      ED
      ED"
380 INK 6: PRINT AT 1,27;"B
      A"
381 INK 4: PRINT AT 15,4;"C"
382 PRINT AT 11,27;"C"
383 PRINT AT 7,8;"C"
384 GO SUB 750
385 IF t=0 THEN GO TO 642
390 LET r=r-1
395 PRINT AT 21,24;"TIME=";r
396 PRINT AT 21,2;"SCORE=";s
397 IF r=9 THEN PRINT AT 21,3
0;" "
410 IF INKEY$ ="8" THEN LET a
=a+1
420 IF INKEY$ ="5" THEN LET a
=a-1
421 IF r=0 THEN : BEEP 3,1
422 IF r=0 THEN LET t=t-1
423 IF r=0 THEN LET r=65
430 INK 6: PRINT AT b,a;"F"
440 PRINT AT b,a+1;" "
450 PRINT AT b,a-1;" "
454 IF a=30 THEN PRINT AT b,a
;" "
455 BEEP .01,15
460 IF a=28 AND b=19 OR a=29 AN
D b=19 OR a=7 AND b=15 OR a=8 AN
D b=15 OR a=23 AND b=11 OR a=24
AND b=11 OR a=10 AND b=7 OR a=11
AND b=7 THEN GO SUB 1000
470 IF b=3 AND a=27 THEN GO SU
B 600
525 IF a=31 THEN LET a=30
540 GO TO 330.
600 FOR x=0 TO 24
610 BEEP .06,x
620 NEXT x
630 LET s=s+500
635 LET t=t-1
642 IF t=0 THEN PRINT AT 21,0
;"(3*ig8:iW:iA:iN:iT:3*ig8:iA:iN
:i0:iT:iH:iE:iR:3*ig8:iG:i0:i?:3
*ig8)(Y/N)"
643 IF t=0 THEN PRINT AT 12,8
;"YOUR SCORE=";s
644 IF INKEY$ ="n" THEN STOP
646 IF t=0 AND INKEY$ ="y" THE
N RUN
647 IF t=0 THEN GO TO 644
648 PAUSE 100
650 GO TO 120
750 IF b=15 AND a=5 THEN LET t
=t-1
760 IF b=11 AND a=26 THEN LET
t=t-1

```

```

770 IF b=7 AND a=9 THEN LET t=
t-1
775 IF b=11 AND a=27 THEN LET
r=70
780 IF b=7 AND a=8 OR b=15 AND
a=4 THEN LET r=85
840 IF a=7 AND b=3 OR b=7 AND a
=5 OR b=11 AND a=3 OR b=15 AND a
=2 OR b=11 AND a=29 OR b=7 AND a
=28 THEN GO TO 850
845 RETURN
850 FOR j=0 TO 3
855 PRINT AT b,a;" "
860 LET b=b+1
870 PRINT AT b,a;"F"
875 PAUSE 10
880 NEXT j
890 RETURN
1000 IF INKEY$ ="0" THEN GO TO
1010
1005 RETURN
1010 FOR u=0 TO 3
1020 PRINT AT b,a;" "
1030 LET b=b-1
1040 PRINT AT b,a;"F"
1050 PAUSE 7
1060 NEXT u
1061 INK 7: PRINT AT 12,7;"(ig8
)"
1062 PRINT AT 8,23;"(ig8)"
1063 PRINT AT 4,10;"(ig8)"
1064 PRINT AT 16,29;"(ig8)"
1065 INK 7: PRINT AT 16,28;"(ig
8)"
1066 PRINT AT 4,11;"(ig8)"
1067 PRINT AT 8,24;"(ig8)"
1068 PRINT AT 12,8;"(ig8)"
1070 RETURN
5000 INK 4: PRINT AT 3,0;"(5*ig
8)YOU MUST RING THE BELL AT(6*ig
8)THE TOP OF THE SCREEN BY(8*ig8
)RUNNING ALONG THE FLOORS(8*ig8)
CLIMBING UP THE LADDERS(9*ig8)AN
D DROPPING THROUGH THE(8*ig8)HOL
ES. YOU DON'T GET(12*ig8)ENOUGH
TIME TO REACH THE(8*ig8)BELL SO
YOU MUST GET THE(8*ig8)THINGS TH
AT LOOK LIKE THIS(7*ig8)C(ig8).
THESE GIVE YOU MORE(8*ig8)TIME.
YOU GO FROM ONE TO(8*ig8)ANOTHER
.YOU CAN NOT GO(9*ig8)OVER THE
RED SQUARES SO(9*ig8)TO GET THE
C'SYOU MUST(9*ig8)DROP DOWN THE
HOLES.(14*ig8)PRESS KEY 0 TO
START(5*ig8)"
5010 IF INKEY$ ="0" THEN GO TO
5030
5020 GO TO 5010
5030 CLS
5040 GO TO 100

```



```

1 REM SPIDERS
10 DIM c(4): DIM A(B): DIM B(B
)
20 FOR N=1 TO 4: LET A(N)= INT
(RND *5)+2: LET c(n)=a(n): NEX
T N
21 LET B(1)=10: LET B(2)=15: L
ET B(3)=20: LET B(4)=5
30 LET HISCORE=16840
40 LET OXYGEN=1000
50 LET SCORE=0
60 LET HOLE=0
70 LET X=15
80 LET LONG=0
90 LET COUNT=0
99 REM Users Graphics
109 REM Spider1
110 FOR n=0 TO 7: READ a: POKE
USR "p"+n,a: NEXT n: DATA BIN
00011000, BIN 00111100, BIN 1101
1011, BIN 01011010, BIN 00111100
, BIN 01011010, BIN 01011010, BI
N 01100110
119 REM Spider2
120 FOR n=0 TO 7: READ a: POKE
USR "o"+n,a: NEXT n: DATA BIN
00011000, BIN 00111100, BIN 110
11011, BIN 01011010, BIN 0011110
0, BIN 01011010, BIN 10011001, B
IN 10011001
129 REM ME
130 FOR n=0 TO 7: READ a: POKE
USR "m"+n,a: NEXT n: DATA BIN
00010000, BIN 00010000, BIN 001
11000, BIN 01010100, BIN 1001001
0, BIN 01101100, BIN 01000100, B
IN 01111100
135 FOR n=0 TO 7: READ a: POKE
USR "k"+n,a: NEXT n: DATA BIN
00010000, BIN 00010000, BIN 001
11000, BIN 01010100, BIN 1001001
0, BIN 01101100, BIN 01000100, B
IN 011000110
139 REM BALL1
140 FOR n=0 TO 7: READ a: POKE
USR "B"+n,a: NEXT n: DATA BIN
00, BIN 0, BIN 00001000, BIN 00
011100, BIN 00111110, BIN 000111
00, BIN 00001000, BIN 0
149 REM BALL2
150 FOR n=0 TO 7: READ a: POKE
USR "G"+n,a: NEXT n: DATA BIN
00, BIN 00001000, BIN 00011100,
BIN 00111110, BIN 01111111, BIN
00111110, BIN 00011100, BIN 000
01000
159 REM STRING
160 FOR n=0 TO 7: READ a: POKE
USR "S"+n,a: NEXT n: DATA BIN
00011000, BIN 00011000, BIN 000
11000, BIN 00011000, BIN 0001100
0, BIN 00011000, BIN 00011000, B
IN 00011000
200 REM OUTPUT SCREEN
201 BORDER 0: PAPER 0: CLS : IN
K 7: BRIGHT 1:
202 INPUT "INSTRUCTIONS?";a$:
203 IF a$="n" THEN GO TO 205
204 PRINT AT 0,0:"SAVE EARTHS
OXYGEN BARRIER FROM ATTACK BY TH
E SPACE SPIDERS WHICH FALL FROM
THERE WED. NOTE IF A HOLE IT HIT
TWICE WITHOUT BEGIN FILL IN IT
WILL REMAIN FOR EVER
      USE KEY '1' LEFT
      '0' RIGHT AND 'Q' TO F
      ILL IN THE HOLES MADE BY THE SPA
      IDERS.
      AS YOU GET
      BETTER MORE SPIDER APPEAR"
205 PRINT "IF A SPIDER LANDES O
N YOU IT WILL TAKE YOU AWAY"
206 PRINT "EXPECT SOME PHONE CA
LLES"
207 INPUT "PRESS ENTER";A$: CLS
: PRINT FLASH 1: INK 2: PAPER
6: AT 0,0:"(ig5:g5:ig5:g5:ig5:g5
:ig5:g5:ig5) SPIDER ATTACK(ig5:g5
:ig5:g5:ig5:g5:ig5:g5:ig5)"
210 LET C=4: LET A=161: LET B=2
55/2
215 PLOT 0,A
220 DRAW INK 7: PAPER 0:B,C

```

SPACI



EARTH'S oxygen barrier is under attack by the space spiders which fall from the webs. As each spider lands on the barrier it makes a hole and the oxygen leaks. You have to move along the barrier and fill the holes as they are made to prevent the oxygen running out. If a spider lands on you it will take you away and the game ends.

Space Spiders was written for the 16K Spectrum by Ian Wombwell, aged 13, of Durham City, Co Durham.



```

230 LET A=A-4: LET B=B-6: LET C
=C+4
240 BEEP .001,50: IF C >= 85 TH
EN GO TO 260
250 GO TO 215
260 LET C=4: LET A=161: LET B=-
255/2
270 PLOT 255,A
280 DRAW INK 7: PAPER 0:B,C
290 LET A=A-4: LET B=B+6: LET C
=C+4
300 BEEP .001,50: IF C >= 85 TH
EN GO TO 320
310 GO TO 270
320 PRINT AT 0,0;"
";: PRINT I
NK 6; AT 0,10;"HISCORE=";HISCORE
; AT 21,0;"SCORE=";SCORE; AT 21,
21;"OXYGEN=";OXYGEN; AT 21,12;"H
OLE=";HOLE
330 PRINT INK 2; AT 20,0;"(32*
ig8)"
499 REM MOVE SPIDERS
500 FOR N=1 TO INT LONG+1: LET
LONG=LONG+.005: IF LONG >= 4 TH
EN LET LONG=0: GO TO 3000
501 IF a(n)=18 AND b(n)=X THEN
GO TO 4000
520 PRINT PAPER 0: INK 6; AT A
(N),B(N);"S"
530 LET A(N)=A(N)+1: IF A(N)=20
THEN PRINT INK 7: PAPER 0: BR
IGHT 1; AT 20,B(N);"(ig8)": LET
HOLE=HOLE+1: LET A(N)= INT ( RND
*6)+2: FOR M=19 TO c(n) STEP -1
: PRINT AT M,B(N);" ": NEXT M:
LET B(N)= INT ( RND *31): LET c(
n)=a(n)
545 LET A$="0": IF A(N)/2= INT
(A(N)/2) THEN LET A$="P"
550 PRINT INK 6; AT A(N),B(N);
A$
600 REM MOVE ME
610 PRINT AT 19,X;" ": IF INK
EY$="1" AND X>0 THEN LET X=X-1

620 IF INKEY$="0" AND X<31 TH
EN LET X=X+1
625 LET b$="K": IF x/2= INT (x/
2) THEN LET b$="M"
630 PRINT AT 19,X;b$
640 LET SCORE=SCORE+OXYGEN/100:
LET OXYGEN=OXYGEN-HOLE*5: LET S
CORE= INT (SCORE): PRINT AT 21,
6;SCORE; AT 21,19;HOLE; AT 21,28
;OXYGEN
650 IF INKEY$="q" AND ATTR (
20,X)=71 THEN LET HOLE=HOLE-1:
PRINT AT 20,x;"*": BEEP .01,0:
BEEP .01,5: BEEP .01,15: PRINT
AT 20,X;"B": BEEP .01,10: BEEP .
01,20: BEEP .01,30: PRINT AT 20
,X;"G": BEEP .01,40: BEEP .01,50
: BEEP .01,60: PRINT INK 2;
PAPER 2; AT 20,X;"(ig8)"
660 IF OXYGEN <= 0 THEN GO TO
2000
1000 NEXT N: GO TO 500
2000 FOR M=0 TO 10 STEP 10: FOR
N=0 TO 23: PRINT AT M,N;" (2
*ig8)"
2001 IF score>hiscore THEN BEEP
1,10: PRINT AT 11,10;"YOU ARE
A HERO"
2010 PRINT AT M+1,N;" (6*ig8)"

2020 PRINT AT M+2,N;" (2*ig8:sp
:2*ig8:sp:2*ig8)"
2030 PRINT AT M+3,N;" (6*ig8)"

2040 PRINT AT M+4,N;" (ig8:sp:
2*ig8:sp:ig8)"
2050 PRINT AT M+5,N;" (ig8:2*sp
:2*ig8:2*sp:ig8)"
2060 PRINT AT M+6,N;" (ig8:2*sp
:2*ig8:2*sp:ig8)"
2070 PRINT AT M+7,N;" (ig8:sp:
2*ig8:sp:ig8)"
2080 BEEP .001,N+40: BEEP .001,N
+40: BEEP .001,M+30: BEEP .001,M
+30: NEXT N: NEXT M
2090 PAPER 2: CLS : PRINT INK 6
; PAPER 2: FLASH 1; AT 10,5;"PHO

```

```

NE CALL PLEASE WAIT": FOR M=1 TO
5: FOR N=1 TO 10: BEEP .01,10:
NEXT N: PAUSE 20: FOR N=1 TO 5:
BEEP .01,10: NEXT N: PAUSE 20: N
EXT M
2100 INPUT "PHONE CALL FROM EART
H:WOULD YOU LIKE ANOTHER GO Y/N"
;a$
2110 FOR n=1 TO 40: BEEP .01, IN
T ( RND *60): NEXT n: IF a$="y"
OR a$="Y" THEN GO TO 2200
2115 PRINT INK 6: PAPER 2: FLAS
H 1; AT 10,0;"ANOTHER PHONE CALL
PLEASE WAIT": FOR M=1 TO 5: FOR
N=1 TO 10: BEEP .01,10: NEXT N:
PAUSE 20: FOR N=1 TO 5: BEEP .0
1,10: NEXT N: PAUSE 20: NEXT M

2120 BORDER 1: CLS : PRINT AT 1
0,0;"EARTH THINKS A COWARD IS PL
AYING"
2130 GO TO 2130
2200 PRINT INK 6: PAPER 2: FLAS
H 1; AT 10,0;"ANOTHER PHONE CALL
PLEASE WAIT": FOR M=1 TO 5: FOR
N=1 TO 10: BEEP .01,10: NEXT N:
PAUSE 20: FOR N=1 TO 5: BEEP .0
1,10: NEXT N: PAUSE 20: NEXT M

2210 BORDER 1: CLS : PRINT AT 1
0,0;"EARTH THINKS A HERO? IS PLA
YING": PAUSE 100: RUN
3000 PAPER 2: CLS : PRINT INK 6
; PAPER 2: FLASH 1; AT 10,5;"PHO
NE CALL PLEASE WAIT": FOR M=1 TO
5: FOR N=1 TO 10: BEEP .01,10:
NEXT N: PAUSE 20: FOR N=1 TO 5:
BEEP .01,10: NEXT N: PAUSE 20: N
EXT M
3010 PRINT AT 10,0;"Earth ARE!
pleased and you are rewarded wit
h 400 units of extra oxygen": PAU
SE 200: LET oxygen=oxygen+400
3020 LET hole=0: CLS : GO TO 200

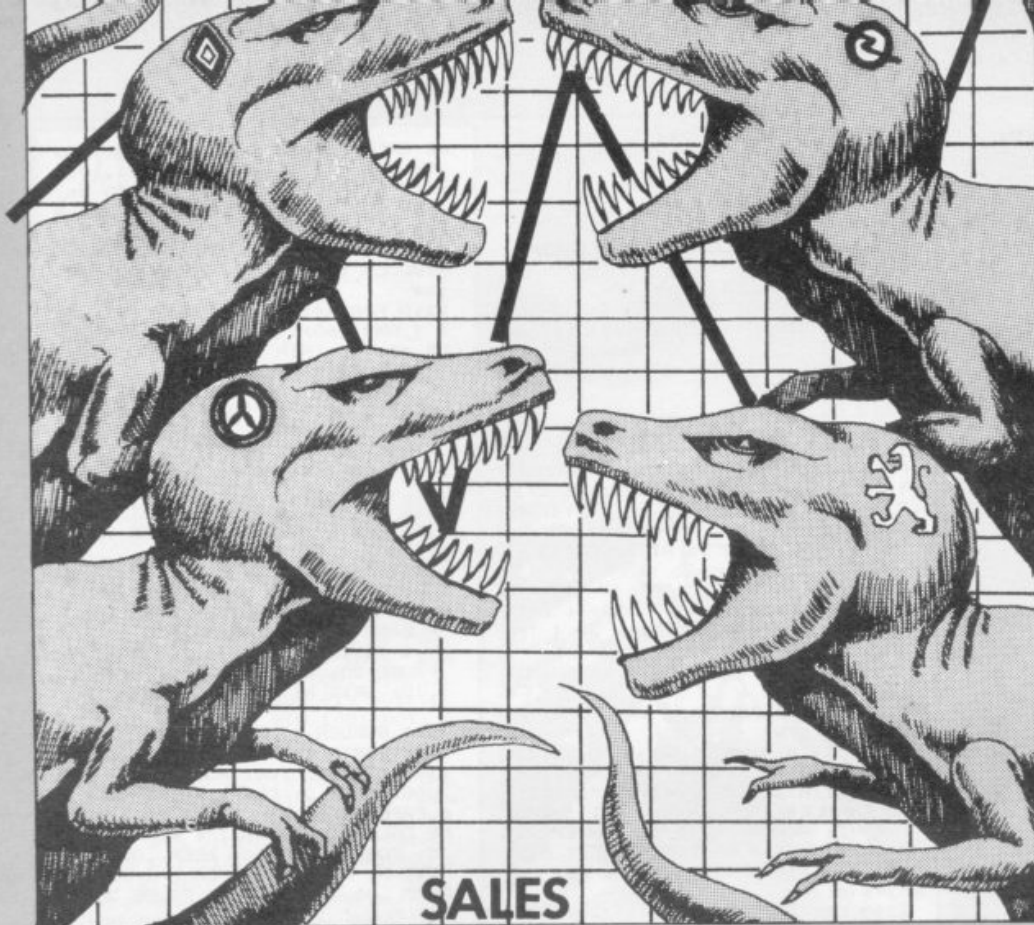
```

```

4000 FOR m=19 TO 0 STEP -1: PRIN
T AT m+1,b(n);"M": AT m,b(n);"O
": AT m+2,b(n);" ": BEEP .001,n:
BEEP .01,n: BEEP .01,n: BEEP .0
01,n: NEXT m
4100 GO TO 2000

```





OLIGOPOLY

OLIGOPOLY for the 48K Spectrum is the second in our series of listings of Cambridge Award winners. The game is for one to six players and each plays the boss of a company which is in competition with the others. Your objective is to create wealth at a faster rate than your competitors.

You will need to make decisions on production levels, selling price, marketing expenses and the level of dividends needed to keep your company afloat.

During the program you will be given news flashes about the state of the market, along with annual reports and forecasts. The computer will prompt for any information it requires but it will be for you to find the strategy to beat your competitors.

Oligopoly was written by N Holgate of Camberley, Surrey, and won third prize in the 1983 Cambridge Awards.

```
1 BORDER 0: PAPER 0: INK 7:
CLS : GO SUB 9900
40 BEEP 0.5,-5: BEEP .5,-3: BEEP 1,0: BEEP .5,2: BEEP .17,5: BEEP .17,4: BEEP .17,2: BEEP .5,4: BEEP 1,7
41 PAUSE 25
42 BEEP 0.5,0: BEEP .75,12: BEEP .25,9: BEEP .5,7: BEEP .5,5: BEEP .5,7: BEEP .5,9
43 PAUSE 25
44 BEEP 0.5,0: BEEP .75,12: BEEP .25,9: BEEP .5,7: BEEP .5,5: BEEP .5,2: BEEP 1,0
45 PAUSE 25
46 BEEP 0.5,-5: BEEP .5,-3: BEEP 1,0: BEEP .5,2: BEEP .17,5: BEEP .17,4: BEEP .17,6: BEEP .5,4: BEEP 1,7
47 PAUSE 25
48 BEEP 0.5,0: BEEP .75,7: BEEP .25,4: BEEP .5,4: BEEP .75,5: BEEP .25,4: BEEP .25,2: BEEP .25,0: BEEP 1,2: BEEP .5,0: BEEP .5,-1: BEEP 1,0
50 POKE USR "A",255
52 POKE USR "A",1,127
54 POKE USR "A",2,63
56 POKE USR "A",3,31
58 POKE USR "A",4,15
60 POKE USR "A",5,7
62 POKE USR "A",6,3
64 POKE USR "A",7,1
66 POKE USR "B",255
68 POKE USR "B",1,254
70 POKE USR "B",2,252
72 POKE USR "B",3,248
74 POKE USR "B",4,240
76 POKE USR "B",5,224
78 POKE USR "B",6,192
80 POKE USR "B",7,128
82 POKE USR "C",1
84 POKE USR "C",1,3
86 POKE USR "C",2,7
```

```
88 POKE USR "C",3,15
90 POKE USR "C",4,31
92 POKE USR "C",5,63
94 POKE USR "C",6,127
95 POKE USR "C",7,255: INK 0
102 CLS : BORDER 6: PAPER 7: INK 1: CLS : PRINT AT 13,0:"How many firms are there in the industry?": PRINT AT 18,0: FLASH 1:"(1 to 6)"
103 IF INKEY#<>" " THEN GO TO 103
104 LET n#=INKEY#: IF n#="" THEN GO TO 104
106 IF CODE n#<49 OR CODE n#>54 THEN GO TO 102
108 LET n=VAL n#: LET n=INT (n+.5): PRINT AT 21,n;n" Firms.": PAUSE 40: PAUSE 40: PAUSE 40: CLS
109 LET kk=0: LET x45=0
115 IF n=1 THEN LET kk=1: LET n=2: PRINT AT 9,0:"Although you are the only player the Spectrum will run a rival firm (number 2).": PAUSE 200: CLS : GO TO 127
120 PRINT AT 9,0:"Each year each firm must decide how to raise its profits and the value of its shares, taking account of other firms' decisions."
125 PAUSE 400: CLS
127 PRINT AT 8,0:" Do you wish to use a printer? (y/n)": FOR x=1 TO 3: BEEP .05,10: BEEP .1,-10: BEEP .1,-15: NEXT x: INPUT z#: CLS
130 PRINT AT 8,0:" How many years would you like to play?": PRINT AT 18,0: FLASH 1:"(2 to 25)"
131 INPUT b#
135 LET tt=VAL b#
190 LET tt=INT (tt+0.5)
```

```
200 IF tt>25 THEN LET tt=25
202 IF tt<2 THEN LET tt=2
205 PRINT AT 21,0:"No. of years = ":tt: PAUSE 20: PAUSE 20: PAUSE 20: CLS
210 DIM j(tt): DIM k(n): DIM l(tt): DIM m(n,tt): DIM n(tt): DIM o(n,tt): DIM p(n,tt): DIM q(n,tt): DIM r(n,tt): DIM s(n,tt): DIM t(n): DIM u(n,tt): DIM v(n,tt): DIM w(n,tt): DIM x(tt): DIM y(n): DIM z(n,tt)
220 DIM a(tt): DIM b(n,tt): DIM c(n): DIM d(n,tt): DIM e(n): DIM f(n,tt): DIM g(n,tt): DIM h(n,tt): DIM i(n,tt)
225 LET p=n*10: LET tr=0.4: LET f1=0.15+RND/10: LET f2=0.225+RND/10: LET f3=1-f2-f1
230 LET h1=1: LET h2=1: LET h3=1: LET h4=1: LET h5=1: LET h6=1: LET h7=1: LET h8=1: LET h9=1: LET h10=1: LET h11=0: LET h12=0: LET h13=0: LET h14=0: LET h15=0: LET h16=0: LET h17=0: LET h18=0: LET h19=0: LET h20=0
235 LET g=1: LET v=0: LET r=10
265 DATA 66158,9458,5.67,10000,10000,2500,7500,10000,10,13842,0.05,1537,2305,12305,0,200000,212305,0,10000
290 LET t=1
300 FOR k=1 TO n
310 READ h(k,t),f(k,t),v(k,t),q(k,t),i(k,t),r(k,t),m(k,t),s(k,t),p(k,t),g(k,t),b(k,t),t(k),n(k,t),e(k),k(k),c(k),u(k,t),d(k,t),o(k,t)
320 RESTORE 265
330 NEXT k
340 LET a(t)=n*o(1,1)*1.01
502 FOR k=1 TO n: BRIGHT 1: BORDER k: BRIGHT 0: INK 0
504 PRINT AT 0,0:"Firm ":k;AT 0
```



```

,25;"Year ";t: IF z$(1 TO 1)="Y"
OR z$(1 TO 1)="Y" THEN INK 7
506 INVERSE 1: PRINT AT 2,9;"Tr
ading Account": PRINT AT 2,26;"#
"
508 IF u(k,t)=0 THEN LET p(k,t)
)=99: PRINT AT 4,0;" Unfortunat
ely this firm is bankrupt a
nd will not be making any
decisions ! ": PAUSE 120
: GO TO 730
510 PRINT AT 4,2;"Sales": INVER
SE 0: PRINT AT 4,8;"( ";INT (0.5+
s(k,t));" @ #";p(k,t);")": LET V
V=INT (s(k,t)*p(k,t)+.5): LET x$
=STR$ VV: PRINT AT 4,(29-LEN x$+
1);x$
515 PRINT AT 5,24;"-----"
540 INVERSE 1: PRINT AT 6,2;"Pr
oduction": INVERSE 0: PRINT AT 6
,13;" (";q(k,t);")"
545 PRINT AT 7,2;"Raw materials
,wages": LET x$=STR$ INT (h(k,t)
+.5): PRINT AT 7,(29-LEN x$+1);x$
548 PRINT AT 9,2;"Contribution
to": PRINT AT 10,2;"overheads":
LET x$=STR$ INT ((s(k,t)*p(k,t)+
.5)-INT (h(k,t)+.5)): PRINT AT 1
0,(29-LEN x$+1);x$
550 INVERSE 1: PRINT AT 12,2;"L
ess": INVERSE 0: PRINT AT 13,2;"
Marketing": LET x$=STR$ m(k,t):
PRINT AT 13,(23-LEN x$+1);x$
555 PRINT AT 14,2;"R & D": LET
x$=STR$ r(k,t): PRINT AT 14,(23-
LEN x$+1);x$
560 PRINT TAB 2;"Reps & Renewal
s": LET x$=STR$ INT (0.5+i(k,t))
: PRINT AT 15,(23-LEN x$+1);x$
565 LET x$=STR$ (m(k,t)+r(k,t)+
INT (.5+i(k,t))): PRINT AT 16,(2
9-LEN x$+1);x$
567 PRINT AT 17,24;"-----"
570 INVERSE 1: PRINT AT 19,2;"G
ross profit": INVERSE 0: IF g(k,
t)<0 AND z$(1 TO 1)<>"Y" AND z$(
1 TO 1)<>"Y" THEN INK 2
575 LET x$=STR$ INT g(k,t): PRI
NT AT 19,(29-LEN x$+1);x$: IF z$
(1 TO 1)<>"Y" AND z$(1 TO 1)<>"Y
" THEN INK 0
577 PRINT AT 20,24;"-----"
580 IF z$(1 TO 1)="Y" OR z$(1 T
O 1)="Y" THEN COPY
585 IF z$(1 TO 1)<>"Y" AND z$(1 TO 1)<>
"Y" THEN PAUSE 50: PRINT AT 21,
1;"(Press any key to continue.)":
PAUSE 850
587 CLS : PRINT AT 0,0;"Firm ";
k:AT 0,25;"Year ";t
588 INVERSE 1: PRINT AT 2,9;"Pr
ofit & Loss": PRINT AT 2,26;"#
"
590 PRINT AT 4,2;"Gross profit"
: INVERSE 0: IF g(k,t)<0 AND z$(
1 TO 1)<>"Y" AND z$(1 TO 1)<>"Y"
THEN INK 2
592 PRINT AT 4,(29-LEN x$+1);x$
: IF z$(1 TO 1)<>"Y" AND z$(1 TO 1
)<>"Y" THEN INK 0
595 PRINT AT 5,24;"-----": INV
ERSE 1: PRINT AT 7,2;"Accounting
Costs": INVERSE 0: PRINT AT 9,2
;"Interest": IF w(k,t)<0 THEN P
RINT AT 9,11;"earned"
598 LET x$=STR$ INT (0.5+w(k,t)
): PRINT AT 9,(23-LEN x$+1);x$
600 PRINT TAB 2;"Depreciation":
LET x$=STR$ INT (0.5+o(k,t)): P
RINT AT 10,(23-LEN x$+1);x$
605 PRINT TAB 2;"Tax": LET x$=S
TR$ INT (0.5+t(k)): PRINT AT 11,
(23-LEN x$+1);x$: IF t(k)<0 THEN
PRINT AT 11,6;"refund"
607 LET x$=STR$ (INT (g(k,t)-n(
k,t)+.5)): PRINT AT 12,(29-LEN x
$+1);x$: PRINT AT 13,24;"-----"
610 IF w(k,t)<0 OR t(k)<0 THEN
PRINT AT 18,1;"(A 'negative' co
st such as a tax refund is, o

```

```

f course, income ')"
612 INVERSE 1: PRINT AT 15,2;"N
et profit": INVERSE 0: IF n(k,t)
<0 AND z$(1 TO 1)<>"Y" AND z$(1
TO 1)<>"Y" THEN INK 2
615 LET x$=STR$ INT (0.5+n(k,t)
): PRINT AT 15,(29-LEN x$+1);x$
: IF z$(1 TO 1)<>"Y" AND z$(1 TO 1
)<>"Y" THEN INK 0
616 PRINT AT 16,24;"-----": IF
z$(1 TO 1)="Y" OR z$(1 TO 1)="Y
" THEN COPY : GO TO 618
617 PAUSE 50: PRINT AT 21,1;"(P
ress any key to continue.)": PAU
SE 850
618 CLS : PRINT AT 0,0;"Firm ";
k:AT 0,25;"Year ";t
620 INVERSE 1: PRINT AT 3,10;"C
ash Flow": PRINT AT 3,26;"#": IN
VERSE 0
625 PRINT AT 5,2;"Money in hand
": PRINT AT 6,2;"(Year ";t-1;")
": LET x$=STR$ INT (e(k)-n(k,t)-
o(k,t)+d(k,t)+.5): PRINT AT 6,(2
9-LEN x$+1);x$
627 INVERSE 1: PRINT AT 8,2;"Pl
us": INVERSE 0: PRINT AT 10,2;"D
epreciation": LET x$=STR$ INT (.
5+o(k,t)): PRINT AT 10,(23-LEN x
$+1);x$
628 PRINT AT 11,2;"Net profit":
IF n(k,t)+.5<0 AND z$(1 TO 1)<>
"Y" AND z$(1 TO 1)<>"Y" THEN IN
K 2
630 LET x$=STR$ INT (.5+n(k,t))
: PRINT AT 11,(23-LEN x$+1);x$
: IF z$(1 TO 1)<>"Y" AND z$(1 TO 1
)<>"Y" THEN INK 0
635 INVERSE 1: PRINT AT 13,2;"L
ess": INVERSE 0: PRINT AT 15,2;"
Dividends paid": LET x$=STR$ INT
(.5+d(k,t)): PRINT AT 15,(23-LE
N x$+1);x$
637 LET x$=STR$ (INT (.5+o(k,t)
)+INT (.5+n(k,t))-INT (.5+d(k,t)
)): PRINT AT 16,(29-LEN x$+1);x$
640 PRINT AT 17,24;"-----"
642 INVERSE 1: PRINT AT 19,2;"M
oney in hand": INVERSE 0: IF e(k)
<0 AND z$(1 TO 1)<>"Y" AND z$(1
TO 1)<>"Y" THEN INK 2
645 LET x$=STR$ e(k): PRINT AT
19,(29-LEN x$+1);x$: PRINT AT 20
,24;"-----": IF z$(1 TO 1)<>"Y"
AND z$(1 TO 1)<>"Y" THEN INK 0
: PAUSE 850
652 IF z$(1 TO 1)="Y" OR z$(1 T
O 1)="Y" THEN COPY
665 CLS : PRINT AT 0,0;"Firm ";
k:AT 0,25;"Year ";t
670 INVERSE 1: PRINT AT 3,9;"Ba
lance Sheet": PRINT AT 3,26;"#":
INVERSE 0
675 PRINT AT 6,2;"Money in hand
": IF e(k)<0 AND z$(1 TO 1)<>"Y"
AND z$(1 TO 1)<>"Y" THEN INK 2
680 PRINT AT 6,(29-LEN x$+1);x$
: IF z$(1 TO 1)<>"Y" AND z$(1 TO 1
)<>"Y" THEN INK 0
685 IF t>1 THEN IF r(k,t-1)*n<
r2 THEN LET k(k)=0.9*k(k)
690 PRINT AT 8,2;"Stocks": LET
x$=STR$ (INT k(k)*3): PRINT AT 8
,(29-LEN x$+1);x$: IF t>1 THEN
IF r(k,t-1)*n<r2 THEN PRINT AT
8,8;" (obsolete)"
695 IF INT k(k)<0 THEN PRINT A
T 8,24;"-----"
700 PRINT AT 10,2;"Machinery":
LET x$=STR$ INT c(k): PRINT AT 1
0,(29-LEN x$+1);x$
705 PRINT AT 14,24;"-----": PR
INT AT 17,24;"-----"
710 INVERSE 1: PRINT AT 16,2;"N
et assets": INVERSE 0: LET x$=S
TR$ INT u(k,t): PRINT AT 16,(29-L
EN x$+1);x$
715 LET y(k)=INT (.5+y(k)+d(k,t
)): PRINT AT 20,1;"(Total divide
nds paid: #";y(k);")"

```

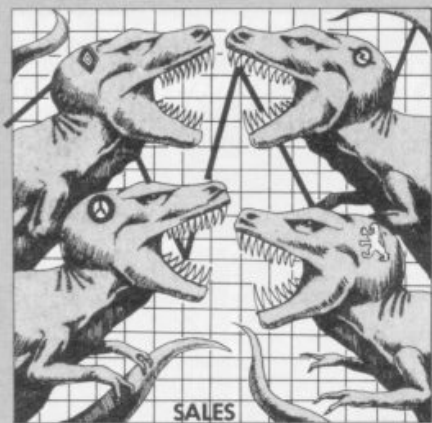
```

717 PRINT AT 21,2;"-----"
720 IF z$(1 TO 1)="Y" OR z$(1 T
O 1)="Y" THEN COPY : LPRINT AT
0,0;" (224 *sp)
": INK 0: PRINT AT 10,1;"P
lease collect your results."
725 PAUSE 1200
730 CLS : NEXT k
740 IF t=tt THEN CLS : BORDER
7: PRINT AT 3,9;"FINAL RESULTS":
FOR k=1 TO n: PRINT AT 4+2*k,4;
"Firm ";k: PRINT AT 4+2*k,20;u(k
,t): NEXT k: PRINT AT 21,0;"Do y
ou want another game? (y/n)": IN
PUT b$: IF b$(1 TO 1)="Y" OR b$(
1 TO 1)="Y" THEN CLS : GO TO 10
0
742 IF t=tt THEN STOP
745 INVERSE 0: CLS : BORDER 7
750 LET t=t+1: FLASH 1: PRINT A
T 2,1;"FORECAST": FLASH 0: PRIN
T AT 2,23;"Year ";t
760 LET g=g+INT (RND*5)-INT (RN
D*4)
765 IF g<=-10 THEN LET g=-5
770 IF g>=10 THEN LET g=6
780 IF g>=0 THEN PRINT AT 4,3;
"Demand expected to rise ";g;"%"
785 IF g<0 THEN PRINT AT 4,3;
"Demand expected to fall ";-g;"%"
790 LET v=v+INT (RND*8)-INT (RN
D*3)
800 IF v<-3 THEN LET v=-1
805 IF v>9 THEN LET v=5
815 IF v>=0 THEN PRINT AT 6,3;
"Costs expected to rise ";v;"%"
820 IF v<0 THEN PRINT AT 6,3;
"Costs expected to fall ";-v;"%"
825 LET r=r+INT (RND*3)-INT (RN
D*3): IF r>16 THEN LET r=12
830 IF r<6 THEN LET r=7
840 PRINT AT 8,3;"Interest Rate
s": LET x$=STR$ r: PRIN
T AT 8,(28-LEN x$);x$;"%"
850 FOR k=1 TO n
860 LET a(t)=a(t)+i(k,t-1)
870 NEXT k
880 LET a(t)=a(t)*(1+g/100)
890 IF a(t)>1.3*a(t-1) THEN LE
T a(t)=1.3*a(t-1)
900 IF a(t)<0.7*a(t-1) THEN LE
T a(t)=0.7*a(t-1)
910 PRINT AT 10,2;"Capacity of
equipment indus-": PRINT AT 11,2
;"tries is ";INT a(t);" this yea
r."
920 LET h20=INT (85+RND*15)/100
: LET h19=INT (100+RND*15)/100
930 PRINT AT 13,2;"If orders fa
ll below this,the";AT 14,2;"pric
e of renewing equipment";AT 15,2
;"will fall by ";INT (100-h20*10
0);" %"
940 PRINT AT 17,2;"If orders ri
se above this,the";AT 18,2;"pric
e of renewing equipment";AT 19,2
;"will rise by ";INT (100-h19*10
0);" %"
950 IF z$(1 TO 1)="Y" OR z$(1 T

```

continued on page 76





continued from page 75

