

April 1984

An independent magazine published by ECC Publications

sinclair user

Issue No 25

Only
85p

INCORPORATING SPECTRUM USER

SHERLOCK HOLMES COMPETITION

Teach your
Spectrum
to think

Meet the
builder of the
Pyramid

Can you
outwit
the great
detective?

Software in
the blackboard
jungle

Getting to
grips with
utilities

ZX-81 modem
adaptor
offer



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.

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.



CONVERSION TAPE I

- Converts: Horace Goes Sking, 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

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 •

SPECTRUM
JOYSTICK
INTERFACE
£11.50

PRO 5000
£13.50

PRO 3000
£12.75

PRO 1000
£10.99



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

Nicole Segre

Consultant editor

Mike Johnston

Managing production editor

Harold Mayes MBE

Software editor

John Gilbert

Program reviewer

June Mortimer

Illustrator/designer

Brian King

Group advertisement manager

John Ross

Sales executive

Annette Burrows

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.



Telephone

All departments
01-359 3525

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

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

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

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

© Copyright 1984

Sinclair User

ISSN No 0262-5458

Printed and typeset by

Cradley Print PLC,

Warley,

West Midlands

Distributed by

Spotlight Magazine Distribution Ltd,

1 Benwell Road,

Holloway,

London N7

01-607 6411

FEATURES

33 ZX-81 MODEM ADAPTOR
Communications on the ZX-81 by
John Lambert.

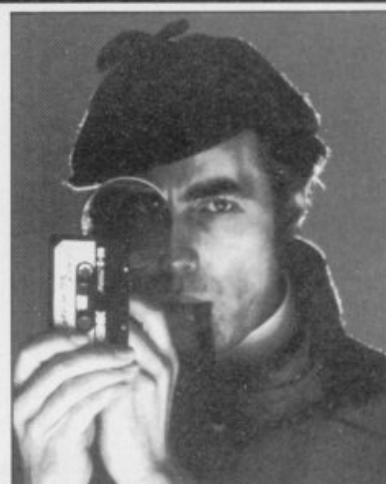
35 SPECIAL OFFER Bargain prices
on the ZX-81 Universal Modem
Adaptor and the Prism Modem 1000.

54 UTILITIES John Gilbert investi-
gates software which can help you
program.

62 COMPETITION Pit your wits
against Sherlock Holmes to win
Melbourne House software and books.

86 MACHINE CODE John Kerrigan
shows how to achieve sideways
movement for large characters.

**104 ARTIFICIAL INTELLI-
GENCE** Even a Spectrum can
learn. J McAllister tells you how.



The great detective, page 62

REGULARS

20 SINCLAIR SIMON Further ad-
ventures of our cartoon hero.

29 HARDWARE WORLD Reviews
of the latest add-ons and peripher-
als.

37 SOFTWARE SCENE We look at
what is on the market for the ZX-81
and Spectrum.

46 HIT SQUAD Nicole Segre talks to
Bob Hamilton, author of The Pyra-
mid.

58 USER OF THE MONTH What's
cooking on the Spectrum? Liz
Leckie reports on a computerised gourmet.

96 SINCLAIR BUSINESS USER
Mike Wright assesses software for
the serious user.

106 EDUCATION Theodora Wood
examines programs for secondary
school children.

122 HELPLINE Andrew Hewson
explains how to convert pro-
grams from one machine to another.

131 MIND GAMES Quentin Heath
battles with the Lords of Time.



Food for thought, page 58

PLUS

5 SINCLAIRVOYANCE

11 SINCLAIR USER CLUB

18 NEWS

25 LETTERS

67 PROGRAM PRINTOUT

113 STARTER PACK

137 SOFTWARE DIRECTORY

NEXT MONTH

BATTLE 1917



We print the award-winning program



A NEW DIMENSION IN EXCITEMENT FROM VORTEX SOFTWARE.

Stop the advance of the Millitoids. Survive the maze of death, rationalise the paradox zone and overcome the dangers encountered in the flatlands.

Achieve this and return to the transporter capsule before the deadline. But beware. There are lethal Hoverdroids, Bouncers and land mines everywhere.

3D full colour graphic effects, machine code fast action and multi-screen wraparound zones make Android Two a mindblowing action game.

**SEEK OUT ANDROID TWO AT
ALL THE BEST DEALERS.**



PLEASE RUSH ME:

SPECTRUM 48K

KEYBOARD/JOYSTICK OPTION

☐ ANDROID TWO(S) **£5.95 EACH**

TOTAL VALUE £

Enclose PO/cheque payable to VORTEX SOFTWARE.

NAME _____

ADDRESS _____

Send to mail order address:

VORTEX SOFTWARE 280 BROOKLANDS ROAD MANCHESTER M23 9HD

DEALER ENQUIRIES WELCOME

Vortex are always seeking exciting new programs. Contact us or send sample.

No time for complacency

THE JUNIOR INDUSTRY MINISTER, Mr John Butcher, has predicted that by 1986 half the households in the U.K. will have a computer. Mr Butcher was speaking at the Computer Trade Association awards ceremony earlier this year, and he went on to describe the schoolchildren of today as the first generation of the computer literate. He added: "Because of this world lead — a direct result of the co-operation between Government and the education sector — the U.K. will have the skilled manpower to exploit the burgeoning information market, especially in software."

The extravagant claim that it is the present Government which has fostered computer literacy through the Microelectronics Education Programme will make many teachers fall about laughing. If children are becoming computer literate — and that is questionable — then they are doing so at home, not in schools which cannot even boast of having a micro for each class, let alone each pupil.

The Microelectronics Education Programme was initiated, belatedly, in 1981, two years after it was ready to move. The Labour Government had planned the scheme to begin in 1979, but lost the General Election and the new Conservative Government immediately called a halt to the project as part of the general cutbacks in expenditure. An inauspicious start, and one which Butcher has conveniently forgotten.

Three years later, the Department of Education and Science reports on the progress of MEP: "the current position in the

have taken courses in computer awareness. That, however, is not enough, and schools have lagged so far behind in the teaching of computer science that universities have taken to giving remedial tuition on the subject to post-A level students. Richard Ennals, of the Department of Computing at Imperial College, London, spoke of the problem at the North of England Educational Conference in Sheffield: "Teachers must be properly trained and the number of computer science teachers increased. It is not enough to provide schools with microcomputers which would only produce a generation of poor Basic programmers."

Those poor Basic programmers are likely to be self-taught, too, as a growing number of schoolchildren become familiar with micros at home. A recent survey by Gowling Market Services showed that 11 percent of homes in the U.K. now have a computer. Well over one million people bought a computer for the first time last year, and nearly two million are expected to do so in 1984. The hands-on experience which children fail to get at school is gained at home, though one unfortunate aspect is that it is only the children of the better-off who learn in that way. Due largely to the failure of MEP to provide all pupils with a computer education, the subject has become, unintentionally, one from which the less well-off children are excluded.

In any case, how literate is that generation of computer kids? What skills will they have to offer in the future? Most Sinclair users would agree that computer literacy has nothing to do with reaching Cavern 20 of Manic Miner or scoring 79 percent on *The Hobbit*. Fortunately, few people use their computers only for playing games. The majority also devote considerable time to programming and learning about the new technology. It cannot be said, however, that those skills will ensure a career in computing. After all, the ability to drive a car and tinker with an engine does not qualify one as a motor mechanic, and even if it did, society requires only a limited number of garage hands.

It must be remembered that a computer is, in the final analysis, only a tool, albeit a very sophisticated one. Familiarity with that tool is essential, as we move ever nearer to a fully computerised society, but far too great an emphasis is placed on programming skills which, one day, with professional software available for every application, will be simply a

'If children are becoming computer literate they are doing so at home'

United Kingdom is that each secondary school, some 5,500 in all, now has at least one microcomputer", and on average there are five computers in each of those schools. Only one-third of primary schools, however, has any computers at all, and the majority of those have only one. In total, then, less than 50,000 computers have been purchased by schools. Scarcely a figure to be proud of, particularly when compared to the 1.19 million home computers sold to first-time users in 1983.

Consequently, computers in school tend to be used, if at all, as demonstration models in the few classes receiving tuition in computer science. In many instances, the only hands-on experience gained by pupils is in after-school computer clubs organised by enthusiastic staff, and those tend to appeal to those who already have a computer at home.

One cannot blame the schools themselves — at least, not entirely. Computers cost money, and even with the help of the MEP schools must shoulder 50 percent of the expense of hardware and software. With the present cutbacks, schools are finding it difficult enough to buy textbooks, and for effective teaching computers must be bought in large quantities. There is a little a teacher can do with one Spectrum plus hardware and a class of 35 pupils.

Nevertheless, some progress has been made. Within the past 30 months, according to DES figures, 80,000 teachers

'Far too great an emphasis is placed on programming skills'

hobby for most users. In the meantime, schools should, ideally, be using computers in every discipline in order that pupils become accustomed to their use and potential. That will better equip people to use computers in everyday life, and they will become expert in using the new technology rather than in programming.

The Government, too, should look carefully at the implications of computers, and instead of being complacent about a so-called computer literate generation which it has done little to foster, it should begin thinking now about educating the public to make good use of increased leisure time.

Don't miss the boat!..



Try **Transversion**, if you dare. Eliminate the Alien Pods in their Galactic Grid under the protection of their Guardians. It'll make your green fingers itch with excitement! Only **£5.90**.

Avoid the ravenous monsters as you dig your way out of trouble with **Digger Dan**. Trigger "Digger" for only **£5.90**!

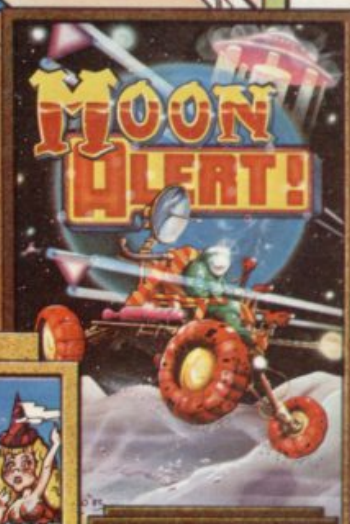
Hunchback – just like the Arcade original. Rescue Esmerelda but you'll have to swing the rope, jump the ramparts and avoid the arrows, knights and fireballs. It really rings with fun and excitement for only **£6.90**.

The escapades of **Moon Alert** could turn even you into a complete Lunartic. You'll really lift-off for only **£5.90**, but we warn you... it's no walkabout.

Now you can try your handicap on the testing greens of the famous **Royal Birkdale**. Set the wind direction and speed, select your iron and use your skill to emulate the golfing "greats". At only **£6.90** you'd better join this club now!

Armageddon, and this could be your last chance to save the Earth from nuclear attack. For only **£5.90** you can be the commander of the missile defence battery... don't miss it!

Rescue puts you right in the pilot's seat. Airlift your men to safety



away from the enemy tanks and aircraft. Hi-res graphics at low-cost price. Only **£5.90**.

The exploits of **Eskimo Eddie** and his faithful pal Percy Penguin can mean only chills and thrills in Santaland with Growler and the Snowbug to hot-up the action. Cracking fun and Arctic action for only **£5.90**.

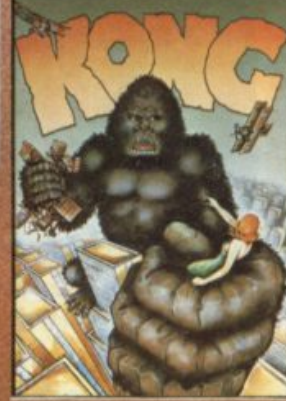
Conquer the mighty **Kong** in one of the UK's best sellers. Rescue

The Ocean line's fun-packed Spectrum voyage – just the ticket!

ARMAGEDDON



RESCUE



maiden from the clutches of the mighty beast and be a hero for only **£5.90**. You've never seen anything like **Mr. Wimpy** – the craziest, zaniest burger battle to sizzle your screens. The greatest game under the bun for only **£5.90**. Quick before it burns!

ocean

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

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

SEEK AND DESTROY.

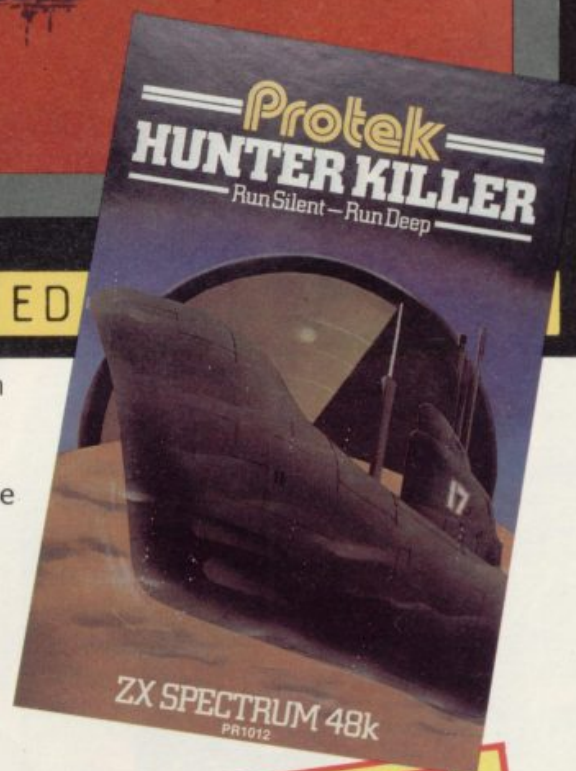


PA 0 HDG 169 ED

You're on a top secret mission. Suddenly your position is threatened by an enemy submarine. You must seek and destroy the intruder.

As the captain of a second world war S-type submarine you have radar and asdic at your fingertips. Plus 18 separate controls which allow you to dive, surface, and manoeuvre your craft. Watch out for enemy aircraft if you stay on the surface too long.

Every tape includes a "two computer option" compatible with "Interface 1" allowing you to link two computers together in a duel.

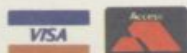


See the complete range of action packed computer games from Protek at your local computer store.

£7.95

Available for the BBC
and Commodore 64 soon.

Protek=



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

LORDS OF TIME

Joins our range of acclaimed pure-text puzzle adventures, at £9.90, for:

BBC 32K **COMMODORE 64** **SPECTRUM** 48K **LYNX** 48K **NASCOM** 32K **ORIC** 48K **ATARI** 32K

ADVENTURE REVIEWS

"Adventures which have a fast response time, are spectacular in the amount of detail and number of locations, and are available to cassette owners... Simply smashing!"

— *Soft, Sept 83*

"Colossal Adventure is included in Practical Computing's top ten games choice for 1983: 'Poetic, moving and tough as hell.'"

— *PC, Dec 83*

"Colossal Adventure... For once here's a program that lives up to its name... a masterful feat. Thoroughly recommended"

— *Computer Choice, Dec 83*

"Colossal Adventure is one of the best in its class. I would recommend it to any adventurer."

— *Acorn User, Feb 84*

"Adventure Quest... This has always been one of the best adventures for me as it seems to contain the lot. In all it took me about eight months to solve."

— *PCW, 18th Jan 84*

"To sum up, Adventure Quest is a wonderful program, fast, exciting and challenging. If you like adventures then this one is for you"

— *NILUG issue 1.3*

"Colossal Adventure is simply superb... For those who want to move onto another adventure of similar high quality, Dungeon Adventure is recommended. With more than 200 locations, 700 messages and 100 objects it will tease and delight!"

— *Educational Computing, Nov 83*

ADVENTURE REVIEWS

"Colossal Adventure... undoubtedly the best Adventure game around. Level 9 Computing have worked wonders to cram all this into 32K... Finally Dungeon Adventure, last but by no means least. This is the best of the lot - a truly massive adventure - you'll have to play it yourselves to believe it."

— *CBM 64 Users Club Newsletter*

"The puzzles are logical and the program is enthralling. Snowball is well worth the money which, for a computer program, is a high recommendation."

— *Micro Adventurer, Dec 83*

"Snowball... As in all Level 9's adventures, the real pleasure comes not from scoring points but in exploring the world in which the game is set and learning about its denizens... this program goes to prove that the mental pictures conjured up by a good textual adventure can be far more vivid than the graphics available on home computers."

— *Which Micro?, Feb 84*

"Lords of Time. This program, written by newcomer Sue Gazzard, joins my favourite series and is an extremely good addition to Level 9's consistently good catalogue... As we have come to expect from Level 9, the program is executed with wonderful style - none of those boring 'You can't do that' messages! Highly recommended."

— *PCW, 1st Feb 84*



MIDDLE EARTH ADVENTURES

1: COLOSSAL ADVENTURE

A complete, full size version of the classic mainframe game "Adventure" with 70 bonus locations added

2: ADVENTURE QUEST

Centuries have passed since the time of Colossal Adventure and evil armies have invaded The Land. The way is long and dangerous, but with cunning you can overcome all obstacles on the way to the Black Tower, source of their demonic power, and destroy it.

3: DUNGEON ADVENTURE

The trilogy is completed by this superb adventure, set in the Dungeons beneath the shattered Black Tower. A sense of humour is essential!

THE FIRST SILICON DREAM ADVENTURE

1: SNOWBALL

The first of Pete Austin's second trilogy. The giant colony starship, Snowball 9, has been sabotaged and is heading for the sun in this massive game with 7000 locations.

THE LORDS OF TIME SAGA

7: LORDS OF TIME

Our congratulations to Sue Gazzard for her super design for this new time travel adventure through the ages of world history. Chill to the Ice-age, go roamin' with Caesar's legions, shed light on the Dark Ages, etc.

Price: £9.90 each (inclusive)

Level 9 adventures are available from good computer shops, or mail-order from us at no extra charge. Please send order, or SAE for catalogue, to:

LEVEL 9 COMPUTING

Dept S, 229 Hughenden Road,
High Wycombe, Bucks HP13 5PG
Please describe your computer



48k

WIN THE POOLS?

SPECTADRAW 2—THE MOST POPULAR POOLS PREDICTION PROGRAM OF 1983 NOW EVEN BETTER VALUE IN 1984!!!!

- ★ Supplied with a database tape containing data on over 8,000 matches since 1980.
- ★ Database is updated each week by user.
- ★ Match and Division names already in the program — no tedious typing every week!
- ★ Program is menu driven for simplicity of use.
- ★ Errors can easily be corrected — the program even checks your entries!
- ★ Comprehensive instruction manual designed to make the program easy to understand.
- ★ Will also forecast the least likely draws for those who prefer to bet on fixed odds.
- ★ Supplied together with SPECTASORT — the Perm Generation Program which takes SPECTADRAW 2's predictions and turns them into ten 8 from 10 full cover perms. Complete your coupon direct from the screen!!

SPECTADRAW 2, 8,000 MATCH DATABASE, SPECTASORT AND INSTRUCTION MANUAL. THE COMPLETE POOLS PREDICTION PACKAGE FOR THE 48K SPECTRUM — NOW AT THE UNBEATABLE PRICE OF £9.95 INCLUSIVE. (Cheques/POs payable to B. S. McAlley).

SPECTADRAW, 1 COWLEAZE, CHINNOR, OXFORD OX9 4TD

CHESS — THE TURK from OCPTM VOTED "THE BEST CHESS OFFERING" by WHAT MICRO?

The original Turk was an eighteenth century automaton, 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.

CHESS—THE TURK represents the very best in 48K ZX SPECTRUM chess programs, standard options are:—

- 6 LEVELS OF DIFFICULTY
- TWO PLAYER MODE
- RECOMMENDED MOVE
- STORING TO TAPE
- PRINT MOVE AND/OR BOARD



CHESS—THE TURK offers a whole range of additional options that have made it the definitive ZX Spectrum chess program. These enable you to:—

- CHANGE LEVELS DURING PLAY
- REMOVE PIECES TO EVEN THINGS UP (AS IF YOU WOULD!)
- CHANGE SIDES DURING PLAY
- PLAY AGAINST THE CLOCK
- SET UP GAMES FOR NEWSPAPER PROBLEMS

A menu driven chess program with a total of **14** options and superb graphics this program has to be seen to be appreciated.

DARE YOU PLAY THE TURK?

DON'T HESITATE... GET ONE TODAY

Available from selected branches of

W H SMITH, BOOTS and MENZIES and other good software stockists.



Software... simply the best

If you experience any difficulty obtaining your copy of CHESS—THE TURK send a cheque or postal order for £9.95 to:

Oxford Computer Publishing Ltd.

4 High Street, Chalfont St. Peter, Bucks. SL9 9QB



THE FABULOUS CASSETTE



FROM Cascade

VALUE that's out of this world

50 GAMES ON ONE CASSETTE

DRAGON BBC A/B Spectrum Apple ATARI ORIC-1 ZX81 VIC-20

It is impossible to tell you everything about the 50 games on CASSETTE - 50 but they include many types such as maze, arcade, missile, tactical and logic games, to suit most tastes in computer game playing. CASSETTE - 50 will appeal to people of all ages and the games will provide many hours of entertainment for all the family at a fraction of the cost of other computer games.

EXPRESS DELIVERY- ORDER NOW

Name _____

Address _____

Post Code _____

Country _____

Dealers & Stockists enquiries welcome.

Please send me by return of post, Cassette 50 at £9.95 per tape. I enclose a cheque/postal order for

£ _____ made payable to Cascade Games Ltd.

Please debit my ☐ No. _____

SPECTRUM ☐ ORIC-1 ☐ ZX 81 ☐ VIC 20 ☐
BBC A/B ☐ DRAGON ☐ ATARI ☐ APPLE ☒



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

SU 4/84



CLUB BENEFITS

Bi-monthly club cassette available to all club members.

Special discounts on hardware, software and books.

Members recover their membership fee many times over.

Free Club software.

Machine code teach-in.

Telephone Helpline.

Technical advice.

Play Captain Kirk and pilot the Enterprise

This month's special offers will advance your knowledge of your machine

THIS MONTH the Club offers a range of software and books at greatly-reduced prices.

Golf will provide any keen golfer with a ZX-81 to play a hole or two with the computer. The game provides an accurate simulation with all the usual hazards. One or two players can play a round on a nine- or 18-hole course.

For Spectrum owners, **Star Trek** will provide one of the best versions of the original mainframe game. Play Captain Kirk and pilot the Enterprise in your search

for Klingons. **Spectipede**, for the 16K Spectrum, is a faithful version of the old arcade game, Centipede. Destroy the segments of the centipede while avoiding the other creatures in the garden. All the software obtainable from the Club this month is from R and R Software.

A variety of books is also on offer. All of them are from Granada publications, which has proved to be one of the best computer and educational publishers in Britain.

Among the selection are one on machine code, written

in easy-to-understand style, one on how to improve Spectrum graphics and sound and one for the educational user. If you want to play games, the *Spectrum Games Book* is for you and if you want to become an efficient programmer, *The Spectrum Programmer* might be just what you need.

All the offers will advance your knowledge of your machine. They can be obtained only by Club members and are available only until the end of April.

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

Chess games free to new members

IN THE JANUARY issue of *Sinclair User* we ran a special offer to attract female club membership. Every female who applied for membership was sent a free Mikro-Gen **ZX Chess** program for the ZX-81 or a Mikro-Gen **Masterchess** program for the Spectrum. The normal price for those programs is £6.95. The response was overwhelming and we received a number of letters from disgruntled males who felt that we were discriminating against them.

Consequently we decided to extend the offer to males and females for this issue only.

Everyone who applies to join the Sinclair User Club in April will receive one of the Mikro-Gen chess programs free, thus effectively reducing the club membership fee to only £5.

More than 400 club applications were received at the beginning of this year and that caused some members to experience delays of several weeks before receiving their membership cards and cassettes. We apologise to all concerned and assure members that we have taken steps to prevent a recurrence.

	List price	Offer price
ZX-81 Software		
Golf	£3.75	£2.99
Spectrum Software		
Star Trek	£3.75	£2.99
Spectipede	£4.95	£3.99
Books		
The ZX Spectrum and how to get the most from it	£5.95	£4.99
The Spectrum Programmer	£5.95	£4.99
The Spectrum Book of Games	£5.95	£4.99
Introducing Spectrum Machine Code	£7.95	£6.99
Learning is Fun — 40 Educational Games for the Spectrum	£5.95	£4.99
Spectrum Graphics and Sound	£6.95	£5.99

MEMBERSHIP FORM

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

Name

Address

.....

.....

Which computer do you own?

ZX-81 ☐ Spectrum ☐

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

Sinclair User Club

Britain

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

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

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

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

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

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

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

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

Eastwood Town Microcomputer Club: E N Ryan, 15 Queens Square, Eastwood, Nottingham 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, Gourcock, Renfrewshire PA19 1PL (Gourcock 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, London 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.

Newcastle (Staffs) Computer Club: Meetings at Newcastle Youth and Adult Centre, Thursday, 7.30 to 10 pm. Further information from R G Martin (0782 62065).

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

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

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

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

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

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

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

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

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

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

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.

ZX-80/ZX-81 Users' Club: PO Box 159, Kingston-on-Thames. A postal club.

Overseas

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

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

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

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

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

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

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

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

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, Sweden.

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

Play with a Griffin

So they take school in their stride



"Fisions (plc) Sicentif Equipment Division"

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

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

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

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

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

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

All good fun!

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



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

GRIFFIN SOFTWARE
- it's an education.

GET THE RIGHT ANGLE ON YOUR SPECTRUM

Trickstick turns your Spectrum into the most sophisticated games machine in the world. Your fingers rest on the Trickstick's six sensitive pads (four directions and two fire buttons) and the harder you press the faster you go or the harder you turn.

Trickstick works by picking up mains hum from your body and converting it by an ingenious circuit design directly into digital input. Proportionality gives vast possibilities for more interesting games.



- ★ Each Trickstick comes with its own interface included in the price.
- ★ Up to eight interfaces can be stacked into each other for 1-8 simultaneous players. (Own 1-8 player game is Attaktics at £10).
- ★ Works with most Kempston compatible software, and with our new programmable adaptor (£10 for Trickstick owners) it works with ANY software.
- ★ Easy to program, even for proportional games.
- ★ In the shops soon. Now available by mail / telephone order at £34.50.

TRICKSTICK-

**The revolution that
Runs Rings round
ordinary joysticks**

THE 80K SPECTRUM - £57.50

Upgrade your 16k Spectrum to a full 80k with the SP80 - a 64k expansion kit giving two 32k pages above address 32767. Not recommended for beginners, but ideal for the serious programmer. Pages are switched using software instructions only, and an LED indicates which page you are on. The other page is isolated from the system, but retains all its information until switched back.

The SP80 simply plugs into the sockets in the 16k Spectrum. Full fitting instructions are provided. It is easy to fit and no soldering is required.

See 48/80 FORTH for another angle.

UPGRADE YOUR ISSUE 2 OR 3 SPECTRUM FOR JUST £23 AND GET A £4.50 COPY OF BEYOND HORIZONS ABSOLUTELY FREE

The SP48 simply plugs into the sockets provided by Sinclair in your Spectrum. Easy to fit, full instructions provided and no soldering. Fits both Issue 2 and Issue 3 machines and gives you a standard 48k Spectrum. And no other expansion kit allows you to upgrade later to the 80k Spectrum. Over 20,000 16k Spectrum owners have already upgraded with the SP48. Join them.

And you get a free copy of BEYOND HORIZONS, so there's yet another angle to look at.

48/80 FORTH - £14.95

The latest, best and most complete version of this popular language for the Spectrum. FORTH runs many times faster than machine code; - a tonic if you're fed up with all those GOTOs.

Each tape includes both a 48k version and an 80k version (for use on Spectrums upgraded with our SP80. SP48 owners are offered a part-exchange price of £18 if they upgrade to 80k).

The manual provides both the normal technical definitions of the language, and an outstanding brief introduction for the beginner. Each tape also includes a superb EDITOR program to give you full control of the 16 (48k) or 32 (80k) disk screens.

A FORTH Toolkit (giving floating point etc) and an extension for the Microdrive will be available shortly. 48/80 FORTH uses standard FIG-FORTH definitions with extensions to exploit the special characteristics of the Spectrum, including BEEP (for real arcade quality sound), DRAW, PLOT and CIRCLE.

BEYOND HORIZONS - £4.50

This teaching program has already made computing less mysterious for thousands of people. It guides you through the Spectrum 48k memory, teaches you to PEEK and POKE systems variables, shows you how the display file and colour attributes work, how a BASIC program is stored byte by byte, and much much more. Outstanding value for those who get stuck on the second half of the Spectrum manual.

Trickstick £34.50

Attaktics £10.00

SP48 (Issues 2 & 3) £23

SP80 £57.50 (Please specify which Issue)

48/80 FORTH £14.95

Beyond Horizons £4.50

Programmable Interface £10 (with Trickstick)

Postage £0.65

0.65



I enclose cheque/PO for

My Access/Visa number is

--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Name

Address

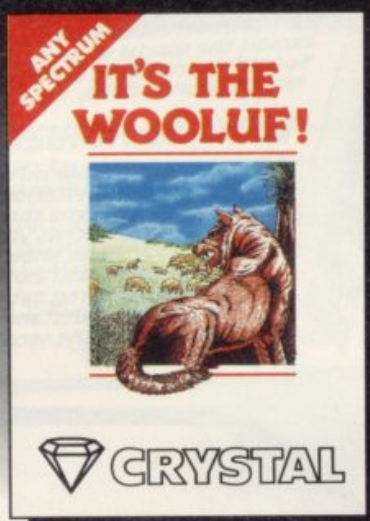
SU4

East London Robotics Ltd.,
Gate 11, Royal Albert Dock,
London E16
24 Hour Access and Visa
ordering 01-474 4430

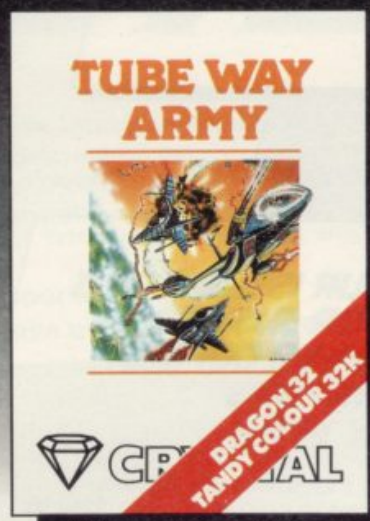
EAST LONDON

ROBOTICS

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.



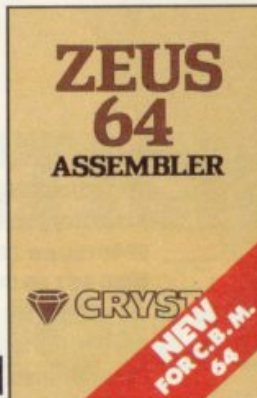
HALLS OF THE THINGS

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.

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.

NOW 3RD GREAT YEAR!

HIRE SPECTRUM and ZX81 PROGRAM TAPES

FREE ILLUSTRATED QUARTERLY MAGAZINE WITH TIPS, NEWS, REVIEWS, DISCOUNT OFFERS PLUS OUR TOP 60 TAPES CHART BASED ON THOUSANDS OF SCORES!

JOIN OVER 3,000 DELIGHTED MEMBERS!

UP TO 2 WEEKS FROM ONLY 64P + P/P & VAT!

ADVENTURE GAMES
ARCADE and SIMULATION GAMES
BUSINESS and PRACTICAL PROGRAMS
UTILITIES
M/C COMPILERS
EDUCATIONAL

FROM OVER 50 TOP SUPPLIERS ALL WITH PERMISSION!

YOUR FIRST TAPE FREE IF YOU JOIN NOW!

THE ORIGINAL SINCLAIR LIBRARY!

NOW READ THE FACTS

We were the first Sinclair library, and have since built up a vast stock—apart from over 200 different programs costing up to £15 each, we maintain a supreme service with up to 30 copies of the most popular ones. We're run not from a back-room but from our own shop and offices which members can visit or phone. Six staff give prompt, friendly help. Plus our free magazine and guaranteed satisfaction;

WHY SETTLE FOR LESS?

To: SOFTWARE LIBRARY, Farnham Road, West Liss, Hants GU33 6JU.

NAME.....Machine.....

ADDRESS.....

Special offer from this issue: LIFE MEMBERSHIP £6 (normally £9.50). Overseas (Europe only) £10, or join a local branch: Scandinavia: Peder Lykkesvej 33, 2300 Copenhagen S. Benelux: Jacobsmitslaan 75, B-2400 MOL, Belgium. W.Germany: Postfach 7809, 4800 Bielefeld. S.Africa: PO Box 1769, Manzini, Swaziland. Eire: 122 South Circular Rd., Dublin 8. SU

DO IT WITH TRANS-EXPRESS

Would you like to transfer your Spectrum programs from

- 1) TAPE TO MICRODRIVE
- 2) TAPE TO TAPE
- 3) MICRODRIVE TO TAPE
- 4) MICRODRIVE TO MICRODRIVE

Then do it with the **TRANS-EXPRESS**

TRANS-EXPRESS will enable you to transfer any Spectrum program of any size up to the full 48.0K. It is user-friendly, reliable and efficient. It goes beyond where similar programs fail.

Just load the **TRANS-EXPRESS** and then follow simple screen instructions. No matter how many parts your program has, whether they are headerless or with header, written in BASIC or m/c, etc., it will transfer them all in one go. You can then verify, save again or load your next program(s).