```

0 1)="Y" THEN COPY
960 IF z#(1 TO 1)<>"Y" AND z#(1
TO 1)<>"Y" THEN BEEP .25,8: BE
EP .25,7: BEEP .25,6: BEEP .25,5
: BEEP .25,4: BEEP .25,12: BEEP
.25,12: BEEP .25,5: BEEP .25,4:
BEEP .25,12: BEEP .25,12: BEEP
.25,5: BEEP .25,4: BEEP .25,12: B
EEP .25,12
965 PAUSE 550
970 LET tn=0: FOR k=1 TO n: LET
tn=tn+n(k,t-1): NEXT k: IF tn/n
>15521 THEN GO SUB 4000
975 LET tn=0: FOR k=1 TO n: LET
tn=tn+n(k,t-1): NEXT k: IF tn/n
>12674 AND tn/n<=15521 THEN GO
SUB 4500
980 IF n=1 AND n(1,t-1)<=11675
AND n(1,t-1)>10046 THEN GO SUB
5000
985 IF tt>2 THEN GO TO 1000
990 CLS: PRINT AT 5,6:"ATTENTI
ON ALL FIRMS !": PRINT AT 10,0:
"All decisions of firms shoul
d bein numbers. If letters are u
sed, the request for a decision w
ill begin again. If a firm spend
s or produces too much or too lit
tle, it will be changed to the ma
xi- mum or minimum ."
992 PRINT AT 20,2: "(Press any k
ey to continue.)"
995 PAUSE 450: CLS
1000 CLS: FOR k=1 TO n
1010 BRIGHT 1: BORDER k: PAPER 7
: INK 0: BRIGHT 0
1020 PRINT AT 1,1: "Firm ";k;TAB
24;"Year ";t
1025 IF u(k,t-1)=0 THEN LET p(k
,t)=p(k,t-1): PRINT AT 4,2:"Unfo
rtunately this firm is bank
rupt and will not be deci
ding anything !": PAUSE 300: CLS
: GO TO 1090
1027 IF k=2 AND kk=1 THEN GO TO
5200
1030 PRINT: PRINT "Please decla
re your decisions on": FLASH 1:
PRINT AT 5,0: PAPER 1: INK 7: BR
IGHT 1:
": FLASH 0: PRINT AT 14,
0:"Advice": PRINT AT 17,0:" Last
year your price was ";p(k,t-1):
": PRINT " Prices averaged aro
und ";INT (p/n):" then.": PRINT
" Your price may vary between 1
and 99."
1032 GO SUB 5100
1033 IF VAL b#<1 OR VAL b#>99 TH
EN GO TO 1032
1034 LET p(k,t)=VAL b#: IF x45=1
AND p(k,t)>p(k,t-1) THEN LET p
(k,t)=p(k,t-1): LET x45=0
1035 PRINT AT 21,0: " ": LE
T p(k,t)=INT (p(k,t)*100)/100: I
F p(k,t)<1 THEN LET p(k,t)=1
1037 IF p(k,t)>99 THEN LET p(k,
t)=99
1040 PRINT AT 5,0: PAPER 2: INK

```

```

7: FLASH 1: BRIGHT 1:
PRODUCTION ": PRINT A
T 17,0: " You may make up to
";INT (c(k)/20):" this year,
or ";INT (c(k)*.075+.5):" with o
vertime.

```

```

1042 GO SUB 5100
1043 IF VAL b#>INT (c(k)*.075+.5
) THEN GO TO 1042
1045 LET q(k,t)=VAL b#: LET q(k,
t)=INT q(k,t): IF q(k,t)>1.5*c(k
) THEN LET q(k,t)=1.5*c(k)
1047 PRINT AT 21,0: " ": IF
q(k,t)<0 THEN LET q(k,t)=0
1050 FLASH 1: PRINT AT 5,0: PAPE
R 0: INK 6: BRIGHT 1:
MARKETING ": FLASH 0
: PRINT AT 17,0: " You may spend
up to #100000 on marketing. La
st year you spent #";m(k,t-1):"

```

```

1052 GO SUB 5100
1053 IF VAL b#>100000 THEN GO T
O 1052
1055 LET m(k,t)=VAL b#: LET m(k,
t)=INT m(k,t): IF m(k,t)>100000
THEN LET m(k,t)=100000
1057 PRINT AT 21,0: " ": I
F m(k,t)<0 THEN LET m(k,t)=0
1060 PRINT AT 5,0: FLASH 1: PAPE
R 4: INK 0: RESEARCH & DEVE
LOPMENT ": PRINT AT 16,0: "
Research and development lowers
costs and raises the appeal of
the product. You may spend up to
#100000. Last year you spent
#";r(k,t-1):"

```

```

1062 GO SUB 5100
1063 IF VAL b#>100000 THEN GO T
O 1062
1065 LET r(k,t)=VAL b#: LET r(k,
t)=INT r(k,t): IF r(k,t)>100000
THEN LET r(k,t)=100000
1067 PRINT AT 21,0: " ":
IF r(k,t)<0 THEN LET r(k,t)=0
1070 PRINT AT 5,0: FLASH 1: PAPE
R 5: INK 0: BRIGHT 1:
NEW EQUIPMENT ": FLASH 0
: PRINT AT 15,0: "Each #20 spent
on Repairs and Renewals will e
nable you to produce an extr
a unit of output next year. You
may spend up to #100000. Last
year you spent #";INT (i(k,t-1
)+.5)

```

```

1072 GO SUB 5100
1073 IF VAL b#>100000 THEN GO T
O 1072
1075 LET i(k,t)=VAL b#: LET i(k,
t)=INT i(k,t): IF i(k,t)>100000
THEN LET i(k,t)=100000
1077 PRINT AT 21,0: " ": IF
i(k,t)<0 THEN LET i(k,t)=0
1080 PRINT AT 5,0: FLASH 1: PAPE
R 7: INK 1: BRIGHT 1:
DIVIDENDS ": FLASH 0
: PRINT AT 17,0: "By paying di
vidends to sharehol- ders, you ma
ke your company's shares more
valuable. Last year you paid out
";d(k,t-1):"

```

```

1085 GO SUB 5100: LET d(k,t)=VAL
b#: LET d(k,t)=INT d(k,t): IF d
(k,t)>100000 THEN LET d(k,t)=10
0000
1087 IF d(k,t)<0 THEN LET d(k,t
)=0
1090 CLS: NEXT k
1100 LET st=RND: IF st>.1 THEN
GO TO 1200
1105 BORDER 2: FLASH 1: PRINT AT
5,12:"STRIKE": FLASH 0: PAUSE 2
00: CLS

```

```

1110 FOR k=1 TO n
1115 IF u(k,t-1)=0 THEN GO TO 1
195
1117 PRINT AT 1,1: "Firm ";k
1120 IF k=1 AND z#(1 TO 1)="Y" O

```

```

R z#(1 TO 1)="Y" THEN LPRINT "
Your workers threaten to strike.
Each firm must choose whether to
give in to their demands, which
would raise costs by about 20%
or suffer a considerable loss of
output - perhaps a quarter.

```

Firms may consult each other but must decide in secret. Do you concede ? (y/n)"

1125 PRINT AT 5,0: "Your workers threaten to strike. Each firm must choose whether to give in to their demands, which would raise costs by about 20% or suffer a considerable loss of output - perhaps a quarter.

Firms may consult each other but must decide in secret. Do you concede ? (y/n)"

1140 IF k=2 AND kk=1 THEN IF RND>.5 THEN LET c#="y": GO TO 1170

1145 IF k=2 AND kk=1 THEN IF RND>.5 THEN LET c#="n": GO TO 1180

1150 IF INKEY#<>" " THEN GO TO 1150

1160 LET c#=INKEY#: IF c#="" THEN N GO TO 1160

1165 IF c#(1 TO 1)="y" THEN PRINT AT 20,10: FLASH 1: PAPER 2: INK 7: "WE CONCEDE !": PAUSE 200

1170 IF c#(1 TO 1)="y" THEN LET v(k,t-1)=(1.15+RND/10)*v(k,t-1): LET v(k,t)=(1.15+RND/10)*v(k,t)

1180 IF c#<>"y" THEN LET q(k,t)=INT (q(k,t)*(0.7+RND/10))

1190 IF z#(1 TO 1)<>"Y" AND z#(1 TO 1)<>"y" THEN PAUSE 200

1195 NEXT k

1200 CLS: BORDER 7: LET q=0: LET p=0: LET pp=0: LET mm=0: LET r1=0: LET r2=0

1205 PRINT AT 14,8: "(5*isp,6*sp,5*isp)"

1206 PRINT AT 13,8: "(5*isp,6*sp,5*isp)"

1210 FOR k=1 TO n

1220 LET q=q+s(k,t-1): LET p=p+p(k,t)

1230 LET pp=pp+p(k,t-1)*s(k,t-1)

1240 LET mm=mm+m(k,t)

1250 LET mm=mm+m(k,t-1)

1260 LET r1=r1+r(k,t)

1265 LET r2=r2+r(k,t-1)

1270 NEXT k

1275 PRINT AT 12,8: "CCC(2*ig5,6*sp)CCC(2*g5)"

1280 LET pp=pp/q

1285 PRINT AT 11,11: "(2*ig5,9*sp,2*g5)"

1290 LET q=q*(1+g/100)*h1: LET h1=1

1295 LET x=0: PRINT AT 14,x: "(sp,ig7,ig3,g4)": PRINT AT 13,x: "(3*sp,g7)": INK 4: PRINT AT 13,x: "(sp,2*g3)": INK 0: LET x=x+1

1297 PAUSE 20

1300 IF m>mm THEN LET q=q*1.02: IF m>mm*1.2 THEN LET q=q*(1+RND/10)

1305 PRINT AT 14,x: "(sp,ig7,ig3,g4)": PRINT AT 13,x: "(3*sp,g7)": INK 4: PRINT AT 13,x: "(sp,2*g3)": INK 0: LET x=x+1

1307 PRINT AT 14,x: "(sp,ig7,ig3,g4)": PRINT AT 13,x: "(3*sp,g7)": INK 4: PRINT AT 13,x: "(sp,2*g3)": INK 0: LET x=x+1

1310 IF a(t)<a(t-1) THEN LET q=q*0.99

1315 PRINT AT 14,x: "(sp,ig7,ig3,g4)": PRINT AT 13,x: "(3*sp,g7)": INK 4: PRINT AT 13,x: "(sp,2*g3)": INK 0: LET x=x+1

1320 IF a(t)>a(t-1) THEN LET q=


```

q41.02
1325 PRINT AT 14,x;"(sp,ig7,ig3,
g4)": PRINT AT 13,x;"(3*sp,g7)":
INK 4: PRINT AT 13,x;"(sp,3*g3)
": INK 0: LET x=x+1
1330 IF m<mm THEN LET q=q*0.99
1335 PRINT AT 14,x;"(sp,ig7,ig3)
": PRINT AT 13,x;"": INK 4:
PRINT AT 13,x;"(sp,2*g2)": INK
0: LET x=x+1
1345 PAUSE 10: PRINT AT 14,x;"
": PRINT AT 13,x;"": INK 4
: PRINT AT 13,x;"": INK 0: LET
x=x+1: PAUSE 10
1350 LET x=0
1354 PRINT AT 10,11;"(2*g1)": PR
INT AT 10,22;"(2*g1)": PAUSE 10:
1364 PRINT AT 10,11;"": PRIN
T AT 10,22;"": PAUSE 10:
1400 FOR k=1 TO n
1410 LET p1=(.1+pp)/(p(k,t-1)*n+
.1)*0.2+(.1+.4*p(k,t-1))/(.1+p(k
,t))+(.1+.4*p)/(.1+p(k,t)*n))
1430 LET m2=(mm+.1)/(m(k,t-1)*n+
.1)*0.15+(.0.3*m(k,t-1)+.1)/(m(k
,t)+.0.1)+(0.55*mm+.1)/(m(k,t)*n+.1
)
1450 LET r3=(r2+1)/(r(k,t-1)*n+1
)*0.4+(0.1*r(k,t-1)+1)/(r(k,t)+1
)+(0.5*r1+1)/(r(k,t)*n+1)
1455 IF p(k,t)>1.26*p(k,t-1) THE
N LET p1=0.5*p1: IF p(k,t)>3*p(
k,t-1) THEN LET p1=0.2*p1: LET
m2=10*m2
1460 LET z(k,t)=p1*f3+f2/m2+f1/r
3
1461 IF r(k,t-1)>1.5*r2/n THEN
LET z(k,t)=2*z(k,t)
1462 IF u(k,t-1)=0 THEN LET z(k
,t)=0: LET u(k,t)=0
1463 IF p(k,t)>1.15*p/n THEN LE
T z(k,t)=0.75*z(k,t): IF p(k,t)>
1.55*p/n THEN LET z(k,t)=0.25*z
(k,t)
1464 IF p(k,t)<.89*p/n THEN LET
z(k,t)=1.5*z(k,t)
1465 IF p(k,t)>p(k,t-1)*1.21 THE
N LET z(k,t)=0.75*z(k,t)
1470 NEXT k
1471 PRINT AT 10,11;"(2*g1)": PR
INT AT 10,22;"(2*g1)": PAUSE 10:
1475 LET z=0
1480 FOR k=1 TO n: LET z=z+z(k,t
): NEXT k
1488 PRINT AT 10,11;"": PRIN
T AT 10,22;"": PAUSE 10:
1500 FOR k=1 TO n
1510 LET s(k,t)=q*z(k,t)/z
1520 IF s(k,t)>q(k,t)+k(k) THEN
LET s(k,t)=q(k,t)+k(k)
1530 IF s(k,t)>s(k,t-1)*3.65 THE
N LET s(k,t)=s(k,t-1)*3.65
1540 LET k(k)=q(k,t)-s(k,t)+k(k)
1545 LET f(k,t)=f(k,t-1)*(1+v/10
0): LET v(k,t)=v(k,t-1)*(1+v/100
)
1550 LET h(k,t)=f(k,t)+q(k,t)*v(
k,t): IF q(k,t)>c(k)/20 THEN LE
T h(k,t)=h(k,t)+(q(k,t)-c(k)/20)
*v(k,t)/3+f(k,t)/15
1555 LET b(k,t)=b(k,t-1): IF q(k
,t)>c(k)/20 THEN LET b(k,t)=b(k
,t)*1.2
1560 NEXT k
1564 PRINT AT 10,11;"(2*g1)": PR
INT AT 10,22;"(2*g1)": PAUSE 10:
1566 PRINT AT 10,11;"": PRIN
T AT 10,22;"": PAUSE 10:
1570 LET i=0
1580 FOR k=1 TO n: LET i=i+i(k,t
): NEXT k
1590 IF i>a(t) THEN GO TO 1650
1600 FOR k=1 TO n
1610 LET c(k)=c(k)+i(k,t)
1620 LET i(k,t)=INT (h20*i(k,t)+
.5)
1630 NEXT k: GO TO 1700
1650 IF i>a(t) THEN GO TO 1670
1660 FOR k=1 TO n: LET c(k)=c(k)
+i(k,t)

```

```

1665 GO TO 1700
1670 LET f4=i/a(t): FOR k=1 TO n
1672 IF i(k,t)=i/n THEN LET c(
k)=c(k)+INT (i(k,t)/f4): LET i(k
,t)=i(k,t)/f4*h19
1675 IF i(k,t)>i/n THEN LET c(k
)=c(k)+i(k,t): LET i(k,t)=i(k,t)
*h19
1678 NEXT k
1680 BORDER 2: INK 1: PAPER 5: F
LASH 1: PRINT AT 2,10;"Newsflash
!": FLASH 0: PRINT AT 6,0;" Cap
ital industries working
overtime.
1690 PAUSE 120: BORDER 7: PAPER
7: CLS: INK 0
1695 IF z#(1 TO 1)="Y" OR z#(1 T
O 1)="y" THEN LPRINT "
Newsflash! Capita
l industries working
overtime"
1800 FOR k=1 TO n
1810 LET g(k,t)=INT (s(k,t)*p(k
,t)-h(k,t)-r(k,t)-i(k,t)-m(k,t)+0
.5)
1820 IF i(k,t)>i/n THEN LET b(k
,t)=.95*b(k,t)
1830 IF i(k,t)<i/n THEN LET b(k
,t)=1.05*b(k,t)
1840 IF r(k,t)*n>r1 THEN LET b(
k,t)=.97*b(k,t)
1850 IF r(k,t-1)*n>r2 THEN LET
b(k,t)=.985*b(k,t)
1860 IF r(k,t)<r1/n THEN LET b(
k,t)=1.02*b(k,t)
1870 LET o(k,t)=INT (c(k)*b(k,t)
+0.5)
1875 LET c(k)=INT (c(k)-o(k,t))
1880 IF e(k)<0 THEN LET w(k,t)=
INT (0.5+e(k)*-r/100)
1890 IF e(k)>5000 THEN LET w(k
,t)=(4-r)/100*(e(k)-5000)
1900 LET tx=tr*(g(k,t)-o(k,t)-w(
k,t))
1910 IF tx>0 THEN LET t(k)=tx
1920 IF tx<t(k) AND t(k)<0 THEN
LET t(k)=0
1930 IF tx<0 AND t(k)>0 THEN IF
t(k)<-tx THEN LET t(k)=-t(k)
1940 IF tx<0 AND t(k)>0 THEN IF
t(k)>-tx THEN LET t(k)=tx/tr
1950 LET n(k,t)=INT (g(k,t)-o(k
,t)-w(k,t)-t(k)+0.5)
1960 LET e(k)=INT (0.5+e(k)+n(k
,t)+o(k,t)-d(k,t))
1975 LET u(k,t)=e(k)+INT k(k)*3+
c(k)
2005 IF u(k,t)>960000 THEN GO T
O 2130
2015 IF u(k,t)<0 THEN LET u(k,t
)=0
2020 NEXT k: IF i>a(t) THEN GO
TO 2038
2022 PRINT AT 14,8;"(5*g8,6*sp,5
*g8)"
2024 PRINT AT 13,8;"(5*g8,6*sp,5
*g8)"
2026 PRINT AT 12,8;"CCC(2*ig5,6*
sp)CCC(2*ig5)"
2028 PRINT AT 11,11;"(2*ig5,9*sp
,2*ig5)"
2030 PRINT AT 10,11;"(2*ig1)": P
RINT AT 10,22;"(2*ig1)": PAUSE 1
0:
2032 PAUSE 5: PRINT AT 10,11;"
": PRINT AT 10,22;"": PAUS
E 10: LET x=25
2033 PRINT AT 14,x;"(sp,ig7,ig3,
g4)": PRINT AT 13,x;"(3*sp,g7)":
INK 6: PRINT AT 13,x;"(sp,2*g3)
": INK 0: LET x=x+1
2034 PRINT AT 14,x;"(sp,ig7,ig3,
g4)": PRINT AT 13,x;"(3*sp,g7)":
INK 6: PRINT AT 13,x;"(sp,2*g3)
": INK 0: LET x=x+1
2035 PRINT AT 14,x;"(sp,ig7,ig3,
g4)": PRINT AT 13,x;"(3*sp,g7)":
INK 6: PRINT AT 13,x;"(sp,2*g3)
": INK 0: LET x=x+1
2037 PRINT AT 14,x;"(sp,ig7,ig3,

```

```

g4)": PRINT AT 13,x;"(3*sp,g7)":
INK 6: PRINT AT 13,x;"(sp,2*g3)
": INK 0: PAUSE 50: CLS
2038 LET yyy=1: PLOT 0,10: DRAW
255,0: PLOT 50,0: DRAW 0,175
2040 FOR k=1 TO n: IF u(k,t)>500
000 THEN LET yyy=0.5
2050 NEXT k
2060 PRINT AT 0,8;"Asset Values
- Year":t
2070 PRINT AT 1,0;"1000s"
2080 PRINT AT 21,27;"Firm"
2090 IF yyy=1 THEN PRINT AT 10,
1;"250"
2095 IF yyy=0.5 THEN PRINT AT 1
5,1;"250"
2100 FOR k=1 TO n
2105 IF u(k,t)>960000 THEN GO T
O 2130
2110 INK k: FOR y=1 TO 24: PLOT
55+y+(24*(k-1)),10: DRAW 0,u(k,t
)*0.00033*yyy: NEXT y
2115 IF n=1 THEN INK 2: FOR y=1
TO 24: PLOT 55+y+24,10: DRAW 0,
u(k,t-1)*0.00033: NEXT y: INK 0:
PRINT AT 21,10;"(Year":t-1;)"
2120 INK 0: PRINT AT 21,5+(k*3);
k
2130 NEXT k
2138 BEEP .15,4: BEEP .15,6: BEE
P .15,7: BEEP .15,4: BEEP .15,6:
BEEP .15,7: PAUSE 15
2140 BEEP .15,6: BEEP .15,4: BEE
P .15,6: BEEP .15,7: PAUSE 15
2142 BEEP .15,6: BEEP .15,4: BEE
P .15,7: BEEP .15,7: BEEP .3,4
2144 BEEP .15,12: BEEP .15,11: B
EEP .15,12: BEEP .15,11: BEEP .1
5,4: BEEP .6,9: PAUSE 15
2146 BEEP .3,7: BEEP .3,6: BEEP
.15,4: BEEP .15,6: BEEP .15,7: B
EEP .15,4: BEEP .15,6: BEEP .5,7
: PAUSE 15: BEEP .15,6: BEEP .15
,4: BEEP .15,7: BEEP .5,7: BEEP
.6,4
2148 PAUSE 200: CLS
2150 LET to=0
2160 LET an=0
2170 FOR k=1 TO n: LET to=to+s(k
,t): NEXT k
2180 FOR k=1 TO n
2190 LET an=an+s(k,t)/to*2*PI
2195 IF s(k,t)=0 THEN NEXT k
2197 IF u(k,t)=0 THEN NEXT k
2200 PLOT 127,86: DRAW 80*COS an
,80*SIN an
2202 IF COS an>0 AND SIN an<=0.
5 AND SIN an>0 THEN LET an1=2:
LET an2=-1
2203 IF COS an>0 AND SIN an>0.5
THEN LET an1=2: LET an2=2
2204 IF COS an<0 AND SIN an>0.5
THEN LET an1=-1: LET an2=2
2205 IF COS an<0 AND SIN an<=0.5
AND SIN an>0 THEN LET an1=-1:
LET an2=2
2206 IF COS an<=0 AND SIN an<=0
AND SIN an>=-0.5 THEN LET an1=-
2: LET an2=1

```

continued on page 78




```

2207 IF COS an<=0 AND SIN an<=0.
5 THEN LET an1=-2: LET an2=-2
2208 IF COS an>0 AND SIN an<=0.5
THEN LET an1=-1: LET an2=-2
2209 IF COS an>0 AND SIN an>=0.
5 AND SIN an<=0 THEN LET an1=2:
LET an2=-2
2210 IF INT (21-(86+80*SIN an)/8
+an1)<1 THEN LET an1=2
2212 IF INT (21-(86+80*SIN an)/8
+an1)>=20 THEN LET an1=-3
2220 PRINT AT INT (21-(82+80*SIN
an)/8+an1),INT ((131+80*COS an)
/8)+an2;k
2245 NEXT k
2250 CIRCLE 127,86,80
2255 PRINT AT 0,6;"Sales Units -
Year ";t
2260 PAUSE 450: CLS
3000 GO TO 500
4000 CLS : PRINT AT 2,11;"IMPORT
S !"
4005 LET h1=1-RND/10
4007 IF z$="y" THEN LPRINT " H
igh profits in the industry h
ave attracted foreign comp- e
tition,which is expected to t
ake ";INT ((1-h1)*100);"% of the
market. (91 * sp)
"
4010 PRINT AT 5,0;" High profit
s in the industry have attrac
ted foreign comp- etition,whi
ch is expected to take ";INT
((1-h1)*100);"% of the market."
4020 PRINT AT 18,0;"(5*q8)": PRI
NT AT 19,0;"(5*q8)": INK 5: PRIN
T AT 19,5;"(27*q8)"
4030 INK 1: LET x=15
4040 PRINT AT 18,x;"A(4*q8,q1,q3
)B"
4050 PRINT AT 17,x;"(3*sp,ig4,q2
,2*sp)"
4055 INK 6: PRINT AT 17,x+1;" "
": INK 1
4060 PAUSE 10: LET x=x-1
4070 IF x>4 THEN GO TO 4040
4075 BEEP 1.5,-30: PRINT AT 17,x
+1;" ": PAUSE 20: INK 6: PRIN
T AT 17,1;"(3*q8)": PRINT AT 16,
2;"(q8,q3)": INK 0: PAUSE 95
4080 RETURN
4500 CLS : PRINT AT 6,11;"TAXES
UP !"
4510 LET tr=tr+0.05
4520 PRINT AT 8,0;"
The Government announces that
everyone is spending too much.
It is therefore raising taxes
by five percentage points to
";tr*100;"% ."
4525 LPRINT "The Government anno
unces that everyone is spendin
g too much. It is therefore rai
sing taxes by five percentage
points to ";tr*100;"% ."
"
4530 IF tr>.45 THEN PRINT AT 12
,4;"again ."
4540 FOR x=1 TO 32: PRINT AT 0,x
-1;"#": PAUSE 2: NEXT x: FOR x=1
TO 21: PRINT AT x-1,31;" ": PR
INT AT x,31;"#": BEEP .1,10-x: N
EXT x
4550 RETURN
5000 CLS : PRINT AT 5,0;"
Profits in the industry have
caused concern and you have
been referred to the Monopolies
Commission. You may not raise
your price next year."
5010 LPRINT "Profits in the indu
stry have caused concern and
you have been referred to th
e Monopolies Commission. You may
not raise your price next yea
r."
5020 PAUSE 550: LET x=45:1
5030 RETURN
5100 LET b$=""

```

```

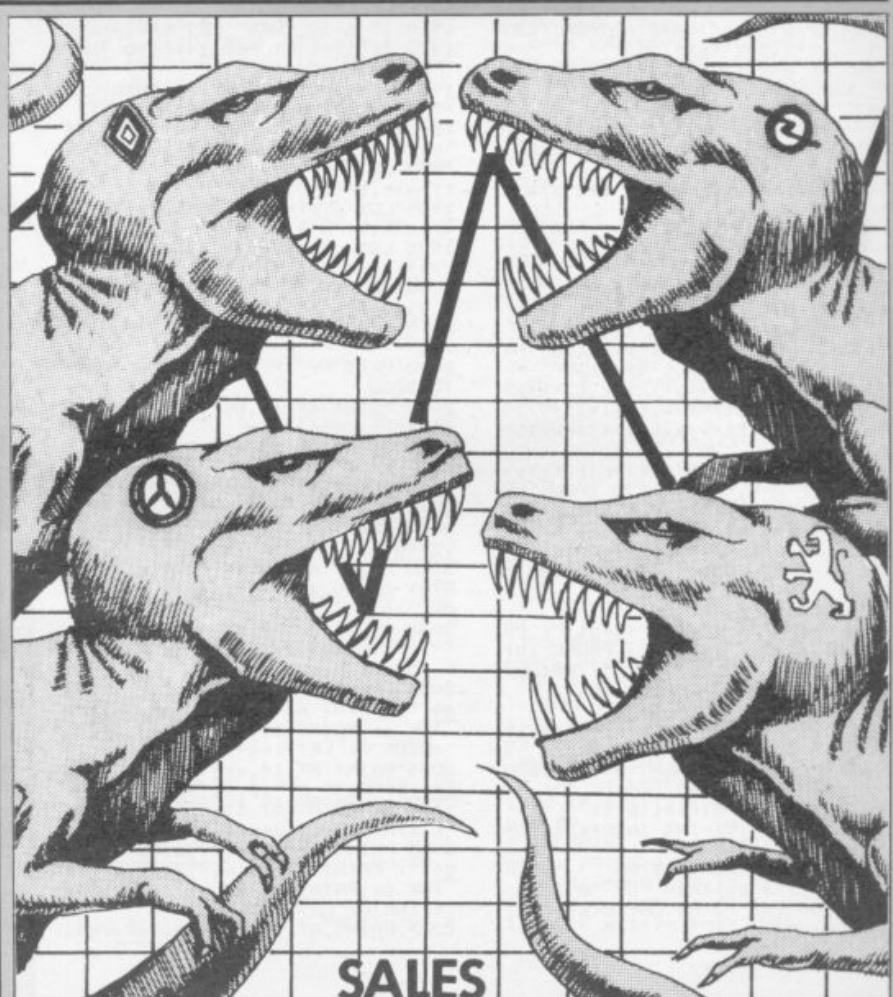
5105 IF INKEY#<>"" THEN GO TO 5
105
5110 LET a$=INKEY#: IF a$="" THE
N GO TO 5110
5115 IF CODE a$=13 AND b$<>"" TH
EN RETURN
5120 IF CODE a$>57 OR CODE a$<48
AND CODE a$<46 THEN BEEP 1,10
: PRINT AT 21,0;" ": GO
TO 5100
5125 LET b$=b$a$: BEEP .01,.01:
PRINT AT 21,LEN b$;"*"
5130 GO TO 5105
5202 LET p(k,t)=p(k,t-1)
5204 LET dif=p(k,t)-p(1,t-1)
5206 LET p(k,t)=p(k,t)-dif*RND
5208 LET p(k,t)=INT (p(k,t)*(1+R
ND/5-RND/5)): IF e(k)<0 AND RND>
.3 THEN LET p(k,t)=p(k,t)+1
5210 LET q(k,t)=INT (c(k)/20)
5215 IF k(k)>0 AND p(k,t)>=p(k,t
-1) THEN LET q(k,t)=q(k,t)-INT
(k(k)*RND*1.25)
5220 IF k(k)<c(k)/100 AND RND>.9
THEN LET q(k,t)=INT (c(k)*1.5/
20)
5222 IF p(k,t)<5 THEN LET p(k,t
)=5+INT (RND*5)
5224 IF p(k,t)>80 THEN LET p(k,
t)=p(k,t)-INT (RND*25)
5230 LET m(k,t)=m(k,t-1)
5235 IF m(1,t-1)>m(k,t) THEN LE
T m(k,t)=m(k,t)*(1+RND/2)
5240 IF m(k,t)>1.8*m(1,t-1) THEN
LET m(k,t)=m(1,t-1)*(1+RND)
5245 IF m(k,t)<2000 THEN LET m(
k,t)=3000+INT (RND*3000)
5248 LET m(k,t)=INT m(k,t)
5250 IF m(k,t)>100000 THEN LET
m(k,t)=INT (m(k,t)-RND*20000)

```

```

5255 LET r(k,t)=r(k,t-1)
5260 LET r(k,t)=INT (r(k,t)*(1+R
ND+RND-RND))
5265 IF r(k,t)<1000 THEN LET r(
k,t)=1000+INT (RND*2500)
5267 IF r(k,t)>r(1,t)*2 THEN LE
T r(k,t)=INT (r(k,t)/(1+RND)): I
F r(k,t)>100000 THEN LET r(k,t)
=INT (r(k,t)-(RND*40000))
5270 IF s(k,t-1)>=.95*q(k,t-1) T
HEN LET i(k,t)=c(k)/20*(1+RND*1
.5-RND)
5272 IF s(k,t-1)<.95*q(k,t-1) TH
EN LET i(k,t)=c(k)/20*(1-RND*1.
5+RND)
5275 IF s(k,t-1)<.55*q(k,t-1) TH
EN LET i(k,t)=c(k)/40*(1-RND*.1
+RND*.1)
5280 LET i(k,t)=INT i(k,t): IF i
(k,t)<1000 THEN LET i(k,t)=INT
(1000+1000*RND)
5285 IF i(k,t)>15000 THEN LET i
(k,t)=INT (20000-RND*10000)
5290 IF e(k)<-3000 THEN IF m(k,
t)>11000 THEN LET m(k,t)=m(k,t)
-1580
5295 IF e(k)<-3000 THEN IF r(k,
t)>8000 THEN LET r(k,t)=r(k,t)-
1870
5300 IF e(k)<-2000 THEN IF i(k,
t)>6000 THEN LET i(k,t)=i(k,t)-
2340
5400 GO TO 1090
9940 BORDER 0: PAPER 0: INK 7: C
LS
9942 PRINT AT 0,11; PAPER 2: INK
7; BRIGHT 1;"OLIGOPOLY"
9948 PRINT AT 5,7; BRIGHT 1: 1
983 N.Holgate."
9970 RETURN

```





SPARX

YOUR SPECTRUM processor is being attacked by the Sparx and you have to electrify the wires to give them a deadly electric shock. Extra points are gained for each phase completed and the game ends when a Sparx reaches the chip.

Sparx was written for the 16K Spectrum by Jonathan Currey, London SE12.