For only **£5.50** you could transfer all of your software, provided you do not infringe copyright.

TAPE TO TAPE

Please send me _____ copies of **TRANS-EXPRESS** SU

I enclose cheque/PO for \$..... at \$5.50 each

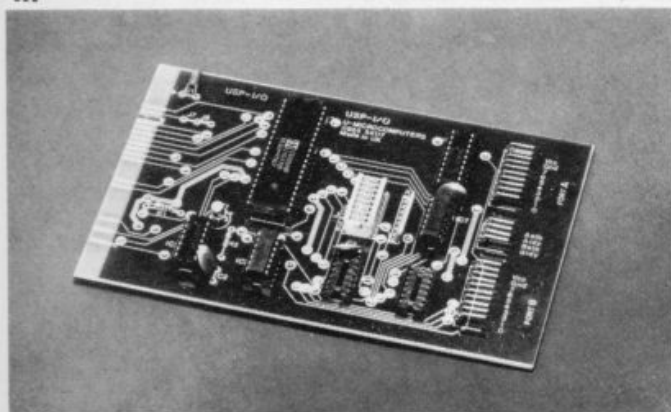
Name.....

Address.....

Send to:

ROMANTIC ROBOT 113 Melrose Ave, London NW2

ZX-SPECTRUM Centronics Interface £26.99 COMPLETE



use it to connect almost any dot matrix printer

U-MICROCOMPUTERS

Look – a really low cost Centronics Parallel interface for your Spectrum. Use it to connect to Epson, Anadex, OKI, Walters, Seikogoshia – almost any dot matrix printer. The USP-PRINT includes: circuit board assembled and tested, Spectrum adaptor (USP-ADAP), comprehensive manual, cable and software on cassette.

Other items from our range:

USP-BBP3	3 slot buffered backplane
USP-BPE4	4 slot extension backplane
USP-232D	Dual channel sophisticated RS232 interface – works for both input and output
USP-PROT	Prototyping board
USP-I/O	General purpose parallel I/F

Note: all the above items require a USP-ADAP if not ordered with the USP-PRINT

ORDER FORM

To U-Microcomputers Ltd
 Winstanley Industrial Estate, Long Lane
 Warrington, Cheshire WA2 8PR

I enclose Cheque/PO for £..... payable to U-Microcomputers Ltd.

Qty	Item	Price each	Total £
	USP-PRINT Centronics interface complete	£26.99	
	other items		
	USP-BBP3 3 slot buffered backplane	£35.65	
	USP-BPE4 4 slot backplane extension	£25.30	
	USP-232D dual serial interface	£29.90	
	USP-PROT prototyping board	£13.80	
	USP-ADAP adaptor	£ 6.90	
	USP-I/O general purpose parallel interface	£29.90	
	plus p & p		£ 1.50
	TOTAL		

Name.....

Address.....

Post Code.....

2 months Warranty Mail Order only Western Europe add £2.00

01.355 APRIL 84

Awards for top Spectrum games

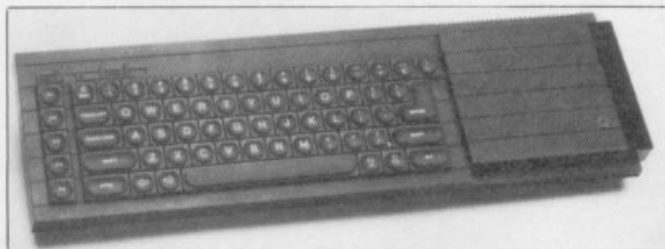
THE GOLDEN Joystick Awards, sponsored by *Computer and Video Games*, have been presented to computer companies which, in the opinion of its readers, produced the best arcade or strategy games in 1983. All the winning games were for the Spectrum.

The prizes were presented by disc jockey Dave Lee Travis, who is a games addict. Game of the Year was **Jet-Pac** and its manufacturer, Ultimate Play the Game, was also voted Software House of the Year. **Ah Diddums**, from Imagine, was the best original game of 1983. In the specific categories **Manic Miner**, formerly of Bug-Byte, was voted Arcade Game of the Year and **The Hobbit** became Best Strategy Game of the Year.

Some confusion marked the award of the prize for best arcade game. The author of *Manic Miner* is no longer with Bug-Byte and Software Projects, a new company, has taken over manufacture and sale of the product.

Eugene Lacy, assistant editor of *Computer and Video Games*, was pleased with the response from readers. He said that he hopes the Golden Joystick Awards will become an annual event.

QL demand likely to cause delays



SINCLAIR RESEARCH admits that it might have difficulty keeping to the 28-day period specified on its order forms because of incredible demand for the new QL. A spokesman for the company says:

"We have had something like 500 to 600 orders every

day, so we are beginning to think about delivery problems and how to avoid them."

In the meantime, the launch of the Sinclair QL appears to have been timed to coincide with the fact that the contract for the BBC computer programme, Making

the Most of your Micro, is due for renewal later this year. John Radcliffe, executive producer of the BBC programme, says:

"Several proposals are being discussed and the appearance of a new generation of Sinclair computers is certainly timely."

The QL will probably have a hard struggle to outweigh the advantage already gained by the Acorn BBC Model B. "We would obviously find it much easier to stay with the computer we already have," says John Harrison of BBC Enterprises, "but many developments have taken place in micro technology since we signed the original contract with Acorn almost three years ago, and certain changes would be needed if we were to renew the contract with Acorn."

A final decision on the winner of the new contract seems likely soon.

Giant showroom opens

A NEW SHOP described as the world's biggest computer store has been opened by Steiger at Stonebridge Park on the North Circular Road, London. Covering 100,000 sq. ft. the open-plan showroom will stock all the leading makes of business and home computers, as well as software and peripherals. Customers will also be able to obtain advice on specific applications and order programs tailored to their needs.

"The idea is to enable a customer to walk in and find a complete system for any particular purpose," says Steiger general manager John

Patterson. Steiger plans to follow the new store with a network of 'mother shops' and 'satellite shops' all over the country. Four stores are scheduled to open this year in Berkshire and the Greater London area.

Piracy fears renewed

A NEW tape magazine, from Qadan Software of Abu Dhabi, has produced a storm of protest from software companies in Britain and renewed fears of software piracy.

QCC is a magazine for the

Spectrum. The difficulty is that it seems to contain games produced by British companies, including *Jet-Pac*, *Arcadia* and *Astroblaster*.

Imagine Software, manufacturer of the best-selling game *Arcadia*, has made it clear to British magazines featuring QCC advertisements it will cease all advertising with them if the Qadan advertisements continue. The company plans to prevent the tapes reaching Britain.

Another software house concerned about QCC is Quicksilver, as *Astroblaster*, another best-seller, is on the magazine contents list. Mark Eyles, a spokesman for the company, says: "We are looking at the situation closely and are trying to obtain a copy of the magazine."

Concern over closure

COMPUTERS FOR ALL, independent distributor of computer products including software and hardware for Sinclair machines, has ceased trading and is likely to go into liquidation. The demise of the company happens at a bad time for wholesalers who have supplied goods to CFA and have received no payment in return.

One such company is

Prism Microproducts, an associate of ECC Publications which publishes *Sinclair User*. Prism has delivered a large quantity of Spectrums and is owed what is believed to be a considerable amount.

Computers For All made a name for itself during the latter part of 1983 when it appeared as a major exhibitor at various large computer shows. At that time the com-

pany had more than 50 dealers throughout the country which used its name in their shops. Now many of those shops are short of computers and software.

Another group to suffer is the consumers who have had to return faulty merchandise. Customers are concerned that those computers will not be repaired and that the machines may not be returned.

Microdrive sales in full swing

THE SINCLAIR Microdrive should be on sale through retail outlets, including W H Smith, in the near future. The original mail order list was completed in early February and from then Sinclair moved to the subsidiary list which consisted of people who had asked to be put on the mail order queue when the Microdrive was in 'closed season'.

The take-up on the original list was approximately 30 percent, which was better than expected. The figure the company was hoping to reach was 10 percent.

Another surprise for Sinclair is the number of people who ordered an Interface One without Microdrives but, on average, each person who has ordered an Interface One has also bought one-and-a-half Microdrive cartridges.

Sinclair Research is hoping to complete orders on the subsidiary list quickly. A spokesman says: "The speed with which we can deal with them depends on how many place orders."

The good news for customers is that they can telephone Sinclair Research and order a Microdrive or Interface at any time. For some time, however, the orders will be dealt with by mail order only.

Spectrum selected for TV cable system

BY THE END of this year, one-and-a-half million households will be able to play professional Spectrum software transmitted on the existing cable television system, on computers hired for less than £10 a month.

Cable Interactive Services, a sub-division of British Telecom, has developed the system, Gamestar, and hopes to sign contracts with the various companies which already have licensed cable networks.

Subscribers to Gamestar

will pay £9.95 per month for 12 months and for that they will receive a 48K Spectrum and a joystick, together with a black box which downloads the software from the television. Each month 20 games will be broadcast and the games will be changed at the rate of five a month, thus providing subscribers with 75 games a year.

"The games will cover the entire range of Spectrum software, from current chart-toppers to golden oldies," says Trevor Havelock of Cable In-

teractive Services. The games will be professional software from leading software houses and will be supplied by Miconet.

Copying of games by hackers will be made as difficult as possible.

In addition to the million-and-a-half households which already have cable television, another 900,000 are due to receive cable in 1985, through the 11 franchises licensed by the Government.

W H Smith has developed a similar games network for cable transmission but has opted for an American system which uses a custom-built terminal and joystick, the software for which is available only in the States.

Why was the Spectrum chosen for Gamestar? Havelock is unequivocal. "The Spectrum is far and away the most popular machine, with a software base second to none," he says.



The Sinclair Research computer centre in Willis Road, Cambridge, has won a major commendation from the Business and Industry panel for the Environmental Award 1984. Built at a cost of £750,000, the complex combines traditional design with major technical innovations. A restored L-shaped building houses the offices and research laboratories, while the glass-covered atrium provides a microprocessor-controlled solar energy system for heating and lighting the complex. An original well has been adapted to provide water at a constant 12 degrees Centigrade.

Computer Snowman

QUICKSILVA has produced a game for the 48K Spectrum based on a book by the best-selling children's author, Raymond Briggs. Called **The Snowman**, the game features a little boy trying to build a snowman in spite of gas flames which melt the snow he has collected and sleep monsters which send him back to bed.

"We had been thinking of

doing a game based on *The Snowman* for some time," says Quicksilva director Mark Eyles.

Briggs, who has no computer, contributed only the broad outline of the story. "We agreed from the start that there was to be no violence in the game." Although he does not play the game, he approves of the final result and hopes the game may lead

to further collaboration with Quicksilva.

"There has been talk of basing another game on my book, *Fungus the Bogeyman*, he says. "I think that might lend itself even better to being played than *The Snowman* does."

Quicksilva comments that any such product will depend on how successful *The Snowman* proves to be.

Best prize

PANIC, an arcade-type game written by Nicholas Best of Bristol, won the prize for the best Spectrum program in the *Sinclair User* Christmas competition. He receives an East London Robotics Trickstick and a games cassette.

The winner in the 16K ZX-81 category was Peter Dziwior of South Croydon. His entry was an extremely fast and professional program, **Formula One**. The winning 1K ZX-81 games was **Sweetshop**, an original simulation submitted by J Lowther of Heywood, Lancashire. Both winners receive a DDC colour interface.

The listing for Sweetshop can be found in Program Printout.

More news on page 20

Timex/Sinclair success

Multi-tasking ZX-81 popular

THE Timex/Sinclair 2068 has been selling well in the States, despite reports that Timex has had difficulty with the new computer.

The machine, which includes a ROM cartridge port and an RS232 interface, has been described as an upgrade of the Spectrum and has a bigger and more manageable

keyboard. Better graphics facilities include the option of an 80-column screen for word processing.

Unfortunately, because of contractual obligations with Sinclair Research, the computer cannot be sold in Europe. Neither does Sinclair expect to manufacture a computer like the 2068 in the

U.K. A spokesman for the company says: "If we were to consider such a move we would produce a machine with our own technology."

Timex expects the 2068 to do even better in the summer when it releases a new range of peripherals. The machine already has a communications modem and printer.

THE MINISTRY of Defence, universities, hospitals and industry have discovered the potential of the ZX-81. With a little help from David Husband of Skywave Software, the ZX-81 has been adapted to multi-tasking by adding a ROM which changes the language from Basic to Forth.

The ZX-81 thus becomes a powerful industrial controller, capable of running more than 10 tasks simultaneously.

Working from his home at Poole, Husband has built a large turnover which he expects to exceed £1 million in 1984.

More than half his customers are companies and organisations and the medical profession has been specially interested.

The ZX-81 Forth ROM costs £25 plus VAT and is available from Skywave Software. Tel: 0202 302385.

QL to star at ZX Microfair

THE NEXT ZX Microfair is to be held at Alexandra Palace, London, on April 28. Promised as the star attraction is a working model of the new Sinclair QL computer.

Advance tickets for the April Microfair can be obtained from Mike Johnston, 71 Park Lane, London N17 0H6. They cost £1 for adults, 50 pence for children. Price at the door, £1.25.

Backlog cleared

THE FULLER FDS keyboard for the Spectrum is now available and the backlog of orders was cleared by the end of February, claims Roy Backhouse, managing director of Fuller.

Fuller has installed a new production line and a telephone hot-line for customer queries — 051-709 9280.

More than 50 complaints

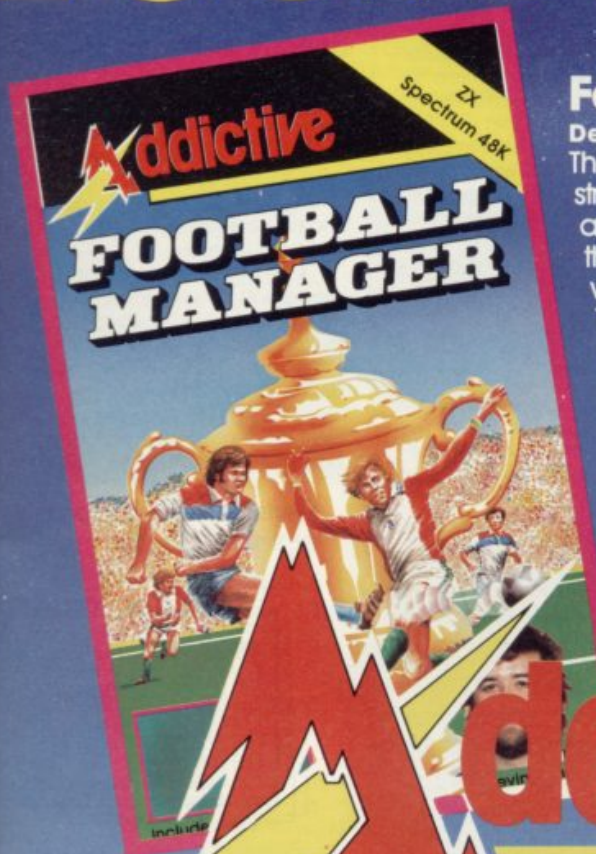
were received at *Sinclair User* in December and January, concerned with overdue delivery and the lack of acknowledgment. Some customers were invoiced for a price increase and additional postage.

Fuller is apparently producing 1,000 keyboards a week, with a 21-day turnaround on orders.



The No.1 Football Game

ZX81 16K,
ZX Spectrum 48K
BBC and Oric versions coming soon!



Football Manager

Designed by Kevin Toms

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



Kevin Toms

Some of the features of the game:–

- ★ Matches in 3D graphics ★ Transfer market
- ★ Promotion and relegation ★ F.A. Cup matches
- ★ Injury problems ★ Full league tables
- ★ Four Divisions ★ Pick your own team for each match
- ★ As many seasons as you like
- ★ Managerial rating
- ★ 7 skill levels
- ★ Save game facility

Addictive

*ZX81 Chart,
Home Computing Weekly 16.8.83

Comments about the game from press and our customers

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

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

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

"It's my own fault you *did* warn me – I am totally and completely hooked on FOOTBALL MANAGER." (Mr. A. Wright – Lancashire.)

"It is by far the best software game that I have seen for the Spectrum." (Mr. N. Lincoln – Surrey.)

"I congratulate you for a marvellous game which keeps the player enthralled." (Mr. N. Creasey – Gerrard's Cross.)

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

"Your FOOTBALL MANAGER game is terrific." (Mr. N. Cumming – West Bromwich.)