```

5 LET hs=0
10 INK 6: PAPER 0: BORDER 0: C
LS
15 GO TO 1000
20 RESTORE 21: FOR i=USR "a"
TO USR "c"+7: READ j: POKE i,j:
NEXT i
21 DATA 0,0,0,255,255,0,0,0,6,
30,126,254,126,30,6,0,153,90,24,
255,255,24,90,153
23 IF INKEY# <> "" THEN GO
TO 22
24 FOR i=1 TO 6: PRINT INK i:
AT 21,5:"Press Any Key To Play"

25 FOR j=1 TO 20: IF INKEY#
<> "" THEN CLS : GO TO 30
26 NEXT j
27 NEXT i: GO TO 24
30 LET sc=0: LET max=100: LET
x=4
34 LET lev=3
35 DIM e(lev,2)
37 FOR i=1 TO lev
38 LET e(i,1)=4+(INT (RND *8
)*2): LET e(i,2)=INT (RND *3)+
1
39 NEXT i
40 PRINT AT 0,0: PAPER 5:"

41 PRINT AT 0,0: INK 0: PAPER
5:"Time:";max; AT 0,18:"Score:"

```

```

;sc: PRINT AT 21,0: BRIGHT 1:"H
igh-score:";hs
50 FOR i=2 TO 20: PRINT PAPER
lev; BRIGHT 1: AT i,20:"
": NEXT i
51 FOR i=4 TO 18 STEP 2: PRINT
INK 7: AT i,0:"AAAAAAAAAAAAAA
AAAA": NEXT i
52 INK 7: PAPER lev: BRIGHT 1:
PRINT AT 5,24:"Z": AT 9,24:"8"
; AT 13,24:"0": AT 17,24:"A": IN
K 6: PAPER 0: BRIGHT 0
60 FOR t=max TO 0 STEP -1
65 BEEP .01,-20
70 PRINT AT x,20: BRIGHT 1: P
APER lev;"
71 PRINT PAPER 5: INK 0: AT 0
,5;t;"
75 IF IN 64510 <> 255 AND IN
64510 <> 191 THEN IF x>4 THEN
LET x=x-2
80 IF IN 65022 <> 255 AND IN
65022 <> 191 THEN IF x<18 THEN
LET x=x+2
85 PRINT AT x,20: BRIGHT 1: P
APER lev; INK 7:"B"
86 IF INKEY#="h" THEN GO TO
230
90 IF IN 32766 <> 255 AND IN
32766 <> 191 THEN GO TO 300
105 FOR i=1 TO lev: LET e(i,2)=
e(i,2)+1
110 PRINT AT e(i,1),e(i,2)-1;

```

```

INK 7;"A"; BRIGHT 1: INK 6;"C"

111 IF e(i,2)=20 THEN GO TO 50
0
112 NEXT i
200 NEXT t
201 FOR j=1 TO 5: FOR i=7 TO 0
STEP -1: BORDER i: PRINT AT 1,8
; INK i:"PHASE COMPLETED": BEEP
.01,20-i: NEXT i: NEXT j
210 LET lev=lev-1: IF lev=0 THE
N LET lev=3: LET max=max+50: IF
max>500 THEN LET max=100
220 GO TO 35
230 IF INKEY# <> "" THEN GO
TO 230
231 IF INKEY#="" THEN GO TO
231
232 GO TO 90
250 STOP
300 FOR i=1 TO lev
310 IF e(i,1)=x THEN GO SUB 35
0
315 NEXT i
320 FOR i=1 TO 5
325 PRINT AT x,0: INVERSE 1: I
NK 1+i:"AAAAAAAAAAAAAAAAAAAA": B
EEP .003,17+i: PRINT AT x,0: IN
VERSE 0: INK 7:"AAAAAAAAAAAAAAAA
AAAA": NEXT i
326 PRINT AT 0,24: INK 0: PAPER
5;sc;"
330 GO TO 100
350 LET sc=sc+INT (INT (20-e(
i,2))*5)*(4-lev)
351 LET e(i,1)=4+(INT (RND *8
)*2): LET e(i,2)=INT (RND *3)+
1: RETURN
500 FOR i=7 TO 0 STEP -1: BORDE
R i: BEEP .01,i: NEXT i
510 FOR i=1 TO 250: NEXT i
515 FOR i=1 TO 20: PRINT AT i,
0: INK lev+3:"*****
*****": NEXT i
516 PRINT AT 10,8: INVERSE 1;"
G A M E O V E R"
520 IF sc>hs THEN PRINT AT 0,
24: FLASH 1;sc: PRINT AT 15,8:
INVERSE 1: FLASH 1:"A New High-S
core": LET hs=sc
530 PRINT AT 20,0: PAPER 1: IN
K 7:"- Press Any Key To Play Ag
ain. -": IF INKEY# <> "" THEN
GO TO 530
540 IF INKEY#="" THEN GO TO
540
550 CLS : GO TO 30
1000 CLS : PRINT AT 0,13: INK 7
; BRIGHT 1:"SPARX!"
1010 PRINT AT 3,3:"The evil Spa
rx are attacking"
1011 PRINT "your Spectrum's Z80
processor"
1012 PRINT "along its incoming w
ires."
1013 INK 5: PRINT " Your only
defence is the"
1014 PRINT "ability to electrify
the wires"
1015 PRINT "which kills the Spar
x on them."
1016 INK 3: PRINT " If a Spar
x reaches the chip"
1017 PRINT "you have lost."
1018 PRINT : INK 4
1019 PRINT "You:"; INK 7;".....
B"
1020 PRINT "Sparx:"; INK 7;"....
C"
1021 PRINT "Wire:"; INK 7;".....
A"
1024 PRINT : INK 5
1025 PRINT "KEYS:": INK 7
1026 PRINT " D=Move Up."
1027 PRINT " A=Move Down."
1028 PRINT " B=Electrify Wire
."
1029 INK 6: GO TO 20
8999 STOP
9000 SAVE "SPARX" LINE 5: VERIFY
"SPARX": RUN


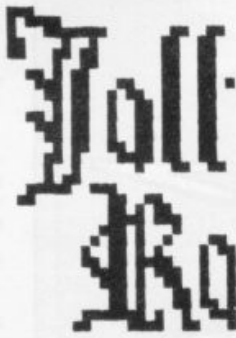
```


JOLLY

```

1 REM "ROGER"
5 LET TR=1000
6 LET TI=100
7 LET CR=10
8 LET LI=3
X 10 PRINT AT 0,4;"

```

```

11 PRINT AT 20,5;"WHAT MIGHT Y
OUR NAME BE?"
12 INPUT N$
15 CLS
X 16 LET S$="

```





```

X 18 LET Q$="

```

```

20 PRINT P$
22 PRINT AT 5,10;"WELCOME ABOARD";
AT 6,10;"CAPTAIN";N$
23 FOR X=1 TO 50
24 NEXT X
25 PRINT AT 21,3;"-"
26 FOR X=1 TO 50
27 NEXT X
28 PRINT AT 13,0;"IF I SIGHT A
SHIP, YOU CAN EITHER SAIL ON (S) OR
ATTACK IT (A) WITH YOUR CANNON.
IF YOU LOSE,
YOU LOSE ALL YOUR TREASURE, AND
VERY LIKELY A LEG OR SOMETHING."
29 PRINT AT 21,8;"PRESS A KEY."
30 IF INKEY$="" THEN GOTO 30
32 PRINT AT 13,0;"IF YOU SAIL
TO TREASURE ISLAND, YOU CAN BURY
YOUR BOOTY THERE, AND IT WILL

```

YOU ARE captain of a pirate ship and you have to sail to the treasure island to bury your booty. At the start of the voyage you have 1,000 doubloons and 10 cut-throats as crew. Extra crew members can be



ROGER

gained when you attack other ships but you can also have a run of bad luck and lose your treasure — or an eye or a leg.

Jolly Roger was written for the 16K ZX-81 by Ron Wood, of Weston-super-Mare, Avon.



BE SAFE.
T, YOU HAVE
NS ABOARD, AND
CUTTHROATS AS CREW

AT THE MOMEN
1000 DOUBLOO
10 UNSAVOURY
PRESS ""S""

TO WEIGH ANCHOR"
33 PRINT ""

```

35 IF INKEY$<>"S" THEN GOTO 35
36 IF INKEY$="S" THEN GOTO 40
40 CLS
42 PRINT P$
45 LET W=INT (RND*5)+1
50 IF W=1 THEN PRINT AT 7,10;"
SHIP AHOY CAP""N ";N$
55 IF W=1 THEN GOTO 150
60 IF W=2 THEN PRINT AT 7,10;"
PIECES OF EIGHT"
70 IF W=3 THEN PRINT AT 7,10;"
SHIVER ME TIMBERS"
80 IF W=4 THEN PRINT AT 7,10;"
SPlice THE MAINBRACE"
90 IF W=5 THEN PRINT AT 7,10;"
PRETTY ";N$
92 PRINT AT 15,7;"PRESS""S""TO
SAIL ON..."
95 IF W<>1 THEN GOTO 35
150 PRINT AT 15,0;"WHAT NOW,CAP
""N ";N$;"?";AT 16,0;"DO W
E SAIL ON,(S),OR ATTACK,(A)?"
155 INPUT D$
157 IF D$="A" THEN GOTO 200
159 IF D$="S" THEN GOTO 5900
160 IF D$<>"A" AND D$<>"S" THEN
GOTO 155
199 REM TELESCOPE
200 FOR B=0 TO 20
205 PRINT AT B,0;"
207 NEXT B
208 PRINT AT 0,7;"THERE SHE BE,
CAP N"
210 PRINT AT 3,13;"
220 PRINT AT 4,11;"
225 PRINT AT 5,10;"
230 PRINT AT 6,9;"
235 PRINT AT 7,9;"
240 PRINT AT 8,9;"
245 PRINT AT 9,9;"
250 PRINT AT 10,9;"
255 PRINT AT 11,9;"
260 PRINT AT 12,9;"
265 PRINT AT 13,9;"
270 PRINT AT 14,10;"
275 PRINT AT 15,11;"
280 PRINT AT 16,12;"
285 PRINT AT 17,15;"
290 PRINT AT 19,0;"WILL YOU FIR
E(F),OR SAIL AWAY(S)"
300 INPUT C$
305 IF C$="F" THEN GOTO 320
310 IF C$="S" THEN GOTO 40
315 IF C$<>"F" AND C$<>"S" THEN
GOTO 300
320 REM CANNON
321 CLS

```



```

325 LET D=INT (RND*5)+1
327 FOR C=0 TO 3
328 CLS
331 PRINT P$
332 PRINT AT 17,3;"
335 PRINT AT 7,10;"PRESS ""F""
TO FIRE,";AT 8,10;"CAP""N ";N$
340 IF INKEY$="F" THEN GOTO 350
345 IF INKEY$<>"F" THEN GOTO 34
5
350 PRINT AT 17,16;"
;AT 18,16;"
;AT 19,1
6
351 FOR X=1 TO 20
352 NEXT X
355 PRINT AT 17,16;"
;AT 18,16;"
;AT 19,1
6
370 IF C=3 AND C>=D THEN GOTO 3
375 IF C=3 AND C<D THEN GOTO 40
0
377 NEXT C
380 LET TR=TR+500
382 LET CR=CR+D
383 IF CR>20 THEN GOTO 7000
385 CLS
386 PRINT P$
387 PRINT
388 PRINT "WELL DONE,CAP""N ";N
$
390 PRINT "YOU SANK HER,AND ";D
; "OF HER CREW JOINED YOURS."
392 PRINT "YOU NOW HAVE ";TR;"
DOUBLOONS"
395 PRINT "ON BOARD.PRESS ""S""
TO SAIL ON"
396 IF INKEY$<>"S" THEN GOTO 39
6
397 IF INKEY$="S" THEN GOTO 40
400 CLS
401 LET LI=LI-1
405 LET CR=CR-2
425 PRINT AT 0,5;S$
430 PRINT
435 IF LI=2 THEN PRINT "THEY BE
AT US,CAP""N PEG-LE
G ";N$
440 IF LI=1 THEN PRINT "YOU CAN
""T WIN THEM ALL, CAP""N PEG-
LEG DEAD EYE ";N$
445 IF LI=0 THEN PRINT "NOT YOU
RDAY,IS IT, CAP""N PEG-LEG DEAD
EYE ";N$;"THE ONE-HANDED?"
450 PRINT
451 IF LI>0 THEN GOTO 455
452 PRINT "THEY TOOK ALL YOUR T
REASURE"
453 PAUSE 100
454 GOTO 9000
455 PRINT "THEY TOOK ALL YOUR T
REASURE. PRESS ""S"" TO SAIL
ON"
460 IF INKEY$<>"S" THEN GOTO 46
0
465 IF INKEY$="S" THEN GOTO 40
5900 CLS
5905 PRINT AT 0,5;0$
5910 PRINT AT 10,0;"DO WE SAIL T
O TREASURE ISLAND CAP""N ";N$;
""? (Y/N)"
5915 INPUT A$
5920 IF A$="Y" THEN GOTO 5940
5925 IF A$="N" THEN GOTO 40
5930 IF A$<>"Y" AND A$<>"N" THEN
GOTO 5915
5940 IF CR>10 THEN GOTO 5999
5950 IF CR<=10 THEN PRINT "YOU D
ON""T HAVE ENOUGH CREW FOR THE
VOYAGE,CAP""N ";N$
5955 PRINT "PRESS ""S"" TO SAIL
ON"
5960 IF INKEY$<>"S" THEN GOTO 59
60
5965 IF INKEY$="S" THEN GOTO 40
5999 CLS

```

```
6000 PRINT AT 3,6;"
```

```
6005 PRINT "
```

```

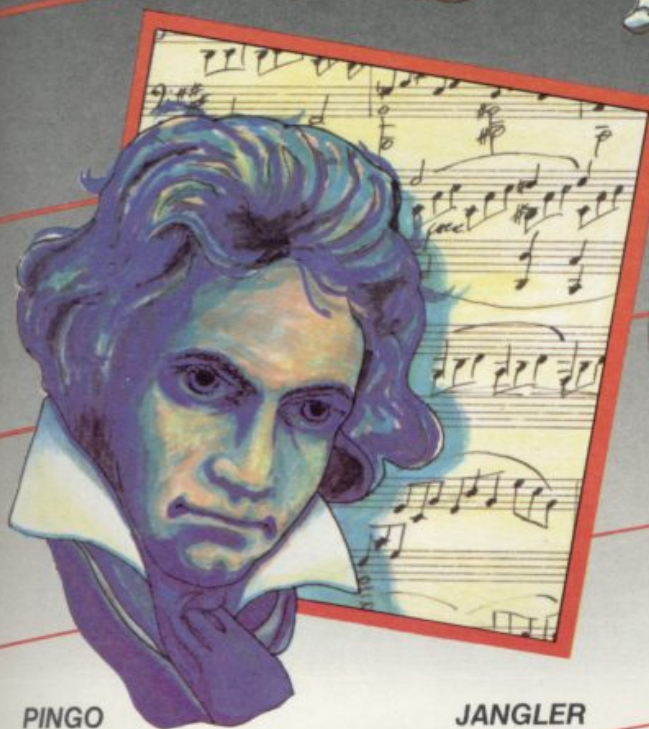
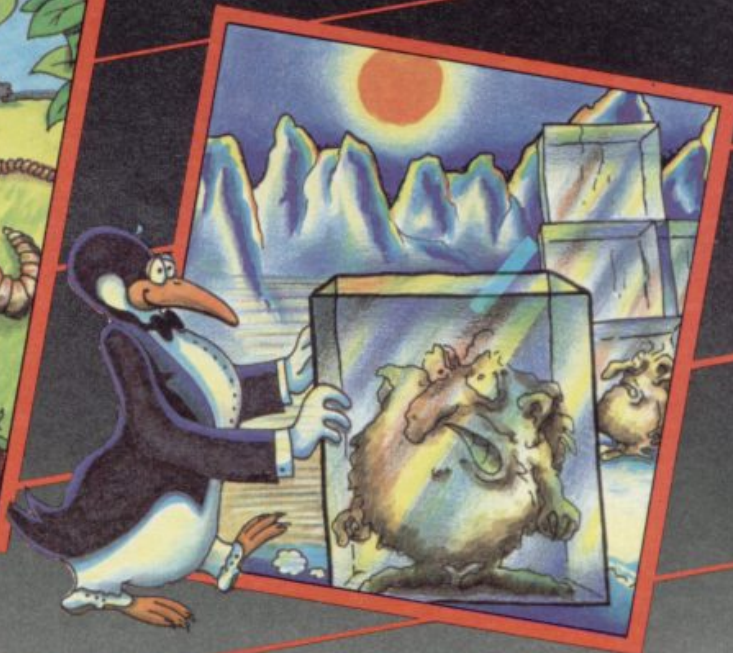
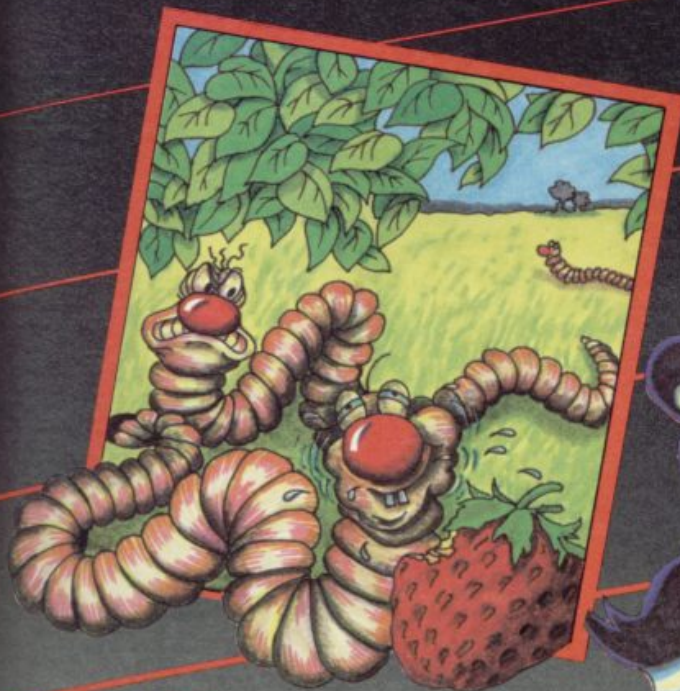
6007 LET TI=TI+TR
6008 LET TR=0
6010 PRINT AT 10,15;"YOU NOW HAV
E";AT 11,15;TI;" DOUBLOONS";AT 1
2,15;"SAFELY BURIED.";AT 13,14;"
WILL YOU RETIRE(R)";AT 14,15;"OR
SAIL ON(S)?"
6015 INPUT A$
6020 IF A$="S" THEN GOTO 40
6025 IF A$="R" THEN GOTO 9000
6030 IF A$<>"S" AND A$<>"R" THEN
GOTO 6015
7000 CLS
7001 PRINT "I""M AS SICK AS A PI
RATE.."
7005 PRINT AT 2,5;S$
7010 PRINT
7015 PRINT (CR-10);" OF YOUR CRE
W HAVE DIED"
7020 PRINT "OF THE DREADED YELLO
W JACK... YOU ONLY HAVE TEN LE
FT. HOW SAD.PRESS ""S"" TO SAIL
ON"
7025 IF INKEY$<>"S" THEN GOTO 70
25
7030 IF INKEY$="S" THEN GOTO 40
9000 CLS
9001 LET K=INT (RND*5)+1
9002 IF K=1 THEN LET L$="LATIN"
9003 IF K=2 THEN LET L$="GREEK"
9004 IF K=3 THEN LET L$="URDU"
9005 IF K=4 THEN LET L$="ESKIMO"
9006 IF K=5 THEN LET L$="SERBO-C
ROAT"
9017 PRINT AT 0,5;P$
9018 PRINT
9019 PRINT "RETIREMENT SEEMS A G
OOD IDEA, CAP""N ";N$
9020 PRINT "WITH ";TI;" DOUBLOON
S"
9025 PRINT "YOU CAN AFFORD TO SP
END YOUR DAYS IN IDLE LUXURY,
TEACHING ME TO SPEAK ";L$

```



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

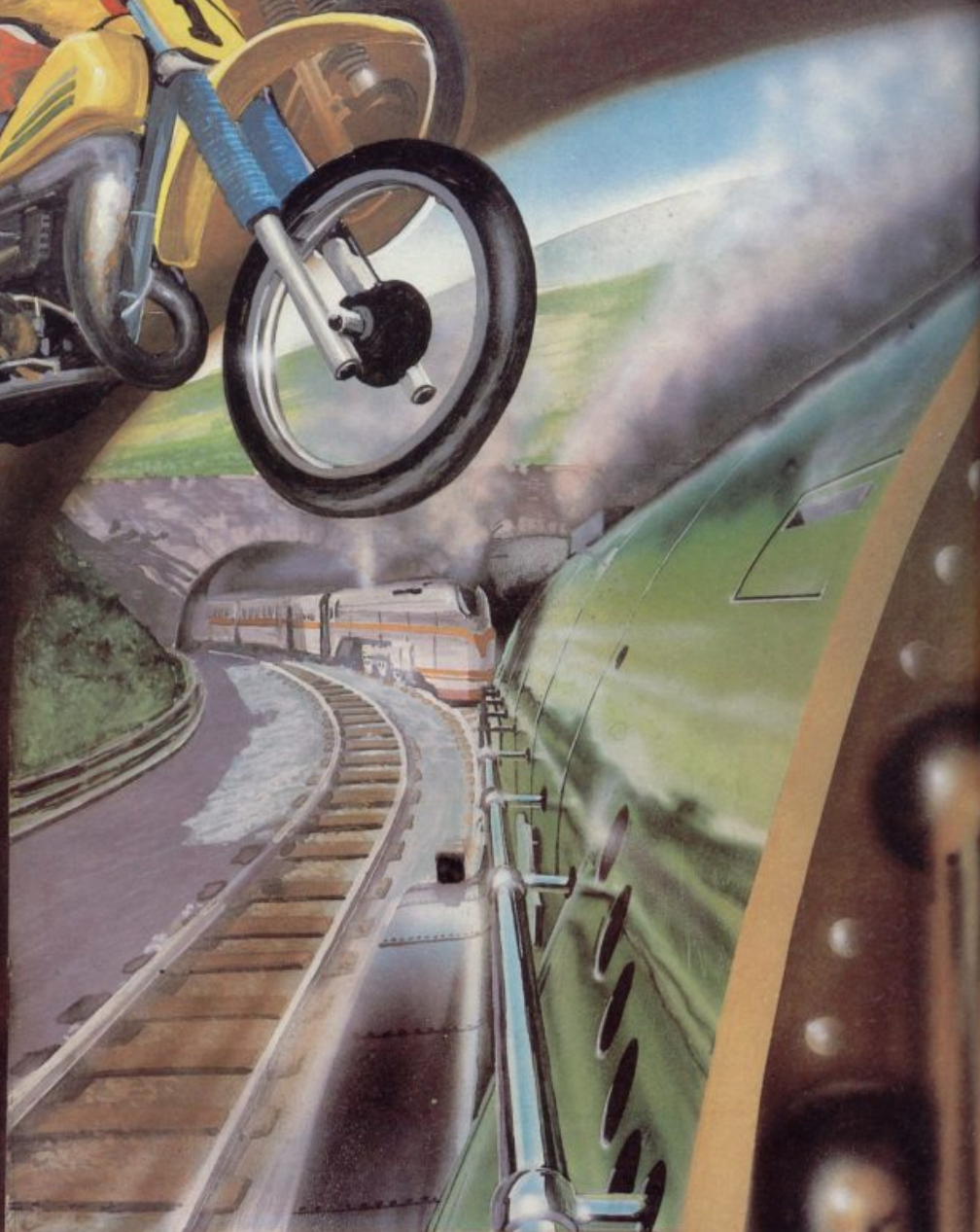
6.95

Available from your software dealer
Dealer enquiries contact

proffsoft Ltd.

131 Trafalgar Road
London, SE 10 9TU

WHEELIE



and
THE
TRAIN
GAME
from

MICROSPHERE

For the Spectrum at £5.95 each.
Available at selected branches of W.H. Smith, Boots,
John Menzies and good computer shops everywhere.
(CBM 64 versions due for release soon)

Sinclair ZX Microdrives and ZX Interface 1

The affordable alternative to floppy discs...



...in the shops, now!

The unique ZX Microdrive system sets the ZX Spectrum apart from all other computer systems.

At a fraction of the cost of floppy discs, it gives fast access to 85K of program and data on Microdrive cartridges. And it opens up exciting possibilities through an RS232 interface and local area network.

ZX Microdrives – the fast way to save or load 85K of program and data. £49.95

ZX Microdrives are controlled by ZX Interface 1.

For their compact size, they're massively powerful. Each interchangeable Microdrive cartridge stores at least 85K of program and data!

You can create up to 50 files on the cartridge – identified by titles of your own choice.

And when you want to display the data again, Microdrives give you lightning-fast access:

- Just 3.5 seconds to access a typical file.
- Only 9 seconds to LOAD a typical 48K program.

ZX Microdrives use the Spectrum's own power supply.

Your first Microdrive is connected to Interface 1 by a Microdrive lead. Then, up to 7 more Microdrives can be added using Microdrive connectors. That gives you a minimum of 680K bytes of on-line capacity.

With memory like that, the possibilities are limitless – stock control, word-processing, even huge adventure games!

With each Microdrive, you'll receive a Microdrive connector and Microdrive demonstration

cartridge. Blank Microdrive cartridges cost £4.95 each. They are available in packs of 4 (with a free cartridge wallet) or singly.

ZX Interface 1 – the multi-purpose controller. £49.95

ZX Interface 1 is a multi-purpose device. It controls up to 8 Microdrives. And it adds file-handling and communication facilities to your Spectrum.

So in one low-priced unit, you also get these two built-in features:

- **RS232 interface** This industry standard interface allows you to link your Spectrum with full-size printers, communicate with other computers employing RS232, and transmit data over telephone lines via modems.

- **The ZX Net** Now you and your friends can transfer programs and data on a local area network – or even play computer games together.

The ZX Net makes it easy, and fast!

It links between 2 and 64 Spectrums, transmitting at 10,000 characters per second. (So a full screen is transferred in around 3 seconds!) With the ZX Net, only one person need type in a program. And a Microdrive or printer can be shared by everyone in the network!

ZX Interface 1 offers you all these facilities, and retains the same peripheral port as the Spectrum itself.

With each ZX Interface 1, you'll receive a connecting lead for the first Microdrive; a ZX Net

lead with jack plugs; plus a comprehensive manual.

An RS232 lead is available as an optional extra at £14.95.

Available from: larger branches of Boots • WH Smith Computer Stockists • Greens Computer Centres • Spectrum Computer Stores • and larger branches of John Menzies • Dixons • Laskys • Currys • John Lewis Partnership • Rumbelows • British Home Stores • House of Fraser and many other good computer stockists nationwide.

Find out more – in your local shop!

The best way to evaluate ZX Microdrives and Interface 1 is to see them for yourself.

There is a full range of ZX peripherals – including ZX Interface 2 for joystick and ROM Cartridge capability, alongside the only computer that supports them – the ZX Spectrum!

For more information, telephone Sinclair Research Ltd, on 0276 685311.

© Sinclair, ZX, ZX Spectrum, ZX Microdrive, ZX Net and ZX Interface are trade marks of Sinclair Research Ltd.

sinclair

Machine code shift

Box 1.

SPECIFICATIONS S8 — Spectrum.

GENERAL DESCRIPTION: This routine checks the present position of a figure shown on the Spectrum screen. If that figure is touching the right edge of the screen, a return is made without affecting either the position of the figure or the pointers to that position. If that figure is not touching the right edge of the screen, the pointers to the position of the figure are re-set one pixel to the right, the variables required by S4 — shift right — are set and then a call is made to S4. The setting of the variables for S4 is made to ensure that only those bytes in the screen area containing the figure are shifted.

RESTRICTION: The routine was designed for a specific figure 14 scans high and 57 pixels wide. Lines 180 and 380 will need adjustment for a figure of another size.

ON ENTRY: V4 — a two-byte variable at 72F0H and 72F1H — must point to the top left of the figure. V5 — a two-byte variable at 72F2H and 72F3H — must point to the top right of the figure. V7 — a two-byte variable at 72F4H — must point to the bottom right of the figure. V8 — a one-byte variable at 72F6H — must contain the bit number of the left-most pixel covered by the figure. S4 and S0 — down a scan — must be in memory.

ON EXIT: V4, V5, V7 and V8 will be set correctly. If the figure is not on the right edge of the screen, it will be shifted right one pixel.

USES: A, B, C, D, E, H, L, V1, V1.

RESETS: V4, V5, V7, V8.

7300		00100	ORG 7300H	
7300	3AF672	00110 S8	LD A,(V8)	;BIT NO. OF LEFTMOST POINT
7303	FE00	00120	CP 0	
7305	CA1C73	00130	JP Z,J1	;INTO NEXT BYTE
7308	3D	00140	DEC A	
7309	32F672	00150	LD (V8),A	;STORE NEW BIT POSITION
730C	2AF072	00160	LD HL,(V4)	;TOP LEFT OF FIGURE
730F	22F771	00170	LD (V1),HL	
7312	210E08	00180	LD HL,080EH	;8 BYTES/14 SCANS
7315	22F971	00190	LD (V2),HL	
7318	CD3072	00200	CALL S4	;SHIFT RIGHT
731B	C9	00210	RET	
731C	2AF272	00220 J1	LD HL,(V5)	;TOP RIGHT OF FIGURE
731F	7D	00230	LD A,L	
7320	E61F	00240	AND 1FH	
7322	FE1F	00250	CP 1FH	
7324	C8	00260	RET Z	;RETURN IF ALREADY AT RIGHT
		00270		;EDGE OF SCREEN
7325	2AF072	00280	LD HL,(V4)	;TOP LEFT OF FIGURE
7328	22F771	00290	LD (V1),HL	
732B	2C	00300	INC L	
732C	22F072	00310	LD (V4),HL	;NEW TOP LEFT OF FIGURE
732F	21F472	00320	LD HL,V7	;BOTTOM RIGHT OF FIGURE
7332	34	00330	INC (HL)	
7333	21F272	00340	LD HL,V5	;TOP RIGHT OF FIGURE
7336	34	00350	INC (HL)	
7337	3E07	00360	LD A,7	;SET A TO TOP BIT OF BYTE
7339	32F672	00370	LD (V8),A	;NEW BIT POSITION
733C	210E09	00380	LD HL,090EH	;9 BYTES/14 SCANS
733F	22F971	00390	LD (V2),HL	
7342	CD3072	00400	CALL S4	;SHIFT RIGHT
7345	C9	00410	RET	
71F7		00420 V1	EQU 71F7H	
71F9		00430 V2	EQU 71F9H	
72F0		00440 V4	EQU 72F0H	
72F2		00450 V5	EQU 72F2H	
72F4		00460 V7	EQU 72F4H	
72F6		00470 V8	EQU 72F6H	
7230		00480 S4	EQU 7230H	
0000		00490	END	
00000	TOTAL ERRORS			
J1	731C	00220	00130	
S4	7300	00480	00200 00400	
S8	7300	00110		
V1	71F7	00420	00170 00290	
V2	71F9	00430	00190 00390	
V4	72F0	00440	00160 00280 00310	
V5	72F2	00450	00220 00340	
V7	72F4	00460	00320	
V8	72F6	00470	00110 00150 00370	

A BASIC PROGRAM last month implemented routines to shift a figure of any size up, down, left or right round the Spectrum screen. In a way it cheated by ignoring the current position of the figure and shifting the whole screen. If that was what was required, faster and simpler machine code routines could have been devised. The sophistication of S4, S5, S6 and S7 is in their ability to alter only a specified section of the screen while leaving the remainder of the screen unaffected. In other words, they should move the alligator and leave any background stationary.

To shift only those bytes which contain the figure it is necessary to set up variables to act as pointers to the present position of the figure. In this example those pointers are held in memory addresses 29424 to 29430 — or 72F0H to 72F6H. Each time the figure is moved the pointers must be adjusted. They are not like the variables at 29275 to 29180 — 71F7H to 71FCH. They must be set before entering S4, S5, S6 or S7 and they are then used by the routines as a scratchpad. In most big programs scratchpad variables need to be distinguished from those which must always keep track of certain values.

Strictly, it should not be necessary to use more than two pointers for a single figure. One pointer is needed for the

‘The stack can be thought of as a left-luggage area for 16-bit numbers’

address holding the top left corner of the rectangle containing the figure and the other pointer is needed to point to the bit number in the byte at that address of the left edge of the rectangle.

If those two pointers are maintained and the size of the rectangle is known, it should be possible to calculate all the other corners of the position of the figure. In practice, it is easier to hold more pointers for the other corners rather than perform repetitive calculations.

In boxes one, two, three and four with this article are routines to maintain the pointers and call the shifting routines. They maintain four pointers. V4, a pointer to the screen address of the top left of the rectangle is required for S4 — shifting a pixel right. V5, a pointer to

John Kerrigan concludes his series and shows how graphics can be moved round the screen.

Box 2.

SPECIFICATIONS S9 — Spectrum.

GENERAL DESCRIPTION: This routine checks the present position of a figure shown on the Spectrum screen. If that figure is touching the left edge of the screen, a return is made without affecting either the position of the figure or the pointers to that position. If that figure is not touching the left edge of the screen, the pointers to the position of the figure are re-set one pixel to the left, the variables required by S5 — shift left — are set and then a call is made to S5. The setting of the variables for S5 is made to ensure that only those bytes in the screen area containing the figure are shifted.

RESTRICTION: The routine was designed for a specific figure 14 scans high and 57 pixels wide. Lines 180 and 370 will need adjustment for a figure of another size.

ON ENTRY: V4 — a two-byte variable at 72F0H and 72F1H — must point to the top left of the figure. V5 — a two-byte variable at 72F2H and 72F3H — must point to the top right of the figure. V7 — a two-byte variable at 72F4H — must point to the bottom right of the figure. V8 — a one-byte variable at 72F6H — must contain the bit number of the left-most pixel covered by the figure. S5 and S0 — down a scan — must be in memory.

ON EXIT: V4, V5, V7 and V8 will be set correctly. If the figure is not on the left edge of the screen, it will be shifted left one pixel.

USES: A, B, C, D, E, H, L, V1, V1.

RESETS: V4, V5, V7, V8.

7350	00100	ORG 7350H	
7350	3AF672	LD A,(V8)	;BIT NO. OF LEFTMOST POINT
7353	FE07	CP 7	
7355	CA6C73	JP Z,J1	;INTO NEXT BYTE
7358	3C	INC A	
7359	32F672	LD (V8),A	;STORE NEW BIT POSITION
735C	2AF272	LD HL,(V5)	;TOP RIGHT OF FIGURE
735F	22F771	LD (V1),HL	
7362	210E08	LD HL,080EH	;8 BYTES/14 SCANS
7365	22F971	LD (V2),HL	
7368	CD6072	CALL S5	;SHIFT LEFT
736B	C9	RET	
736C	2AF272	LD HL,(V4)	;TOP LEFT OF FIGURE
736F	7D	LD A,L	
7370	E61F	AND 1FH	
7372	C8	RET Z	;RETURN IF ALREADY AT LEFT
	00260		;EDGE OF SCREEN
7373	2AF272	LD HL,(V5)	;TOP RIGHT OF FIGURE
7376	22F771	LD (V1),HL	
7379	2D	DEC L	
737A	22F272	LD (V5),HL	;NEW TOP RIGHT OF FIGURE
737D	21F472	LD HL,V7	;BOTTOM RIGHT OF FIGURE
7380	35	DEC (HL)	
7381	21F272	LD HL,V4	;TOP LEFT OF FIGURE
7384	35	DEC (HL)	
7385	AF	XOR A	;SET A TO ZERO
7386	32F672	LD (V8),A	;NEW BIT POSITION
7389	210E09	LD HL,090EH	;9 BYTES/14 SCANS
738C	22F971	LD (V2),HL	
738F	CD6072	CALL S5	;SHIFT LEFT
7392	C9	RET	
71F7	00410 V1	EQU 71F7H	
71F9	00420 V2	EQU 71F9H	
72F0	00430 V4	EQU 72F0H	
72F2	00440 V5	EQU 72F2H	
72F4	00450 V7	EQU 72F4H	
72F6	00460 V8	EQU 72F6H	
7260	00470 S5	EQU 7230H	
0000	00480	END	
00000 TOTAL ERRORS			

J1	736C	00220	00130
S5	7260	00470	00200 00390
S9	7350	00110	
V1	71F7	00410	00170 00280
V2	71F9	00420	00190 00380
V4	72F0	00430	00220 00330
V5	72F2	00440	00160 00270 00300
V7	72F4	00450	00310
V8	72F6	00460	00110 00150 00360

the screen address of the top right is required for S5 and S6 — shifting left and up. V7, a pointer to the screen address of the bottom right is required for S7 — shifting down one scan. V8, a pointer to the bit number occupied by the left edge of the rectangle, is required for both S4 and S5.

Routines S0 to S7 have been designed to be multi-purpose. Although the Basic program examples have displayed an alligator 57 pixels wide and 14 scans high, the routines can be used to display any figure of any size. Unfortunately this month's controlling routines have to be rather more specific.

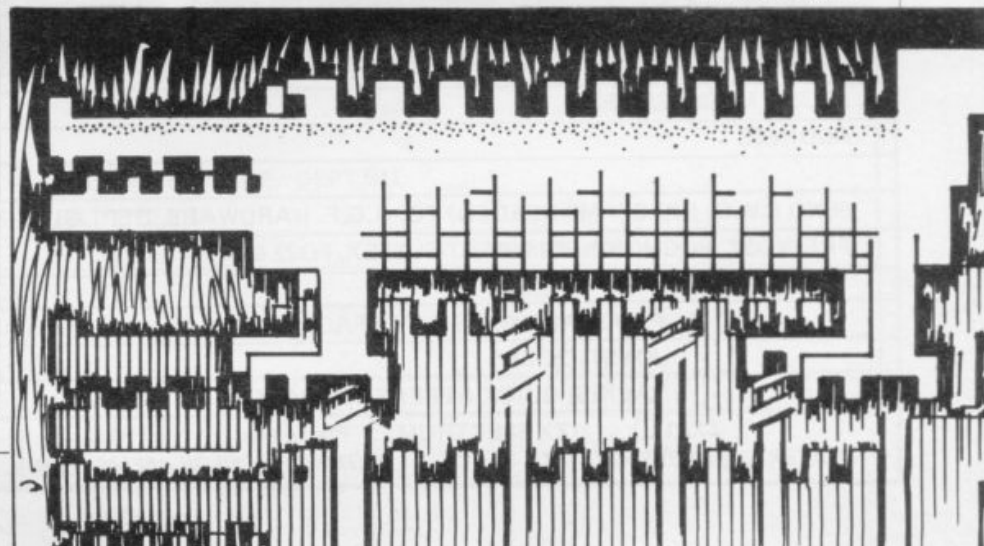
Each scan of a stationary rectangle 57 pixels wide will always fit into eight addresses. If the left edge is in bit 0 of the byte held in the first address, each scan of the rectangle will occupy just bit 0 of the first address and then fill the

'Beginners are advised to beware of complicated use of the stack'

following seven addresses. If you want to shift the rectangle one pixel left, S5 should be set to act on eight bytes per scan. If you want to shift the rectangle one pixel right, S4 should be set to act on nine bytes per scan. The reason is that the eight bytes occupied by each scan before the shift right are not the same eight as those occupied after the shift.

Line 120 of S8 tests for whether the bit number of the left edge is zero. Rectangles of different width will require tests for different left-edge bit numbers on shifts right. For instance, a rectangle 53 pixels wide would require a test to find if the bit number is either 5, 6 or 7 or 0, 1, 2, 3 or 4. For such a test, line 120 would become "CP 5" and line 130 would become "JP C,J1".

continued on page 90



AGF

MICRODRIVE

PROGRAMMABLE JOYSTICK INTERFACE

for
Spectrum
or **ZX81**



AGF PROGRAMMABLE INTERFACE

Recognised as the only true Hardware Programmed joystick interface this product offers all the features associated with such a design.

You can use *any* Atari-compatible joystick controller with *any* software for your Sinclair Spectrum or ZX81, not just those with a joystick option.

Movement of the joystick is recognised by the computer *exactly* the same as pressing the appropriate control keys, and can therefore give the most immediate response to that movement. The hardware programmed design works with *all* possible key-reading methods, both BASIC and Machine Code.

Eight directional movement, with or without the fire button being pressed, can be achieved by only programming the left, right, up, down and fire keys required by the game.

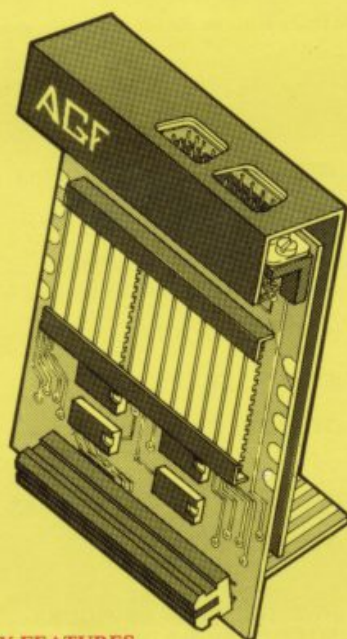
Programming is achieved by a two-digit code, which is looked up on the Programming Chart supplied, for each direction and firing button. These two numbers are then selected on a pair of leads which are clipped onto appropriately numbered strips on the interface.

Once configured this can be marked onto a Quick Reference Programming Card for storing with the game. As the programming is *not* power dependent the interface can be immediately used when next switched on.

The keyboard remains fully functional and can be used simultaneously with the joystick.

An integral rear expansion connector means there is no need to remove the interface to connect other peripherals.

NB. A recent design improvement now means that the AGF Programmable Interface works with the new Quickshot II rapid "Auto Fire" feature.



KEY FEATURES

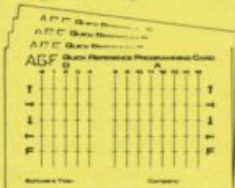
- ★ Programmable design gives TOTAL software support.
- ★ Accepts Atari, Competition Pro, Wico, Starfighter, Quick Shot, Le Stick etc.
- ★ Rear extension connector for all other add-ons.
- ★ Free demo program and instructions.

PACKAGE CONTENTS SUPPLIED

- Programmable Interface Module as illustrated, complete with clip-on programming leads.
- Self adhesive programming chart detailing how to define which key is simulated by UP, DOWN, LEFT, RIGHT, and FIRE.



- One pack of ten Quick Reference Programming Cards for at-a-glance setting to your games requirements.



- 12 months guarantee and full written instructions.



Quickshot II® JOYSTICK

NEW IMPROVED GRIP : BUILT-IN STABILIZING SUCTION CUPS

TRIGGER FIRE BUTTON : RAPID AUTO FIRE SWITCH : TOP FIRE BUTTON

FROM: MR/MRS/MISS

ADDRESS

SEND C.W.O. (NO STAMP NEEDED) TO: A.G.F. HARDWARE, DEPT.SU.

FREEPOST, BOGNOR REGIS, WEST SUSSEX, PO22 9BR.

QTY	ITEM	ITEM PRICE	TOTAL
	PROGRAMMABLE INTERFACE	27.95	
	JOYSTICK(S)	17.95	
	PACK(S) QUICK REFERENCE CARDS	1.00	
ZX81 <input type="checkbox"/> ZX SPECTRUM <input type="checkbox"/> Please tick		FINAL TOTAL	
DEALER ENQUIRIES WELCOME		EXPORT PRICES ON APPLICATION	



JOYSTICK INTERFACE II

for
Spectrum
or ZX81



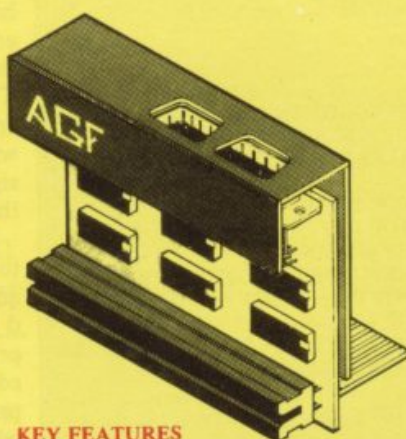
ABOUT OUR JOYSTICK INTERFACE

Following in the footsteps of our extremely popular original interface, which has sold over 1,000 worldwide since October last year, we have improved its performance.

The Interface Module II has been specially designed to plug on to the rear connector of your ZX Spectrum or ZX81 and allow you to connect any standard Atari type digital Joysticks. All of the computer's connections are duplicated on an extension connector so that you can still use any other devices intended for use with your computer. The Interface Module II resides in the same memory space as the keyboard, which remains fully functional at all times, therefore it will not interfere with anything else connected.

When a suitable joystick is plugged into 'Player 1' socket its action will mimic pressing the cursor keys, up "7", left "5" and so on. The firing button will simulate key φ. A second Joystick may be connected in the 'Player 2' position which simulates in a parallel fashion keys T-Y-U-I-P.

Using joystick control in your own programs is as easy as reading keys. Eight directions and Fire are all read by simple BASIC.



KEY FEATURES

- * Proven cursor key simulation for maximum software support
- * Accepts Atari, Competition Pro, Wico, Starfighter, Le Stick, etc Joysticks
- * Second Joystick facility
- * Rear extension connector for all other add-ons

AGF COMPATIBLE SOFTWARE – AVAILABLE NATIONWIDE

The following titles are available from us:

Galactic Jailbreak/	: Apocalypse	£4.95
Snake	: Software	£4.95
3D Tanx	: DK Tronics	£4.95
Splat!	: Incentive	£5.50
Phoenix	: Software Ltd	£5.50
Escape	: Megadodo	£5.50
3D Tunnel	: New Generation	£4.95
Knot in 3D	: Software	£5.95
Cyber Rats	: " "	£5.95
	: Silversoft	£5.95

COMPATIBILITY CASSETTES £4.95

These cassettes have short programs to load before the chosen game which will convert it to use the cursor keys and therefore become compatible with the Interface Module II.

Cassette 1 converts	Cassette 2 converts
Arcadia	Centipede
Schizoids	Planetoids
Hungry Horace	Jet-Pac
Horace Goes Skiing	† Pssst
Spectres	† 3D Combat Zone
Penetrator	† Invaders

† Will require 48K Memory.

WHERE TO BUY AGF PRODUCTS OVER THE COUNTER

Ashby Computer Centre
186 Ashby High Street, Scunthorpe,
S. Humberside DN16 2JR
Brainwave Microcomputers
24 Crown Street, Ipswich, Suffolk IP1 3LD
Buffer Micro Ltd
310 Streatham High Road, London SW16
Chelsea Micros Ltd
14 Jerdan Place, London SW6 1BH
Computers of Wigmore Street
87 Wigmore Street, London W1H 9FA
Everybodys Hobbies
1 Great Colman Street, Ipswich,
Suffolk IP4 2AA

4Mat Computing
67 Friargate, Preston, Lancashire PR1 2AT
Gamer
24 Gloucester Road, Brighton BN1 4AQ
GB Microland
7 Queens Parade, London Road,
Waterloo, Hants
Melgray Hi-Tech Ltd
49 Broad Street, Hereford HR4 9AR
Micro Fare
296 Gloucester Road, Horfield, Bristol
Raven Video
74 Green Lane, Tettenhall, Wolverhampton
Screen Scene
144 St George's Road, Cheltenham
Gloucestershire GL50 3EL

Screens
6 Main Avenue, Moor Park, Northwood
Middlesex.
Syntax Computers
76 Cornwall Street, Plymouth PL1 1NS
Teleco Video
53 Maple Road, Penge, London SE20
Telford Electronics & Computing
26a Bradford Street, Shipnall,
Shropshire TF11 8AU
The Computer Shop
Unit 25, Handyside Arcade, Percy Street,
Newcastle-upon-Tyne NE1 4PZ
The Computer Centre (Humberside) Ltd
26 Anlaby Road, Hull HU1 2PA

FROM: MR/MRS/MISS

ADDRESS

SEND C.W.O. (NO STAMP NEEDED) TO: A.G.F. HARDWARE, DEPT.SU.

FREEPOST, BOGNOR REGIS, WEST SUSSEX, PO22 9BR

QTY	ITEM	ITEM PRICE	TOTAL
	INTERFACE MODULE II	16.95	
	JOYSTICK(S) – QUICKSHOT I	11.95	
	SOFTWARE:		
	SOFTWARE:		
ZX81 <input type="checkbox"/> ZX SPECTRUM <input type="checkbox"/> Please tick		FINAL TOTAL	

DEALER ENQUIRIES WELCOME

EXPORT PRICES ON APPLICATION

Box 3.**SPECIFICATIONS SA — Spectrum.**

GENERAL DESCRIPTION: This routine checks the present position of a figure shown on the Spectrum screen. If that figure is touching the top edge of the screen, a return is made without affecting either the position of the figure or the pointers to that position. If that figure is not touching the top edge of the screen, the pointers to the position of the figure are re-set one scan up, the variables required by S6 — shift up — are set and then a call is made to S6. The setting of the variables for S6 is made to ensure that only those bytes in the screen area containing the figure are shifted.

RESTRICTION: The routine was designed for a specific figure 14 scans high and 57 pixels wide. Line 220 will need adjustment for a figure of another size.

ON ENTRY: V4 — a two-byte variable at 72F0H and 72F1H — must point to the top left of the figure. V5 — a two-byte variable at 72F2H and 72F3H — must point to the top right of the figure. V7 — a two-byte variable at 72F4H — must point to the bottom right of the figure. V8 — a one-byte variable at 72F6H — must contain the bit number of the left-most pixel covered by the figure. S6 and S0 — down a scan — must be in memory.

ON EXIT: V4, V5, V7 and V8 will be set correctly. If the figure is not on the top edge of the screen, it will be shifted up one scan.

USES: A, B, C, D, E, H, L, V1, V2.

RESETS: V4, V5, V7, V8.

```

73A0          00100      ORG 73A0H
73A0 2AF272    00110 SA   LD HL,(V5)      ;TOP RIGHT OF FIGURE
73A3 CD0071    00120      CALL S2          ;UP A SCAN
73A6 C8        00130      RET Z           ;ALREADY AT TOP OF SCREEN
73A7 22F771    00140      LD (V1),HL
73AA 22F272    00150      LD (V58),HL     ;TOP RIGHT OF FIGURE
73AD 2AF072    00160      LD HL,(V4)      ;TOP LEFT OF FIGURE
73B0 CD0071    00170      CALL S2          ;UP A SCAN
73B3 22F072    00180      LD (V4),HL     ;NEW TOP LEFT OF FIGURE
73B6 2AF472    00190      LD HL,(V7)      ;BOTTOM RIGHT OF FIGURE
73B9 CD0071    00200      CALL S2          ;UP A SCAN
73BC 22F472    00210      LD (V7),HL     ;NEW BOTTOM RIGHT OF FIGURE
73BF 21080E    00220      LD HL,0E08H    ;14 SCANS/8 CHRS
73C2 22F971    00230      LD (V2),HL
73C5 CD9072    00240      CALL S6         ;SHIFT UP
73C8 C9        00250      RET
71F7          00260 V1    EQU 71F7H
71F9          00270 V2    EQU 71F9H
72F0          00280 V4    EQU 72F0H
72F2          00290 V5    EQU 72F2H
72F4          00300 V7    EQU 72F4H
7100          00310 S2    EQU 7100H
7290          00320 S6    EQU 7290H
0000          00330      END

```

00000 TOTAL ERRORS

```

S2      7100  00310  00120 00170 00200
S6      7290  00320  00240
SA      73A0  00110
V1      71F7  00260  00140
V2      71F9  00270  00230
V4      72F0  00280  00160 00180
V5      72F2  00290  00110 00150
V7      72F4  00300  00190 00210

```

continued from page 87

If the left edge occupies bit 5, the right edge occupies bit 1 and a shift right will place the rectangle in the same seven addresses it occupied before the shift. If the left edge occupies bit 4, the right edge occupies bit 0 and a shift right will involve eight addresses.

Take another example. Figures which are a precise number of bytes wide will always involve the same number of addresses on shifts right or left. A rectangle 56 pixels wide would always require S4 and S5 to act on eight bytes per scan. If the left edge occupied bit 7, each scan of the rectangle would fill seven bytes. A shift in either direction would fill one bit of another byte. If the

left edge occupied any bit other than bit 7, each scan would affect eight addresses and those eight addresses would contain the figure after a shift in either direction.

Summing up, there are three situations. If the width in pixels divides by eight, the same width is required for S4 and S5, no matter which bit number the left edge occupies. If the remainder after dividing the width in pixels by eight is one, the routine S8 can be adapted easily. In other circumstances the carry flag rather than the zero flag should be used for the jump in line 130 of S8. The same logic will be required for adaptations to S9, the routine to control shifts left.

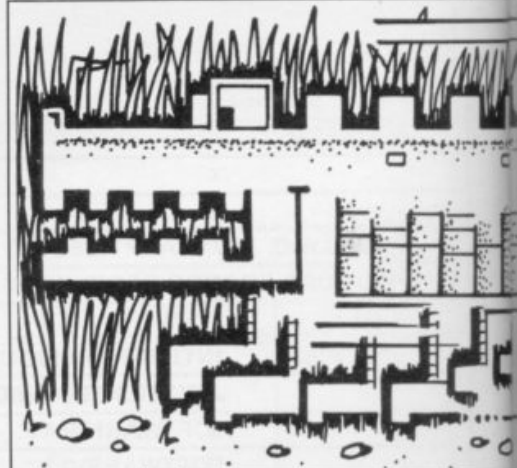
Apart from controlling the pointers, setting the opening requirements of S4, S5, S6 or S7 and calling one of those routines, S8 to SB also ensure that the figure cannot escape from the edge of the screen. There are no problems for SA and SB to check the top and bottom edges of the screen. S0 and S2 — down and up a scan — use the zero flag to indicate the edges but S8 and S9 have to contain their own tests for the right and left edges of the screen.

S8 has the relevant test in lines 240, 250 and 260. The bytes at the right edge of the screen are the only ones in screen memory with all the bottom five bits of the least significant byte of the address set, that is equalling 1. S9 has the relevant test in lines 240 and 250. The bytes at the left edge of the screen are the only ones in screen memory with all the bottom five bits of the least significant byte of the address re-set, that is equalling 0.

Box five contains the Basic program to poke the latest routines into memory and then test them using the l, r, u and d keys. As in last month's article, the program assumes that you have recorded the code of the routines in the previous months' articles. The program tries to load that code in line 20 under the name "ALLINIT".

Our shifting routines require values to be passed to routines via known variable locations. A more-commonly-used alternative is to pass values to small subroutines via the stack. The stack is an area of internal memory. The Basic program sets the stack in the area below 28671, or 6FFFH, with the CLEAR instruction in line 10.

Assembly language beginners are advised to beware of over-complicated use of the stack. Even if we do not intend to use stack instructions, we have to understand them to understand how other people's programs work. In particular,



the Spectrum ROM has routines which require various values to be placed on the stack before they are entered.

The stack can be thought of as a left-luggage area for 16-bit numbers. All numbers on the stack are 16-bit or two-byte numbers. That means that if you want to save the current contents of the A register, you have to save the contents of the flag register as well. For stack operations all the registers are taken in pairs. Saving a register pair on the stack is called PUSHing that register pair. Re-claiming a 16-bit number off the stack and putting it into a register pair is called POPping that register pair.

The stack may contain 20 two-byte numbers. That does not mean that you

'The stack may contain 20 two-byte numbers but you cannot choose which of the 20 to POP next'

can choose which of the 20 you wish to POP next. The stack keeps track of a current position with the two-byte register, the stack pointer. An instruction like POP DE will return whatever was the last number saved on the stack. That number will be at the bottom of the stack. POP DE will also increment the stack pointer twice.

If POP DE is followed by PUSH HL, the present number in HL will be added to the bottom of the stack, taking the locations held previously by the number now POPped into DE. The stack pointer will also be decremented twice.

So PUSH BC, PUSH DE, POP BC, POP DE would exchange the contents of BC and DE, leave the stack pointer set at its original position, and repro-

duce the two numbers immediately below the stack. One reason for using the stack to pass values, rather than leaving them in known variable locations, is that stack operations are faster. That increased speed is unlikely to be important to your routines but is important to the much more complicated routines in the Spectrum ROM.

Apart from PUSHes and POPs, the stack is also used by CALLs and RET-urns. A CALL has the effect of PUSHing the present PC, or program counter, register contents and then filling the program counter with the addressed called. A RET has the effect of POPping the next number off the stack into

the PC register. That means that passing a value to a subroutine via the stack will involve the subroutine peeling-off the return address, safeguarding it, accessing the value and then PUSHing the return address before the standard RET. That must be done with care to ensure that the stack does not either grow further and further down in memory or disappears above the CLEARED address and covers the machine code.

The general rule is that in each subroutine for each possible run the number of PUSHes must equal the number of POPs and the number of CALLs must equal the number of RETurns.

continued on page 92

Box 4.

SPECIFICATIONS SB — Spectrum.

GENERAL DESCRIPTION: This routine checks the present position of a figure shown on the Spectrum screen. If that figure is touching the bottom edge of the screen, a return is made without affecting either the position of the figure or the pointers to that position. If that figure is not touching the bottom edge of the screen, the pointers to the position of the figure are re-set one scan down, the variables required by S7 — shift down — are set and then a call is made to S7. The setting of the variables for S7 is made to ensure that only those bytes in the screen area containing the figure are shifted.

RESTRICTION: The routine was designed for a specific figure 14 scans high and 57 pixels wide. Line 220 will need adjustment for a figure of another size.

ON ENTRY: V4 — a two-byte variable at 72F0H and 72F1H — must point to the top left of the figure. V5 — a two-byte variable at 72F2H and 72F3H — must point to the top right of the figure. V7 — a two-byte variable at 72F4H — must point to the bottom right of the figure. V8 — a one-byte variable at 72F6H — must contain the bit number of the left-most pixel covered by the figure. S6 and S0 — down a scan — must be in memory.

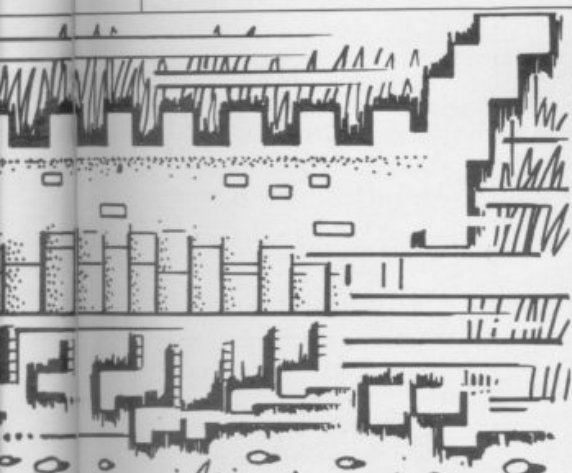
ON EXIT: V4, V5, V7 and V8 will be set correctly. If the figure is not on the top edge of the screen, it will be shifted down one scan.

USES: A, B, C, D, E, H, L, V1, V2.

RESETS: V4, V5, V7, V8.

73D0		00100	ORG 73D0H	
73D0	2AF472	00110 SB	LD HL,(V7)	;BOTTOM RIGHT OF FIGURE
73D3	CD0070	00120	CALL S0	;DOWN A SCAN
73D6	C8	00130	RET Z	;ALREADY AT BOTTOM OF SCREEN
73D7	22F771	00140	LD (V1),HL	
73DA	22F472	00150	LD (V7),HL	;BOTTOM RIGHT OF FIGURE
73DD	2AF072	00160	LD HL,(V4)	;TOP LEFT OF FIGURE
73E0	CD0070	00170	CALL S0	;DOWN A SCAN
73E3	22F072	00180	LD (V4),HL	;NEW TOP LEFT OF FIGURE
73E6	2AF272	00190	LD HL,(V5)	;TOP RIGHT OF FIGURE
73E9	CD0070	00200	CALL S0	;DOWN A SCAN
73EC	22F272	00210	LD (V5),HL	;NEW TOP RIGHT OF FIGURE
73EF	21080E	00220	LD HL,0E08H	;14 SCANS/8 CHRS
73F2	22F971	00230	LD (V2),HL	
73F5	CDC072	00240	CALL S7	;SHIFT DOWN
73F8	C9	00250	RET	
71F7		00260 V1	EQU 71F7H	
71F9		00270 V2	EQU 71F9H	
72F0		00280 V4	EQU 72F0H	
72F2		00290 V5	EQU 72F2H	
72F4		00300 V7	EQU 72F4H	
7000		00310 S0	EQU 7000H	
72C0		00320 S7	EQU 72C0H	
0000		00330	END	
00000	TOTAL ERRORS			

S0	7000	00310	00120 00170 00200
S7	72C0	00320	00240
SB	73D0	00110	
V1	71F7	00260	00140
V2	71F9	00270	00230
V4	72F0	00280	00160 00180
V5	72F2	00290	00190 00210
V7	72F4	00300	00110 00150



Machine Code

continued from page 91

Thus to access a value from the stack from within a subroutine, when it was placed on the stack from outside the subroutine, POP BC peels-off the return address; EXX if BC is to be used in this subroutine; POPDE — this is the value we want; the routine; PUSH any register pair; EXX — if we EXXed previously, PUSH BC; and RET.

The EXX instruction exchanges the contents of the shadow BC, DE and HL

with the contents of the current registers. It does not affect the A register or the flag register. In most Z-80-based machines it is a very useful way of saving register contents while we use the register for some other purpose.

Spectrum Basic does not save the value in the shadow HL before accessing your machine code routines with RANDOMISE USR. The Spectrum ROM may want that value when you return to Basic. If you intend to use the

shadow HL, you should save its contents first and then replace them before returning. It is sensible to save the shadow HL if the instruction EXX appears anywhere in your code.

At this stage I am aware of all those areas with which I have not dealt in this series. I hope readers have found some of the information useful and will be able to treat the routines as the basis of a library of routines for manipulating figures on the Spectrum screen.

Box 5.

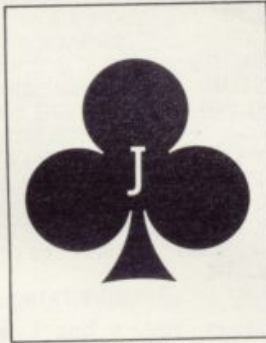
```
10 CLEAR 28671
20 LOAD "ALLINIT" CODE
30 REM INITIAL V1,V2,V3,V4
40 DATA 10,72,34,112,8,14
50 FOR A=29175 TO 29180: READ B: POKE A,B: NEXT A
60 RANDOMIZE USR 29184
70 REM S8 MACHINE CODE
80 DATA 58,246,114,254,0,202,28,115,61,50,246
90 DATA 114,42,240,114,34,247,113,33,14,8,34
100 DATA 249,113,205,48,114,201,42,114,125
110 DATA 230,31,254,31,200,42,240,114,34,247
120 DATA 113,44,34,240,114,33,244,114,52,33
130 DATA 242,114,52,62,7,50,246,114,33,14,9
140 DATA 34,249,113,205,48,114,201
150 FOR A=290440 TO 29509: READ B: POKE A,B: NEXT A
160 REM S9 MACHINE CODE
170 DATA 58,246,114,254,7,202,108,115,60,50,246
180 DATA 114,42,242,114,34,247,113,33,14,8,34
190 DATA 249,113,205,96,114,201,42,240,114,125
200 DATA 230,31,200,42,242,114,34,247,113,45
210 DATA 34,242,114,33,244,114,53,33,240,114
220 DATA 53,175,50,246,114,33,14,9
```

```
230 DATA 34,249,113,205,96,114,201
240 FOR A=29520 TO 29586: READ B: POKE A,B: NEXT A
250 REM SA MACHINE CODE
260 DATA 42,242,114,205,0,113,200,34,247,113
270 DATA 34,242,114,42,240,114,205,0,113,34
280 DATA 240,114,42,244,114,205,0,113,34,244
290 DATA 114,33,8,14,34,249,113,205,144,114,201
300 FOR A=29600 TO 29640: READ B: POKE A,B: NEXT A
310 REM SB MACHINE CODE
320 DATA 42,244,114,205,0,112,200,34,247,113
330 DATA 34,244,114,42,240,114,205,0,112,34
340 DATA 240,114,42,242,114,205,0,112,34,242
350 DATA 114,33,8,14,34,249,113,205,192,114,201
360 FOR A=29648 TO 29688: READ B: POKE A,B: NEXT A
370 REM INITIAL VALUES OF V4,V5,V7,V8
380 DATA 10,72,17,72,49,77,7
390 FOR A=29424 TO 29430: READ B: POKE A,B: NEXT A
1000 PAUSE 0
1010 IF INKEY$="r" THEN RANDOMIZE USR 29440
1020 IF INKEY$="l" THEN RANDOMIZE USR 29520
1030 IF INKEY$="u" THEN RANDOMIZE USR 29600
1040 IF INKEY$="d" THEN RANDOMIZE USR 29648
1050 GO TO 1000
```

E·N·I·G·M·A Can you break the code?



CONTROL



ACCEPT?



REJECT?



ACCEPT?



REJECT?

ENIGMA is a new type of computer game. In most games you have a set of rules. In these games it is the other way round. The game will be over when you discover the rule by which it is being played. The computer will accept or reject cards — your objective is to discover the rules. There are five rules in all — but don't be discouraged — the games can be solved — if you have enough imagination and perseverance.

Available on cassette with full instructions for the BBC 'B', Electron and Spectrum machines, at £9.95 including VAT, post and packing. When you've solved all the five games return the cassette with £4 to us and we'll send you another.

Dealer Deals Ltd, 20 Orange Street,
London WC2H 7ED
Access card holders ring 01-289 2188 24 hours.

To Dealer Deals Ltd, 20 Orange Street, London WC2H 7ED

Please state machine _____ Please rush me an Enigma cassette.

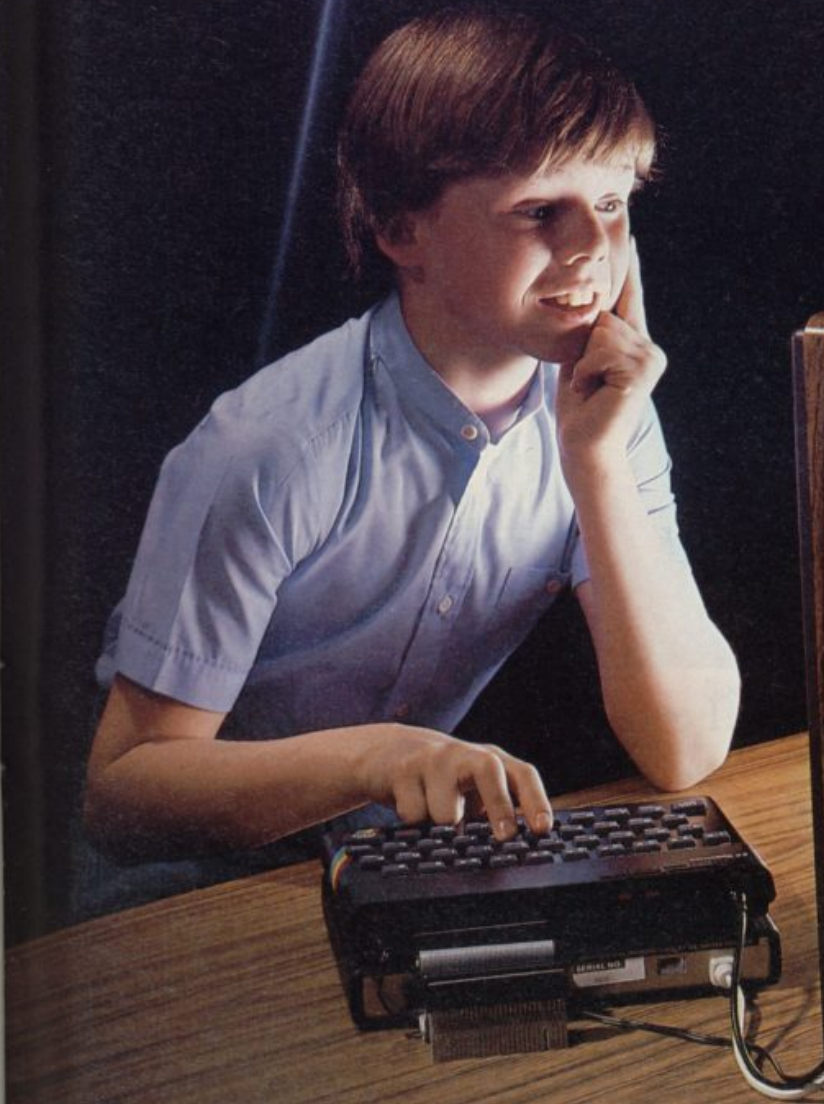
I enclose a cheque/P.O. for £9.95 payable to Dealer Deals Ltd or debit my

Access card No. _____ Signature _____

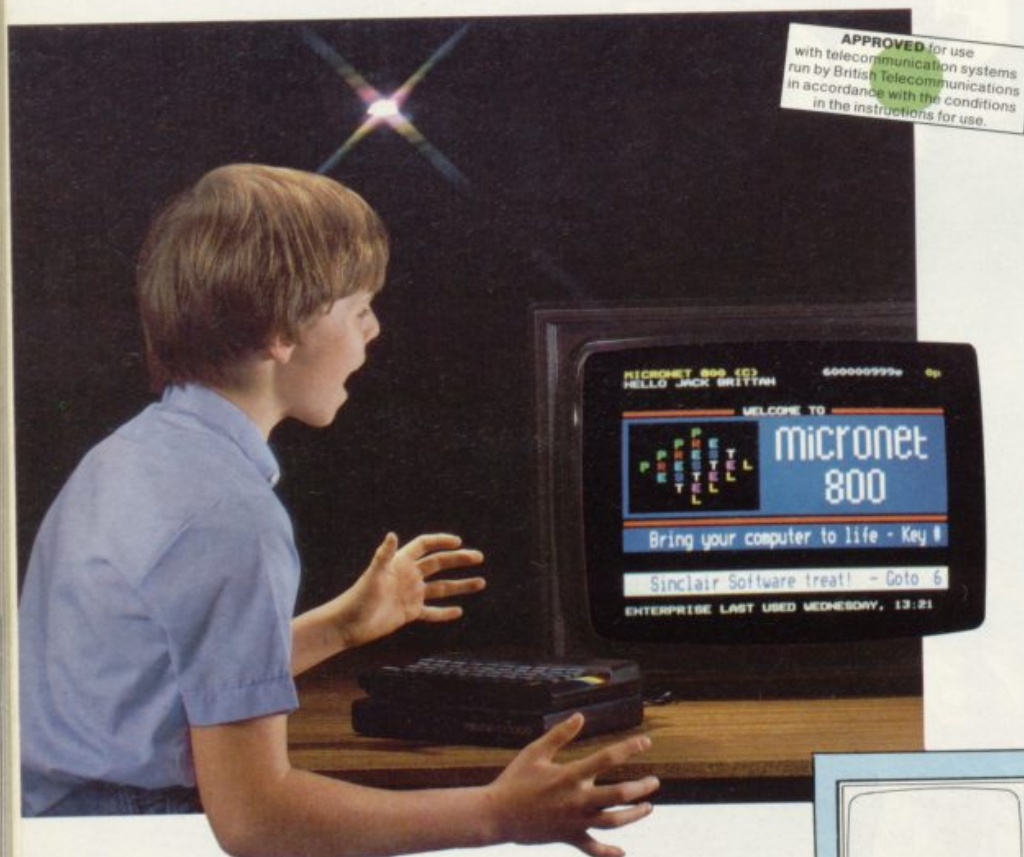
Name _____ Address _____

Postcode _____

**Sneak into a
mainframe with
your Spectrum...**



...and access an drive of news, views



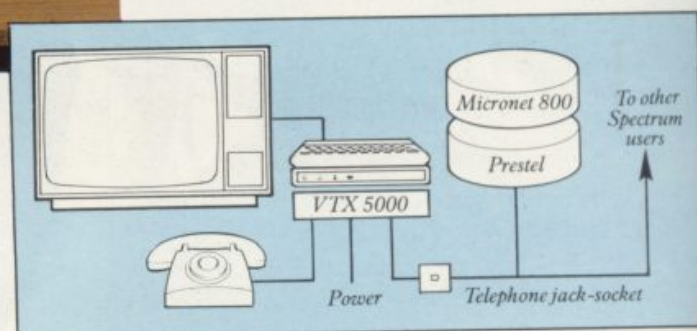
Games



Travel

Simply by connecting your Spectrum to the telephone line, via the award-winning Prism VTX 5000 communications modem, you can get to all the information, games and communication facilities held on viewdata mainframes.

So, you can link into a variety of services, including Prestel and Micronet 800. Access hundreds of software programs – many completely free. Talk to fellow users. Keep up-to-date with all the latest national, international and micro news. Play on-screen games. Check sports results. Book travel and entertainment.



Learn a language.

The choice is simply vast. Plus, your Prism VTX 5000 allows you to communicate directly with other Spectrum owners.

And now, our special offer means that you can do all this for just £11* a month. So complete the coupon and send it to us today, and we will let you have full details of our unbeatable offer.

* All prices quoted refer to domestic use only. For business use the Prestel annual standing charge is £66. Therefore business users will be billed £44.50 per quarter.

An exciting world of news, facts & fun!



Swapping



Educational software



Shopping



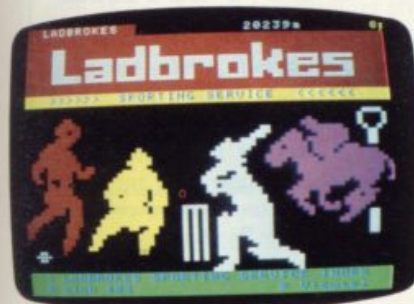
News



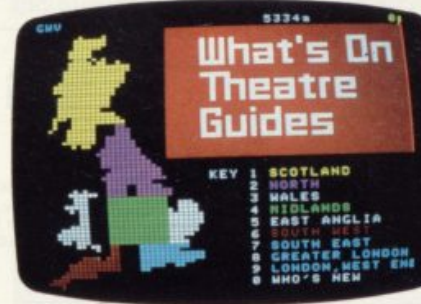
Competitions



Telesoftware



Sport



Booking



Mailbox

FOR JUST £11* A MONTH YOU WILL GET:

- A Prism VTX 5000 worth £99.95.
- One year's subscription to Prestel worth £20.00.
- One year's subscription to Micronet worth £32.00.
- Free user-to-user software - normally retailing at £19.00.
- Quarterly hardware and software offers.
- Discounted software through Micronet (up to 20% off retail prices).

Prism Microproducts Ltd.
Prism House, 18-29 Mora Street
City Road, London EC1V 8BT.
Tel: 01-253 2277



Prestel and the Prestel symbol are trademarks of British Telecommunications.

Please send me full information on your special offer to Spectrum users.

Name: _____

Address: _____

CRICKET

FOR

ZX SPECTRUM 48K

By David Owen

Look at these features:



★ **EXCITING MATCHES** in which your decisions really count. Make bowling changes and field positionings; tell your batsmen to score faster or to be more defensive.

★ **INTELLIGENT PROGRAM:** The Spectrum decides your opposition's strategy skilfully and logically.

★ **DETAILED PLAYER CHARACTERISTICS:** Get to know your team's strengths and weaknesses.

★ **INFINITE OPPOSITION:** Including all the County sides. Ten difficulty levels.

★ **BALL BY BALL COMMENTARY** — scoreboard, scorecard and many interesting and helpful features.

★ **USES 48K to the full!**

A realistic, addictive and enjoyable game

£6.95 including post and packing and full instruction booklet. Export orders add £1.00

T. J. OWEN, NORLINGTON, LEWES ROAD, EAST GRINSTEAD, W. SUSSEX RH19 3TA

Trade enquiries welcome.

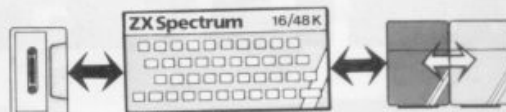
DO IT WITH TRANS-EXPRESS

Would you like to transfer your Spectrum programs from

- ① MICRODRIVE TO MICRODRIVE ③ TAPE TO TAPE
- ② TAPE TO MICRODRIVE ④ MICRODRIVE TO TAPE

Then do it with

TRANS-EXPRESS



TRANS-EXPRESS is the most comprehensive package of four m/c utilities for transferring Spectrum programs. They are user-friendly, simple to use, reliable & very efficient. They go much beyond where similar attempts failed, enabling you to transfer any kind of programs up to the full 48.0K length - provided you do not infringe copyright. **TRANS-EXPRESS** is an essential microdrive companion and an invaluable software back-up utility.

We are offering the entire package for **£9.95** or a combination of TAPE TO MICRODRIVE & MICRODRIVE TO MICRODRIVE for **£7.50**. You can also buy each of the four programs separately for **£5.50** only.

TAPE TO TAPE

Please send me a copy of **TRANS-EXPRESS** ① ② ③ ④ Please tick where applicable

I enclose cheque/PO for (Please add £1.00 for orders outside UK)

Name

Address

ROMANTIC ROBOT 113 Melrose Ave, London NW2

Quality programs from HARTLAND SOFTWARE

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 ZX-81 (16K) and the ZX Spectrum (48K) for just £6.95.

All prices include postage and packing.

HARTLAND SOFTWARE (Dept. S), 32 IVOR PLACE, LONDON NW1 6DA

★ GAMES ★

MISTERMIND

Hartland Software's version of the popular board game, also known as "Bulls and Cows". Not only can you play the game using this program, but you can take the computer on as well. You will find it hard to beat!

AVAILABLE FOR THE ZX SPECTRUM (48K)£6.95

TOP DOG

A game simulating the world of dog breeding and showing. You start with £500 to buy your first pair. The object of the game is to breed the Cruft's Supreme Champion without going bankrupt!

AVAILABLE FOR THE ZX SPECTRUM (48K)£5.95

TRAVELLING SALESMAN PROBLEM

Not a game, but a fascinating insight into the world of network theory. The travelling salesman problem is an old one. You have a number of towns, scattered about the country; the problem is to choose the shortest route for the salesman so that he visits each town once, and returns to his original starting place! This program tackles the problem using the 2-optimal method. All you do is enter the grid-references of the towns, and wait! You may also, if you wish, enter a non-linear distance function. This program makes full use of ZX Spectrum graphics, and displays a scale map of the route it has chosen.

AVAILABLE FOR THE ZX SPECTRUM (48K)£8.95

WANTED — Good, machine code programs for ZX Spectrum, ZX-81, BBC 'B'. Generous royalties paid!

The Spectrum soldiers on

Nicole Segre talks to Pierre-Paul Struye, Belgian collector of military helmets and Sinclair enthusiast

When Belgian-born Pierre-Paul Struye, general secretary of a multi-national cement company, decided to organise a reunion dinner for his former comrades in the Royal Belgian Air Force at the end of last year, he let his ZX-81 do most of the work. The machine kept track of who was to be invited, who had accepted, who had paid for tickets, and whether they were taking their wives. "It proved to be a very successful event," Struye says.

Now 54, Struye spends an increasing amount of time using or programming a computer. His chief hobby, however, is collecting military helmets, and that is why he bought a computer in the first place.

"I became interested in the subject early in 1983 because my eldest son was then doing a course in computer studies in the United States. It was he who suggested a computer might be useful for keeping a check on my collection. I hunted in magazines and settled on the ZX-81 because it was so cheap. It has served me very well," he says.

Struye owns about 280 military helmets — "a good collection by European standards," he says — and has them all listed on his Masterfile program from Campbell Systems. He divides his time between Paris and Brussels and the program enables him to learn at a glance in which of his various storage places any particular item is to be found.

"Before, I had it all written on scraps of paper," he says. "This is much more satisfactory."

The program also tells him which helmets he has in duplicate and is willing to offer to other collectors, and which he needs to fill gaps in his collection — at the moment, chief among them is a first world war British helmet with an anti-shrapnel visor. Another facility he likes is being able to classify helmets according to their provenance or date.

Struye sends printout listings of his helmets regularly to fellow collectors all over the world and has recently been using his computer to send order forms for a book about helmets which he is writing in collaboration with an international team of authors.

"The book will appear in English and French and so far as I know it will be the first work of its kind on the market," he says.

Struye has extended the use of his ZX-81 into other areas. Not only did it help him organise his air force reunion dinner but when three of his five children were married last year, Masterfile again proved invaluable. It provided him with a complete list of friends and relatives, sorted who was to be invited to the ceremony and who only to the reception, checked who was attending and provided a head count for caterers.

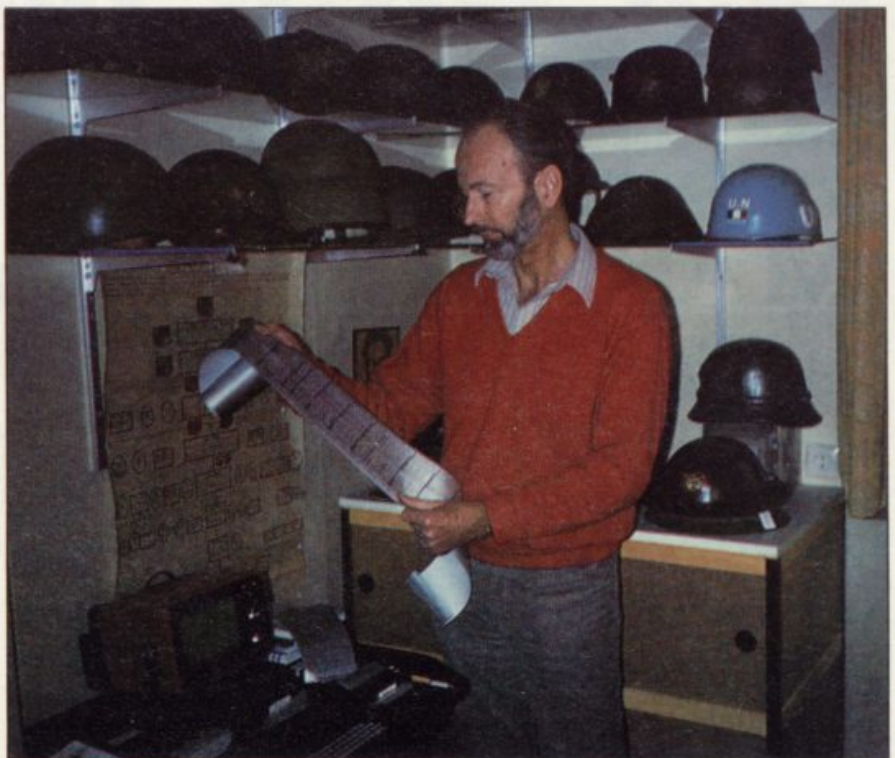
"I realise that not everyone has to deal with three weddings in one year," he says, "but if you do, a ZX-81 can save a good deal of trouble."

Although Struye bought his computer primarily to put some method into his collection of helmets, not to mention reunion dinners and wedding arrangements, he also thought it would be a useful introduction to computing.

"My company is not yet computerised," he says, "but it is only a matter of time. I would like to see all those in managerial positions having their own VDUs and I would like to be as fully-informed as possible when we have to decide which systems to install."

With that aim in view, Struye has turned his hand to programming. His first effort was a simulation program,

continued on page 98



User of the Month

continued from page 97

designed to help deal with the problem of a subsidiary company which was running at a loss, setting out the various possible courses of action and what the likely outcome would be.

"It took me several days — and nights — to write it," Struye recalls. "I found that once I started, I could not stop. It is extraordinary how you do not notice time passing when you are programming."

Early this year, Struye decided to go on to better things and bought a 48K Spectrum which, he says, is now becoming more readily available in France and Belgium. He is working on a program for the new machine which will calculate the nett pay of all his company's employees after tax has been deducted. He plans to use it to work out salaries when sending staff overseas.

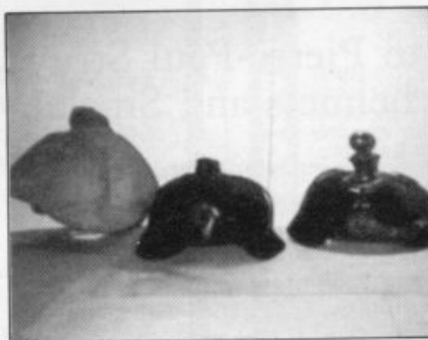
"I have not finished it" he says. "My wife does not like me 'playing' with my computers, so I have to fit in programming when she is away in Brussels."

Next on his agenda is a budget control program, although Struye does not yet know if he will write it himself or use the Microsphere Omni-Calc.

"There is plenty of superb software for the Spectrum," he says. "I have

been using Tasword for word processing and although the Spectrum keys are not ideal, the program is excellent." He is equally pleased with VuCalc, which he uses for his personal accounts.

One aspect of micros in which Struye is not interested is games. "They are a terrible waste of time," he says categorically. "Programming is much more



amusing. I find solving the problems of logic it poses fascinating."

Although now the proud owner of a Spectrum, Struye is still full of praise for the ZX-81. "It is an ideal introduction to computing and it can achieve a tremendous amount of work," he says. "Unless you are an avid games player, the lack of colour is no disadvantage."

He is now looking for a program which will convert his ZX-81 programs for the Spectrum; he has tried Slowloader from East London Robotics but so far has not been able to make it work.

Meanwhile, he is looking forward to acquiring a Microdrive. "The only disadvantage of the Spectrum is the time you have to spend loading and saving," he says. "It will be wonderful when that problem disappears." As for the QL, it is not yet high on his list of priorities. "It is a professional machine," he says, "and for the moment my needs are purely personal."

Besides loading and saving, Struye has encountered only one other difficulty with his Spectrum, or rather with a ZX printer which sometimes prefers to eat paper rather than issue it in a steady stream. Because of a tip from a fellow Spectrum owner, he has found that bending the springs on either side of the paper feed to tighten them solves the problem.

So far as he knows, Struye is the only collector of military helmets using a computer in the pursuit of his hobby but he strongly recommends others to follow his example. "A ZX-81 can not only make things easier but is great fun", he says.

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.

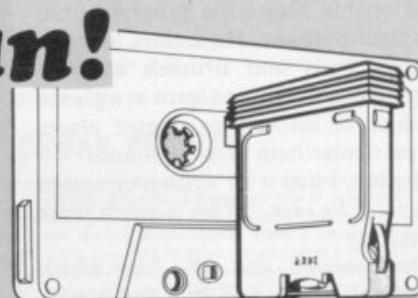
Many more products available. Send SAE for details!

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

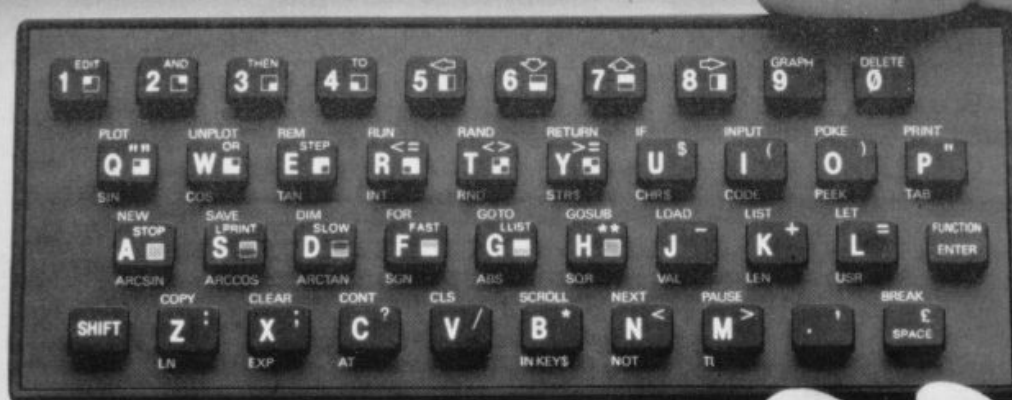
All programs mailed 1st class by return.
Prices include VAT and postage within Europe.
Campbell Systems
(Dept.SU) 15 Rous Road, Buckhurst Hill,
Essex, IG9 6BL England 01 504 0589



With MYRMIDON'S
Micro-Print ©
up to 51 columns!



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 £

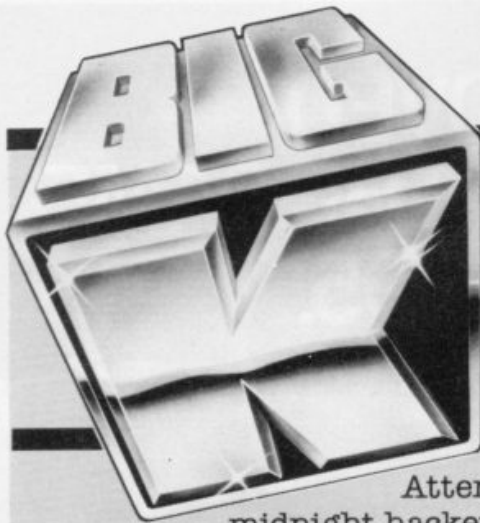
Name

BLOCK CAPITALS

Address

A3

FILESIXTY



THE NEW COMPUTER GAMES MAGAZINE THAT BREAKS ALL THE RULES

Attention all you pixel-packers, midnight hackers and binary-bustin' bozos! Gorf's gift to gamesville has just hit the streets. Big K's the name and Big K's the game – it's a new magazine that's going to be music to your micros. Whatever Big K gets in its sights – technical, tactical or just plain old topical, don't expect anything typical. Big K **plays** it different and **says** it different. We're not afraid to shoot from the hip – and we're always hip when we shoot! We've a no-holds-barred approach to arcade strategy and adventure that'll have your CRT's tingling. Key in to Big K now for a magazine that puts news, reviews, programs and hardware under your fingertips. **After your first byte of Big K...the game will never be the same.**

THIS ISSUE: Modem Living – access the world through your micro and telephone – Big K makes the right connections.

- Win a full-sized BATTLEZONE arcade game in Big K's extravagant competition.
- What's all the fuss about? Big K examines the 68000 wonderchip.
- Atari 800XL review.
- 7 games programs for Commodore 64, Vic 20, BBC, Spectrum, ZX81, Oric, Atari.
- Atari graphics – read Big K's special feature.

Plus – Arcade Alley, dozens of games reviews, expert technical features, lots of fun and lashings of colour.



Third amazing issue on sale 17th May

Ask your newsagent for a copy – 85p

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 ultra-violet 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 102

Starter Pack

continued from page 101

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.

NUMBER RACE

NUMBER RACE is a simple program written for the ZX-81 by Philip Taylor of Rowlands Castle, Hants. Once the program is RUN you will be asked to input the lane in which you think the winning number will run. There is a choice of nine lanes. The results of the game are given on completion and you will be told if you have won or lost.