Programmers

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



Action from the Spectrum version

Available from computer software stockists nationwide, including & WHSMITH

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

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

Overseas orders add £1.50

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

Addictive Games

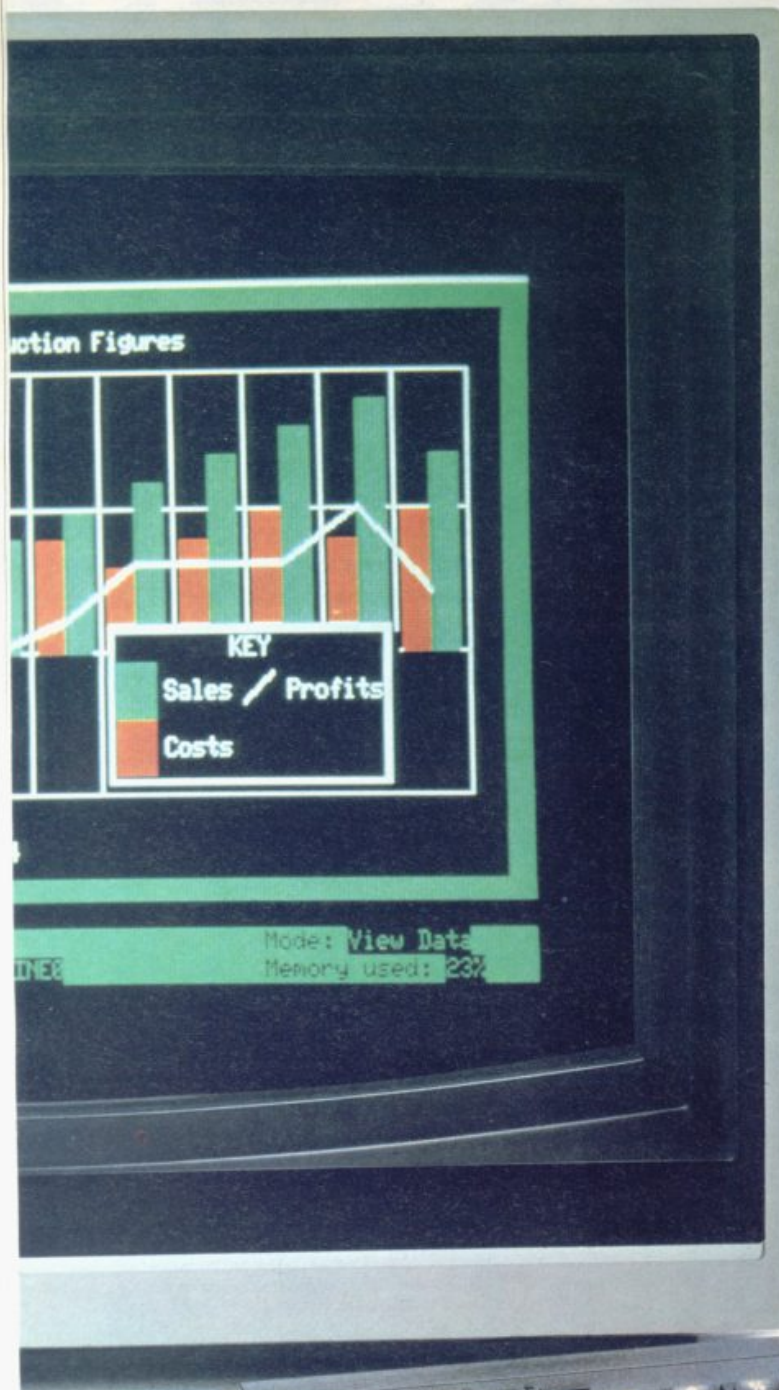
Albert House, Albert Road, Bournemouth BH1 1BZ.

† Spectrum version only

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

New-Sinclair QL

There's no comparison chart, b



The Sinclair QL is a new computer.

Not just a new Sinclair computer, but a totally new sort of computer – nothing like it exists anywhere.

It's not just a bit better than this, or a bit cheaper than that – it's a computer that's very hard to compare with anything. Just check the features below – and if you don't agree, take up the challenge at the end of the advertisement.

If you do agree, there's only one course of action you can take... get yourself a Sinclair QL at the earliest possible moment.

The Sinclair QL has 128K RAM. Big deal?

Several micros offer 128K RAM, or more, as standard. The 'What Micro?' table for December 1983 lists over 50 of them – but 40 of the 50 micros listed cost over £2,500!

The Sinclair QL offers you 128K RAM for under £400, and an option to expand to 640K. That's a lot of bytes to the pound!

The Sinclair QL has a 32-bit processor. Who else?

Under £2,700, nobody. Even the new generation of business computers, such as the IBM PC, are only now beginning to use 16-bit processors.

At prices like this, the Motorola 68000 family – widely regarded as the most powerful microprocessors available – will remain a luxury.

Yet with the Sinclair QL, the 32-bit Motorola 68008 is available for less than £400.

You can also be sure that the QL will not become outdated. 32-bit architecture is future-proof.

32-bit processor architecture, 128K RAM, and QDOS combine to give the QL the performance of a mini-computer for the price of a micro.

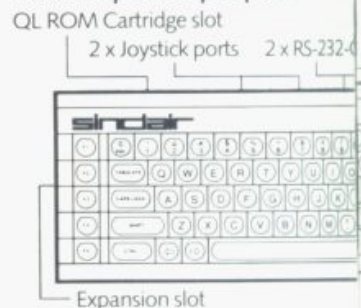
Exclusive: new QDOS operating system

No competition! QDOS sets a new standard in operating systems for the 68000 family of processors, and may well become the industry standard.

QDOS is a single-user, multi-tasking, time-sliced system using Sinclair's new SuperBASIC as a command language.

One of its most significant features is its very powerful multi-tasking capability – the ability to run several programs individually and simultaneously. It can also display the results simultaneously in different portions of the screen. These are features not normally available on computers costing less than £7,000.

Eleven input/output ports



New professional keyboard

The QL keyboard is designed for fast input of data and programs.

It is a full-size QWERTY keyboard, with 65 keys, including a space bar; left and right-hand shift keys; five function keys; and four separate cursor-control keys – key action is positive and precise.

A membrane beneath the keyboard protects the machine from dust (and coffee!), and for users who find an angled keyboard more comfortable, the computer can be raised slightly at the back by small detachable feet.

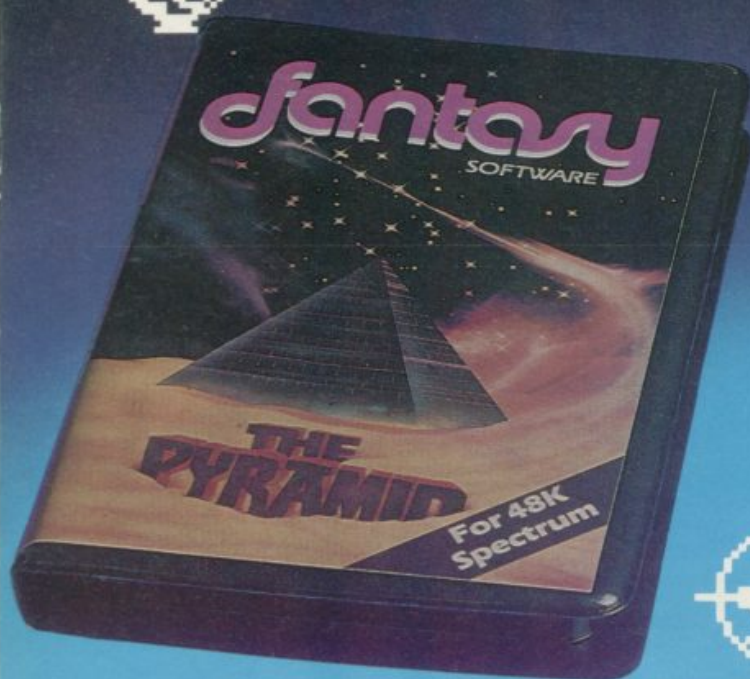
because there's no comparison!

Sinclair Research Ltd, Stanhope Road, Camberley, Surrey, GU15 3PS.

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 interconnected 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.

Poor service from Sinclair?

JOHN KERRIGAN'S article in the January issue is the nearest I have seen to a reasonable explanation of what the Spectrum ROM does with the display file but would it not be better to demonstrate the way in which the file handles pixels? The article assumes the reader to have a reasonable knowledge of Basic so that it can be used to show scans in a very easy-to-follow way, as I hope the following short programs will demonstrate. It means that you should ignore the advice in the Sinclair manual, page 164, not to POKE into the display file.

All the programs are variations on the same theme. They are best RUN in the order shown. The PAUSES are simply to slow the action. The only explanation needed is that POKEing 255 into a display file address inserts eight pixels per character position/scan — one for each bit position — and 129 places a pixel in the MSBit and LSBit of a byte.

Now for a complaint about the continuing poor service offered by the Sinclair organisation. I do not buy games software, nor do I buy any

software which I can easily develop myself. The exception was the cassette being offered by Sinclair mail order explaining the latest microchip technology. As I used to dabble in electronics some years ago and possess some reasonable test equipment, I thought that the cassette would offer a useful update of knowledge. Accordingly I ordered the cassette in November. A card arrived postmarked December 5 saying my order was being processed.

Later my Barclaycard statement showed that I had been charged for the cassette and as I was in credit with the company it meant that I had already paid for an item which had not been delivered. When I telephoned Sinclair I was told to call back in a week if the item had still not arrived. Is it any wonder that the Japanese make inroads rapidly into the British market? In case there is complacency about the rest of Europe, let me warn the industry that the French are already catching up and have their own cheap micro on sale.

**R G Urquhart,
Romford, Essex.**

```
10 FOR r=0 TO 6143
20 POKE 16384+r,255
30 PAUSE 2
40 NEXT r
```

```
10 FOR r=0 TO 6143 STEP 32
20 POKE 16390+r,129
30 NEXT r
```

```
10 FOR r=0 TO 6143 STEP 32
20 POKE 16390+r,255
30 PAUSE 5: CLS
40 NEXT r
```

```
10 FOR r=0 TO 6143
20 POKE 16384+r,129
40 NEXT r
```

```
10 FOR r=0 TO 6143 STEP 256
20 POKE 16390+r,129
30 PAUSE 10
40 NEXT r
```



Special offer delayed

WE APOLOGISE to all customers who suffered delays in despatch of half-price ZX-81 software following our advertisements in the January and February issues of *Sinclair User*.

Due to phenomenal response, stocks were exhausted very quickly. We hope that all respondents have now had their goods delivered. Watch out for our next special offer.

**The Software Workshop,
Yew Tree, Selbourne,
Hampshire GU34 3JP.**

Past the post on Atic Atac

ON MONDAY, January 16 at 4.58pm, history was made. I, the first person ever to do so unless someone already has but is too lazy to write, finished Atic Atac. I have compiled a list of cryptic clues to aid all Attikers in their quest:

The key handle is the UL-

TIMATE piece; knights in shining armour win the day; the key to success is white; journey's end is near in the room with the impassable door; tread warily; beware of mobile trapdoors; barrels make useful staircases; a mapped-out adventure is easy to solve; to get Frankie, go for his bolt.

**John Cockbill, aged 15,
Evesham, Worcs.**

Plot greater than graphics

IT SEEMS to me that more and more companies are putting all their effort into producing super, smooth, mind-boggling graphics at the expense of anything you could call a plot.

Companies must start designing new games which people will be still playing in a year's time. Only one company to my knowledge does so and that is Lothlorien with its war game series.

**Steve Turner,
Kingsgrove,
Cheshire.**

Covers with a touch of class

WHAT an original publication *Sinclair User* is. The cover photographs alone are proof of it. Some computer magazines feature scantily-clad dolly-birds in the hope of boosting sales. Other covers have endless and monotonous close-ups of computer keyboards but *Sinclair User* stands alone and has real class.

Uncrumpled *Sinclair User* covers could well be worth

more than that prized stamp collection in a few years. Preserve your February issue with care. Whoever masterminded your devastatingly funny Wally of the Month series of cover photographs deserves a sales department medal. I cannot wait to buy the next issue.

**Ian Russell,
Llanbedr,
Gwynedd.**

More letters on page 26

Corridors lack the third dimension

I BOUGHT a copy of Corridors of Genon, acting on the review on page 52 of the December issue and on the Gilbert Factor of 9 awarded to it in Cassette Round-up.

I am astounded by your high regard for the program and that John Gilbert should consider it the equal of Halls of the Things. Where Halls is unquestionably challenging and addictive, Corridors is dull and aversive.

The claim that the program is 3D is rubbish. It uses a 2D projection with perspective. The term 3D should be reserved, as it is in the video world, for genuine stereoscopic 3D, be it by means of polarised glasses, lenticular grid, holography or whatever. To my knowledge, no program is yet 3D. To misuse the term 3D in this way can only bring confusion to the field of micro graphics and lower people's regard for it.

**Peter Gardner,
Ulverston,
Cumbria.**

● *The term 3D was not applied as a scientific definition but rather as a description of the graphical representation on a computer screen. Admittedly the term was used loosely but it was used to describe a type of graphics generally referred to by the computer games industry as 3D.*

In search of Logo tapes

I OWN a 48K Spectrum. I heard that the child-orientated Logo language is available for the Spectrum but, unfortunately, no computer shop which I visited here in Israel seems to be aware of it.

Could you please let me know if Logo is available in cassette form for the Spec-

trum and how could I purchase it? **Victor Harnik,
Haifa, Israel.**

● *A limited version of Logo is available from CP Software, 17 Orchard Lane, Prestwood, Bucks HP16 0NN. Sinclair Research will soon have Turtle Logo available for the 48K Spectrum which should conform to MIT standards. It will also use the Edinburgh Turtle.*

Singled-out for praise

I FEEL I must write to you in praise of two software houses. The first is Hilton Computer Services Ltd, whose Personal Banking System I have used for some time. Recently I have contacted the company on a number of occasions and each time I have received courteous and prompt attention.

The second company is Flowchart Ltd. Recently I purchased a copy of its Home Budget program. On running it I found it not entirely suit-

able for my needs. I wrote to Flowchart explaining the problem. By return I received an upgraded program and a spare data tape. Special service, indeed.

John Hadley, Oxford.

Preventative system crash

RECENTLY there has been printed frequently a method of stopping programs from auto-running on a ZX-81 using RAND USR 836 in fast mode. I am writing to tell you of a way of defeating this.

It works on the simple idea that when someone breaks into your program, the screen is displayed, and if you have pre-set system variable 16397, the system will crash: 9994 FAST
9995 LET X=PEEK 16397
9996 POKE 16397, 0
9997 SAVE "....."
9998 POKE 16397, X
9999 RAND USR.....OR
GOTO.....

When someone tries to

stop the program auto-running, it will make the computer display the screen before it reaches line 9998, so the system will crash.

**Paul Taylor, aged 13,
Whittlesey,
Cambs.**

Suitable graph paper found

IN REPLY to Michael Horgan's request for information — *Sinclair User*, January — on suitable graph paper for the Spectrum, I mention two products for less than £5 of which I know. Pixel-Pad is available from Computer Agencies Ltd, 28 Sun Street, Hitchin, Herts SG5 1AT and costs £4.99 for 50 sheets of A3 size paper.

ZX Spectrum Graphics Sheet is available from Keyboard Word Processing & Advanced Office Systems, 28 Forest View Road, London E17, and costs £4.25 for 50 sheets of A4 paper.

Refill pads for the Keyboard graph pad kits are available for £3.50 for a 50-sheet pad and can be obtained from Intelligence (G.B.) Ltd, 4 Oban House, Oban Street, Poplar, London E14 0JB.

**P Dobson,
Pitman Publishing Ltd,
London WC2.**

Perfect for beginners

THE BASIC problem of a displayed variable being different from the value of that variable held in the computer memory, as referred to on page 11 of issue No. 23, is easily overcome with the line LET N = VAL(STR\$(N)). That changes the stored value, as follows:

```
10 LET N = 10**2
20 PRINT "N is ";N
30 PRINT "But 100 - N is
   ";100 - N
40 PRINT "N will now be changed
   using VAL(STR$(N))."
50 LET N = VAL(STR$(N))
60 PRINT "N is still displayed as
   ";N
70 PRINT "But now 100 - N is
   ";100 - N
```

While writing I would like to defend the ZX-81 against some of the recently published comments of unreliability. I have installed eight ZX-81s at my school and they have worked perfectly for 18 months with daily use. The only difficulty has been the wearing out of the keyboards but replacements have been purchased and fitted easily.

I consider the ZX-81 an ideal beginners' computer and the latest 16K RAM pack designs seem to have overcome the infamous wobble problem.

We have linked all our ZX-81s to one tape recorder, so

that one program may be loaded into them all simultaneously. That is a great advantage when using the computers as teaching aids.

All that is needed is a length of screened cable and sockets which are used instead of the EAR socket of the computer recorder. Note that the use of sockets avoids having to disturb the plugs into the ZX-81; tape recorder sockets seem much more resistant to repeated plugging and unplugging than those on the ZX-81.

**Christopher Cox,
Langport,
Somerset.**

"YOUR SAME-DAY SERVICE IS BY A LONG WAY THE BEST"

(J FARMER, EDINBURGH)

SOFTWARE SUPERMARKET

CONFUSED by the vast choice of Spectrum programs? Don't be, we can help. We've played hundreds and chosen just the best of each sort. Details are in our catalogue - free with your first order. It's the only catalogue brave enough to put in the best, leave out all the rest and quote all the reviews! (We produce no programs ourselves - so our choice is impartial.) Of course, we have VALHALLA and THE HOBBIT (each £14.95) and MANIC MINER (£5.95), but here are just a few others that may surprise you (and will amaze you if you buy them!)

WE TRY TO SEND YOUR PROGRAMS BACK ON THE SAME DAY WE RECEIVE YOUR ORDER. Phone orders for VISA or ACCESS, 24 hours a day from any country where your own laws allow this! Mail order or phone credit card only. All games work with KEYBOARD CONTROL and joystick as shown.

Spend more time playing the great programs - and less time trying to find out which they are! In over 40 countries you rely on us to pick the best and send them fast. All games in stock - and tested by us - BEFORE they are advertised! Try us and see....

ANY SPECTRUM

DEATHCHASE "Life in the fast lane ... Deathchase is essential ... some of the best 3D graphics I've seen." (PCGames) Speed your Big Bike through the forest: you can only fire at top speed to kill the enemy bikers, tanks, helicopters. It's a night and day 3D chase that gets faster and faster. Amazingly realistic! KEMPSTON STIX. (Micromega) £5.95

THRUSTA HIGHLY ORIGINAL AND FASCINATING NEW ARCADE GAME from a new company! Very neat graphics as your beautiful spaceship (with 'real' gravity) pushes and drops rocks to crush the revolting wobbling monsters' eggs before they hatch. Watch out for the guards! Great big smooth graphics make you feel you are really there! Takes a long time to complete each screen. Well-chosen keys but also KEMPSTON STIX. (Software Projects) £5.95

PHEENIX "This program has everything ... superb presentation, graphics and sound. Highly recommended." (HomeCompWeekly) The full arcade-action 5 screens in the best-ever Spectrum 'Phoenix'. 5 skill levels. Choice of character sets: demo mode. Crams 48K quality into 16K. KEMPSTON/AGF STIX. (Megadodo) £5.50

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

3D SEIDDAB ATTACK "One of the most impressive 3D programs I've seen." (PopCompWeekly) Great 3D view through the turret of your tank as you patrol the city at night - glowing, luminous skyscrapers. Radar plan shows where you are - and where they are. 1 or 2 players and amazing flying saucers! You can see the damage they do to your tank as it happens! KEMPSTON STIX. (Hewson) £5.95

48K SPECTRUM ONLY

WHEELIE "Lovely graphics, very, very difficult and challenging. Excellent value." (Crash) Take off on your SuperDream Bike, jump buses and cars, watch out for hedgehogs as you search for the ghost rider. Will you find him? Will you beat him? Keyboard or ANY STIX. Some of the most spectacular graphics and sound we've met. Totally involving. (Microsphere) £5.95

PI-BALLED THE PIMANIAC'S Q-BERT!! Forget the horrible reggae flipside (you will eventually) and concentrate on changing the colour of the PYRAMID OF PI. Watch for the Piman and Sid the Snake, the Bouncing Balls, Col and Jas. 66 screens: transporter discs: graphic jokes. Buy it, it's wonderful! KEMPSTON STIX. (Automata) £6.00

HUNTER-KILLER "AN EXCELLENT SIMULATION." (PersCompNews) Captain your own S-Class submarine: hunt down and kill the enemy sub: 18 controls (PROTEK STICK helps): dive, surface, chart your course: watch through your periscope the 3D target. Full-screen control room: chart room: periscope view. Quick-kill practice mode. Good full-screen graphics. Watch the track as your torpedoes run towards the enemy.... (Protek) £7.95

DENIS AMUSING and highly original text adventure. As Denis Thatcher, you travel up to 95 locations, seeking peace in the pub. You need to find a drink every few moves, while dropping in on the Royals, the MPs and, eventually, the Pope wearing a truss and carrying a lawnmower. It is all quite mad and lots of fun. 100% m/c. NO STIX. Written with THE QUILL (only £14.95!) The Thatcher adventure is by (Applications) £5.50

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

ALCHEMIST "Graphically, this is probably the best game I imagine have produced." (PopCompWeekly) Beautifully graphic arcade/adventure - as pretty as ATIC ATAC (£5.50) but entirely different. Amazing full-screen apparently endlessly different graphics as you search for the 4 parts of the Spell, turning yourself into a Golden Eagle from a Wizard (and back). Cast spell, fight the monsters with lightning bolts - and don't forget to eat too! Astounding. MOST STIX. (Imagine) £5.50

THE FOREST "The world's most realistic adventure game." (PersCompNews) RAVE REVIEWS all over for this fully graphic computer simulation of orienteering: you really feel you are map-making as you search for the Control Points. Draw 3D diagrams of the terrain, contour maps and feature maps. And there's 37kms of unmapped country for you to discover ... 32-page manual helps. NO STIX. (Phipps) £9.95

STONKERS "Excellent ... the best war game I've seen ... very addictive." (Crash) The best battle-game graphics yet (NOT an arcade game). Simple joystick (MOST STIX) control: but the brain is in your strategy and tactics as you deploy and supply your troops. Beautiful large and small-scale maps of the battle area: moving graphics: great sound: tickertape messages: 2 skill levels. You are on the brink of battle ... make your first decision, NOW! (Imagine) £5.50

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 is faithfully reproduced and the screen display (which scrolls helpfully) is simply incredible. NO STIX. (Automata) £6.00

HALLS OF THE THINGS "The most exciting and innovative game I have seen ... no other game runs with such speed, smoothness of action and graphical quality." (ZX Comp) Explore an 8-storey maze: find treasures: avoid nasties - but this time it's all graphic and you can see yourself waving your sword! Brilliant use of 19 command keys. NO STIX. (Crystal) £7.50

CHARGE PROGRAMS TO VISA OR ACCESS CALL 01-789 8546 (24 Hours)

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: **SU17**

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

Signature

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

Name

Address

Postcode

Phone, if any, in case of query

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

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. _____



Walkers
COMPUTER SERVICE
AND REPAIRS

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

Improved floppy disc interface

A NEW floppy disc interface from Technology Research has now been upgraded further to allow you to LOAD and SAVE variables. By preceding the save name with a # all the variables will be saved. In addition, when SAVEing a program the variables are saved with it and when auto-run on LOADING it then does a GOTO 1 rather than RUN, which would have CLEARED the variables.

It is pleasant to see a company which is always trying to improve its products, especially as, in this case, it will cost no extra.

Details from Technology Research, 356 Westmount Road, London SE9 1NW.

Prototypes get finishing touch

KELAN, or rather its trade name Hobbyboard, is well-known among hobbyists as a supplier of hardware and complete kits. Its latest offering is a prototyping kit which can be used for the ZX81, Spectrum or Jupiter Ace. The kit — part No. HB/2090 — will give a professional finish to any project and can be used for many of the designs in *Sinclair Projects*.

In each kit are a prototype PCB, with space for 10 16-pin ICs — or perhaps 12 — and a Veroboard scratch pad, a Spectrum-style 28-way edge connector — that can be cut down for use on other machines — an extender card, a 9-pin D-type, Atari-style PCB mounting socket, and a case in which to put it all. Case screws are included.

Costing £9.50 inc., the kit is very good value. Contact Kelan (Hobbyboard), North Works, Hookstone Park, Harrogate, North Yorkshire HG2 7BU. Tel: 0423-883672.



In a category of its own

MOST COMPUTER hardware falls into one of two categories. Either it is a marvel of modern science or, as is unfortunately too often the case, it is over-priced and unnecessary. The Fatherboard, marketed by Censcot, could be said to be in a category of its own.

It could not be said to be visually impressive but it does what it was designed to do remarkably well. It is a board on which a computer and all its peripherals can be put securely so that they can be moved as a unit. It has an ingenious method of holding

a listing so that it can be typed in comfort.

The main board measures 30cm. by 60.5cm. overall with rubber feet on the bottom and back edge. Into that is inlaid a piece of pegboard 27.5cm. x 58cm. — with enlarged holes at strategic points. That is first removed. The computer, tape deck and any other items are laid out and then tied to the board using the wire supplied. There are also bolts to act as anchor points.

All the leads can then be threaded through the bigger holes and any slack hidden

underneath. The pegboard is then replaced in the main board and screwed into place. Also supplied is a nylon dust cover which fits over the board with a hole at the front to allow access to the carrying handle on the main board. As everything is secured to the board it can be carried and stored vertically.

The copyholder is a board which is secured vertically to any two holes on the pegboard. On to that the moving cursor is fitted. That is two clothes pegs through which a piece of string has been threaded. Tied to the string are two pieces of wood. When properly arranged, one piece of wood can be moved up and down to keep track of where you are in your listing.

If you have sat on the edge of an armchair in front of the family TV with a computer on one knee and a magazine on the other trying to type in a listing surrounded by wires and pieces of computer, only to be told to clear everything away, then you can see how useful the Fatherboard could be. It may not be much to look at but it is well-thought-out.

Fatherboard is marketed by Censcot, 25 Laurelhill Place, Stirling, Scotland FK8 2JJ. It costs £17.50 plus £1.50 p&p.

Competitive joystick

REGULAR READERS of Hardware World may remember the mechanical joystick reviewed in the February issue. New from EEC Ltd is another joystick which clips over the Spectrum case and presses the 5, 6, 7 and 8 cursor keys mechanically in

response to the movement of the stick.

The casing is a one-piece moulding which fits very snugly to the Spectrum case. Inside that the stick is joined securely to a shaped plate which then presses down on one or more levers to depress

the key. The design appears to be well-thought-out, with attention paid to its strength.

A previous criticism of this type of joystick was that it would work only with games configured to use the cursor keys and that is still so but EEC includes details of more than 60 games which can be played with the joystick.

Retailing at £9.95, or from EEC with an extra 55 pence postage, the joystick is competitively priced. EEC is at 1 Whitehouse Close, Chalfont St Peter, Bucks SL9 0DA.



More hardware on page 30

Light pen makes menu choice difficult



AMONG Add-On Electronics hardware is a light pen for the Spectrum, a device which, when pointed at the TV screen, can indicate to the computer where the pen is pointing. Included in the software provided with the pen are 16 routines to allow you to draw pictures using the facility.

The light pen is in two parts, the pen and, second, a small box containing the electronics into which it is plugged. The Spectrum power supply is then plugged into the side of the box and another lead is plugged into the Spectrum power socket. Once the software tape has been loaded the other lead from the box is plugged into

the Spectrum EAR socket and you can use the pen to run the program.

A television set works by moving an electron gun across the screen and where the electrons fall the phosphor on the screen will glow. To make up a picture the gun starts pointing at the top left of the screen and then moves down in a zig-zag fashion making, on a modern TV, 625 sweeps across the screen. It does that 25 times per second. If you know when the gun starts scanning the screen you can time how long it takes to reach any given point.

Inside the light pen is a BPW148 photo-transistor with one leg cut off. When

light falls on it a current passes through it. The software enables the computer to measure the time between the electron gun starting a new scan and the light pen passing a current. The time interval shows at what point on the screen the pen is being pointed.

Obviously the timing is critical and here the software fails to do its job. It was almost impossible to use the program provided as, when picking from the menu, the pen would be pointed at the chosen square, but the software assumed it was being pointed up to 2in. to the left, choosing another menu selection.

If it had been consistent,

that problem could have been overcome but the error varied according to the area of screen selected and by a random element. The instructions provided with the pen give a short Basic program to allow you to adjust your set to the pen. That did not solve the problem. The error may be due to the television set used and may not occur on all sets. If possible, borrow a pen from a friend and try it before buying.

It is interesting to note that the instructions mention there being a fine control on the light pen box when there is none, either externally or internally, on the printed circuit board.

The only other light pen with that control is one made by DKTronics, which shares the same address as Add-On Electronics. To confuse the issue further the software cassette with the pen bears a copyright notice from a now defunct company, Kayde, and the picture on the light pen box is the same as that used in Kayde advertising.

Both the other light pens sold for £10 less than the Add-On Electronics version.

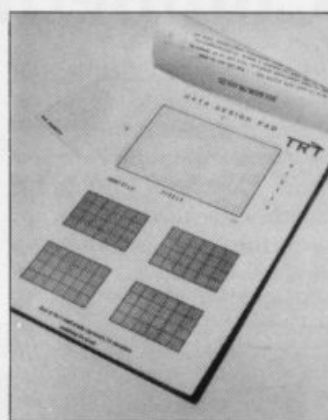
At £30 the pen can be obtained from Add-On Electronics, Units 2, 3 & 4, Shire Hill Industrial Estate, Saffron Walden, Essex CB11 3AQ.

Having designs on graph paper

WHEN CREATING designs on Sinclair machines, a piece of graph paper is invaluable but its only disadvantage is that most commercial paper has a 10 × 10 grid. The Data Design Pad solves the problem by providing two different grids. The first has 22 squares by 32 and is ideal for designing a screen layout using individual characters. The second

has 24 squares in a 6 × 4 pattern, each square being further divided into an 8 × 8 grid, and can be used for individual user-defined graphics or larger designs. Every pad has 50 sheets, each sheet having one of the former and four of the latter grids.

At £4.60 for one, £7.70 for two and £10.70 for three pads, all inc., they are by no



means inexpensive, but can save a good deal of time. They are available from TRT Designs, 43B Nightingale Lane, Clapham, London SW12 8SU.

Spectrum under cover

NEW from PDQ Software is the Galaxy dust cover for the Spectrum. Made in a metallic blue PVC with a silver flash, the cover provides an attractive means of keeping a computer clean. There is even a cut-out on the back of the cover to enable you to leave all the leads and any add-ons plugged-in.

Priced at £1.75 inc., the dust cover is available by mail order from PDQ Software, Parsley Rye, Hilders Lane, Edenbridge, Kent TN8 6JU.

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 £

BLOCK CAPITALS

Name

Address

A1

FILESIXTY

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

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



IS HERE!

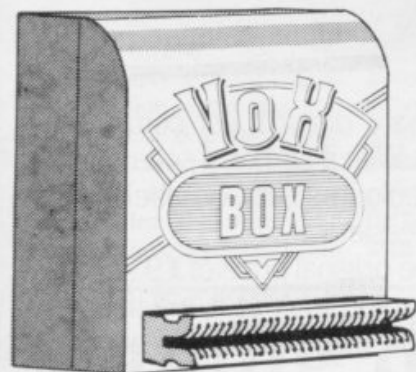
**To fit your SPECTRUM
ONLY £19.99 + £1.50 P + P**

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

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

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

Also available for Commodore/Atari/BBC/



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

**ONLY
£29.99**

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

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

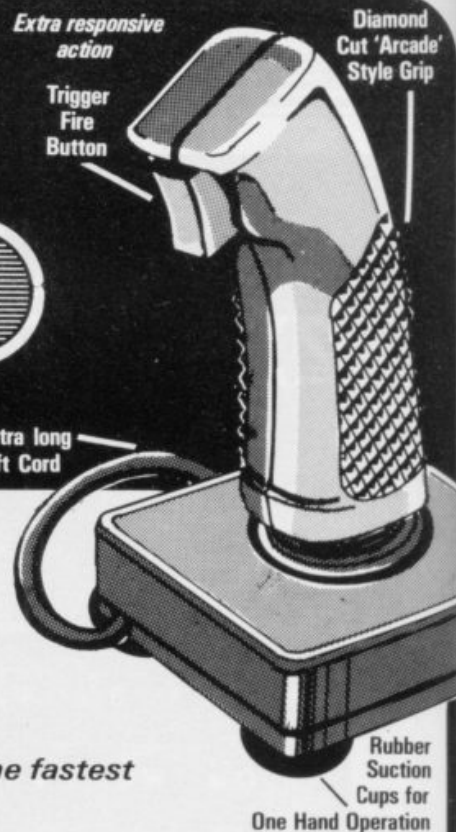
TRADE ENQUIRIES WELCOME

ALLOW 7 DAYS

Postage Please Add £1.50

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

24 HR CREDIT
CARD LINE

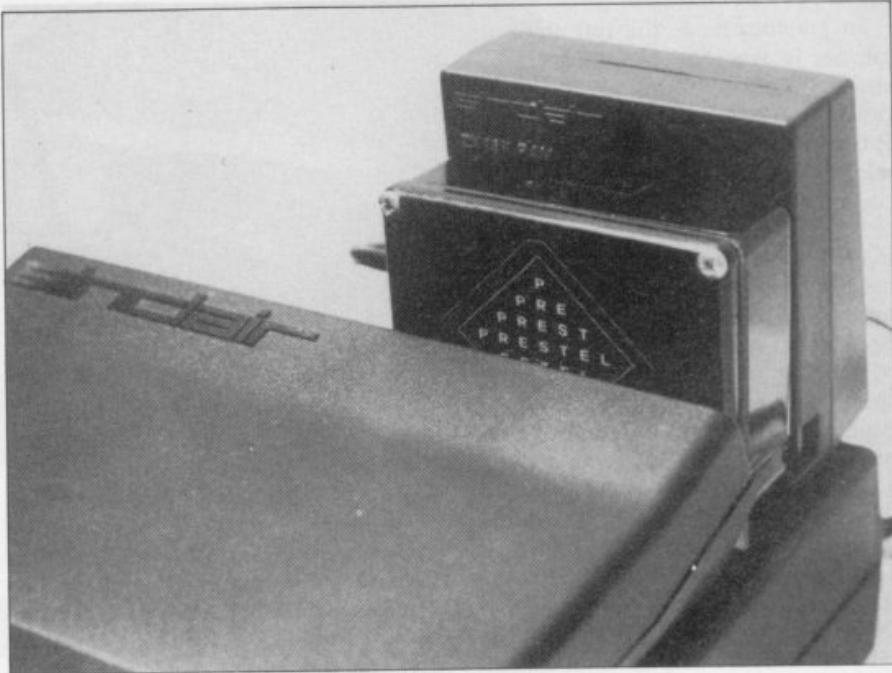


IT IS UNUSUAL in the Sinclair hardware world to be presented with a completely new idea. The Universal Modem Adaptor from Micro-computer Resources Ltd is such a device. With the adaptor your ZX-81 can now communicate with almost any other computer and, with the addition of a suitable modem, it can "talk" to most of the large Information Providers such as Prestel, Micronet, Rewtel, Cashtel and many more.