```
10 PRINT "LANE ?"
20 INPUT B
30 LET B=B+6
40 FOR F=1 TO 9
50 PRINT AT 0,5;B-6;AT F+6,0;F;AT F+6,10;CHR$(F+156);AT F+6,28;"

60 NEXT F
70 LET K=INT (RND*9)+7
80 LET Z=9
90 LET Z=Z+1
100 PRINT AT K,Z;
110 IF PEEK (PEEK 16398+256*PEEK 16399)=0 THEN GOTO 90
120 PRINT AT K,Z;" ";CHR$(K+150)
130 IF Z=27 THEN GOTO 150
140 GOTO 70
150 IF B=K THEN PRINT AT B,3;"won"
160 IF B<>K THEN PRINT AT B,3;"lost"
```


Variables used by the program:

S = score.
A = landing pad position across screen.
B = ship's position across screen.
C = ship's position down screen.
Z = landing pad position down screen.
10 Make the starting score 0 and. . .

20 Clear the screen.
30 Print the score.
40 Start the landing pad at the left of the screen.
45 Find a random position for the landing pad down the screen which is at least seven lines down but not more than 20.
50 Start the ship in the middle of the screen.

This is the start of the main play loop. The program works its way through all the lines to line 140 and then returns to that point and loops through again, unless told to do something else.

60 Increase the position of the landing pad across the screen.

70 Find the new position of the ship across the screen. If you are pressing the 8 key, the expression (INKEY\$="8") will be true and will equal 1; if not, it will equal 0. The same applies to the 5 key. If both are being pressed, the INKEY\$ function will not work, as it can recognise only one key at a time. That kind of mathematics is known as Boolean algebra; for more information see chapter 10 of the manual.

80 Increase the position of the ship down the screen.

90 Prints the trail left by the ship.

100 Prints the ship.

110 If the across and down positions match, the ship has landed, so go to the extra lines which increase the score and start a new game.

120 If the ship has reached the bottom of the screen, go to the end of the game.

130 Prints the landing pad.

140 Go back to the start of the play loop.

The increase score routine. If you landed in line 110 the program goes to line 150 to increase the score and start a new game. When writing a program it is best to put all routines which are not often used outside of the main play loop. In that way the game will be a little faster, as it does not have to look through so many lines.

150 Increase the score by 10.

160 Returns to the start of the game but does not re-set the score.

170 The end of the game. Print the crashed ship.

AS YOUR starship hurtles to the ground leaving behind a trail of asterisks, you must attempt to dock on the moving landing pad.

Use key 5 to move left and 8 to move right. **Lander** was written for the 1K ZX-81 by Colin Flisk of Altrincham, Cheshire.

```

10 LET S=0
20 CLS
25 PRINT AT 0,0;S
30 LET C=0
40 LET A=1
45 LET Z=INT (RND*13)+7
50 LET B=10
60 LET A=A+1
70 LET B=B+(INKEY$="8")-(INKEY$="5")
80 LET C=C+1
90 PRINT AT C-1,B-1;" * "
100 PRINT AT C,B;"███"
110 IF B=A AND C=Z-1 THEN GOTO 150
120 IF C=20 THEN GOTO 200
130 PRINT AT Z,A;"███"
140 GOTO 60
150 LET S=S+10
170 PAUSE 50
180 GOTO 20
200 PRINT AT C,B;"███"

```

LANDER
LANDER
LANDER
LANDER
LANDER


```

1 REM SPECTRUM COLOUR
5 BORDER 7: INK 0: PAPER 7: B
RIGHT 0: OVER 0: INVERSE 0: FLAS
H 0: CLS
10 LET a= BIN 01010101: LET b=
BIN 10101010
20 FOR f=0 TO 15: READ x: POKE
USR "a"+f,x: NEXT f
30 DATA a,b,a,b,a,b,a,b
40 DATA 255,129,129,129,129,12
9,129,255
45 FOR g=1 TO 20: PRINT AT g,
0;"(g5)"; AT g,31;"(ig5)": NEXT
g
47 FOR g=0 TO 31: PRINT AT 1,
g;"(ig3)"; AT 20,g;"(g3)": NEXT
g
50 FOR p=0 TO 7: FOR i=0 TO 7

60 LET a$="AAAAAAAAAAAAAAAAAAAA
AAAAAAAAAAAA"
70 PRINT AT 0,0: PAPER i: INK
0;"B"; INK 0: PAPER 7;"(;"i;"")
+ "; PAPER p: INK 0;"B"; INK 0:
PAPER 7;"(;"p;"") = (BRIGHT 0/1).
.."
80 FOR a=2 TO 10: PRINT AT a,
1: INK i: PAPER p;a$: NEXT a
90 FOR a=11 TO 19: PRINT AT a
,1: INK i: PAPER p: BRIGHT 1;a$:
NEXT a
100 PRINT AT 21,2;"PRESS ANY K
EY TO CONTINUE..."
110 FOR t=0 TO 500
120 IF INKEY$ <> "" THEN GO
TO 130
125 NEXT t
130 BEEP .01,-5: PRINT AT 21,0
;"
": NEXT i: NEXT p
133 FOR g=0 TO 30: NEXT g
135 FOR f=0 TO 21: PRINT AT f,
0: PAPER 7;"
": NEXT f
140 PRINT AT 10,0;"(ig4:30*g3
:g7)"; AT 11,0;"(ig5)"; AT 11,31
;"(g5)"; AT 12,0;"(ig1:30*ig3:ig
2)"
150 PRINT AT 11,2;"ANY KEY TO
RUN PROGRAM AGAIN"
160 IF INKEY$="" THEN BORDER
1: BORDER 2: BORDER 3: BORDER 4
: BORDER 5: BORDER 7: PAUSE 1: G
O TO 160
170 CLS : RUN
200 STOP

```

72 COLOURS

CHRISTOPHER SMITH of Dagenham, Essex wrote **72 Colours** for the 16K Spectrum. Once RUN, the colours appear on the screen and the two squares at the top show which of the eight Spectrum colours is being used to achieve that colour.



mission

TEN POINTS are gained each time you shoot the invader heading towards earth intent on taking over. Use keys 5 and 8 to move left and right and 0 to fire.

Mission 1 was written for the 1K ZX-81 by Colin Flisk, of Altrincham, Cheshire.