It would be best to explain some of the terms. First, a modem, standing for MODulator/DEModulator. It takes electronic signals from a computer and translates them into a form which can be sent along a telephone line; it also takes signals from the telephone and translates them back into a form the computer can understand.

An Information Provider, in this sense, is a computer database which can be accessed via a telephone line. To be able to do that the adaptor has to use a means of communication which the IPs will understand, first in the way the information is coded for transmission and, second, what each code means. For transmitting and receiving it uses a standard known as RS232, a method where some bits of each byte are set, or not, to indicate where each byte starts and stops and also the content of the byte. Readers may care to look at a longer explanation of this in the January issue of *Sinclair User*.

There is a version of this standard for use on telephone lines laid down by British Telecom called the CCITT. The standard way of interpreting the code is similar to ASCII and has two forms — that laid down by Prestel, which includes an alphamosaic graphic set, and that known as CET from the Council of Educational Technology,



Communications with the ZX-81

John Lambert investigates a new idea

1000 which has a 5-pin socket into which the lead plugs was used.

Inside the adaptor is a 4K EPROM which resides in memory from 8K to 12K and is called into use by the command RAND USR 8192. At that you are presented with a greetings page which fills the screen, as suddenly you have 40 columns rather than the usual 32. If the sides of the message are off the screen, by using the left and right cur-

quickly they can send and receive their data.

Prestel presents the ZX-81 with a problem, in that it is a colour IP and, of course, the ZX-81 can work only in black and white. The adaptor circumvents the problem in two ways; by using a system of colour weighting it notes the relative intensities of the colours it should be using and then prints in either black on white or white on black — that method can be turned off if necessary. It is also possible to invert the screen, to print white on black as normal.

Another problem with any data sent by telephone is that any noise on the line can be interpreted as data. If that happens, by use of the shifted 7 key a message is sent back to Prestel (*00) and the whole page is re-transmitted.

Only the number keys are used normally, plus new-line — which has been reconfigured as — and the fullstop — reconfigured as *. If, however, you want to send a message, telegram or use the Mailbox facility, the rest of the keyboard can be used, the alphabetic keys giving lower-case and upper-case when SHIFTed.

continued on page 34

'If you then want to access Prestel, all you have to do is to connect the modem to a socket and plug a telephone in the back'

which devised a system whereby tele-software could be downloaded to a microcomputer.

The adaptor plugs into the user port of the ZX-81 and needs a 16K RAM pack plugged in the back. If you have a Sinclair printer you can also use it to COPY frames. A lead from the side of the adaptor terminates in a 5-pin DIN plug. The lead carries the Transmit data (TXD) and Received data (RXD) lines, plus earth (COM). For the purpose of the review of Prism Modem

sor keys the whole screen can be made to scroll in that direction.

If you then want to access Prestel, all you have to do is to connect the modem to a telephone socket and plug a telephone in the back. With the switch on the front of the modem set to M/NET, you dial Prestel and when you hear a continuous tone you put down the line switch and are presented with the Prestel greetings page and a request for your password. To access other IPs the system is similar but will depend on how

ZX-81 Modem Adaptor

continued from page 33

In graphics mode the full alphamosaic set is available, including double-size characters. Also available in function mode are all the necessary Prestel control codes. The only ones missing are cursor on/off, flash and conceal/reveal.

While the adaptor was designed initially to be used with Prestel, it can be used to access other databases. On start-up it sets a number of variables to the Prestel standard, which can be changed by the user. The first of them is the speed of data reception/transmission or baud rate — bits per second. Prestel uses 1,200/75 while other IPs may use 1,200/1,200 or 300/300 and you have the choice of all three. The Prism modem can work only at 1,200/75 or 1,200/1,200. Second, while RS232 is a standard, it has many versions and is, in fact, not very standard. For the technically-minded, the adaptor is set initially to one start bit, seven data bits, one even parity bit and one stop bit. You can then toggle — set or not — odd/even parity and also between enabling parity of not, with don't care on input and a stop bit on output.

Finally, some IPs — not Prestel — require the screen to scroll up and that can also be toggled on and off. Screen scrolling is rather slow at about one-third of a second but should not present a problem.

There are even more features built into the adaptor. If you want to send a message, obviously to sit and type it out while connected to a telephone line could be both expensive and time-consuming. To that end there is a 5K area of memory set aside as a Local Message Buffer where you can store up to five

pages or frames. You can therefore compose your message at leisure and send it all at once.

The buffer can also be used to download individual pages for later use. In addition, Microsource has built-in a fast cassette interface which will load or save the contents of the buffer. When saving it puts out a three-second tone to set the level on recorders with an automatic level control and then saves at more than 250 characters per second.

The adaptor has the codes for the CET standard built-in. With an IP such as Micronet which has software to be downloaded — at the time of writing that facility had been inhibited — by finding the header frame and then calling the downloader routine programs up to 12K can be downloaded. The adaptor checks each page as it is loaded, trying again automatically if it finds an error and, when complete, sends a log-off message (*90). It then checks the program for syntax errors and puts a REM statement with a question mark at the start of the line if it finds one.

If you want to connect your modem

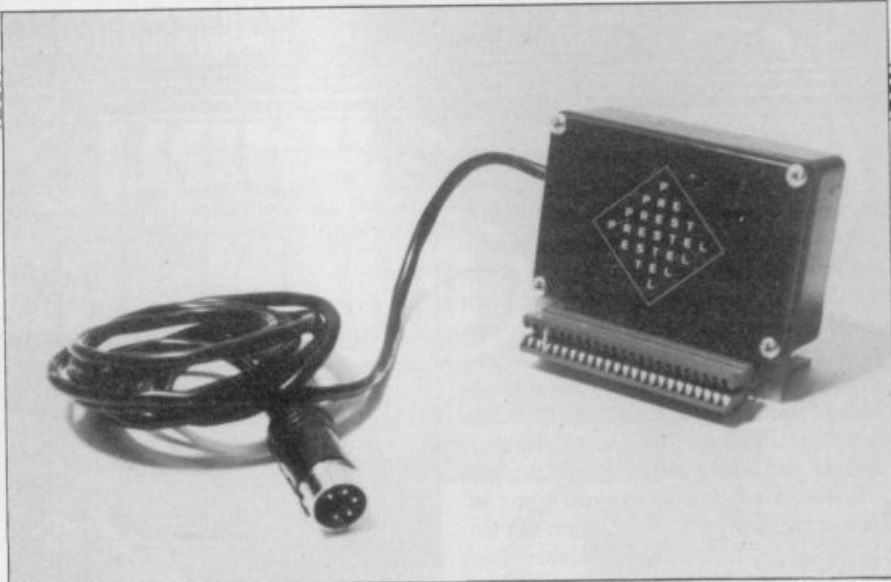
to the adaptor, provision has been made for a wide variety of inputs. Although it operates at TTL levels — 3.5V — 0.2V — the input pin is connected to a resistive diode network so that it can accept the full $\pm 12V$. It also has inverter gates which can be by-passed should your modem require it. On output, the adaptor generates tones to conform to CCITT V23.

For the technically-minded, the adaptor contains a ROM, two single-bit ports and an eight-bit buffer. The buffer is used to provide the bit graphics. When the ROM is called the Basic ROM is paged-out and the adaptor runs five interacting tasks. It samples the input port, converting its contents to ASCII and storing it in the display buffer. The screen buffer is then sent to the TV and the keyboard is sampled.

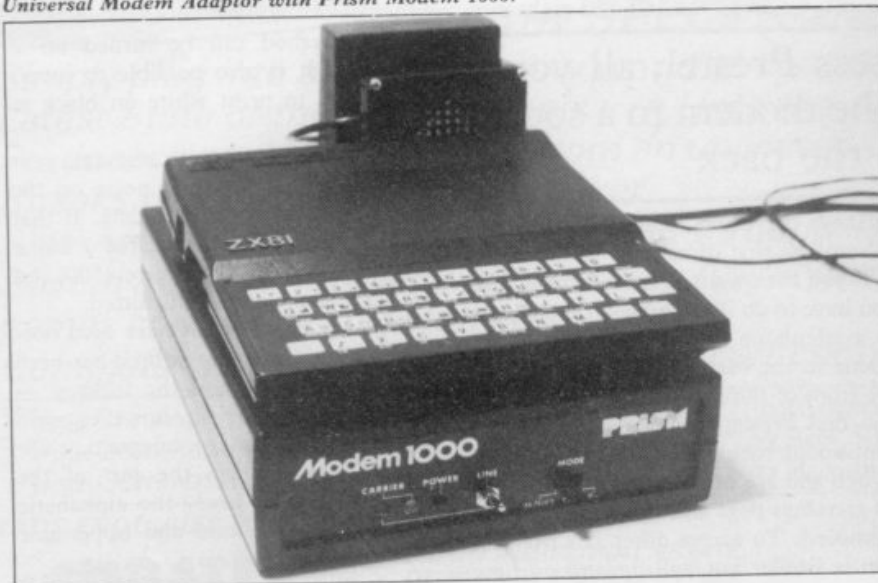
Finally, the display buffer is interpreted to generate the screen buffer. When either sending a character or COPYING the screen to the printer, all other tasks are suspended. About 10K of RAM is used for the bit-mapped display and workspace, 5K for the local message buffer and 1K for Basic, which is used when downloading a program. If the program is more than 5K long, space is taken from the display, which is then turned off.

All in all, it is an extremely well-designed piece of hardware with a multitude of uses. On its own it can be used to generate teletext graphics which provide greater flexibility than the standard ZX-81 set; with a modem it opens a world of information literally at your fingertips. The thought which has gone into it is obvious and at £29.95 it represents very good value. To obtain similar features on another computer you would have to spend at least twice as much, if not more.

For further information contact Microcomputer Resources Ltd, 1 Branch Road, Park Street Village, St Albans, Herts. Tel: 0727 72917.



Universal Modem Adaptor with Prism Modem 1000.





EXCLUSIVE OFFER

Sinclair User has negotiated an exclusive offer with Microcomputer Resources for the ZX-81 Universal Modem Adaptor and the Prism Modem 1000. Together they enable the 16K ZX-81 user to access the outside world. The **ZX-81 Universal Modem Adaptor** is a low-cost entry into the field of data communications. It provides all major Prestel features: 24 lines of 40 columns, upper- and lower-case characters, viewdata graphics, alphanumeric talkback and the ability to download programs according to CeT standards. The adaptor has a choice of baud rates to cover the normal standards, parity control options and scrolling, as well as an off-line editing mode with block sending capability, a fast cassette interface and a ZX printer screen dump.

By itself, the adaptor is a fascinating toy for the generation and manipulation of text and graphics. Once it is coupled with the Prism Modem 1000, then Prestel, Micronet 800 and the bulletin boards are at your command.

The hardware is capable of meeting the demands of future hi-res viewdata formats.

Normally priced at £30, we are offering the ZX-81 Modem Adaptor for only £22.50 including VAT and postage and packing.

The **Prism Modem 1000** not only allows access to viewdata services, but also enables the user to communicate directly with other modem users, via the telephone line. It incorporates a self-test facility to check that both the modem and the computer are functioning correctly. The modem usually costs £69.95. *Sinclair User* readers can obtain it for only £63 including VAT postage and packing.

Both items can be ordered separately or together. Simply fill in the order form below.

ORDER FORM

Send to: Microcomputer Resources Ltd, 1 Branch Road, Park Street, St Albans, Herts AL1 4JR.

Please supply the following:

Quantity	Hardware	Price	Total
	Universal Modem Adaptor	£22.50	
	Prism Modem 1000	£63.00	
		Total due	

I enclose a cheque/postal order made payable to Microcomputer Resources Ltd for

Name

Address

Signature Date

Offer applies to U.K. readers only. Allow 28 days for delivery. Offer applies while stocks last.

ANOTHER PUZZLE FROM IMAGINE

£5.50
A PIECE

MOLAR MAUL

(Any Spectrum)

*A totally new experience;
an oral extravaganza!*

BEWITCHED

(VIC-20)

*This game
makes Hampton
Court look a
doddle!*

PEDRO

(48K Spectrum, Dragon, BBC Model B,
Electron & Commodore 64)

*You'll get no siesta
when you meet this mad
Mexican gardener!*

JUMPING JACK

(Any Spectrum)

*20 levels of crazy, zany
fun.*

ALCHEMIST

(48K Spectrum)

*Can you discover the
"Spell of Destruction?"*

Ah Diddums

(Any Spectrum)

*Be prepared for
some sleepless nights
with this best
seller.*

ARCADIA

(Any Spectrum, any VIC-20,
& Commodore 64)

*Discover Britain's
best selling
computer game
for yourself.*

ZZOOM

(48K Spectrum)

*Don't just play your
Spectrum... fly it!*

ZIP ZAP

(48K Spectrum)

*Heart stopping
tension -
supersmooth
animation*

LEGGIT

(Dragon & Atari)

*Leap your way
through hazard
filled screens.*

STONKERS

(48K Spectrum)

*Poised on the very
brink of battle, every
decision is yours!*

WACKY WAITERS

(VIC-20)

*Take a tip from us, if you
want to stay sane, work
at a different hotel!*

WINNER
of the
CVG GOLDEN JOYSTICK AWARD
1983

Sharon O'Brien will welcome any U.K. or foreign dealer enquiries at:-

Imagine Software Ltd.

'Imagine House', 5 Sir Thomas Street,
Liverpool L1 6BW.
Tel: 051-236 8100 (20 lines)
Telex: 628586 Games-G



**..the name
of the game**

Golden Oldies

For the benefit of new ZX-81 owners we look retrospectively at some chart-toppers of the past

IT IS unfortunate but true that the ZX-81 seems to have slipped from the minds of software authors who look at it with embarrassment and wish it would go away. If anyone were to suggest that more software should be written for the black-and-white, low-resolution machine the instigators would be regarded as mad and informed quietly that the ZX-81 is no longer commercially viable.

That is to forget, however, that there are still thousands of users who want to be satisfied in terms of software and that their ranks are increasing



every day. It is for those people who still hold the ZX-81 in esteem that we look back at products which are still on the market and about which new owners may not know.

The most prolific software house for the ZX-81 which is still manufacturing for the market is New Generation. It has great pride in its products because it produced the first 3D game, **3D Monster Maze**.

The game puts you into a three-dimensional maze, using conventional ZX-81 graphics speeded with machine code. The effect is incredible and the program could be for a black-and-white Spectrum. It gives the effect of high-resolution graphics.

You are not alone in the maze, as you will find when

you discover the footsteps which are plodding slowly towards you. If you are lucky you will lose the owner of those big feet, or he will lose you. If you are not so fortunate you will see Tyrannosaurus Rex moving towards you along the corridor. At that point it might be a good idea to run or you will be eaten.

Contrary to popular belief there is a way out of the labyrinth and when you find it you will be shown a pretty graphics display along with a 'you got out of this one' message. The game can be made more difficult but the initial playing level is sufficient for beginners.

The only criticism of 3D Monster Maze is the long wait, in FAST mode, while the maze is set up. That is a time of seemingly unending boredom but it is soon forgotten when play begins. 3D Monster Maze is essential for all owners of the 16K ZX-81.

Another famous name in the ZX-81 market is Orwin Software. Michael Orwin, the compiler of a number of games tapes, appears to take a less active role in the company now but his ZX-81 software is still selling well.

There are five cassettes in all but only the first takes the 1K ZX-81 into account. It includes 11 programs, seven of which are in machine code. The good thing about the software is that the same games are recorded on both sides but not in the same order. That means you can always reach a particular program quickly, so long as both sides will load.

The games include several old arcade favourites, such as **Invaders**, **Planet Lander** and **Maze of Death**. They are all fast in action although,

even with the ZX-81 keyboard, they are easy to play.

The other programs on the cassette are also very inventive and include **I Ching**, a Chinese prediction program, **Codebreak**, which is self-explanatory, and an unusual program, **Bouncing Letters**. Cassette One costs £3.80 and is worth every penny.

The rest of the ZX-81 cassettes from Orwin are for the 16K machine. One of the best is Cassette Four which contains eight games. All of them should be familiar as either arcade or traditional games but each is well-thought-out and the graphics are good for a ZX-81.

Gunfight is the best game on Cassette Four so far as graphics are concerned. It pits you against a gunfighter you must kill in a shoot-out. The other obstacles in the duel to the death are two cacti and a wagon which moves continually up and down the screen. The computer is fast on the draw and you will need precision timing to survive.

ZX Scramble is another good arcade game in the package. It includes three stages in which you have to fight your way through the passages of alien subterranean caverns.

You gain points for destroying the aliens which fly at you and also for bombing the aliens which are on the floor of the cavern. You must, however, beware of the ceiling which will dip to meet you as you travel from left to right on the screen. Because of the speed at which your spacecraft travels you are likely to be destroyed more by low-flying ceilings than by aliens.

Other games on the cas-

sette include a 3D version of **Noughts and Crosses**, two invader-type programs, a version of **Conway's Game of Life** and **Snakebite**, in which you have to avoid a poisonous reptile which wants to cut short your life. Cassette Four again provides value for money and costs £6.

Another company which was to the fore of the ZX-81 software boom was Quicksilver. It produced a remarkably good version of **Defender** which is still around, called **Defenda**. Unlike space invader games, your craft moves across a landscape from left to right on the screen, destroying all in its path or being destroyed by the aliens which drop bombs or crash kamikaze-style into your battleship.

Adjustments can be made to the program if your television set cannot keep pace with such a fast game and you will usually have to make some kind of adjustment to get rid of a screen display which might bend or flash.

The game is fast, furious and almost impossible to play. It should cater for all arcade addicts who still hanker for new versions of original arcade games. **Defenda** from Quicksilver costs £3.95.

3D MONSTER MAZE

Memory: 16K
Price: £4.95
Gilbert Factor: 9

CASSETTE ONE

Memory: 1K
Price: £3.80
Gilbert Factor: 7

CASSETTE FOUR

Memory: 16K
Price: £6
Gilbert Factor: 7

DEFENDA

Memory: 16K
Price: £3.95
Gilbert Factor: 8



Old favourite is right on target

THE GUARDIAN, for the 48K Spectrum, is the first version of the classic arcade game Tempest for the machine. You are in a spaceship on the edge of a vortex into another universe. Through the doorway flit groups of aliens intent on destroying you. Each has its own attack patterns which you must study closely if you are to survive.

To destroy the aliens you must use your laser bolt gun. You will also have the opportunity to use two secret star smasher weapons which will fizz down the sides of the vortex and destroy everything trying to exit.

The Guardian, from PSS, is a spirited attempt at producing a version of Tempest, a game from which everyone else has shied away. It is a difficult game to run at a reasonable speed and, although the author has simplified the game, it is still worth playing.

It is not often that we would recommend a take-off of a game found in arcades as the market is becoming more sophisticated and demands greater originality. The Guardian provides nothing spectacular in innovation but it is easy and fun to play.

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

Horses take over in heavenly joust

BELIEVE it or not, you have been put in a saddle in the sky in **Winged Warlord** for the 16K Spectrum. The horse you are riding has wings and you have a lance with which you must unseat the blue warriors from their winged horses.

Unseating the blue devils is not sufficient to kill them as they float to the ground, as if they had parachutes. You must run them through with your lance before their faithful steeds come to the rescue.

The game is similar to arcade Joust which has stormed the States and is finding favour in Britain. The os-

triches used in the original version have, however, been replaced by horses.

There are two ways in which you can die during the game, when you will lose one of your four lives. You can be unseated by an enemy knight or you might encounter the Evil Bird of War which looks more like a duck than a personification of evil.

The graphics are amusing and the game is fun to watch as well as play.

Winged Warlord has a two-player option. That means only that you can take turns to spike the enemy and notch high scores. It is a pity



players cannot challenge each other using different parts of the keyboard. The game would have been slower on that option but more interesting. It can be obtained from CDS Micro Systems.

WINGED WARLORD
Memory: 16K
Price: £5.95
Gilbert Factor: 6

Graphics redeem maze game

YET ANOTHER three-dimensional maze. It is incredible that anyone with a sense of what the market expects should produce another maze game in which you move round collecting treasure and gaining points.

The damning criticism

may be just a little too harsh — but only just. In **Skull**, for the 48K Spectrum, you also have to avoid the skulls with jewelled eyes which inhabit the complex and make sure that you do not get stuck in corners of the maze where bars fall from the ceiling.

Apeing the antics of Donkey Kong

MONKEY BIZNES is not a new version of the famous Marx Brothers film but a game for the 48K Spectrum. The monkey in the game is King Kong and, if you had not guessed already, it is another version of the classic arcade game Donkey Kong.

You have to rush up the scaffolding to rescue the fair maiden in distress. To do so you have to hammer the barrels which are thrown at you by Kong or dodge them if you do not have a convenient hammer to hand. If you fall from the scaffolding and you have one of your umbrellas handy you can float down a level and try again.

If you manage to reach the

top of the scaffolding on one level a ladder will extend heavenwards and you will climb up to the next level. You will continue to risk your life climbing until all your four lives have been lost.

Monkey Biznes, from Artic Computing, is an amusing and colourful game. It would have been much better if released several months ago, as there are several similar games on the market. It can also be a bit tedious after you have been through several levels of play.

MONKEY BIZNES
Memory: 48K
Price: £5.95
Gilbert Factor: 7

One other problem you may encounter is the trapdoors which will open and close as if they had minds of their own.

If you solve one level of the complex the computer will transport you to another more difficult floor. When the game finishes you may be able to put your name on the high score table which takes your level number into account.

The graphics and the quick and easy response of the game are two factors in its



favour. It is, however, difficult to find the instructions when playing. Skull is produced by Games Machine.

SKULL
Memory: 48K
Price: £6.95
Gilbert Factor: 5



May the force be with you

ADD-ON ELECTRONICS 3D Star Wars might even win a prize as the worst piece of software on the market. The least of the criticisms cover the instructions which are far too long and, perhaps for copyright reasons, give a different plot on the cassette insert and the game. For instance, on the cassette insert the hero is called Luke Clearthinker but in the game the hero has obviously changed his name by deed-poll to Luke Skywalker.

The real criticisms focus on the game. There are too many keys with which to control your ship and, if you try to remember where each one is, you could easily forget which button you have to press to fire your lasers. With a little experimentation we managed to find the key just before we were eventually destroyed with a score of zero.

The graphics are lifeless and produce one of the poorest versions of 3D we have seen. Because of the mess of graphics darting in all directions on the screen, which are supposed to be rebel ships, it is difficult to tell in which direction you are moving even if you have your finger on a particular movement key.

The screen looks more like a patchwork of coloured blobs than a space scene. If you buy the game, may the force be with you. You will need it.

3D STAR WARS
Memory: 48K
Price: £5
Gilbert Factor: 1

Snowman all set to melt the ice

THE SNOWMAN, for the 48K Spectrum, is a game based on the best-selling book of the same name by Raymond Briggs. It is based loosely on some of the action in the book but it centres on the building of the snowman. It should appeal to young children because of its non-violent nature.

To build the snowman you have to collect snow and avoid the flames which will chase you so that you can turn it back into water.

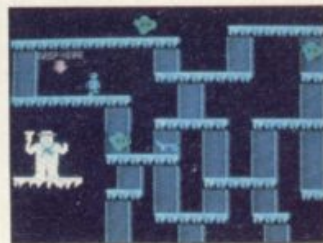
In some ways the game is like Jet-Pac, from Ultimate, as there is a drop site on the left of the screen which you must reach to mould the snowman's body and dress him.

There are four stages to each round. The first is to

collect the snow, the second to put on the features, the third to dress the snowman and the fourth to collect ice cubes to prevent him melting. Once all of those phases have been completed you will move to round two and a different screen layout.

There are two ways of winning points. You could forget about building the snowman at the first stage and collect objects such as crackers, stockings and Christmas trees. That will boost your score considerably, so long as you do not fall from the ice structure. If you do, or your energy level is depleted too much, you will fall back into bed.

The alternative is to build the snowman but risk the wrath of the sleep monsters,



which can only be combatted using the special alarm clocks.

The game is attractive and is a change from the violence of Space Invaders and the like.

The Snowman, from Quicksilver, combines the best of many games already on the market.

SNOWMAN
Memory: 48K
Price: £6.95
Joystick: Kempston, Cursor
Gilbert Factor: 8

No escaping alien trap

IF YOU SUFFER from feelings of being trapped with nowhere to go, **Loony Zoo**, produced by Phipps Associates, is not calculated to offer relief. The storyline is that while surveying another planet, you have been captured by its vastly superior inhabitants and put into one of their zoos, together with various other alien specimens.

It is possible to escape by jumping from ledge to ledge

to reach the door pressure-pad located at the top of the screen. It will let you into another cage with new and more menacing inmates, and another, and another. More than likely, however, you will not need to worry about the next cage as you will find it extremely difficult to get out of the first.

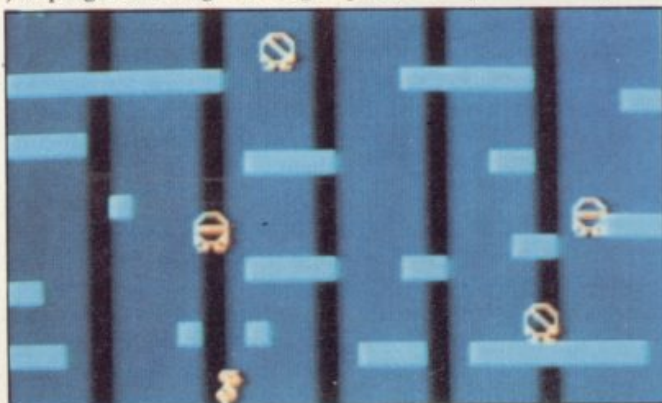
In spite of its relatively simple graphics and slow pace, **Loony Zoo** manages to

be infuriatingly addictive, especially if you enjoy a challenge to your reflexes.

In a similar vein from Phipps Associates is **Killer Knight**, in which, because of a freak time-slip, an evil knight has dragged away your girl friend whom you must try to rescue. The medieval trappings cannot disguise the basic Kong pattern.

The hero's flea-like hopping movements are novel but otherwise the difficulty of getting very far into the game without starting again, and the fact that it is possible to notch a high score by running back and forth along the bottom level, make it slightly inferior to some variations on theme.

LOONY ZOO, KILLER KNIGHT
Memory: 48K
Price: £5.95
Gilbert Factor: 6, 5



More Software on page 40

A bridge for the novice player

BRIDGEMASTER, for the 48K Spectrum, is nothing to do with the programs which claim to play full versions. It fulfils the worthier aim of teaching the player how to play Bridge.

The course is split into a series of lessons using the Acorn system, based on hands dealt by the computer. It starts simply by giving the user a chance to see play in action and you can follow play on the screen with an audio cassette which provides background narrative.

When the narrative is finished you have a chance to play the hands discussed in the lesson and the computer will inform you of any mistakes you make. There are 55 deals which you have to run through in that way, although the package makes each interesting in turn.

Also included with the four tapes, two for software and two for commentary, is a short instruction book which is helpful in setting up the course and letting the user know about the standards used, and a book by expert Terence Reese. The book is not related to the software but it shows that an expert has faith in the package.

As well as providing an easy introduction to the subject, **Bridgemaster** will make people who would not normally be interested in the subject into addicts. It is a product which will make you feel you want to gather some friends and get out the cards. It is a welcome change from programs which would have you play Bridge with them.

Bridgemaster can be obtained from the usual computer outlets, including W H Smith and Boots.

BRIDGEMASTER
Memory: 16K
Price: £24.95
Gilbert Factor: 9

Ghost rider rules in duel of death

FIND the ghost rider and race to death in **Wheelie**, a motor-cycle game for the 48K Spectrum. Before you can take part in this death race you will have to hunt through the many strange roads in the cavern scenario for the mysterious figure on a motor-cycle who will be your opponent.

In the caverns you will

find hazards such as buses and cars to jump over, ice and gas to avoid, and ramps to pass over to reach the various parts of the cave system.

Your machine has all the latest equipment and will accelerate to phenomenal speeds. You should be careful, however, as many of the roads in the ghost rider's world are dead ends.

When you crash your rider will fly from his machine and skid to a halt on the road. While the animation is excel-



Sun burn can be terminal

IF YOU do not take adventure games too seriously, you might enjoy **Here Comes the Sun** from Alligata Software. In this somewhat tongue-in-cheek tale, you play the part of the last great hero who must try to prevent his space station colliding with the sun, failure resulting in a solar explosion which will wipe out the universe.

That is the theory, but in practice playing the game more often seems to result in the hero suffering some ignominious disaster, such as turning purple from lack of air and being pronounced "seriously dead".

The game starts in the airlock of the spaceship, whence

you must trace your way to the retro-rockets which will enable you to pilot the ship to safety. Unfortunately, giving perfectly sensible commands does not often elicit a sensible response.

Simple graphics do not add a great deal to the game and in time the humour may pall, but the adventure provides a reasonable amount of entertainment.

Here Comes the Sun is produced by Alligata Software, 178 West Street, Sheffield S1 4ET.

HERE COMES THE SUN
Memory: 48K
Price: £5.95
Gilbert Factor: 6

lent, during those effects the crash sequence is a little too graphic and some people might find it tasteless.

Wheelie can be obtained from Microsphere Computer Services Ltd, 72 Roseby Road, London N10 2LA.

WHEELIE
Memory: 48K
Price: £5.95
Joystick: Most joysticks
— key program option
Gilbert Factor: 7

Digger takes the cake

DINKY DIGGER from Postern may well remind you of Pac-Man but this time the monsters are trying to eat you, and probably succeeding most of the time.

The object is to clear the screen of cherries, eventually grabbing the cake to be found at the centre. The Pac-man-like monsters meanwhile are doing their best to prevent you achieving your aim, but it is possible to eliminate the monsters by throwing a crystal ball at them, or by running under an apple in the hope that it will fall and flatten them.

Even if you succeed in getting rid of a monster or two, unless you have extremely nimble fingers you are unlikely to progress very far into the game. One monster is followed quickly by another and slow response to the movement keys makes it almost impossible to out-run them.

Most people will find they have lost a life in no time and it is a pity that the authors have added to the frustration of the game by making the player wait for an infuriating little tune to finish before embarking on another at-

tempt. When the game is finished, a score table is displayed which features an action sequence of the hero throwing a ball at one of the monsters and, appealing though that may be the first time, it serves only to slow the action when it is repeated.

Dinky Digger is definitely not for the novice, although it might appeal to experienced players eager to improve their keyboard skills.

DINKY DIGGER
Memory: 48K
Price: £6.95
Gilbert Factor: 4

Put everything you need on the keyboard with a Custom Keypanel Kit.



Everything you need
IS on the keyboard with
CUSTOM KEYPANELS.

These precision die-cut plastic panels fit perfectly over your keyboard and provide an instant and individual reference to all of your software.

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 blanks for your own designs.

SPECTRUM KEYPANELS are 96x224mm and the labels are printed in 'Spectrum' bright red. A MUST for flight-simulation and all multi-key games and applications.

The **FIRST** add-on for your Spectrum.

ORIC KEYPANELS are 105x275mm and the labels are 'ORIC' blue. Master those CTRL and ESC key combinations.

An **INSTANT** reference to all ORIC's keyboard functions.

Now available from WH SMITH and other good computer stores.

Post today to **Softeach Limited**, 25 College Road, Reading, Berkshire, RG6 1QE. We despatch to you first class post by return.