```

10 LET S=0
20 LET C=10
30 LET A=1
40 LET B=1
50 LET B=B+1
60 LET C=C+(INKEY$="8")-(INKEY
$="5")
70 IF B=30 THEN LET B=0
80 IF B=0 THEN LET A=A+2
90 PRINT AT A,B;" "
100 IF A=15 AND B=29 THEN STOP
110 PRINT AT A,B;" "
120 PRINT AT 20,C;" "
130 IF INKEY$="0" THEN PRINT AT
A,C+2;"*"
140 IF INKEY$="0" AND C=B THEN
GOTO 160
150 GOTO 50
160 PRINT AT A,B+1;" "
170 LET S=S+10
180 PRINT AT 0,0;S
190 PAUSE 50
200 GOTO 50

```


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

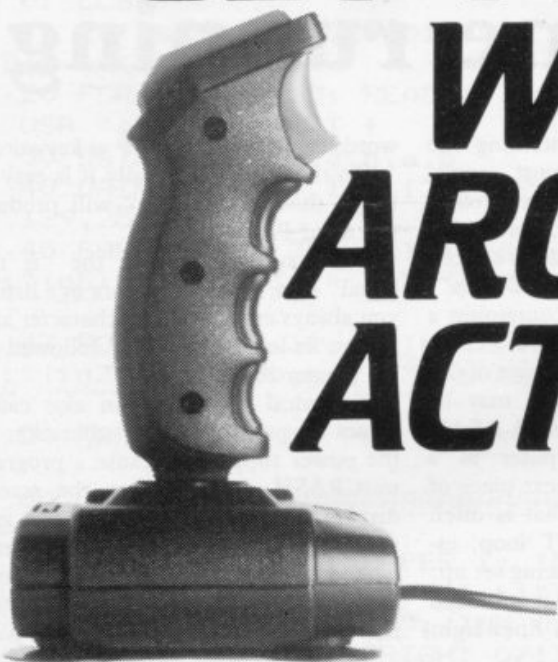
are both connected firmly. That error is caused by the computer and not by the program.

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.

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).

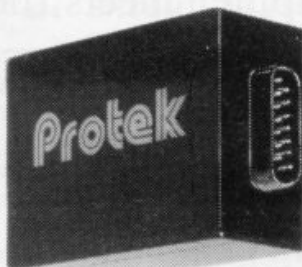


QUICKSHOT I £9.95

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.

TRANSFORM LTD.

Business Software

FOR SMALL BUSINESSES AND THE SELFEMPLOYED

Business Bank Accounts £10.75

This program enables you to make debits under 17 sub-headings. Statements includes totals of all subheadings.

Sales Day Book £10.75

For all your invoices, this program will enable you to prepare statements of outstanding invoices. Program will also calculate VAT.

Purchase Day Book £10.75

Keeps a complete record of all your purchases under 17 sub-headings. This program will also calculate VAT.

Business Packs £25.00

Incl. Bank Account, Sales, Purchase programs.

Stock Control £10.75

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.

Invoicing £15.00

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.

Word Processing by Tasman £13.90

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.

Masterfile by Cambell Systems £15.00

This is one of the best data systems available for the ZX Spectrum. This program has many uses in a small business.

Dlan by Cambell Systems £7.95

Use your Spectrum to sell your products. Dlan will display your message in up to 11 different typefaces. Will scroll in any direction.

64 Column Generator by Tasman £5.50

You can use this program within your programs to display 64 columns of screen.

Payroll by Byte One £19.95

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.

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.

Invoicing Sales/Purchase Ledger

NEW

A micro-drive base program incorporating all of the above with built-in price list. £25

Superfile

NEW

A new database program stores pages of text 64 columns x 20 lines. Full search facility and prints on full size printer.

£14.95

All of the above programs for ZX Spectrum 48K.

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 Bechtelham Kent

Tel: 01-658 6350



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

SPLAT ☐

MOUNTAINS OF KET ☐

TEMPLE OF VRAN ☐

1984 ☐

MILLIONAIRE ☐

COMMODORE
64 £6.50

SPLAT ☐

BBC BISERIES 1)

£6.50

1984 ☐

No

Name

Address

INCENTIVE

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

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 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.



Ultimate Play The Game is a trade name of Ashby Computers and Graphics Ltd., The Green, Ashby de la Zouch, Leicestershire, Tel (0530) 411485. Dealer enquiries welcome.

Contents

On page 110 Mike Wright gets to grips with QL software. Below we print the pick of the post

SINCLAIR BUSINESS USER

Q Save trouble in the system

I HAVE BEEN using the following set-up for some time: a ZX-81 housed in a dK-Tronics keyboard, Sinclair 16K RAM, Q Save, Memotech Centronics Interface and Seikosha GP-100A Printer. Recently a Memopack 64K RAM was purchased. That has five switchable modes, only four of which are usable on the ZX-81. The problem is that there appears to be incompatibility between the Q Save, the 64K RAM and the Centronics Interface.

The following occur in the four modes: Mode B—Q Save Software will load successfully; after setting Q Save above RAM top—new, new line—and entering PRINT USR 8671 the computer responds with '32' in the top

left-hand corner of the screen. Mode C—Q Save software will load successfully; the program will load successfully, but the printer will not operate. Mode D—As Mode B. Mode E—As Mode C.

Is there another RAM pack I can use, or can Q Save be modified so that it is usable? I have, incidentally, written to Memotech, PSS Ltd and Radionics Supplies (who I believe make the hardware for PSS).

I can, of course, use my existing set-up without Q Save, but I am very reluctant to do that. One program we are using in the office is a filing system using The Fast One from Campbell Systems—a very good program—but with the amount of data

we will be eventually using, we cannot possibly use the conventional loading system—it would take far too long. With a program of that length Q Save really comes into its own.

**J P Heritage,
General Manager,
The Triton Engineering
Co. Ltd,**

Masterfile update wins high praise

I BOUGHT a copy of Masterfile after reading your review in the February issue. I am more than enthusiastic about this terrific program, which makes it unnecessary to buy any additional programs for mailing lists, stock control, accounts and a whole host of other business uses.

This is to let your readers know that the new version 9 has an excellent printed manual and several very useful updates, e.g., back viewing of records and a supplementary program which converts the file for use with Microdrive.

In addition, when I telephoned the company regarding one or two queries, my problems were answered fully and clearly by the programmer.

Your business reviews are most helpful to me in making a decision about the suitability or otherwise of programs available.

**B Stern,
Hayes,
Middlesex.**

Vu-File on microdrive: Psion say no

WHAT a contrast. On receiving my Interface 1 and Microdrives I wrote to Tasman Software and Psion for guidance on using Tasword II and Vu-File respectively with Microdrive.

Tasman sent detailed instructions by return of post, Psion sent a stuffy letter full of claptrap about breach of copyright and said it was impossible. Long semi-business programs like Vu-File must be available on Microdrive. If Psion will not do it it is inviting cowboys to step in.

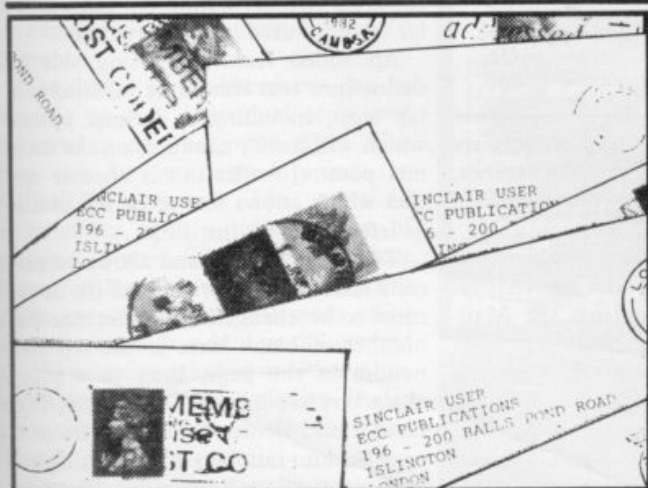
**John Hurdley,
Birmingham.**

Sweet shop cash book

AS THE OWNER of a 48K Spectrum I am interested in the computer for business use. I would like to know where I can obtain programs suitable for use with a small confectionery and stationery business. I use the Simplex D cash book, published by George Vyrer Ltd.

I understand that Vyrer has a program for use with Commodore 64 but not for use with any other computer.

**S Allott,
Billingham,
Cleveland.**



Quantum Leap to big business

The Psion software packages for the new QL are extremely powerful.
Mike Wright investigates their potential uses

IN JANUARY, Sir Clive Sinclair launched his latest computer, the QL — it stands for Quantum Leap, not as some would have us believe Queue Long. Following the Spectrum and ZX-81 it is a major step forward in price and performance. Its features include a full keyboard, 128K RAM expandable by a further 512K, two Microdrives, TV or monitor outputs, a RS232 port, joystick ports, networking and multi-tasking.

The majority of business machines usually include some or all of the basic business programs — word processor, database, spreadsheet and graphics — in the price. The QL, although not specified as a business machine, has all of those included in its £399 price. The programs are Quill, a word processor; Abacus, a spreadsheet; Archive, a database; and Easel, a business graphics package. They are being written by Psion, creator of Flight Simulation and Chequered Flag.

The keywords in the design have been user-friendliness and flexibility, words which in programming terms are usually not synonymous. Work began

the bottom of the screen which shows information on items such as file name, amount of memory used or remaining, and mode of operation.

All the programs have a Help function which will give information on-screen of the options available. It is available at any time by pressing key F1. The Help pages are stored on the Microdrive cartridge and loaded only when needed. Other common features include the use of F2 to toggle the display of the control area on and off, F3 to select a command and ESC to back out of or escape from a situation.

While it is difficult to give more than a flavour of each program, I believe it will be sufficient to show some of the power of these excellent programs. When the QL was launched I was wildly enthusiastic about the software. Since then I have had the opportunity, thanks to Psion, of using it regularly and while I may have found the odd wrinkle or the occasion where a program does not behave exactly as I expected or hoped, that has not detracted from my exuberance. If anything I now look forward even more to the day when

be printed. The program returns automatically to a new line at the end of an old one and it will move with it any word unfinished automatically.

Basic editing is just as easy. The cursor is moved via the arrow keys to the point to be edited and CTRL and either the left or right arrow key deletes letters to the left or right. For bigger amounts of text CTRL and ↑ deletes all text to the left while CTRL ↓ deletes text to the right. Text to be added is typed straight in; when the cursor is in position the text is re-justified automatically and if a large number of letters is added, two blank lines are inserted to save the constant shuffling of text.

Options are also provided so that bold type, underlining, and sub- or super-script can be used and seen as the text is being entered. That is done using the TYPEFACE option and bold type is denoted on-screen by using green lettering instead of the usual white.

More detailed editing and design work can be done using the COMMANDS. A list of them is provided by pressing the F3 key; a second list can then be obtained using the Other option. Each command is selected by pressing its initial letter when it is shown in the control area. They include options for searching and replacing specified strings, setting tab stops similar to those used on a typewriter.

An added feature is being able to define how text should be justified at a tab stop, including a decimal option which will justify numbers on the decimal point. Justification is another option which allows text to be left centre or left- and right-justified.

The Design command allows parameters related to the printing of the document to be changed. They include the number of blank lines at the top and bottom of the page, lines to a page, characters to a line — 40, 64 or 80. The Header and Footer commands let each page be auto-numbered in either alphabetic, numeric or Roman numeric char-

'The keywords in the design have been user-friendliness and flexibility, words which in programming terms are usually not synonymous'

on the suite of programs 18 months ago before the approach from Sinclair Research and it is intended to continue with updates and developments released from time to time via QLUB, the QL Users' Bureau.

The display is similar in all the programs and consists of a control area at the top of the screen which shows the commands and options available to the user; the display area which displays the output of the program; all the programs except Archive also have a status area at

I have a QL. When the programs are released eventually for other machines, dBase II, VisiCalc and Wordstar will have real competition.

Quill is a powerful and flexible word processor, although it does not yet possess the extra facilities that the Mailmerge and Spellstar programs provide for the popular Wordstar. It is easy to start with Quill and no computing knowledge is necessary; text is typed-in straight from the keyboard and is shown on the screen in exactly the way it will

acters, as well as including text at the top — or bottom. Margin changes the start-up values for the three margins left (0), indent (10) and right (80).

Perhaps the most important feature for the serious business user is the ability to import files from the other three packages directly into Quill. That means that tables can be inserted directly into a report with the minimum of effort. Unfortunately graphs must be printed separately or photographed.

Graphs are a useful tool for illustrating points which need to be made. Often, unfortunately, they are not drawn because of the time and effort involved in obtaining a smart, clear display. With Quill, that is no longer a problem; even the chore of entering the data into a data file before plotting has been eliminated.

Once loaded, Quill shows the outline of the graph in the display area; the x axis is labelled January to December and the y axis is numbered 0-10. As numbers are entered they are displayed automatically on the graph, which is self-scaling to make most use of the room available. The labels along with any other text can be edited using the EDIT command.

Once one set of figures has been entered, another set can be entered using the NEWDATA command. A name for the data is requested but before apparently returning to the start the old set is stored in memory. Any old set can be used as the current figure by the OLDDATA command.

It is also possible to create a new set of data by using a formula. For example, wave=sin — count *10*PI()/180 creates and displays as a bar chart a set of figures called wave which is calculated as the sine of count, a variable which returns 1 for the left-most figure, 2 for the next, and so on; times 10 times the constant pi divided by 180 or simply a sine wave plotted every 10 degrees.

The design of the bar charts can be changed to suit individual style and taste and to give maximum effect. The bars can be re-designed using the CHANGE command. That gives 17 styles of bar, with a further option of creating user-defined bars. More changes to the style and colour of graph paper, axes and text are also made using that command. In addition the current figures can be re-graphed as either a line graph or pie chart using change. It also gives similar options on the style and colouring of the graphs.

Even on a graph it may be necessary

to pick out a particular value to emphasise it. A HIGHLIGHT command has been provided for that purpose. It allows a special symbol or bar to be used to represent the data point in line and bar graphs but perhaps it is most useful on pie charts, where the sector is highlighted by being detached slightly from the rest of the pie.

More than one set of data can be shown at once using the VIEW command. That suggests that all data sets should be displayed but allows the user

'Cells can also be defined by the appropriate row and column levels'

to name only those he wants to be shown. It then offers a format for the display or users can select the format.

Data can be transferred to Abacus, Archive and Quill by the EXPORT command. When a graph is sent to Quill it is sent as a table of values. Reproduction of the graph for use in a document must be done using PRINT or by photographing the screen after the control and status areas have been cleared using key F2 and shift F2 respectively.

Abacus is described as a thinking

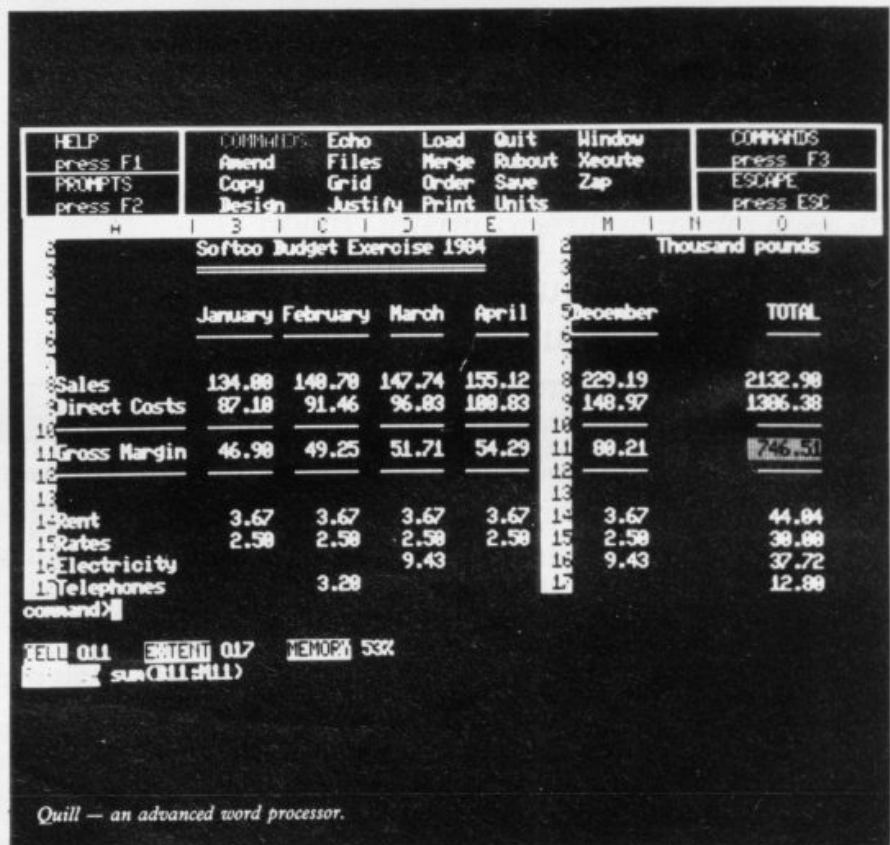
spreadsheet. Psion has used the term to try to describe the impressive features it contains. The spreadsheet mimics a large piece of paper, in this case with 256 rows and 64 columns — only a window of 16 rows and seven columns is shown on screen. Each cell on the sheet is referred to by a column — letter(s) — and a row number — e.g., A1, B16, BL256 — and can contain a number, text or a formula.

Numbers can be shown on the spreadsheet in five ways — Integer, Decimal, Exponent, Monetary and Percent. Decimal, Exponent and Percent all allow the number of decimal places to be specified, while Monetary rounds to two decimal places and inserts a leading user-specifiable currency sign.

Perhaps one of the most powerful features of Abacus is its ability to label rows and columns and to use those labels in further calculation. Cells can also be defined by the appropriate row and column labels. Formulae can be defined for a cell, row, column or even a range of cells.

A range of commands allows the user to amend data on the sheet, copy cells or blocks to another position, echo the number or formula in one cell to another cell or range of cells or erase the contents of one or more cells. A column of numbers can be sorted using Order;

continued on page 112



continued from page 111

although the numbers are affected, formulae are not. Grid allows rows or columns to be inserted or deleted.

Other commands allow the user a high degree of design flexibility. Numbers and text can be left centre or right-justified using JUSTIFY. The DESIGN command offers options on Auto-calculation — the table is re-calculated after every entry. If Auto-calculation is turned off, a re-calculation can be forced by the XECUTE command, treating cells with zero as noughts or BLANKS, the order of calculation — rows or columns first — and a range of options on controlling the printer.

Two sections of the sheet can be shown together with the WINDOW command. A range of options is provided for handling files, including merging one grid with another, loading, saving, importing and exporting.

While the range and ability of the commands is impressive, the range of functions Abacus supports almost turns it into a programming language. Apart from the usual arithmetic functions, the user can be prompted for input, as either text or numeric, by using the ASKT or ASKN in a cell.

Other functions depend on the QL clock being set and the return date, time or number of days passed since a nominal zero value or the name of month (n) where n=1-12. For the financial user a Nett Present Value and an Internal rate of Return function are provided. A look-up table can be set up elsewhere in the grid and referred to.

As one would expect with such a range of commands and functions, there

HELP press F1	CURSOR move ← with ↑ keys →	TEXT Type to insert at Press ENTER for new para Delete: SHIFT KEY & ← Change mode: SHIFT KEY F4	STYLE press F4 GLOSSARY press F5	COMMANDS press F3 ESCAPE press ESC
------------------	--------------------------------------	--	---	---

.....1.....2.....3.....4.....5.....6.....7.....8

London Hill.

Dear John,

Re : 37, Baldock Street, Hill

I enclose a cheque for £136.45 for searches that you have carried out on this property. I note that the property is owned by Milharbour Estates Ltd. and I would be grateful if you could approach them on our behalf.

We are prepared to offer up to

MODE: INSERT
STYLE:

WORDS: 65

LINE: 21 PAGE: 1
DOCUMENT: "default.doc"

Abacus — a thinking spreadsheet

Records and Files. A field is the basic piece of information, e.g., name; a record is a group of fields and the file is a group of records. A file is started by using the CREATE command and also specifying the variable names which will make up the fields.

Records can be added to a file by the INSERT or APPEND commands, though it will usually be easier to use Insert which prompts for the variable names. While the DELETE command erases a record from the file, it erases only the current record and so will often be used in conjunction with the BACK and NEXT commands.

Back displays and makes current the

used, while OPEN is used to open read-and-write files.

Records and fields can all be searched using the FIND and SEARCH commands. Find looks through all fields for a given string, independent of capitals, and the first record with the field is shown. Others can be displayed using Continue. Search is more selective and searches the named field(s) for the string, as specified. Again the first matching record is shown; others can be shown using continue. SELECT picks out a subset of the records.

Archive has an in-built format for records but that can be changed to the users' own using the SEDIT command. That can then be saved using SAVE and re-loaded using SLOAD. Once loaded, the display becomes active and is used for displaying records in that format.

Procedures are written using the EDIT command and are named programs without numbers, written using the commands of Archive. The full command set includes loops — while; endwhile; branching — if; endif; user input — input. A range of functions is also supported. Procedures can also be created using the other procedures. It is conceivable that a procedure could consist of other procedures.

In the Edit command, facilities exist for deleting and re-positioning commands as well as inserting or amending them. A Trace mode is also provided so that a procedure can be followed line by line to speed up the location of errors.

● Mike Wright is currently writing a series of books on the QL software for Melbourne House.

'Programs can be written as a series of self-standing routines, called procedures, which will be familiar to BBC micro owners'

is a wide range of error messages which help to locate easily any mistakes which may have been made or may arise from calculating a formula with a meaningless argument.

The fourth and most complex program of the Psion package is Archive, a multi-file relational database. As such it has its own language with a syntax similar to QL SuperBASIC. Programs can be written as a series of self-standing routines, called procedures, which will be familiar to BBC micro owners but probably not to ZX-81 or Spectrum owners.

The basis of any database is Fields,

previous record while Next does the same for the next record. The FIRST and LAST commands perform a similar function, displaying the first and last records respectively, and POSITION sets the record with the number specified the current one. Once a file and all its records have been created they can be saved by closing it with CLOSE or QUIT. When at a later stage the file is to be used it must be opened i.e., loaded into memory and made ready for use. Archive files can be used in two ways, as read-and-write files or read-only files. When files are opened so that they can only be read the LOCK command is

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.

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!



FOR 48K SPECTRUM

£6.95

* Genesis II *

the adventure game that understands plain English!

The colony ship Genesis II has been hijacked by space pirates – and you're the only crewman left! Only you can save the cargo – an entire forest, full of animals, destined to populate a new world. This exciting adventure game has a vocabulary of nearly 300 words, avoiding that frustrating search for the precise word command.

- ★ Nearly 100 different locations
- ★ Over 60 objects ★ 100% machine code
- ★ Over 500 possible actions

* For 48K Spectrum
£6.95

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



PHONE YOUR
VISA/ACCESS
NUMBER

MIKRO-GEN

44 The Broadway, Bracknell, Berks RG12 1AG Tel: 0344 427317

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

Limited Company

£17.50

£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

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 subsetting 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

The Sinclair QL Companion

by Boris Allan

— an essential handbook for all who want to know about the QL.

Covers the Sinclair SuperBASIC language and the principles of structured programming, the use of sound and graphics, and examines the QL's hardware facilities.

Includes sections on programming the QL's Motorola 68008 microprocessor and an overview of the Intel 8049 support chip — used to handle peripherals such as the QL's keyboard.

Makes useful comparisons between the techniques of programming the QL and other popular micros.

Buy your copy NOW — from all good booksellers.

ISBN 0 273 02187 7

Pitman Publishing



Publication April
£6.95

The best accessory for your micro



ONLY
£34.49

(P+P £2.50)

The Rotronics Portable Case

Here is the ideal portable work station for home, school or work. Specially made for most home microcomputers, it contains your ZX81 or Spectrum within a smart executive style case with removable lid for convenience in use.

The individually tailored foam insert securely protects your

micro, printer, cassette recorder, tapes and manuals during transit. A scalpel is provided to modify the insert for expansion units and an alternative insert can be supplied if you change your hardware in the future. The case is also available with uncut foam inserts. All components remain fully operational within the case via inter-

connections routed between the double layers of foam, so there are no unsightly leads.

This is the first case designed for easy use with each component positioned for convenient operation. The overall dimensions are 138mm x 700mm x 363mm.

Spectrum Joystick Interface

Revolutionary design allows standard (9 pin) joystick to be used with any Spectrum software. Easily programmed in seconds - no links or cassette software required £24.45 (p+p 50p).
Spectravideo "Quickshot" Joystick £9.45 (p+p 50p).



ZX Panda

The best 16K RAM for the ZX81. Anti-wobble design with LED power indicator. 16K Expandable RAM Pack £18.50 (p+p 50p). 16K Plug-in Module for above £13.95 (p+p 50p). 32K Giant Panda including Module £31.45 (p+p 75p).

Order Form

Trade Enquiries Welcome

Please send me (tick appropriate box)

- ☐ Rotronics Portable Case at £36.99 (inc. £2.50 p+p) for ZX81/Spectrum/Uncut Foam (please delete as necessary)
- ☐ ZX Panda 16K RAM Pack at £19.00 (inc. 50p p+p)
- ☐ ZX Panda 16K Plug-in Module at £14.45 (inc. 50p p+p)
- ☐ ZX 32K Giant Panda including Module at £32.20 (inc. 75p p+p)
- ☐ Spectrum Joystick Interface at £24.95 (inc. 50p p+p)
- ☐ Spectravideo "Quickshot" Joystick at £9.95 (inc. 50p p+p)

All prices inclusive of VAT

I enclose a cheque/PO for £ _____ made payable to SMT.

Name _____

Address _____

SMT

SU/6/84

Please allow 28 days for delivery. Send to (no stamp required)
FREEPOST Greens Norton Towcester Northants NN12 8BR

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

MICROMEGA

**3-Dimensional arcade strategy
on the 48K Spectrum — £6.95**

Compatible with Kempston, Protek/AGF,
and Interface 2 joystick types.

Available at:



spectrum

Great expectations

Theo Wood talks to teachers about the potential of computers in education and finds the possibilities fascinating

THIS is likely to be the year when the educational uses of the computer move to the forefront of discussions among teachers in schools, both primary and secondary. One development to note is the way teachers have taken different routes to become adept at using a computer in the classroom. Some may have attended courses provided by their local education authorities, while others, having bought micros for home use, have taken them into schools and been surprised by the overwhelming popularity of the micro in their own teaching situations.

Steve Wright, who teaches at Langdon School, a comprehensive in the London Borough of Newham, already had a great deal of computing experience before he began using a Spectrum in the mathematics department. While working for his physics degree he used a mainframe and during post-graduate work was writing programs in Fortran. Buying a ZX-81 rekindled his interest in programming and he started writing programs he could use in school work. When he bought a Spectrum the pro-

cess continued and there are now three Spectrums in his department.

cess continued and there are now three Spectrums in his department.

Ken Heaton, a teacher at Gateway Junior School, Lisson Grove, London had used computers in his mathematics and statistics course at Kent University but it was buying a Spectrum which spurred him to become involved in using computers in the educational field. He first took his Spectrum for children to use in a lunch-time computer club. The response was overwhelming.

"The demand was so great that we had in the end to limit the numbers to the higher end of the school, because so many children were interested," he says.

Terry O'Brien, a teacher at Comber Grove Primary School, Camberwell, became enthusiastic about the potential of computers in schools when he attend-

ed two-day introductory course at the MEP centre in Croydon. After that he bought a Spectrum for home use and then started to use it at school, where there are now four Spectrums as well as one RML 480-Z.

Having introduced computers into schools, the most important consideration is how their use is to be implemented in everyday learning. I spoke to Ian White, an advisory teacher for secondary education at the Inner London Educational Computing Centre. He sees the role of the computer as important in a number of areas.

"It has a very wide-ranging role. In my subject area you have the computer studies course which is taken to examination level, and that is a specialist study in computers. That in the past has tended to be the only computer education and has necessarily had to do computer awareness.

"There is the awareness of society in general and computers as part of that society has to be taught within that. Computers are used in particular subject areas to enhance those subjects."

Wright sees the computer as particularly useful in the latter field, where cross-fertilisation of work between the computer and other more conventional modes of studying is increasing motivation by the use of computer modelling and more learner-orientated discovery.

He is interested in the role which strategy games can play in the curriculum and has been using **Corn Crops**, a Spectrum program, with his second- and third-year pupils to great effect.

As a teacher at junior school level, Heaton summed up his view of the role a computer can play. "I think in an infant and primary school it is important to grow with the times, so that children are used to a computer from the age of four or five, so that once they go to secondary school, it is not a complete shock to them."

For O'Brien, a computer has its place in the activity classroom, not only to help with basic skills but to introduce children to new areas of learning, such as Logo.

"A micro has a special effect on children as it is completely non-judg-

mental and allows them to acquire and reinforce basic skills in an efficient and enjoyable way".

Authorities vary as to which hardware to support in their schools. The Inner London Education Authority, for example, like many others, decided to standardise on the RML machines at primary and secondary level. There are obvious reasons for standardisation, as support systems can develop software and maintenance for all machines in the schools. Other authorities, such as Grampian Regional Council, chose to support the Spectrum at primary level.

Of 285 primary schools, more than 240 have ordered or have received their Spectrum kits under the Department of Trade and Industry scheme. Gavin Bell, director of the project at the teachers' resources centre in Aberdeen, says:

"We are conducting a survey on computers owned by schools but there are already clear signs that schools are buying more computers — several have four or five. One of the reasons for choosing the Spectrum was that, while the first computer is subsidised, second and subsequent machines are not. With bulk discounts our schools can buy a complete 48K kit, with printer, Microdrive and colour display for less than £400. In-service training is being carried out in stages and there is further support for teachers via regional working parties which are reviewing avail-

concentration at Comber Grove



able software, producing guidelines on the best use of various packages, and drawing up specifications for educational programs."

The relative merits of various pieces of hardware from a technician's point of view is best argued in other forums; teachers are more likely to be interested in what a computer can do in their own subject areas. Just as there are different decisions as to hardware, it would be very surprising if there was complete agreement about the merits of various approaches in software. The child-centred approach obviously favours programs which allow children to investigate, discover and create. At the other end the teacher-centred approach would prefer programs which have a clearly identifiable purpose within the scope of skills training.

Those are the two extremes of the axis and the two views are not mutually exclusive, in that an open-ended program such as Logo can be teacher-directed, and some programs which reinforce basic skills by requiring text entry can be of the exploratory type. Teachers and parents will choose software from what is available, according to their proclivities for a certain approach, as well as recommendations from other teachers and teachers' cen-

'The real power of computing will be seen in simulations'

tres. Some may even write their own programs as Wright, Heaton and O'Brien have done.

There is a need to evaluate software beyond the review stage to discover if a particular program achieves results for a period, say six months. With his headmaster Michael Kent, O'Brien hopes to raise money so that every classroom in his school is provided with a Spectrum and eventually hopes that the school will become a centre for the evaluation of programs used on an everyday basis.

Commercial software has improved in the last year, he thinks: "A year and a half ago the experts were correct in saying they were rubbish but I think that is changing".

In the last year vast numbers of programs have been published for the Spectrum but there are still gaps, particularly in the number of information retrieval database packages, a proper implementation of Logo, and a junior word processing package. There could



Ken Heaton and Steve Wright

be many more strategy/adventure games which complement course work in various subject areas for children who have acquired basic skills.

The Sinclair Education Exhibition held in March indicated that those gaps are about to be filled. The Sinclair Logo was on show, with intended release in about a month, and a half-finished junior word processor called Scribe, written by CSH Ltd of Cambridge, was also on the Sinclair stand.

I asked David Park, Sinclair educational representative, what software developments he would like to see in the future. "I am keen to see programs which develop logical thinking and those which employ the strengths of the computer in data handling. We would hate to see a number of drill and practice programs; they have their uses but that is not the way forward. The real power of computing will be seen in simulations, something children cannot experience in their local environment, such as simulations of real events, like running a coal mine or an oil field".

The most impressive feature of the show was the control applications for the Spectrum. Griffin and George, supplier to schools was showing its interface which provides three types of inputs and three outputs. Applications on show included a Fischer-Technic model with full moving gears, a robotic arm and a panda crossing. Griffin and George supplies all the accessories, such as stepper motors and sensors to measure temperature, pressure, magnetic fields and movement.

Richard Bignall from the MEP project for the Chiltern area spoke of future developments for the Spectrum: "The

developments in which we are involved are using Logo for control applications in the primary school, so that instead of just doing Turtle graphics for driving a turtle on the floor, you can plug in other pieces of hardware.

"We are hoping to produce in the next year a self-contained board for primary schools which will allow them to interface with the real world and to demonstrate certain principles, such as digital and analogue input/output. It will be expandable.

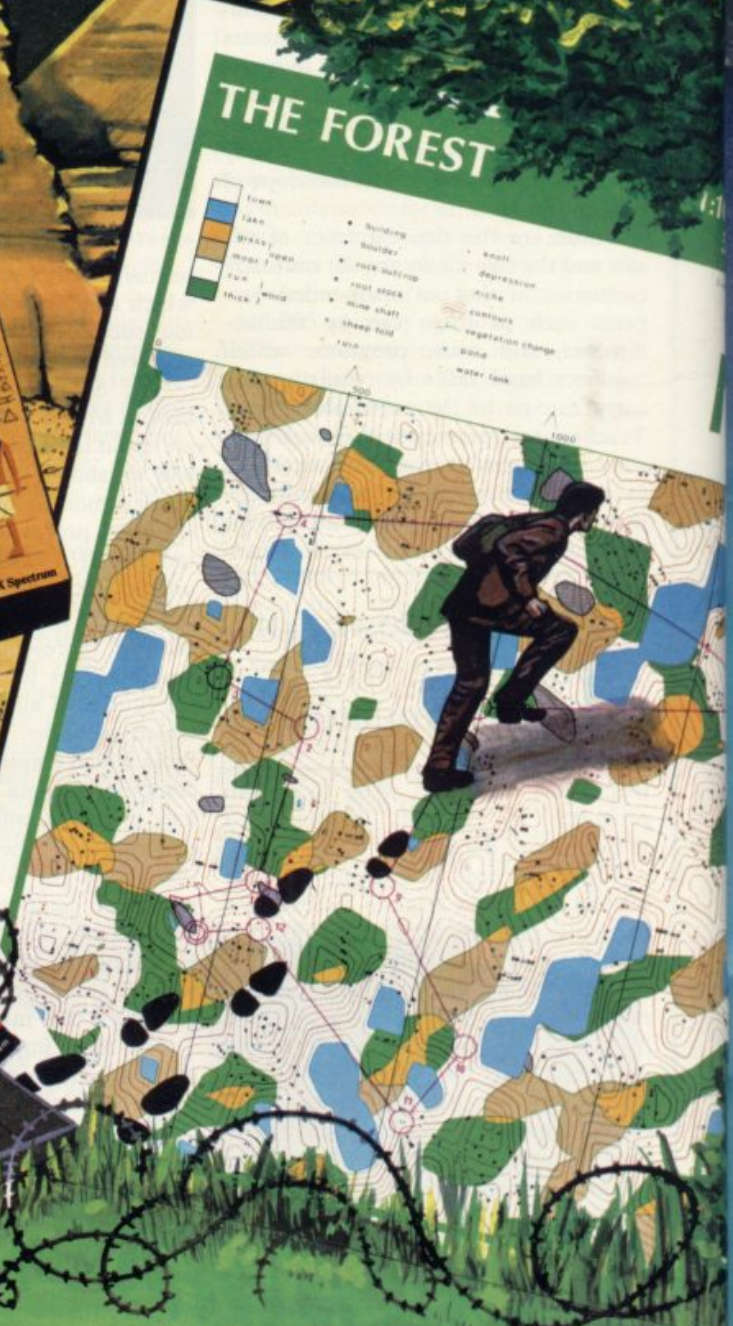
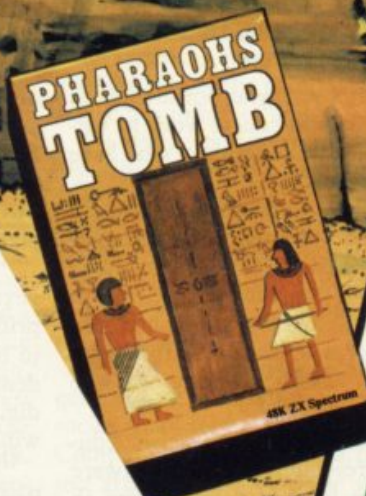
"We have been using versions of Basic in secondary schools for control applications and are working on a version of control Basic for the Spectrum.

"Looking at Logo, we hope to do the same thing in a much more friendly fashion; in fact, we are very tempted to say let us use Logo for most applications. We are aiming for an A4-sized board costing around £100, not in a box, as we want the children to see the circuits and get away from the black box image.

"The board will run two motors with reversing of the Lego type. There are plenty of remote-controlled children's toys on the end of a piece of wire which range from the talking dog to such things as racing cars, as well as model trains."

With all those developments, it looks as if the role of the Spectrum as an education machine is assured. Interfacing projects will soon be within the scope of children and adults who may have had no previous experience of electronics and, apart from the benefits to technical education, the developments look like being enjoyable and, above all, entertaining.

48K ZX SPECTRUM



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

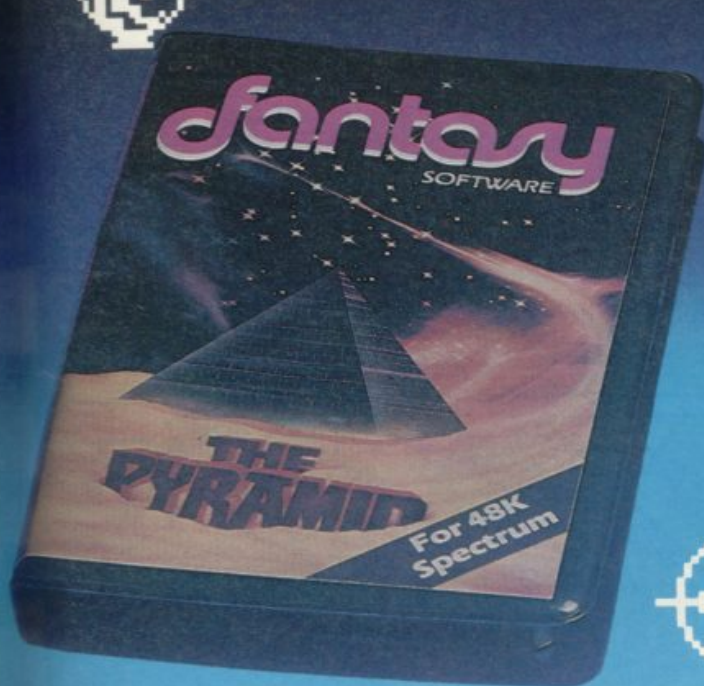


fantasy

SOFTWARE

The battle could be yours.....

.....but it won't be easy!



This is 'ZIGGY', shown above, in his exploratory capsule and is a true representation of the on-screen graphics.

THE PYRAMID

THE PYRAMID is an arcade style game which has a very adventurous feel to it.

The Pyramid contains 120 chambers on 15 levels. In order to get from one chamber to another you must fight off the indigenous aliens to collect an energised crystal which will neutralize the force field guarding the two exits.

The Pyramid is inhabited by a total of 60 weird and exotic alien types, all of which are beautifully animated. You will meet a whole variety of demons, droids, insects and monsters, with a sprinkling of the more unusual, the extra-terrestrial tweezers, galactic strawberry, cosmic claw, mutant eye, plus a whole host of entities that defy rational description. You'll no doubt invent your own nicknames.

You proceed to explore the pyramid from top to bottom with the difficulty generally increasing with the depth of level. Depending on the choice of exit from each chamber you are likely to have a different game every time you play.

Apart from the challenge of trying to achieve the highest score possible the pyramid contains a number puzzle to solve. The more chambers you successfully visit the more information is gathered to enable you to discover the secret numbers of the pyramid. The puzzle won't take you days to solve, it will probably take you a few months.

DOOMSDAY CASTLE

DOOMSDAY CASTLE consists of a labyrinth of 74 complexly inter-connected Halls and Passages where you will meet a whole host of adversaries serving the infinitely evil Scarthax, the Garthrogs, the Orphacs, the phenomenally nasty Googly Bird and the Urks which manifest themselves in over fifty unbelievably weird and wonderful guises.

Scarthax has scoured the Universe to bring together the six ancient stones of life force. United in Doomsday Castle they are being used to wield an irresistible power over the cosmos, emanating waves of corruption through every galaxy.

To save the Universe, you must battle your way through the Castle to find and collect the six stones and use their force against Scarthax to destroy Doomsday Castle, hopefully escaping yourself before the final cataclysmic explosion.

The task is not easy (saving the Universe never is!) and it will take you many games to unfold the structure of Doomsday Castle and discover the locations of the ancient stones.

The addictive arcade style action will keep you coming back to play but the overall challenge should still keep you occupied for months.

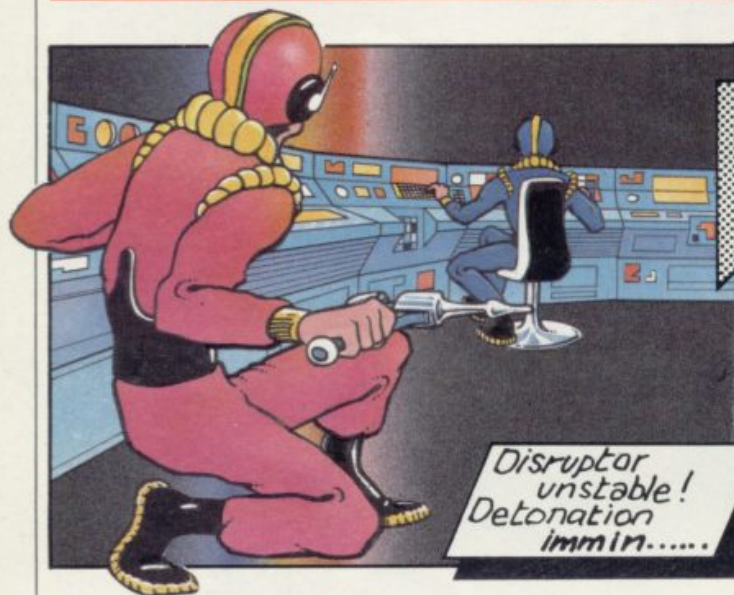
FANTASY SOFTWARE is available from W.H.SMITHS, JOHN MENZIES, BOOTS, LASKYS, GREENS, RUMBELOWS, SPECTRUM GROUP, COMPUTERS FOR ALL and all other good software retailers.

The Pyramid at £5.50 and Doomsday Castle at £6.50 from

FANTASY SOFTWARE, FALCONBERG LODGE, 27A ST GEORGES ROAD, CHELTENHAM, GLOS GL50 3DT
despatched by return first class post together with free membership and current newsletter of the Fantasy Micro Club.
Trade Enquiries welcome - telephone 0242-583661.

BEYOND

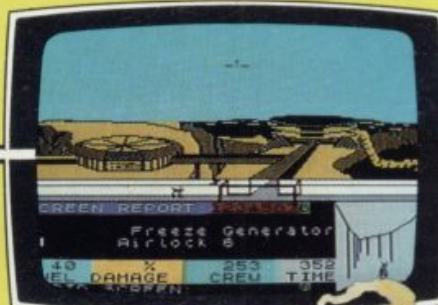
CHALLENGING SOFTWARE



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. Hurlled 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.



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.**

BEYOND

To . . . **Beyond** Competition House,
Farndon Road, Market Harborough,
Leicestershire LE19 9NR

Please send me . . .

Qty Total Price

PSYTRON	£7.95
SPELLBOUND	£5.95
THE LORDS OF MIDNIGHT	£9.95

BEYOND HOTLINE
0858 34567

GRAND TOTAL
all prices include p&p

I enclose a Postal Order/Cheque payable to Beyond, or charge my credit card.

Card Number _____

Access/Visa (Delete as necessary) _____

Name _____

Address _____

Post code _____

Signature _____

Please rush me details of the 'Enter the Beyond' Software Club. ☐ **54.6**

ACTION IN THE THIRD REICH...



SPECIAL OPERATIONS

This graphic adventure allows you to pick your own specialist team. Evade the German patrols in order to locate, photograph, penetrate and eventually destroy a germ warfare research centre, stealing the top secret cultures on the way.

Spectrum 48K £5.95

THE THIRD DYNASTY...

NEW

Woken from eternity by a mad archeologist and armed only with a spade you must bury the spirits in the masonry of the Pyramid if you are ever to read the cartouches and return to your golden sarcophagus.

Spectrum 48K £5.95



OR THE THIRD DIMENSION.

NEW



GRID PATROL

Fast and furious. Eight different screens test your lightning reactions as you attempt to wipe out the aliens in a devastating crossfire from surrounding tanks. High score table. 100% machine code.

Any Spectrum £5.95

JOYSTICK COMPATIBLE KEMSTON AND CURSOR JOYSTICKS

Simply fill in the coupon below and POST TODAY!

ORDER NOW!

ACTIONMASTER GAMES - AVAILABLE AT SELECTED OUTLETS OF:-
JOHN MENZIES, NCS, CO-OP, SPECTRUM, MAURO, TIGER TRADERS, LIGHTNING DEALERS & BETTER RECORD SHOPS. SELECTED TITLES AT W.H. SMITH

You'll also find the full range of Actionmaster, Adventuremaster and Warmaster games in our free colour catalogue.

Special Operations	48K Spectrum £5.95	Two-Gun Turtle	Any Spectrum £5.95
Mummy Mummy	48K Spectrum £5.95	Bedlam Blaster	Any Spectrum £5.95
Grid Patrol	Any Spectrum £5.95	Beetlemania	Any Spectrum £5.50
Micromouse	Any Spectrum £5.95	Please send me my FREE colour catalogue	

I enclose a cheque/P.O. for £ _____ made payable to M C Lothlorien.
Please debit my Access A/C No. _____
Name _____
Address _____

SU 5/84

Post to: M C Lothlorien, 56a Park Lane, Poynton, Stockport, Cheshire, SK12 1RE
Tel: Poynton (0625) 876642

LOTHLORIEN

more action for
your money

Doric Computer Services

Present

The Oracle's Cave

AN AMAZING NEW
ADVENTURE GAME
WITH ANIMATED
GRAPHICS
FEATURING:-

- A completely new cave layout, monster position and event sequence generated for every game.
- A time limit of 5 'days' on every adventure.
- Continuously displayed high resolution graphics and text.
- All monsters, articles and locations depicted to a level of detail that pushes SPECTRUM graphics to the limit.

"The closest yet to a true
animated graphic adventure...
...excellent value for money."
POPULAR COMPUTING WEEKLY.



FOR THE
48K SPECTRUM

'Superb high resolution with smooth scrolling... with the nights drawing in this program should give you plenty to think about' *Micro Adventure Dec 83*
'The graphics are smooth, startling and exciting. They show the way for the development of the graphics adventure in the next year' *Sinclair User Annual 84*
'Each quest is selected by you at the beginning of the game and you will have five game days in which to complete it. The time is exceptional in adventure games' *Sinclair User Dec 83*

Available from W. H. Smith, Boots, J. Menzies and other leading retailers or direct from:

DORCAS SOFTWARE
3 THE OASIS, GLENFIELD,
LEICESTER LE3 8QS.

At £7.95 (Postage and Packing free.)

COMING SOON:

- ★ THE RUNES OF ZENDOS — 12 adventures in one game with even more animation, problem solving, sentence input and other exciting features! For 48K Spectrum.
- ★ COMMODORE 64 version of THE ORACLE'S CAVE!

*We have changed our business name to **DORCAS SOFTWARE** to avoid confusion with other companies and computers. Rest assured that the high quality of our products and services will remain unaltered.

The trouble with joysticks

Andrew Hewson answers add-on queries

IT IS inevitable, I suppose, that as more add-on hardware reaches the market, more people should write to me concerning their difficulties in running all the items in their collection at one time. When the Spectrum was released the only available add-on was the ZX printer. These days a cursory glance through the pages of this magazine will reveal the variety of items available to the willing purchaser — keyboards, sound units, speech units, light pens, joysticks and more joysticks, printer interfaces, to say nothing of the official Sinclair Interfaces One and Two.

The main difficulty people experience is plugging all the items in their collection into the back of their machines at the same time. Sometimes the difficulty is physical, in that the bulk of one item prevents a second item being plugged in, but too often it is because a manufacturer has omitted to provide a duplicate edge connector on the rear of the equipment, thus preventing a second or third item from riding piggy-back. That seems particularly thoughtless to me.

In principle, the problem can be solved by an hour or so of careful work with a soldering iron, some edge connectors and suitable multi-way cable, but I doubt if most people care to be so adventurous. In view of the multiplicity of add-ons, my advice is that if it does not have a second edge connector, don't buy it. In the last resort, consult the small advertisements as there are some constructive firms supplying extension systems.

The main topic this month is joysticks. I have had a number of letters about them, including this cautious enquiry from Grahame Cox of Epsom. He writes: **I have not bought a joystick because the number of options is bewildering. Would you please advise me what are the advantages and disadvantages of the various arrangements?**

The choice is bewildering, as he says, but probably the simplest arrangement is the keyboard clip-on type such as the Mechanical Stick from EEC or the

Spectrum Stick from Grant Design. Those devices clip over the upper face of the Spectrum and contain plastic linkages which transmit the physical movement of a short joystick via appropriately-positioned feet direct to the arrow keys — 5, 6, 7 and 8.

That arrangement has three advantages. It is cheap, it is guaranteed to work with all the games which also use



the arrow keys — and that means virtually all arcade games — and the rear edge connector remains free for use with other hardware. The devices rely on a crisp mechanical linkage and if, like me, you are enthusiastic when shooting aliens, you can distort the units all too easily so that the feet no longer press against the keys.

Assuming that you have decided against the clip-on type, the next step is to realise that there is a difference between the joystick and the electronic box of tricks — the interface — which connects the joystick to the computer. The joystick proper is essentially a stick with a limited degree of movement which closes one or more of a group of microswitches as the stick is moved within a frame.

For my money there is not much to choose between the various conventional makes, although some people have strong preferences. I find the stiffer ones with a strong tendency to self-centre easiest to control but that is probably because I like to wrestle with the stupid things. The Trickstick from

East London Robotics is a novel idea and perhaps it points to the kind of finger-tip control which will become common in the future.

The greatest variation between manufacturers occurs in the interfaces. There are four types. Kempston, so-called because Kempston was the first in the market to use the system — the joystick setting is returned by the IN 31 command; arrow keys — The joystick mimics the arrows keys 5 to 8 and the fire button mimics the 0 key; Sinclair interface two — the right-hand joystick mimics the top right half row — keys 6 to 0 — and the left-hand joystick mimics the top left half row — keys 1 to 5; programmable — can be set to mimic any five keys on the keyboard.

Logically, the programmable types should be recommended because they are the most flexible but re-setting them can be a tiresome business. The arrow-key types make a good second best, because so many games use those keys. A number of games also use the Kempston system because that was the first joystick on the market. The company also markets a range of conversion tapes for a number of popular games. I would put the Sinclair arrangement last in order of preference although, as the company manufactures the computer, I suppose we must permit a certain leeway.

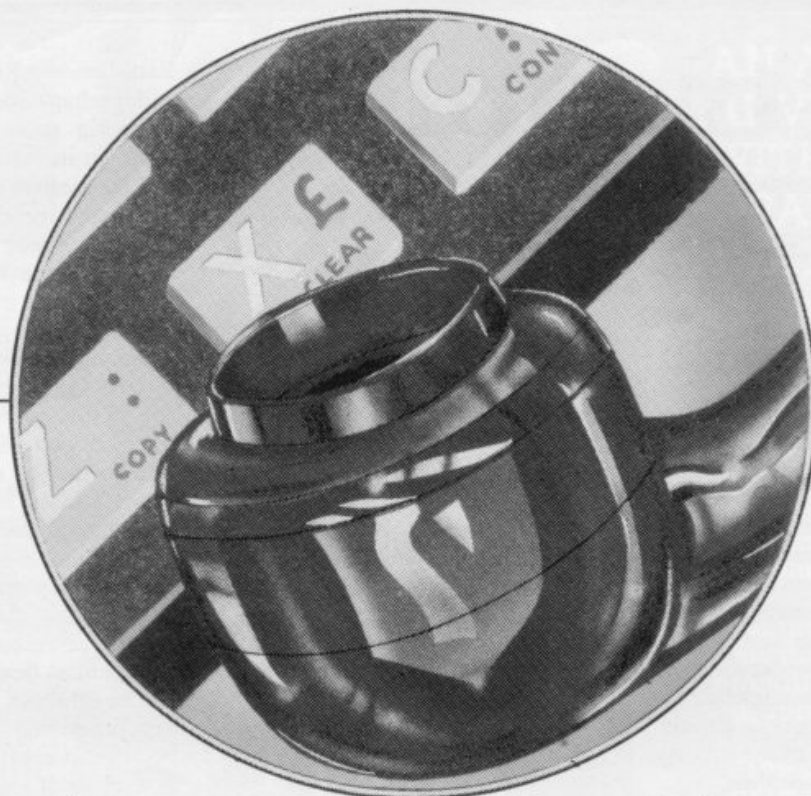
Andrew Church of Gainsborough raises a common query. He writes: **Last Christmas I was given a Quickshot joystick but many of the games I had acquired previously are not compatible. Can I convert them?** Derek Ward of Abingdon has a similar problem with his Interface Two and Crack Shot joystick.

In principle any game can be converted provided you are able to "break" it so as to be able to analyse the program. If the joystick is read in machine code,

'There is not much to choose between the various makes'

you must disassemble the program and locate the IN instructions. Study page 160 of *ZX Spectrum Basic Programming* to determine the substitutions to be made to make the program compatible with your interface. If the joystick is read in Basic, make the appropriate substitutions in each INKEY\$ or IN instruction.

continued on page 127



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
- Acoustic coupling
- Flexible design for perfect acoustic connections
- Battery powered (40 hours from 4AA 1.5V battery)
- LED indicator
- Available for delivery 1st June 1984.

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.



● Please address problems and queries to Andrew Hewson, Helpline, Graham Close, Blewbury, Oxfordshire.

continued from page 125

Mike Harding of Derby raises an interesting point for discussion. He writes: **I have noticed a great variation in the sophistication of the joystick control in various games on the market. Some are restricted to movement in one of four directions at right angles. In some, diagonal movement can occur and in some movement is possible in any direction. I have tried to emulate those effects in my software but I have not gone very far.**

When I received that letter I turned to my colleague, Steve Turner, author of **3D Lunattack** and other games, because he has made a study of joystick control features in the course of his work. This explanation is based on his comments. The initial problem is to achieve a balance between human reaction times and the speed of the game. If a single speed increment is used, so that for example moving the joystick to the left causes an object to move to the left at a constant speed, moving the joystick instantaneously to the right halts the object and moving the stick to the right again starts it moving to the right at a constant speed; the net result is a rigid, inflexible game with not much "feel".

Turner's solution is to read the position of the joystick as frequently as possible and to adjust the velocity of the object on the screen by a small amount in accordance with the current joystick position. When that technique is used, an object appears to accelerate gradually from rest to a maximum velocity in a given direction.

The rate of acceleration and the maximum velocity can be "tuned" by the programmer to make the game challenging to play without being impossible. It is also possible to include a

decay constant so that the object slows gradually if the joystick is returned to the central position.

An additional feature of Turner's approach is that while it is necessary to read the joystick only in four directions at right angles, the object can be driven in any direction on the screen. Inspired by his comments, I had the Spectrum program listed in table one written to demonstrate the effects. The program can be adapted for use with either the

Interface Two — lines 2000 to 2060 — or the arrow keys/keyboard clip-on type — lines 5000 to 5070. Notice how the IN command is used to read the hardware in each case.

The program includes two constants, CC1 and CC2, set in lines 1045 and 1046, which control the "feel". The first one determines the increment in the movement of the object each time the joystick is read and the second determines the rate of decay to rest.

```

100 GO SUB 1000: REM Define variables,
    constants and functions
105 BRIGHT 1
115 REM Repeatedly . . .
120 GO SUB 5000: REM Check for joystick
    activation
130 GO SUB 3000: REM Do calculations
140 GO SUB 4000: REM Do display
150 GO TO 120
155 REM . . . until <BREAK> is pressed
1000 LET ax=0: LET ay=0: REM Horizontal
    and vertical acceleration
1005 LET ux=0: LET uy=0: REM Initial
    velocity
1010 LET vx=0: LET vy=0: REM Final
    velocity
1020 LET sx=128: LET sy=85: REM Horizontal
    and vertical position
1022 LET x=sx: LET y=sy: REM Plot co-
    ords
1030 LET axm=10: LET aym=10: REM
    Maximum acceleration
1035 LET vxm=30: LET vym=30: REM
    Maximum velocity
1040 LET sxm=255: LET sym=174: REM
    Maximum screen co-ords
1045 LET cc1=1.0: REM Constant for joys-
    tick effectiveness
1046 LET cc2=0.3: REM Constant for iner-
    tial decay
1055 LET wx=0: LET wy=0: REM 'True;
    if 'wrap-around' occurs
1060 REM Find the remainder after the div-
    ision a/b
1070 DEF FN m(a,b)=(ABS (a/b)-INT ABS
    (a/b))*ABS b*SGN a
1090 REM Check if the bit with weight b is
    set in number n
1100 REM Return 'true' flag if set, 'false' if
    clear
1110 DEF FN t(n,b)=(INT (n/b)/2-INT
    (INT (n/b)/2)<>0)
1122 REM Limit the number n to the range a-
    b
1124 DEF FN x(n,a,b)=(n<a)*+(n>=a
    AND n<=b)*n
1130 REM Flags for the joystick functions
1140 LET left=0: LET right=0: LET
    fwd=0: LET back=0: LET fire=0
1160 LET value=0: REM Byte returned by
    joystick port
1180 LET bdr=7: REM Border colour
1200 INPUT "Would you like a trace (y/n)?
    ";a$
1202 IF a$<>"y" AND a$<>"n" THEN
    GO TO 1200
1204 LET p=(a$="y")
1208 INPUT "Would you like values print-
    ed? ";a$
1210 IF a$<>"y" AND a$<>"n" THEN
    GO TO 1208
1212 LET v=(a$="y")
1220 FOR i=0 TO 255 STEP 10
1230 PLOT i,84: DRAW 0,4
1240 NEXT i
1260 FOR i=0 TO 169 STEP 10
1270 PLOT 127,i: DRAW 3,0
1280 NEXT i
1340 RETURN
1999 REM for a ZX Interface 2
2000 LET value=IN 61438
2020 LET left=FN t(value,16)=0
2030 LET right=FN t(value,2)=0
2040 LET fwd=FN t(value,4)=0
2050 LET back=FN t(value,8)=0
2060 LET fire=FN t(value,1)=0
2080 RETURN
2400 REM Diagnostic —
2410 REM 'RUN 2500' to test the INput
    routine
2500 GO SUB 2000: CLS: PRINT left,
    right,fwd,back,fire: GOTO 2500
3000 LET ax=FN x(ax+cc1*(right-left)-
    cc2*SGN ax,-axm,axm): REM Acceler-
    ations
3010 LET ay=FN x(ay+cc1*(fwd-back)-
    cc2*SGN ay,-aym,aym)
3030 LET vx=FN x(ux+ax,-vxm,vxm):
    REM Velocities
3035 LET vy=FN x(uy+ay,-vym,vyn)
3050 LET sx=sx+ux+0.5*ax: REM Dis-
    placements
3055 LET sy=sy+uy+0.5*ay
3070 LET w=(sx<0 OR sx>sxm OR sy<0
    OR sy>sym)
3075 IF w THEN LET sx=FN
    m(sxm+sx,sxm): LET sy=FN m(sym+
    sy,sym)
3100 LET ux=vx: LET uy=vy
3120 RETURN
4000 LET bdr=FN m(bdr+fire,8):BORDER
    bdr
4015 PLOT OVER 1,x,y
4020 IF p AND w=0 THEN DRAW sx-x,
    sy-y: GO TO 4030
4025 PLOT OVER 1,x,y
4030 LET x=sx: LET y=sy
4034 IF v=0 THEN GO TO 4050
4035 PRINT AT 0,0;" "
4036 PRINT AT 1,0;" "
4037 PRINT AT 2,0;" "
4038 PRINT AT 0,0:INT ax,INT ay ' vx,vy '
    sx,sy
4050 RETURN
4999 REM Keyboard clip-on
5000 LET value=IN 63486
5010 LET left=FN t(value,16)=0
5030 LET value=IN 61438
5040 LET right=FN t(value,4)=0
5050 LET fwd=FN t(value,8)=0
5060 LET back=FN t(value,16)=0
5070 LET fire=FN t(value,1)=0
5090 RETURN

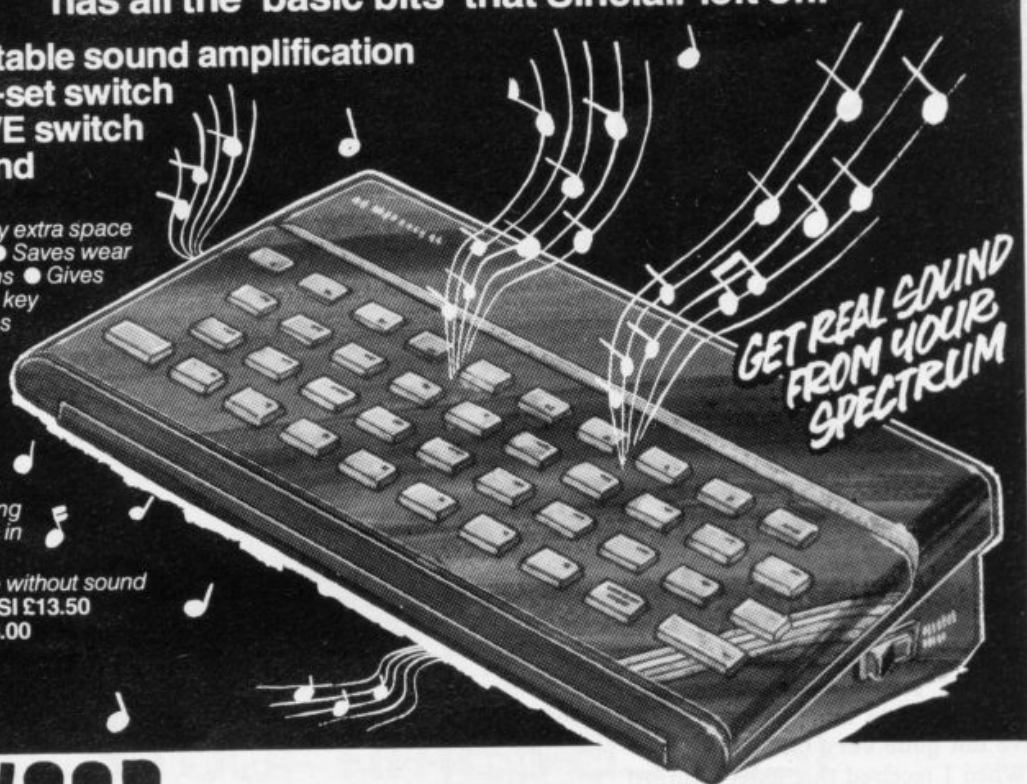
```

**Table 1. Spectrum joystick demon-
stration routine. Note — lines 4035, 4036
and 4037 each print 32 spaces.**

with the
sensational

has all the 'basic bits' that Sinclair left off.

- SPECTRUM REF PBSI £13.50**
ZX81 REF PBZXI £13.00



GET REAL SOUND
FROM YOUR
SPECTRUM

KELWOOD

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

STOPS ZXBI RAM-PACK WOBBLER

Flat: Ref **SW** £5.25. Titled: Ref **STW** £6.25
Extra long for printer – Flat: Ref **LW** £5.75. Titled: Ref **LTW** £6.75

Takes the heat out of your computer. Lets your Spectrum or ZX81 run much cooler.

Separate Cool-it Unit
ZX81 Ref **ZXC** £11.65 Spectrum Ref **SC** £11.85

Cool-it units built into other Kelwood add-its:
Power Base (Spectrum) Ref **PBSIC** £18.55 • Power Base (ZX81) Ref **PBXZIC** £18.05 • Sound Power Base (Spectrum only) Ref **SPBIC** £25.00 • Back Pack 1 Ref **BP1C** £32.55 • Back Pack 2 Ref **BP2C** £24.55 • Back Pack 3 Ref **BP3C** £26.55 • Back Pack 4 Ref **BP4C** £18.60 • Back Pack 5 Ref **BP5C** £26.90 • Back Pack 6 Ref **BP6C** £18.90 • Wearsaver (Spectrum) Ref **WSSC** £16.00 • Wearsaver (ZX81) Ref **WSZSC** £15.80

WEAR SAVERS

- 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

The compact way to work ● Room for all essential peripherals ● Ideal for use in restricted spaces



● 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 stop 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 CWH £49.00
 Legs Ref LCW £11.00

All Prices include VAT

Name _____

Address _____

 Access
Barclaycard No. _____

**CREDIT CARD
HOTLINE TEL:
(0709) 63242
8am-10pm**

QUANTITY	REF	AMOUNT
Items under £10 plus 60p P&P		TOTAL
£5.00 P&P		ENCLOSURE

Items under £10 plus 60p P&P
Items over £10 plus 95p P&P
Workstations plus £3 P&P

TOTAL
ENCLOSED

We stock
Software

KELWOOD COMPUTER CASES Downs Row, Moorgate, Rotherham

ENCLOSED
PERSONAL CALLERS WELCOME

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

SU6

HEARING IS BELIEVING *Tele Sound* SPECTRUM BEEP BOOSTER

TELESOUND is ready built and tested so that you can get the full sound of your Spectrum through any unmodified television set, black and white or colour. The unit is easy to fit in minutes without any previous experience as full fitting instructions are provided.

TELESOUND has been designed using the very latest ultra miniature components so it's size is an incredible 2 x 1.3 x 1mm. and fits neatly inside the Spectrum. Three easy push-on connections are made to the Spectrum. The connections are clearly shown in a diagram that comes with full fitting instructions.

TELESOUND FEATURES

- SOUND AND VISION TOGETHER FOR ADDED REALISM.
- BEEP VOLUME CONTROLLABLE FROM A WHISPER TO A ROAR.
- KEYBOARD CLICK CLEARLY HEARD TO ASSIST PROGRAM ENTRY.
- PROGRAMS CAN BE HEARD WHEN BEING LOADED • NO SOLDERING OR CASE CUTTING REQUIRED.
- ADDITIONAL AMPLIFIER NOT NECESSARY • SEPARATE POWER SUPPLY NOT REQUIRED.
- USES NO MEMORY SO WORKS WITH ALL PROGRAMS • COMPATIBLE WITH ALL OTHER ADD-ONS INCLUDING MICRODRIVE

TELESOUND comes complete with easy to follow fitting instructions and costs £9.95 inclusive of post, packing etc. Please state your computer when ordering.

COMPUSOUND



C
T
A



DEPT: SU6, 32-33 LANGLEY CLOSE, REDDITCH, WORCS.
B98 0ET. TELEPHONE: (0527) 21429 (21439 Answerphone).

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

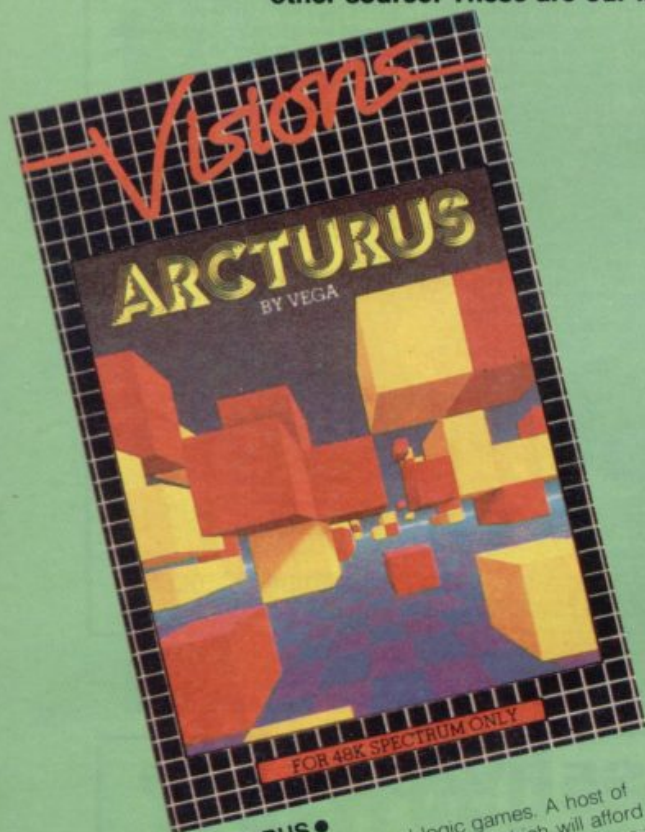
Send to:

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

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.

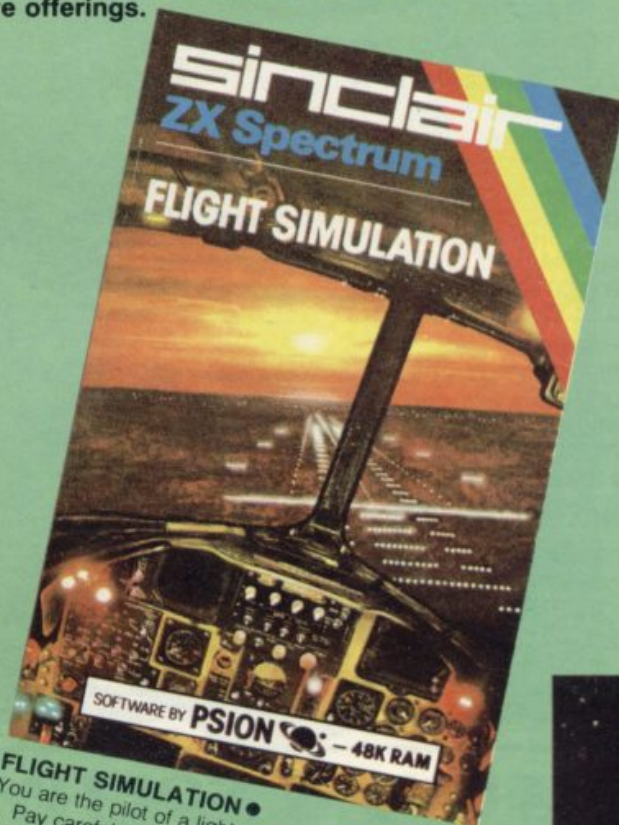


ARCTURUS •

This is the first of Visions' logic games. A host of features are offered to the player which will afford many hours of entertainment. Not an easy game to put down and at the higher levels seemingly impossible to beat. For the Spectrum 48K.

Cassette price: £6.95

Ref. No: 2-55



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 w
not en
your
days

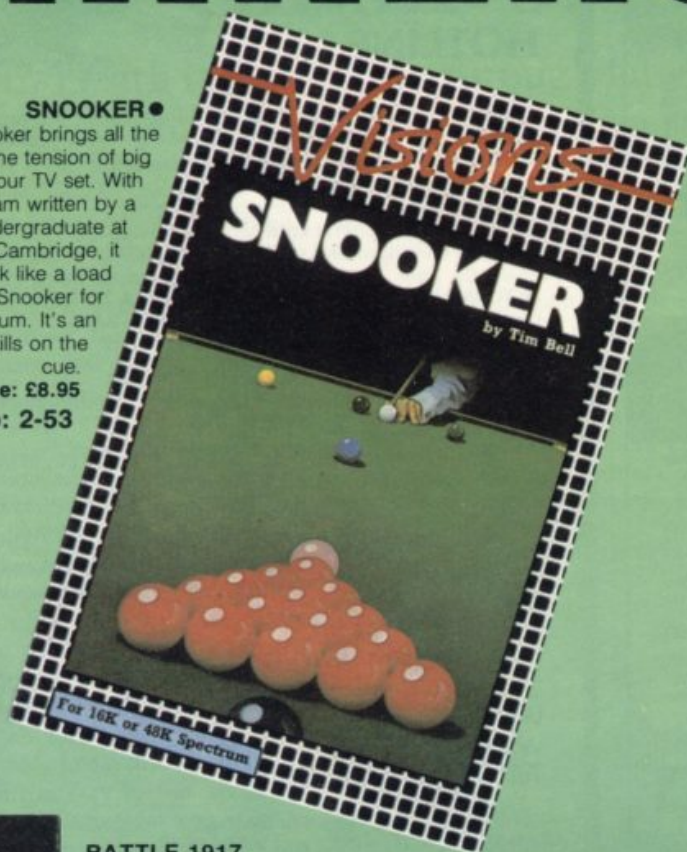
WINNERS

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%

Total

I enclose a cheque/postal order for _____

Name _____

Address _____

[Allow 28 days MAXIMUM FOR DELIVERY]



GUARANTEE

For complete confidence. If you are entirely satisfied with the quality of our purchase return it to us within 7 days and we will provide a replacement.

READY FOR THE FLAT SEASON

COURSEWINNER

THE PUNTERS COMPUTER PROGRAM

COURSEWINNER allows you to use the power of your computer to get the edge on the bookmaker. The program contains a database full of detailed information on all English and Scottish flat courses. The ten leading trainers and jockeys, and effect of the draw for different weight carried and race length is detailed for each course. This information can be displayed on the screen for reference at any time.

COURSEWINNER can be used in two modes — quick mode requires only the starting price and results of the last three outings (as found in any newspaper) for each runner. Extended mode allows detailed analysis of the following factors:

- Recent form and starting price
- Weight carried and Race length
- Trainer and jockey form for the course
- Effect of the draw and of the going

* Also included in the package is a utility which calculates the returns on any single or accumulator bet, win or place, tax paid and deducted.

Available for: SPECTRUM (48K), BBC (B), COMMODORE 64, DRAGON, APPLE II/IIe, ATARI (48K)

Price £12.50 all inclusive

POOLSWINNER

THE ULTIMATE POOLS PREDICTION PROGRAM

POOLSWINNER is the most sophisticated pools prediction aid ever produced. It comes complete with its own massive database.

Fully menu driven. Simple to use, yet very powerful.

Predicts SCOREDRAWS, DRAWS, ALWAYS and HOMES.

Selec Software guarantee that POOLSWINNER performs significantly better than chance. Your prospects of dividends, and perhaps a jackpot are greatly enhanced.

POOLSWINNER automatically calculates the league tables as the season progresses. The tables for any division can be displayed for reference at any time.

THE DATABASE supplied with the package is the largest available — over 20000 matches (10 years league football). The database automatically updates as results come in, allowing the program to adapt to recent changes in patterns.

POOLSWINNER is for use with English and Scottish league matches, or cup matches between league sides. The program can be used for all future seasons.

The package is complete with program, 20000 match database, and detailed instruction booklet.

Available for: SPECTRUM (48K), ZX81 (16K), BBC (B), COMMODORE 64, DRAGON, APPLE II/IIe, ATARI (48K)

Price £15.00 all inclusive

Immediate dispatch (return of post)



SELEC SOFTWARE

37 COUNCILLOR LANE, CHEADLE, CHESHIRE
061-428 7425



LEAP FURTHER AHEAD

You've been asking us to produce an all-age QUIZ program — NOW WE HAVE!

HOTLINE



- the telephone link between the White House and the Kremlin must be kept open for the sake of world peace
- BUT there are breaks in the HOTLINE
- the user must repair these
- to do this he answers questions correctly
- could be the general knowledge sets supplied
- or you can input and save your own HOTLINE questions



HOTLINE is a SOPHISTICATED yet SIMPLE TO USE means of setting your own TESTING PROGRAM. Makes learning facts for exams easy.

AVAILABLE NOW FOR THE SPECTRUM 48K.

Available shortly for the BBC 32k and the Commodore 64

Comes complete with full instructions in a deluxe A5 plastic package with full colour wrapper and comprehensive booklet inside.

£11.25 (retail) Good discounts given



"WHY THE FROGS? Get 'Words & Pictures' — our first EARLY READING program — and find out. £9.25"

Enquiries/Orders (Cheque/Access)

CHALKSOFT LIMITED
37 Willowslea Road
WORCESTER
WR3 7QP
Telephone: 0905 55192



Dealers may order direct or through
SOFTSEL, LIGHTNING, and WEBSTERS
software.

Chalksoft Ltd are Members of The Computer Trade Association.

The Key to Spectrum Machine Code Success.

Picture'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, DEFW, 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/PO 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/PO 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.



The Clash of the Titans

Quentin Heath treads warily through labyrinths of Greek mythology.

MOST ADVENTURE games are set in the far future or in a past which the author and programmer have created. **Perseus and Andromeda** from Digital Fantasia, however, is different as it takes its plot from a Greek myth.

At the start of the 48K Spectrum game the main goal is to get into the royal palace to see the king. A good knowledge of the original myth would help you through the quest and in some cases that knowledge is imperative. The information on the card insert with the game is enlightening about the background to the characters involved in the story but a good book on the subject would be useful.

If you do not have a book I can tell you that the king is the one person who can tell you what you must do. The way in which you must ask him for your mission is odd, to say the least. Using formats such as 'say to' or 'speak to' followed by the statement you want to use enclosed in quotation marks will not work. It becomes obvious that you have to do something basic and unregal and **EXAMINE KING**.

King Polydectes will not be very helpful even after you have been to all that trouble to find him. He will tell you to slay Medusa, who is the main protagonist, and rescue the Princess Andromeda whom you want as your bride.

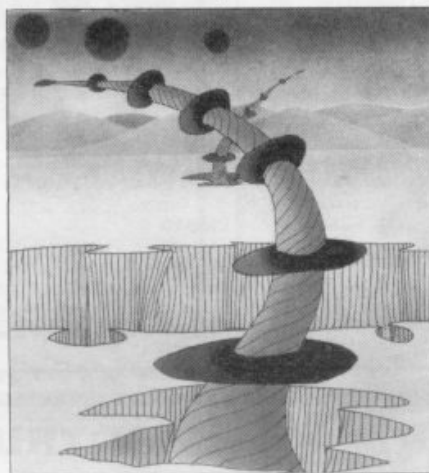
Looking at the way in which you talk to the king, we can see two valuable points which will help in playing the adventure. First, characters seem to be treated as objects. For example, it is as if Polydectes is a statue, like the Delphic Oracle who, once disturbed, will make a suitably inspired but useless utterance.

The second point I want to raise is about the use of words in the adventure. Many games use words in the context of different situations but their meanings stay the same throughout the game. As you can see with the word **EXAMINE**, some of the words in **Perseus and Andromeda** have double meanings. **EXAMINE** can be used to mean 'look at the object in front of you' or, more suitably, it can mean 'interrogate the character, monster or object which is in front of you'.

The authors have used words in an

eccentric manner. You will find the ploy irritating at times, especially when you are trying to figure how to get one of the treasures which form the first set of objectives in the game. My warning is to look for unusual ways of using commands in the game, as the authors seem to have flouted the rules of English.

In the original story Perseus had to find treasures or weapons with which he had to arm himself before he could think about chasing monsters. Among



the weapons to be found are a discus with an engraving of Mount Olympus on it, a shield which has been highly-polished by Athene, winged sandals from Hermes and a golden helmet also from Hermes. All but one of them can be found in the temples which are attributed to the various gods and goddesses of Greece.

There are various methods by which treasures can be obtained and if you manage to find the poor old beggar who inhabits a dried-out watering hole and is eternally thirsty you may also find a way to get what you want from the gods.

If you give the old man what he wants he will return the favour by giving you a discus. Examine the prize carefully and find the verb which you will need to use when you climb to the principle of success in the Temple of Athene. When you have reached that temple all you have to do is say your prayer to the goddess and wait. You will then be in possession of Athene's gift, which should be used against one of the only women in Greek mythology who does not need a permanent wave.

The most difficult of the treasures to obtain is the Golden Helmet. You will find it in the cave by the pool of water. It will be hanging from the head of a statue which refuses steadfastly to give up its treasures. I tried everything logical to get the hat, from climbing, jumping, and scaling the wall to invoking all gods using the 'pray' method.

I needed about half an hour to solve the problem, without using the help sheet provided by the author, but in the end I intend to give only a hint and tell you that you will kick yourself when you finally work out the puzzle. To knock the helmet from the statue you will need one of the objects. Pretend you are playing on a coconut shy and knock off the helmet.

When you have the helmet you will, no doubt, have solved the first part of the adventure. You will have used none of the objects collected so far, except for the water-carrying sack, but as a final fling you could take to the air.

Return to the temple of the god who gave you the winged shoes. Put on the shoes and walk into the pedestal. I can tell you only that if you mount the pedestal you will not be able to fly.

The best way to move around the sky is to use the command word 'FLY', although others will do just as well. You will find that your flight path seems to be controlled by a greater power and the gods are obviously directing you to your next battleground.

The authors have crammed the main part of the story into the third part of the game. It is useful to know the general order in which you have to combat the monsters. First you must deprive the author's version of the Stygian witches of their all-seeing eye. After that you must defeat the Harpies and find Medusa's lair.

After defeating Medusa you must find Pegasus and ride him to defeat the Kraken and save Andromeda. The final part of the adventure is spoiled slightly because you can refer to the myth for a solution to a particular problem.

The adventure is faithful to the old Greek story but if you want to find extra hints you might like to see the film *Clash of the Titans*, or read the book. Those sources provide information on the plot and are also easier to read than the translation of the original.

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

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 _____

SU 6

ALL PRICES INCLUDE VAT

**SAGA 2
CRUSADER**
FOR GAMES, PROGRAMMING AND BUSINESS

The ZX Spectrum is the best Homecomputer for Software, both educational and games. The main flaw, is of course, the keyboard. This classic keyboard housing is designed to accommodate the ZX81 and Spectrum personal computer. A professional full size 'Qwerty' keyboard has been designed, with full travel keys and a full size space bar. Special functions are strategically placed for rapid programming and ease of use. Designed today for users of tomorrow, you can play the fastest games with the greatest of ease. Its easy to assemble too - you need 1 Screwdriver and 5 minutes - Simple! Available in a white housing with grey and white key caps.

(Full size standard quality keyboard)



ONLY
£59.95

SPECTRUM USERS!

NEW SPECTRUM KEYBOARDS...

The Saga 2 Crusader has an extra 22* extra special single button function keys. Microdrive Interface 1 compatible, dedicated cursor keys shifted & not shifted.

*Some are duplicated for ease of use.

SAGA SYSTEMS LTD

WOODHAM RD, WOKING, SURREY

CALLERS WELCOME AT WOKING COMPUTER CENTRE,
TRADE ENQUIRIES (04862) 69527

Please send me
I enclose Cheque/PO payable to Saga Systems Ltd for £.
Please add £1.15 P&P per item.

Name _____

Address _____

Please fill in this coupon (to be used as label) in block capitals to ensure fast delivery

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 $X_i > 0$, $X_i < 0$, $-a < X_i < a$ sign constraints). Displays the canonical equivalent of the primal, values of slack variables, dual problem and its solution. Capacity examples (var.xobs.): 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 (smp.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.

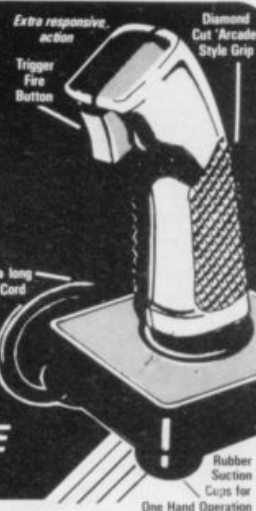
PLEASE SEND A5 SIZE S.A.E. FOR INFORMATION ON MICRODRIVE-BASED PACKAGES.

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

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



IS HERE!
THE TOP AMERICAN JOYSTICK
IS NOW AVAILABLE IN THE U.K. . . .

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

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

Manic Miner Jetpack 3D Tunnel Cosmicos Shippery Sid Cosmic Guerilla Brain Damage Frenchy
Cooker PS517 Cyber Rats Nite Fite Armageddon Last Sunset Astroblast
Tomb Raider Spookymon Gulpmen Mission Impossible Mazeman Knot in 3D
Jettman Frogger Transam Robotics Armageddon Extremator 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



The ultimate add on for the keen games player!

NEW NEW

ONLY £15.99
P + P £1.50

JOYSTICK INTERFACE PLUS
SPECTRUM SOUNDBOOSTER
ACTUALLY AMPLIFIES THROUGH YOUR TV SPEAKER

FEATURES INCLUDE

- Joystick interface compatible with a huge range of games (Kempston system) • Compatible with any Atari type joystick including auto rapid fire models.
- Amplifies Spectrums 'Beep' into a roar through your TV speaker! (fully controllable).
- Stylish all in one unit no messy wires.

ALSO AVAILABLE. THE VOX BOX with all the features of the games age plus a fully programmable speech synthesizer with unlimited vocabulary.

<input type="checkbox"/> Triga Command Spectrum	£19.99	Postage Please Add £1.50 Allow 7 days
<input type="checkbox"/> Triga Command Atari	£12.99	
<input type="checkbox"/> Triga Command Commodore	£12.99	24 HR CREDIT CARD LINE
<input type="checkbox"/> Triga Command BBC	£19.99	
<input type="checkbox"/> Games Ace (Spectrum only)	£15.99	VISA
<input type="checkbox"/> Games Ace + Triga Command	£24.99	
<input type="checkbox"/> Vox Box, Spectrum	£29.99	WELCOME
<input type="checkbox"/> Vox Box and Triga Command	£39.99	

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

NEW FROM BELLFLOWER SOFTWARE FOR THE 48K SPECTRUM

**IF YOU THINK YOU
KNOW YOUR POP MUSIC,
STUART HENRY'S READY
WITH A CHALLENGE!**

FEATURES

More than 750 questions
verified by Radio Luxembourg
DJ Stuart Henry

Personalised scoreboard

1 or 2 player option

Random mystery tunes

6 rounds per game

£5.75

**NOW AVAILABLE AT
SELECTED BRANCHES
OF W.H.SMITH**

ALSO AVAILABLE BY MAIL ORDER FROM:
BELLFLOWER SOFTWARE,
6 ROSEWOOD AVENUE, GREENFORD,
MIDDLESEX 01-903 1816

Stuart Henry's
**POP
QUIZ**



◇ The Stuart Henry Multiple Sclerosis Research Fund receives a donation for every copy sold ◇

TRANSFORM LTD.

**ZX Spectrum
keyboard**

The professional touch!



Just look at the features:

- * Will incorporate micro-drive interface and power supply
- * 60 keys including full sized space bar
- * Large Enter key
- * Numeric pad
- * Emode key
- * On/off switch with LED

The TRANSFORM keyboard — transforms your ZX Spectrum into a fully-operational professional machine. No dismantling — just unscrew the top of your Spectrum.

With this keyboard you can use your Spectrum for all your business needs — everything from accountancy to word processing.

- * Decimal point key on both numeric pad and keyboard
- * Full stop, Comma, Semi-colon, Colon, single delete and single edit keys
- * Easy installation — no soldering required
- * Black brushed aluminium case
- * 407mm wide, 220mm deep and 75mm high

For fast delivery send your cheque or P.O. today

TRANSFORM Ltd, 01-658 6350

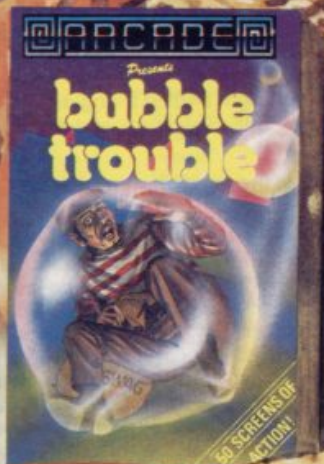
41 Keats House, Porchester Mead, Beckenham, Kent

£69.95
+ £2 p&p

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!!

Available from John Menzies and good computer stores

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: _____

SUB

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	ADS Interface
Euroelectronics Interface	Kempston Interface
Hilderbay Interface	Morex Interface
Sinclair ZX Interface 1	Tasman 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

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

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

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

SPRINGFIELD HOUSE

HYDE TERRACE, LEEDS LS2 9LN

SOFTWARE DIRECTORY

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	Contrast

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
Forty-Niner	Software Farm
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
Hickstead	CCS
High-resolution Invaders	Odyssey
Invaders	Abersoft
Invaders	Bug-Byte
Invaders	Odyssey
Invaders	Selec
Invaders	Silversoft
Krazy Kong	PSS
Maze Death Race	PSS
Maze Man	Abersoft
Mazogs	Bug-Byte
Namtir Raiders	Artic
Night Gunner	Digital Int.
Puckman	Hewson
Six Games	A Stubbs
Space Raiders	Sinclair
Space Trek	JRS
Swag + Voyager	Howard
3D Monster Maze	New Generation
Three Games Cassette	McGraw Hill
Zuckman	DJL
ZX Invasion Force	Artic
ZX Panic	Selec
ZX-81 1K Games Pack	Crystal
ZX-81 Pocket Book	Phipps

Business

Accounts (Limited company)	Hestacrest
Accounts (Sole Trader)	Hestacrest
Business Bank Account	Transform
Critical Path Analysis	Hilderbay
Draft	Myrmidon
Mailing List	Hestacrest
Payroll	Hilderbay
Payroll	Soft Tech
Payroll	Soft Tech
Personal Banking System	Hilton
Purchase Ledger	Hestacrest
Sales Day Book	Transform
Sales Ledger	Hestacrest
Text	Contrast

Education

Calpac 1-2	Calpac
Four Rules of Number	Micro Master
Integration	University
Intermediate English 1-2	Rose
Intermediate Maths 1-2	Rose
Language Devel. Series	Glasson
Language Devel. Series	Micro Master
Linear Programming	University
Matrix Operations	University
O Level Chemistry	Calpac
O Level French Revision	Rose
O Level Maths Revision	Rose
Polynomials	University
Primary Arithmetic	Rose
Regression	University
Self-teach Program	Anvil

Language

Forth	Sinclair
ZX Forth	Artic

Practical

Ephemeris	Bridge
Football Pools	Hartland

Puzzle

Nowotnik Puzzle	Phipps
Word Fit	Ram Writer

Simulation

Fighter Pilot	Digital Int.
Flight Simulation	Sinclair
Pilot	Hewson
Print Shop	CCS

Strategy

Airline	CCS
Auto Chef	CCS
Bank Raid	J M Senior
Battleships	JRS
Conflict	Martech
Cyborg Wars	Stratagem
Dallas	CCS
Farmer	CCS
Football Manager	Addictive Gms.
Fort Apache	Contrast
Galaxy Conflict	Martech
Great Britain Ltd	Hessel
Ocean Trader	Quicksilva
Pioneer Trail	Quicksilva
The Settler	BSS

Traditional

Do Not Pass Go	Work Force
Lynchmob	Bridge
Original Superchess	CP Software
Othello	M.O.I.
Tai	PSS

Tenpin	
ZX 1K Chess	
ZX Compendium	
ZX-Chess I	

Phipps	*
Artic	*
Carnell	7
Artic	*

Utility

Graphics	IPA	*
Graphics Toolkit	JRS	9
Machine Code Test Tool	OCP	*
MCoder	PSS	8
Programme Enhancement		
Package	R and R	*
Renumber Delete	Work Force	*
Sideways Copy	D King	*
Trace	Texgate	7
ZX Compiler	Silversoft	*
ZX Screenkit	Picturesque	*
ZX-81 Remload	Picturesque	*
ZX-Bug	Artic	*
ZX-sideprint	Microsphere	*
ZXAS	Bug-Byte	*
ZXDB	Bug-Byte	*

SPECTRUM 16K

Adventure

Android One	Vortex	*
Escape	New Generation	8
Mines of Saturn/Return to		
Earth	Mikro-Gen	*
Moria	Severn	*
Planet of Death	Artic	6
Secret Valley	Newsoft	*
The Great Western	New Soft	*
Time Bandits	New Soft	*

Arcade

Aquarius	Bug-Byte	6
Arcadia	Imagine	5
Arcadian	J K Greye	6
Assassin	Spectrasoft	*
Attack on New York	Fry	*
Avenger	Abacus	5
Baltic Patrol	E. Midland	*
Baron	Temptation	*
Base Invaders	Imagination	*
Black Hole	Quest	6
Blind Alley	Sunshine	7
Breakaway	Procom	*
Bug Blaster	Crystal	*
Cassette A	Orwin	*
Caterpillar	CDS	*
Cavern Fighter	Bug-Byte	4
Centi-bug	dK' Tronics	*
Children's Compendium	Dymond	*
City Defence	Mikro-Gen	*
Colour Clash	Romik	4
Cookie	Ultimate	*
Cosmic Guerilla	Crystal	8
Creepy Crawler	Mikro-Gen	*
Crevasse and Hotfoot	Microsphere	7
Cruising	Sunshine	4
Cyber Rats	Silversoft	7
Death Chase	Micromega	6
Demolition	Comp. Rentals	*
Destroyer	Winters	*
Di-lithium Lift	Hewson	3
Digger Dan	Ocean	*
Doombugs	Work Force	8
Dymonoids	Dymond	*
Earth Defence	Artic	5
Ed-On	Add-On	4
Eskimo Eddie	Ocean	*
Family Games Pack	Hornby	*
Fireflash	Abacus	5
Froggy	DJL	7
Fruit Line	P A Hanson	*

Fruit Machine	dk' Tronics	6	Masterfile 16	Campbell	*	Dallas	CCS	6
Galactians	dk' Tronics	*	Matcalc	Work Force	*	Dictator	Bug-Byte	*
Galactic Trooper	Romik	3	Micropen	Contrast	*	Farmer	CCS	*
Galactic Warriors	Abacus	6	Vu-Calc	Sinclair	7	Football	Winters	*
Galaxians	Artic	6	Vu-File	Sinclair	8	Heathrow	Hewson	8
Games Pack 1	A Burnham	*				Las Vegas	Temptation	*
Games Tape 1-2	Sospan	*				Quincy	Severn	*
Ghost Hunt	PSS	*				The Settler	BSS	*
Gnasher	R & R	8		Widget	*			
Gobble-a-Ghost	CDS	*	Education	Sinclair	7	Traditional		
Gobbleman	Artic	*	Alphabet	Sinclair	*	Backgammon	Hewson	*
Godzilla and Martians	Temptation	7	Alphabet Games	Heinemann	*	Bridge Tutor	CP	8
Gorilla	D Hornsby	*	Apostrophe	Calpac	*	Bridgemaster	Bridgemaster	9
Ground Attack	Silversoft	6	Ballooning	Heinemann	*	Challenge	Temptation	*
Ground Force Zero	Titan	*	Calpac 1-3	Sinclair	7	Gambling Tape	Dymond	*
Gulpman	Campbell	6	Car Journey	Artic	*	Las Vegas	Temptation	5
Haunted Hedges	Micromega	6	Cargo	Widget	*	Odds-on	RSD	*
Hopper	PSS	6	Chess Tutor	Lerm	*	Othello	CP Software	*
Horace and the Spiders	Sinclair	8	Counting	Startersoft	8	Pinball	M.O.I.	*
Horace Goes Skiing	Sinclair	8	Education One	Soft Cottage	*	Pool	Winters	*
Hungry Horace	Sinclair	8	Educational	Collins	*	Reversi	Bug-Byte	7
Invasion Force	Artic	8	Firework Music	Granada	*	Roulette	Sinclair	8
It's the Wooluf	Crystal	5	First Numbers	Micro Master	*	Solo Whist	Newsoft	*
Jet Pac	Ultimate	*	40 Education Games	Tutorial	*	Spec. Microchess	Video Soft.	*
Jogger	Severn	*	Four Rules of Number	Poppy	8	Super Play 1	Artic	*
Labyrinth	Axis	4	French Voc Test	Longman	*	Tennis	Video	*
Leap Frog	CDS	*	Hidden Letters	University	*		Winters	*
Light Cycle	PSS	*	Hot Dot Spotter	Rose	*			
Luna Crabs	Micromega	7	Integration	Rose	*	Utility		
Magic Meanies	CDS	2	Intermediate English 1-2	Collins	*	Auto Sonics	Buttercraft	5
Maze Chase	Hewson	8	Intermediate Maths 1-2	Glasson	*	Aspect	Bug-Byte	5
Meteor Madness	Spectresoft	*	Know Your Tables	Micro Master	*	Audio Sonics	Work Force	4
Meteor Storm	Quicksilva	7	Language Devel. Series	Logic 3	*	Character Generator	Spectrasoft	*
Meteoroids	dk' Tronics	7	Language Devel. Series	Poppy	*	Designer	Matrix	*
Meteoroids	Softek	6	Learn Basic	University	*	Dietron	Custom	6
Millypede	Add-on	7	Learning Read 1	Lerm	*	Disassembler	dk' Tronics	7
Mined Out	Quicksilva	7	Linear Programming	Stell	*	Display	Work Force	*
Moon Buggy	Visions	6	Marks Book	AD Software	7	Editor/Assembler	Picturesque	8
Muncher	Silversoft	*	Maths Invaders	University	*	Extended Basic	CP	7
Muncher	Silversoft	6	Maths Tutor	Poppy	*	FP Compiler	Softek	9
Nanas	Mikro-Gen	*	Matrix Operations	Bridge	*	KeySounder	S and G	*
Orbiter	Silversoft	7	Money	Prime	*	Machine Code Test Tool	OCP	7
Ostron	Softek	*	Night Sky	Homestudy	*	Master Toolkit	OCP	7
Pengy	Micromania	4	Number 6	Homestudy	*	MCoder	PSS	8
Pitman Seven	Visions	8	O Level Maths	Collins	*	Micro-print	Myrmidon	*
Planetoids	Sinclair	5	O Level Physics	Widget	*	Micropen	Contrast	*
Proteus	Abacus	*	Paddington's Shopping Mix-	University	8	Peek	Zen	*
Rapedes	Visions	*	up	Essex	*	Print Utilities	Sinclair	7
Repulsar	Softek	*	Pathfinder	Rose	*	Programmer's Dream	Work Force	8
Rider	Virgin	6	Polynomials	Heinemann	*	Renummer Delete	Work Force	*
Road Toad	DK Tronics	7	Pre/early school cassettes	University	8	Slow Loader	ELR	9
Robot Panic	Soft Mill	1	Primary Arithmetic	Anvil	*	Sound FX	dk' Tronics	6
Sam Spade	Silversoft	5	Punctuation Pete	Widget	*	Spec. Bug	Artic	*
Santa	Artic	*	Regression	Heinemann	*	Spec. Editor/Assembler	Picturesque	8
Sentinel	Abacus	7	Self-teach Program	Startersoft	*	Spec. Monitor	Picturesque	8
Shark Attack	Romik	5	Shape Sorter	B Farris	*	Spec. Sound	M Afzal	*
Sheer Panic	Visions	7	Special Agent	Microl	8	Spec. Tape Copier	S Giza	*
Shiva Special 1	Shiva	*	Spellbin			Spectrum Super Toolkit	Nectarine	8
Sky Raider	C M Smith	*	Teacheraid			Spectsound	PDQ	2
Slippery Sid	Silversoft	8	Use and Learn			Supercode	CP	*
Space Fighter	Winters	*				Tape Breaker	Spectrasoft	*
Space Intruders	Quicksilva	7	Language	Betasoft	9	Tape Copier	Lerm	*
Space Lanes	Cathedral	6	Beta Basic			Taswide-64	Tasman	*
Space Raiders	Sinclair	*	Practical			The Key	Keysoft	*
Space Zombies	Mikro-Gen	6	Biorythms	Spectrasoft	*	Trace	Texgate	8
Spec. Frogs/ Showdown	Artic	*	Countries of the World	Hewson	8	Trace	Zen	*
Spec. Gobbleman	Artic	*	Cycle Planner	Medidata	4	X Ray	Zen	*
Spec. Invaders	Artic	*	Map of the UK	Kuma	*	ZXED	dk' Tronics	*
Spec. Invasion Force	Artic	*	Shopping List	SD				
Spec. Scramble	Work Force	7						
Spectipede	R and R	8	Puzzle					
Spectral Invaders	Bug-Byte	8	Flippit	Sinclair	7	SPECTRUM 48K		
Spectral Panic	Hewson	5	Hanoi King	Contrast	7	Adventure		
Spectres	Bug-Byte	6	Lojix	Virgin	3	Abyss	CCS	6
Strike Four	Spectresoft	4	Nowotnik Puzzle	Phipps	7	Ace in the Hole	Add-on	*
Styx	Bug-Byte	7	Quazar	Rose	4	Adventure 1	Abersoft	6
Sub	Romik	*				Adventure Island	Contrast	*
Tank Battle	dk' Tronics	8	Simulation			Alchemist	Imagine	*
The Devil Rides In	Carnell	*	Air Traffic Controller	Hewson	6	Arcane Quest	Add-on	*
3D Monster Chase	Romik	3	Airliner	Protek	6	Atlas Assignment	Virgin	7
Train Game	Microsphere	9	Golf	R & R	7	Black Crystal	Carnell	7
Trom	dk' Tronics	4	Golf	Virgin	8	Black Dwarf's Lair	Newsoft	*
Vortex	JK Greye	5	NightFlite	Hewson	5	Black Planet	Phipps	7
Winged Warlord	CDS	6	Print Shop	CCS	8	Byte	CCS	3
Wizard's Warriors	Abersoft	*	Pro-Golf	Hornby	7	Castle Blackstar	SCR	7
Yomp	Virgin	7				Circus	Dig Fant	8
			Strategy			Classic Adventure	Melbourne Hse	*
Business			Auto Chef	CCS	*			
Finance Manager	OCP	9	Big Match Soccer	Winters	*			
Home Computer Pack	SD Micro	*						

141

Software Directory

Pascal Compiler
Snail Logo
Spec. Forth
Spec. Forth
ZX Forth

Hi-Soft
CP
Abersoft
CP
Artic

Strategy

Airline
Angler
Apocalypse
Battle 1917
Battle of Britain
Brewery
British Lowland
Caribbean Trader
Conflict
Derby Day
Football Manager
Galaxy Conflict
Galaxy Conflict
Gangsters
General Election
Great Britain Ltd
Hunter Killer
It's Only Rock 'n' Roll
Johnny Reb
King Arthur
1984
Oligopoly
Plunder
Red Weed
Scatterbrain
Sheepwalk
Special Operations
Stonker's
Tradewind
War 70
Warlord

Traditional

Backgammon
Brag
Bridge Player
County Cricket
Do Not Pass Go
Draughts
Evolution
Go To Jail
Grid run/Pontoon
Original Superchess
Pontoon

CCS
Virgin
Red Shift
CCS
Microgame
CCS
CCS
E. Midland
Martech
Comp. Rentals
Addictive Gms.
Martech
Martech
CCS
Bug-Byte
Hessel
Protek
K-Tel
Lothlorian
E. Midland
Incentive
CCS
CCS
Lothlorian
Manor
Virgin
Lothlorian
Imagine
WDS
CCS
Lothlorian

CP
T Lebon
CP
Allanson
Work Force
CP
Microsphere
Automata
Arcade
CP Software
Contrast

Ramopoly
Roulette
Scrabble
Snooker
Superchess II
Superchess Three
The Turk
Voice Chess
Yahtzi
ZX Draughts
ZX-Chess II

J Fletcher
Dymond
Sinclair
Visions
CP
CP
OCP
Artic
Work Force
CP
Artic

Practical

Beamsan
Cricket Averages
Diet
Diet Master
Dietician
Engine Diagnostic
First Aid
Football Pools
How Long have you got?
I Ching
I Ching
Personal Reminder
Star Gazer
The Complete Guide to
Medicine
World Info

Beamsan
Spartan CC
dK' Tronics
Diet Master
Keysoft
Spectrasoft
Eastmead
Hartland
Eastmead
Salamander
Sirius
SD Micro
CRL
Eastmead
Wimsoft

Puzzle

Arcturus
Computaword
Hanoi King
Jumbly
Mazecube
3D Strategy

Visions
Work Force
Contrast
dK' Tronics
PAL
Quicksilva

Simulation

Fighter Pilot
Flight Simulation
Golf
Inkos
Royal Birkdale
Strike Attack
Test Match
The Forest
Troon

Digital Int.
Sinclair
dK' Tronics
Chalksoft
Ocean
Micromart
Comp. Rentals
Phipps
Hornby

MAIL ORDER PROTECTION SCHEME

Advertisements in this magazine are required to conform to the British Code of Advertising Practice. In respect of mail order advertisements where money is sought in advance of the despatch of goods the Code requires the advertiser to despatch goods within 28 days, unless a longer period is stated. Where goods are returned to an advertiser, undamaged, within 7 days, the purchaser's money must be refunded, plus the cost of returning the goods. The reader should retain evidence of despatch.

If you order goods from mail order advertisements in this magazine and pay in advance of delivery you will be considered for compensation under the Scheme if the advertiser becomes insolvent or ceases to trade provided that:

(a) you have not received the goods, or a refund in respect of returning same, AND:

(b) you write to the Advertisement Manager of this magazine, stating the facts, not earlier than 28 days from the date of the order and NOT LATER THAN THREE MONTHS from the date on which the advertisement appeared.

THE SCHEME ONLY COVERS ADVANCE PAYMENT SENT IN DIRECT RESPONSE TO AN ADVERTISEMENT IN THIS MAGAZINE. IT DOES NOT COVER:-

- (a) Classified advertising;
- (b) payment made in response to catalogues, brochures, etc. received as a result of responding to such advertisements;
- (c) advertisers offering services as opposed to goods;
- (d) claims where payment is made with Access or Barclaycard and where the cost of the goods is over £30. In this case claims should be made to the Credit Card Company concerned.

Full details of the Scheme are available by sending a stamped and addressed envelope to Mail Order Protection Scheme, Periodical Publishers Association, Imperial House, Kingsway, London WC2B 6UN.

SPECTRUM O'Level Revision MATHS and FRENCH



In full colour presentation boxes which include a useful leaflet of topics covered.

Programs are compatible with most 'O' level boards and randomised data is used where possible in the questions so the programs can be used many times.

Help facilities and full explanations are given where appropriate.
see for free brochure



ROSE SOFTWARE
148 WIDNEY LANE
SOLIHULL
WEST MIDLANDS B91 3LH
TEL: 021-705 2895

£6.95
(inc p&p)

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.

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.

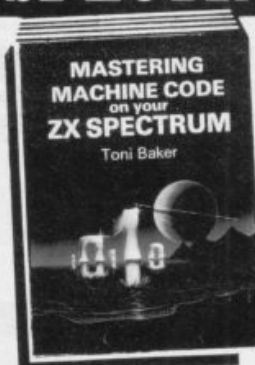
Features:-

- * 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.

SPECTRUM - ZX 81



Make the most of your micro with these acclaimed books from the experts!

- | | |
|---|-------|
| <input type="checkbox"/> Mastering Machine Code on Your ZX SPECTRUM
Toni Baker, 315 pages | £9.95 |
| <input type="checkbox"/> Beyond Simple BASIC — Delving Deeper into Your ZX SPECTRUM
Dilwyn Jones, 206 pages | £7.95 |
| <input type="checkbox"/> Programming Your ZX SPECTRUM
Tim Hartnell, Dilwyn Jones, 230 pages | £6.95 |
| <input type="checkbox"/> 60 Games and Applications for the ZX SPECTRUM
David Harwood, 90 pages | £4.95 |
| <input type="checkbox"/> Creating Arcade Games on the ZX SPECTRUM
Daniel Haywood, 158 pages | £3.95 |
| <input type="checkbox"/> Instant SPECTRUM Programming
Tim Hartnell, 126 pages, C60 cassette | £4.95 |
| <input type="checkbox"/> 20 Simple Electronic Projects for the SPECTRUM, ZX81 and Other Computers
Stephen Adams, 104 pages | £6.45 |
| <input type="checkbox"/> Putting your SPECTRUM to Work
Chris Callender, 88 pages | £4.95 |
| <input type="checkbox"/> SPECTRUM Machine Code made Easy Vol. One (for beginners)
James Walsh, 222 pages | £5.95 |
| <input type="checkbox"/> SPECTRUM Machine Code made Easy Vol. Two (advanced programmers)
Paul Holmes, 152 pages | £5.95 |
| <input type="checkbox"/> Mastering Machine Code on your ZX81
Toni Baker, 188 pages | £7.50 |
| <input type="checkbox"/> Getting Acquainted with your ZX81
Tim Hartnell, 128 pages | £5.95 |
| <input type="checkbox"/> The Turing Criterion — Machine Intelligent Programs for the 16K ZX81
Harrison, Charlton, & Jones, 154 pages | £5.25 |
| <input type="checkbox"/> 34 Amazing Games for the 1K ZX81
Alastair Gourlay, 54 pages | £4.95 |
| <input type="checkbox"/> 49 Explosive Games for the ZX81
Tim Hartnell, 138 pages | £5.95 |

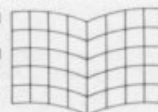
Interface Publications, Dept. SU, 9-11 Kensington High Street, London W8 5NP.

Please send me the books indicated. I enclose £.....

Name:

Address:

INTERFACE
PUBLICATIONS



Sinclair Supermart

POOLS PREDICTION

Made easy on 16K or 48K Spectrum. Takes 1 hour per week to make predictions. Regular small wins possible. Outputs best draws, homes and away. Features analytical draw finder which allows program to learn from its own mistakes, however small. Comes with free permutation calculation program. Also—Pontoon (48K only) can you win the bank and beat the Spectrum? It's not easy.

Ask for: Pools 16K at £6.95
Pools 48K at £8.95
Pontoon 48K at £3.95

ROMBEST, 9, Hawkstone Avenue,
Newport, Salop TF10 7SE.

Replica Blank Firing Colt 45 Automatic as used by U.S. Army, ideal stage prop, with ammo. £4.75; Carriage 50p

Replica 44 Auto Magnum, the gangsters favourite, with ammo. £4.35; Carriage 50p

Another collectors item:
Remington 1874 Army Revolver, all metal with blanks. Black £6.20; Gold finish £7.20; Carriage 55p

Ideal for video film making
Mail order only, send cheques or PO's to:
Razzamattaz, 80 Selhurst New Rd, London SE25

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 Age 3-10 £7.00

LEARNING TO READ 1 Age 2-5 £6.50

4 All-graphics pre-reading games

POPPY PROGRAMS, Richmond House, Ingelton, Carnforth LA6 3AN
Computer Trade Association Member

HORSE RACE FORECASTING

This super programme picked as 1st choice the winners of the Grand National, St. Leger and many more in '83.

48K Spectrum £12.00
16K Spectrum £10.00
16K ZX-81 £10.00
1K ZX-81 £8.00

FOOTBALL POOLS FORECASTING

This programme will forecast the likely home, away wins and draws and lets you use your own expertise as well.

48K Spectrum £12.00
ZX-81 (16K) £12.00

50% royalties paid for top programmes!!!

Send cheque or P.O. to
The Butronics Co., Penjerrick House,
Budock, Nr. Falmouth, Cornwall.

ZX-81 CASSETTE FAST LOAD SAVE and TAPE LOADING AID

Get your cassette really working
MINIMUM 10 times ordinary SAVE speed
UP TO 20 times on good recorders NO
hardware "add ons".

All memory sizes (eg 16K, 32K and 64K)
FAST VERIFY, FAST MACHINE CODE
SAVE (save any part or all of memory).
TAPE LOADING AID see the levels you
really get off tape.

Just £6 or £3 Loading Aid alone. Details
50p, refund against purchase.

MUSAMY SW

11 Brettenham Avenue, Walthamstow,
London E17 5DG.

NEW 48K Spectrum NEW 16K ZX-81 NEW

HEATHPLANNER

For the 48K Spectrum

This is the program for almost everyone wishing to plan appointments for clients on a weekly basis. It automatically plans your weekly time table; all you have to do is enter details of your clients availabilities and it will sort out all the conflicting times and produce a series of plans or timetables allowing most clients to have their first choice of appointment time.

It covers up to seven days a week with a maximum of fourteen periods per day. The program accepts up to 126 clients including those on a waiting list. It includes extensive view-file facilities. A client on a waiting list can if and when you wish be included in the timetables starting at any week within the next twelve months. There is a priority system so that established clients will not have their appointment time changed unless absolutely necessary. One or more clients can be given guaranteed lesson times. Consider what this program could do for you.

It would eliminate the time required, the tedium and fallibility of the usual manual method. Also, rather like an expert system it is objective, it is also indefatigable and in practice has found appointments which would otherwise have been lost.

An almost identical program called Appointments which accommodates 69 clients is available for the 16K ZX-81.

Available from Heath Computing, 7 The Meadows, Flackwell Heath, Bucks HP10 9LX.

Heathplanner for 48K Spectrum £12.00 Inclusive
Appointments for 16K ZX-81 £10.00 Inclusive

MICROCOMPUTER REPAIR SERVICES

Spectrum £10.50 + P&P + VAT
VIC 20 £12.50 + P&P + VAT
C 64 £15.00 + P&P + VAT

Upgrades 16K to 48K for Spectrums
issue 2 and 3. We also repair all
Commodore systems.

Tel: Slough (0753) 48785

SPECTRUM/ZX-81 REPAIRS

48K Upgrade 'Telesound' kits
PLUS

All spare parts.

Acesure Ltd, 43 Old St,
Ashton-u-Lyne, Lancs.

Tel: 061-339 8266

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.

Also Commodore Systems repaired.
Tel: 061-205 4974

**ZX SPECTRUM
32K RAM Up-Grade
£23.50 + VAT
SPECTRUM REPAIRS
£20.00 + VAT
MICRO-TEK
ELECTRONIC
SERVICES
01-520 6414**

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, pythagoras, matrices, integral calculus, transformational geometry, rates of change, maxima and minima.

TOTAL 160K

(TOTAL 8 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

(S) TOP SECRET (S) for any Spectrum

Be in **FULL CONTROL** of programs on **YOUR**
COMPUTER. STOP and reveal the **SECRETS**
of your favourite programs. A machine code
UTILITY that STOPS, most Basic or Machine
Code programs, protected or not, **WITHOUT**
CRASHES.

Activate routine, press two keys and be in
FULL CONTROL LEARN/LIST/MODIFY etc.,
all the options are yours.

The ideal **MICRODRIVE** companion. If you're
a basic beginner, a machine code master, a
program writer or a games fanatic, this is the **UTILITY**
that can open the door for **YOU.**

PLUS pages of **SECRET** information about
methods used by professionals to keep their
secrets hidden.

48K Spectrum £5.95, including advanced **HEAD-
ER READER** and **Dec/Hex Hex/Dec converter.**

16K Spectrum £4.95 (Relocatable under software
control)
Cheque/P.O. to **ASH BYPRODUCTS**, Dept SU,
183 Bristol Road, Edgbaston, Birmingham B5
7UB.

**ZX-81, SPECTRUM, DRAGON,
BBC, VIC 20 & CBN 4
Software lending library**

We have for hire programs for your com-
puter. 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 250 hire titles, mostly
for the Spectrum.

Send cheque or PO for £5 to:
SOFTWARE LENDING LIBRARY
PO Box 3, Castleford, West Yorks.
Stating name, address and computer type.

Overseas members very welcome. All mail
dealt with on a daily basis.

Special exchange section
for all members

We need good quality programmes
for the ZX Spectrum, cash and
good royalties paid.

Phone Capricorn Software
9-6 on (0795) 533979.

**MAKE MONEY NOW
CAPRICORN SOFTWARE**

68 Bysing Wood Road, Faversham,
Kent ME13 7RJ.

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

Repdes to:
Dept SU, ACE Services,
8 Asperfield Road, Biggin Hill, Kent.

SPECTRUM ACCESSORIES

Power Reset with LED on/off display £4.75 inc.
also with Save/Load control £7.00 inc.
Sound Amplifier £9.50 inc.
Sound Amplifier with power reset £12.00 inc.
Sound Amplifier with power reset and
Save/Load control £14.50 inc.

These units allow you to leave your computer
leads permanently connected.

Cheques or SAE for details to:

Micro S.C., 7 Brock Gardens,
Hale, Liverpool L24 4AU.

The rate for classified
advertising in the

**Sinclair
supermart**

is only £10.00 per
single column centimetre.

★★★★★ TAPE COPIER 5 ★★★★★★ (new version)

Makes BACK-UP copies of ANY type of SPECTRUM (16/48K) program (incl headerless, m.v.c. unstoppable) easily with MANY UNIQUE features.
FULL MONEY BACK GUARANTEE if you are not satisfied.

MAXIMUM 5 STARS from Home Comp. Weekly with 3 out of 4 100% RATINGS.

★ **LOADS** in all program parts CONTINUOUSLY — even without pressing a key. Other copiers require many loadings — MASSIVELY saving you time and trouble!

★ **M/Drive** — GENUINELY copies BASIC, M/CODE + arrays onto MICRODRIVE. Stops programs — VITAL to alter loading instructions to HELP make them run.

★ **BREAK** at any time/continue loading feature.

★ **MAXBYTES** makes a working copy of programs occupying the full 16K or 48K!

★ **Verifies**, Repeat copies, Auto, Abort, Program name plus HEADER data.

★ **Copies HEADERLESS** and other types. Indeed ALL programs that we are aware of!

★ **Very user friendly** and simple to use, with FULL instructions.

TAPE COPIER £4.50 **TAPE COPIER WITH M/DRIVE £5.50**

(add £1.00 Europe, £2.00 other countries)

Old customers updates at £1.50 or £2 with m/drive plus SAE and 2 tape.

LERM Dept SU
Cottingham, Mkt Harborough, Leics

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 for catalogue and Special Offers.

12 FERNHALL DRIVE, REDBRIDGE, ESSEX IG4 5BN. Tel: 01-550 5575

**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
- 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

OR BOTH for £12

Check/PO (payee THINK TANK) to:
think tank Educational Software
Dept SU16, 35 Watlington Road,
Wotton Bassett, London SW19 8EQ

MICRO DRIVE USERS CLUB

CALLED Microdrive Exchange.
This news letter club is designed to help by the exchange of info and ideas.

Did you know you can pay up to £5.50 for a cassette to transfer tapes to microdrive and then they DON'T RUN?

Issue 1 will include. How to avoid this, plus transferring programs which normally over-write the microdrive map, transferring Vu-File, Zoom, etc. etc.

Membership is £5 per year. Europe £8 per year.

Please make cheques payable to ZX Guaranteed.

Microdrive Exchange is run by G. A. Bobker

ZX GUARANTEED (Dept SU)
29 Chadderton Drive, Unsworth,
Bury, Lancs
Tel: 061-766-5712

SPECTRUM ROM why waste time PEEKing ROM? I offer 16K bytes of ROM printed 16 bytes per line on A4 paper for £3. Mr S. G. Moss, 45 Wern Llanfairpwll, Gwynedd LL61 5AQ.

EASY KEY-FINDING CHART for the Spectrum. Save time. All you need for effortless in-putting displayed on one concise A4 chart. £2. R. Pritchett, Sunset House, Bibury, Nr. Cirencester, Glos GL7 5ND.

SEIKOSHA GP100A Mk II Dot Matrix Printer. Ideal for Spectrum. As new. £160 incl. delivery. Tel: York 490109.

KD INTERLINK TWIN DISC DRIVE, adds. Monitor and Keyboard, Epsom MX80FT Printer £480 o.n.o. the lot. Ring: 0704 30001 for quick sale.

THE MAGIC SHOW. Wonderful teacher tested English, Maths, Music program for children 7-11. Get your work right and see the show. £5. SAE details. Bourne, 44 Haslam Crescent, Bexhill, Sussex.

ATTENTION KENT. Computer World now open with wide range of software (games, educ. and business) and Micros-Spectrum/ZX81—and interfaces, keyboards. Computer hire. 208 Kenhouse Rd., Beckenham, Kent. 01-778 0479.

10 MIND-BOGGLEING GAMES for Spectrum 16/48K including Tri-Angle, Stars, Colourcode, Higher or Lower etc. Full instructions on tape, bargain only £2.50. D. King, 1 Garrick Walk, Tilgate, Crawley, Sussex.

ZX81 16K plus case and keyboard. 13 original tapes, include 3D Monster Maze and Test Match. Manual and games book. Bargain at £70. 'Phone: Falfield 260157 between 4.30pm and 7.30pm.

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.

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.

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.

SPECTRUM OWNERS. We are the mail order specialists in serious software for business, domestic, utility and education. Send S.A.E. for our latest catalogue SD Micro-Systems (SU), P.O. Box 24, Hitchin, Herts.

"SCREEN" SCREEN DESIGNER for 48K Spectrum. Many features including character designer copy screen area. Fast code, great for "Hurg" owners, £5.00 P/O, P. R. Smith, 71 Arcadian Gardens, London N22 5AG.

SWOP YOUR SPECTRUM software. Loads of top names, e.g. Cookie, 3D Tunnel, Time Gate, etc. Write or phone, J. S. Lall, 7 Greenwood Road, West Bromwich. Tel: 021-502 4589.

**TO ADVERTISE IN
THE SUPERMART
CALL AJAY ON
01-359 3525
NOW!**



**BE ANTI-GLARE,
AND CRACK
THE HI-SCORE!**



You know the feeling, you've been re-playing for the last hour and still you can't beat your earlier hi-score, in fact it's getting worse. The problem is that there are so many missiles and fireballs zapping about that you can't see them coming. You've got glare-fatigue! what you need is an anti-glare screen! They cut right through the confusion and let you thwart the attack before it has begun! The anti-glare screen sticks on and peels off your T.V. No longer will you suffer headaches or eyestrain — so you can play on in peak condition. Your anti glare screen measures approx 12" x 9" and is the answer to mastering record scores, and it will allow you to program for hours in comfort — all that for £2.95!

**TRT Design, 89a Fernhead Road, Maida Vale,
London W9**

**YES! I want to crack the Hi-Score, please send
Anti-Glare Screen(s) at £2.95 each, to:**

Name.....
Address.....
County.....
Town.....Post Code.....

All orders processed within 24 hours!

Send your postal order/cheque made payable to 'TRT Design' to:

**TRT Design, 89a Fernhead Road, Maida Vale,
London W9.**

SPHERE SOFTWARE

From the publishers of Celtic Revision Aids

MATHEMATICS

Examination Practice & Tests

An 'O' level revision tape of 8 programmes for mathematics students with 48K Spectrums £5.95 (inc. p+p)

Cash with orders to: Sphere Software,
30-32 Gray's Inn Road, London WC1X 8JL

ZX-81: PKPs Positive Keyboard Pads



**THESE CLEAR SELF ADHESIVE
PADS GIVE POSITIVE FINGER
TIP CONTROL**

10 PKPs = £1.25

40 PKPs = £2.99

PLEASE ADD 30p P&P

CHEQUE AND POSTAL ORDERS TO P. NEWBERRY
"GLASTON" COMPUTERS, YALLANDS HILL, MONKTON HEATHFIELD,
TAUNTON, SOMERSET TA2 8NA.

Advertisement Index

AGF Hardware	88, 89	Melbourne House	60, 61
Addictive Games	xv	Micromega	117
Arcade Software	137	Microsphere	84
Atari International	93, 134	Micro-Gen	114
Bell Flower Software	136	National Software Library	134
Beta Soft	115	Nectarine	43
Beyond Software	122, 123	New Generation	48, 49
Bridgemaster	143	OCP	93
Bridge Software	xiv	Ocean Software	18, 19
British Micro	xvi	Owen T. J.	93
CCS	50	Picturesque	132
CP Software	42	Pitman Publishing	115
Cabel Software	59	Practical Software	123
Cambridge Computer Store	58	Print & Plotter	54, 55
Cambridge Computing	53	Prism	94, 95, 96
Campbell Systems	98	Profisoft	83
Chalksoft	132	Protek	106, 126
Cheetah Marketing	44	Quicksilver	148
Cheetah Soft	12	Richard Shepherd Software	36, 65
Compusound	64, 129	Reed Exhibitions	46
Cross Software	64	Romantic Robot	93
Crystal Computing	20	Rose Software	142
Dk'Tronics	26, 27, 28, 29	SMT Rotronics	116
DRG Business Machines	113	Salamander Software	22
Datel	135	Selec Software	132
Dee Kay Systems	58	Sinclair Research	17, 85
Digital Integration	ii	Sky Wave	58
Dorcas	124	Soft Concern	8
Durrell	11	Softtech	14
Enigma	92	Software Supermarket	39
Fantasy	66, 121	Software Workshop	130, 131
File Sixty	99	Tasman Software	138
Hartland Software	43	Texgate	64
Hestacrest	115	Transform	107, 136
Hewson Consultants	147	Treetop	52
Hornby	129	Tremiver Ltd	134
IPC	100	Tutorial Software	143
ISP Marketing	25	Ultimate	32, 108
Incentive Software	107	University Software	135
Interface	143	Vortex	4
Kelwood Heating	128	Walkers Computer Services	38
Kempston Micro Electronics	2	W. H. Smith	6, 7
Kernow Software Services	129	Zeal Marketing	146
Lothlorien	123		

Reach an estimated readership of over 200,000 users per month for as little as £2.00*.

Or if you are starting your own small business advertise in the supermart for only £10.00.

Yes all you have to do is fill in the coupon below including your name, address and/or telephone number and send to: Supermart, Sinclair User, ECC Publications, 196-200 Balls Pond Road, London N1 4AQ.

Maximum 30 words.

Your advert will appear in the earliest possible edition.

Name

Address

Tel:

Have you included the fee of £2.00 or £10.00?

*for second hand sales only

Conditions

The Advertisement Manager reserves the right to alter, reject or suspend an advertisement without assigning any reason. Advertisements are accepted subject to approval of copy and to the right of the Advertisement Manager to alter, reject or cancel any order without explanation. The Publishers are not liable for any loss from any cause whatever, nor do they accept liability for printers' errors. The Advertiser shall indemnify the Publishers in respect of any claim, cost and expenses arising out of any libelous or malicious matter or untrue statement in any advertisement published for the advertiser, or any infringement of copyright, patent or design therein. The placing of any order will be deemed to be an acceptance of these conditions.

ZEAL

SOUND BOOSTER FOR SPECTRUM



- Plug in and use—no internal connections
- No batteries needed
- Good, clear sound
- Output control
- Load/Save facility built in
- Fully guaranteed

BRING THE SOUNDS OF
YOUR GAMES TO EXCITING
LIFE FOR JUST

£14.99
(incl. VAT & P&P)

NEWSFLASH!

14" **MICROVITEC** Colour Monitor

SPECTRUM Compatible

£285 (incl. VAT & carriage)

16K **RAMPACK** for ZX-81

£17.50 (incl. VAT & P&P)

Please send me (enter quantity in box)

- ☐ Sound Boosters @ £14.99
- ☐ Colour Monitors (Spectrum Compatible) @ £285
- ☐ Rampacks for ZX-81 @ £17.50

Above prices include VAT/P&P/Carriage

Name.....

Address

I enclose Cheque/P.O. for £.....

ZEAL MARKETING LIMITED
Vanguard Trading Estate, Storrorth Lane,
Chesterfield S40 2TZ. Tel: 0246 208555

THE
LUNA 25
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 propellene 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

HEROES APPLY WITHIN.

QUICKSILVA

All Titles available mail order from:
QUICKSILVA MAIL ORDER P.O. Box 6, Wimborne, Dorset BH21 7PY. Tel: (0202) 891744.



FRED
SPECTRUM 48K £6.95
COMMODORE 64 £7.95
(Available soon)



SNOWMAN
SPECTRUM 48K £6.95



BOOGABOO
COMMODORE 64 £7.95
SPECTRUM 48K £6.95



GAMES DESIGNER
SPECTRUM 48K £14.95



ANT ATTACK
SPECTRUM 48K £6.95



MINED OUT
ELECTRON £6.95
BBC £6.95
LYNX £6.95
SPECTRUM 48K £4.95
ORIC/ATMOS £6.95
(Available soon)

Available at:



John Menzies
WHSMITH

and leading multiple retailers and specialist computer stores.



WARNING: These programs are sold according to QUICKSILVA Ltd's terms of trade and conditions of sale, copies of which are available on request.

**HAVE YOU JOINED THE
GAME LORDS YET?**
Send S.A.E. for details and catalogue