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

Hartland Software's Famous FOOTBALL POOLS PROGRAM

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

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

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

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

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

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

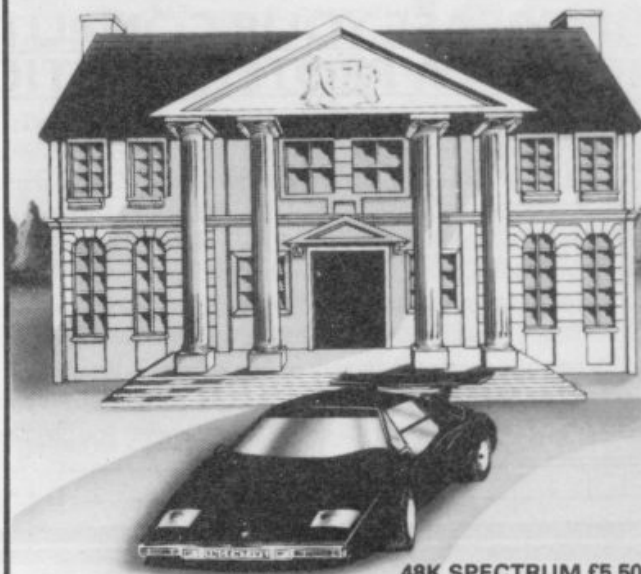
This program will not cost you a fortune either! It is available for the ZX81 (16K) and the ZX Spectrum (48K) for just £6.95, including postage & packing, from:

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

NEW FROM INCENTIVE

MILLIONAIRE

A NEW EXPERIENCE IN GETTING RICH!!



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

ARCADE ACTION FOR THE ZX SPECTRUM!



INCREASE YOUR COMPUTER FUN WITH A PROTEK JOYSTICK SET.

Playing the computer game? Then take control of the situation the Protek way. Our unbeatable combination of joystick and interface has been specially designed to give you arcade quality control on your Sinclair ZX Spectrum.

The Protek joystick interface simply plugs in at the back of your Spectrum and is compatible with a wide range of software including bestsellers from Quicksilver, Ultimate, Ocean, A & F CRL, and other leading software publishers.

The Spectravision joystick controller has a handy pistol grip, top and base fire button, and rubber suction cup footing for single hand operation.

You can buy them separately or in a special presentation set which comes complete with "Airliner", a flight simulator. And it's only £24.95.

Either way, they'll give you maximum fun whenever you play the computer game.

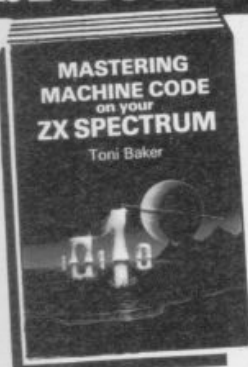


Protek=

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



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 |

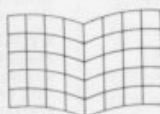
Interface Publications, Dept. SU, 9-11 Kensington High Street, London W8 5NP.

Please send me the books indicated. I enclose £.....

Name:

Address:

**INTERFACE
PUBLICATIONS**



All Interface books are available from computer and book stores, including WH Smiths, Menzies, Bouts and Duxons. Trade supplied by: The Computer Bookshop, 30 Lincoln Road, Clifton, Birmingham B27 6PA (021 707 7544, telex 334361).

INCENTIVE

PRESENTS...

SPLAT!

FOR THE 48K SPECTRUM AND COMMODORE 64



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

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

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

SPECTRUM 48K £5.50 - COMMODORE 64 £6.50



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

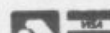
From a small humble home to a magnificent estate? Take on one of life's little challenges & become a millionaire! Start up a Software Co, Buy, sell, Advertise, Deal with Honest Harry, Full Screen Graphic Representation of your current residence, + many other features. A compulsive game that grips you.

SPECTRUM 48K £5.50



OUR PROGRAMS ARE AVAILABLE FROM ALL LEADING DEALERS NATIONWIDE. In case of difficulty please use the coupon below.

ORDER FORM



48K SPECTRUM
£5.50 EACH

COMMODORE
64 £6.50

Please send me the titles as indicated by 1st class post. I enclose cheque/P.O. for £..... or debit my Access/Visa Account

SPLAT ☐
MOUNTAINS OF KET ☐
TEMPLE OF VRAN ☐
1984 ☐
MILLIONAIRE ☐

SPLAT ☐
BBC BISERIES 1) £6.50
1984 ☐

No

Name:

Address:

INCENTIVE

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

BEHIND THIS SCREEN THERE'S A WHOLE

MICROSPHERE

WAITING TO GET

OUT



*** WHEELIE (48K Spectrum)**

As proud owner of the ultimate racing motorbike, you find yourself in a strange world — a world full of double-decker buses to leap and where even the hedgehogs are out to get you! Your only hope of escape is to find the elusive ghost rider and then beat him in a life-or-death race.

100% machine-code action, keyboard and joystick options, demonstration mode, and amazing graphics combine to make WHEELIE one of THE games for 1984. . . only £5.95

CBM 64 and BBC owners — WHEELIE and THE TRAIN GAME will soon be ready for your micros.

*** THE TRAIN GAME (16/48K Spectrum)**

The game that starts where model railways left off. Full graphics featuring passenger, goods & express trains; tunnels; stations; turntable bonus games; irate passengers; collisions derailments; and everything else you'd expect from a major railway! just £5.95

" . . . an excellent game which is original, well thought-out and full of action" (S. User Nov 83)

"Fun, fun, fun to play . . ."
(Home Computing Weekly 27/9/83)

OMNICALC (48K Spectrum)

The best Spectrum spreadsheet you can buy. Written in machine code, to be faster, to give you more space for data, and to include more features, it is guaranteed uncrashable. Complete with comprehensive manual £9.95

"If more programs shared the quality of OMNICALC then we might see more Spectrums in offices"
(Home Computing Weekly 3/6/83)

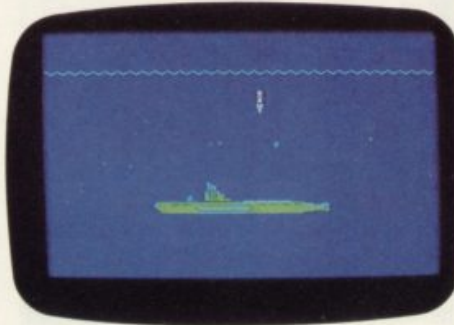
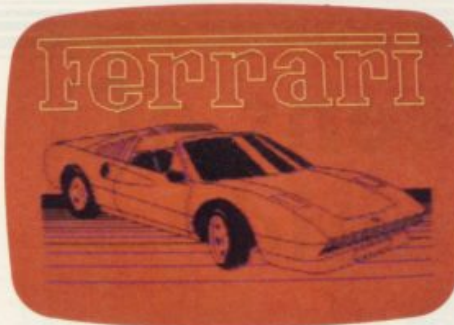
EVOLUTION (48K Spectrum)

Meet Tyrannosaurus Rex, Pterodactyl, Brontosaurus and many more fascinating creatures on the journey from the start of life to man. See 3500 million years of evolution compressed into half an hour £6.95

Items marked * are available from selected branches of



Available at good computer shops everywhere, or by mail order from MICROSPHERE, 72, Rosebery Road, London N10 2LA (Tel: 01-883 9411)



The most imaginative graphics programming software for your Spectrum

PAINTBOX is a must for every 48K SPECTRUM owner! If you want to exploit the full graphics capability of your machine you can do so... simply and easily with **PAINTBOX**.

Take a look at the screen prints shown above. They are the sort of thing you could produce on your SPECTRUM. **PAINTBOX** gives you an entire suite of graphics programming aids in one integrated program. For instance:

UDG EDITOR

The facility to define and re-define up to 84 graphics characters for your programs or for use in screen-planning.

UDG DRAWING BOARD

A fully-integrated UDG planner for defining up to 4 Banks of characters. Planning facilities include MIRROR, INVERSE, ROTATE, FILE.

SKETCHPAD

An experimentation "window" for developing the UDG set.

PRECISION PLOTTER

An amazingly versatile high resolution drawing board which includes PAPER choice INK choice PLOT, DRAW, CIRCLE, FILL, ARC, OVER, ERASE, and STORE!

SCREEN PLANNER

Combining **PRECISION PLOTTER** and **UDG** characters! A multi-purpose graphics facility to enable you to produce incredible screen graphics. All work can be sent to a Printer and **SAVED** as **SCREEN** or as **CODE** with its own built-in machine code routine for instant recall from BASIC.

The program comes with a **DEMO** program and a 28 page book that's packed with hints and tips on how to get the best from **PAINTBOX**.

PAINTBOX is ideally suited for use with the Print 'n' Plotter Spectrum Jotter Package — the first and best graphics planning pad for the Spectrum! So why not place an order today? Write, call, or see your local dealer.



01-660 7231

24 HOUR CREDIT CARD ORDERING

Post to: Dept S Print 'n' Plotter Products Ltd.,
19 Borough High Street, London SE1 9SE.
Please send me:

- "PAINTBOX" SOFTWARE @ £7.50 (+75p p+p total £8.25)
- SPECTRUM JOTTER PADS @ £7.50 (£1.50 p+p total £9)
- SPECTRUM KEYBOARD OVERLAYS @ £2.60 (35p p+p total £2.95)
- 5 ROLLS ZX PRINTER PAPER @ £11.55 (95p p+p total £12.50)

- ☐ I enclose remittance in full
- ☐ Please bill my Access/Barclaycard/Visa/Mastercard No:

Overseas orders please add 25% for additional surface mail rate.

NAME _____

ADDRESS _____

DEALERS: Phone 01-403 6644 for enquiries

**Print 'n' Plotter
Products**

Sharp ascent of The Pyramid

Nicole Segre talks to Bob Hamilton

TO SAY that things move fast in the software industry is scarcely a revelation but Bob Hamilton's career in the last year is a striking illustration of that oft-repeated fact. Since April he has transformed himself from a small cog in the wheels of a large, well-established company into a best-selling games author, co-director of a flourishing software company and, in his own words, "a very lucky man."

The program for which Hamilton, now 28 years old, is best-known is **The Pyramid**, which has loomed large on the software charts since it was released in October. Described by its author as an arcade-style adventure, the game presents the player with 120 chambers stacked in pyramid formation and inhabited by a variety of monsters such as extra-terrestrial tweezers, galactic strawberries and mutant eyes.

The player's aim is to guide the hero Ziggy in his exploratory capsule from the top level of the pyramid down to its base, zapping the aliens in each chamber with his little laser and collecting the crystal which will enable him to escape through one of the exits into the chamber below.

Several aspects of the game make it one to be played for hours, if not days or weeks. Once you have negotiated the 15 levels successfully, each more difficult than the last, you can play again to improve your score by achieving the same feat in a shorter time, or concentrate on choosing a different route through the chambers with their varying sets of weird and wonderful aliens.

Whenever you have dealt with one chamber, the screen displays a picture of the outside of the pyramid, with your position shown in red — not only a useful guide but a convenient pause in which to rest or perhaps take refreshment before resuming play. Completing the pyramid also gives you a series of numbers which make up a puzzle, with a cash prize offered for the first players to send the missing numbers.

Finally, as in his earlier games, Hamilton has incorporated a code, which only he can interpret, to check the authenticity of the high scores players claim to have achieved.

The pyramid formed the peak of a brief climb in programming which began when Hamilton decided to buy his two younger brothers, then aged 14 and 16, a Spectrum. At the time he was working on the software of an aircraft databus project at Smiths Industries Aerospace and Defence, just outside Cheltenham. Because of a holiday he had planned which failed to materialise, he was at home for two weeks and began to play with the Spectrum. "I was amazed," he says. "I thought it was just as good as all the advanced computer equipment I was using at work."

He was less impressed, however, with the standard of the games he had also bought for his brothers and was soon convinced that he could do better.



Less confident of his business abilities than of his programming, he suggested to a friend and colleague, Paul Dyer, that the two of them form a partnership to market Spectrum software.

The result was the new firm of Quest, formed in April, 1983, which later changed its name to Fantasy Software. Hamilton's first production for the fledgling company was a game called **Black Hole**, which he followed with a second called **Violent Universe**. Both were simple arcade game of the space invaders type and both sold steadily without creating a great sensation.

It was the appearance of a smash hit from the new firm of Ultimate in the summer of 1983 which made Hamilton change course. The game was **Jet-Pac** and the quality and smoothness of its graphics convinced Hamilton that he would have to produce something more complex, with more sophisticated

graphics techniques, if he was to make a real impact on the market.

"I started with the idea of a pyramid," he says, "and the game grew from there." He acknowledges freely that his two brothers, his girl friend, his girl friend's flatmate, his partner Dyer, and their secretary Anne all contributed suggestions, encouragement and sustaining cups of tea towards the successful completion of the game.

While the graphics of **The Pyramid** are accomplished, Hamilton prides himself chiefly on the game's playability. Its sequel, **Doomsday Castle**, has, in the opinion of Dyer, less playability and superior graphics. In the same vein as **The Pyramid**, **Doomsday Castle** again stars Ziggy, who this time battles against the evil Scarthax, the Garthfrogs, the Orphacs, the kamikaze Urks and the "phenomenally nasty" Googly bird.

Even Hamilton has difficulty in saving the universe from these fiends but he thinks that programming a game is a hindrance to playing it skilfully. "To be a good player," he says, "you need a good deal of concentration as well as enthusiasm. Once you have spent many laborious hours programming a game, much of the enthusiasm has gone."

From small beginnings, the firm of Fantasy Software has remained small and both directors plan to keep it that way. "We'd rather produce three or four really good games in a year and keep down our overheads than produce 30 or 40 games of which only one of two will really sell," says Dyer.

The company still consists only of the two partners, the secretary, and one full-time programmer, John White, employed in December to translate **The Pyramid** for the Commodore 64. Eventually the aim is for Fantasy to produce all its games for that machine and the Spectrum simultaneously.

One of the benefits of remaining small and informal is that it allows Fantasy to keep close links with its clientele. Several files in the Cheltenham office bulge with the letters received at the rate of around 80 a week from grateful young customers. The two directors also produce a newsletter which publishes, among other things, the high scores sent by the players of the various games, duly decoded and checked by Hamilton.

The firm's flexible structure also allows Hamilton to work whenever he chooses, a great advantage compared to his former life as a company employee. While Dyer handles sales, advertising, distribution and other such weighty matters during normal business hours,

Hamilton prefers to work late into the night — “my best time, he says is between 11pm and 2am” — saving a part of the day for running and other sporting activities.

“It is sad when you see people playing computer games or programming all day long,” says Hamilton, who is a great believer in the healthy life. He likes to run anything between three or 50 miles a day over the local hills in training for various crosscountry events. He also once ran a 24-hour race, in which contestants run for a day and a night to see who covers the greatest distance, but so far has never taken part in a marathon. “Too short,” he says. “They scarcely give you time to get started.

His new life also means that Hamilton can, say, work 14 hours a day for a spell of two months and then have time to enjoy his other favourite activities,

‘Hamilton is convinced that keeping fit helps him to write programs’

potholing and mountaineering. He once tried hang-gliding but a crash on his first attempt discouraged him from further experiments. Most of his mountain climbing is done in North Wales, but the high spot, in both senses, of his year was climbing Mount Kenya at Christmas.

Hamilton is a vegetarian and is convinced that keeping fit helps him to write his programs. “I do some of my best work after a run,” he says.

Exercise apart, Hamilton does not know to what his success as a programmer is due. He has a degree in mathematics, but not computer science, and has never been able to draw. “The main thing,” he says, “is to get the overall design right so that the game will be easy to program.”

Both he and Dyer have high hopes of the next game, which they plan to release in September. It will be a “true adventure” starring Ziggy and possibly some friends, but no other details are being offered. “We cannot reveal more, in case anyone else beats us to it,” says Dyer. In the meantime, Hamilton is working on a lighter arcade-style game called **Kondore**, with bird graphics inspired by his visit to Kenya.

Hamilton writes all his programs using a Spectrum and two Microdrives and has found that a perfectly adequate



arrangement so far. “You do not need fancy hardware,” he says. “You just have to push the machine to its limits.” Nevertheless, he would not say no to Commodore 64 and is even more anxious to lay his hands on the new Sinclair QL.

“I think the QL will revolutionise the whole concept of computer games,” he says. “It is very exciting but, at the same time, I can see myself regretting the days when you could write an excellent game for the Spectrum in a mere two months. The QL will be much more complex.”

Hamilton believes he is an unusually

fortunate man. He lives in a town he likes which is surrounded by splendid running country and earns a living by doing what he likes best whenever he chooses. Perhaps best of all is the fan mail and the idea that he is pleasing his public. “On Christmas Day, I woke up to the snowy slopes of Mount Kenya and thought of all the children who might at that moment be opening a parcel to find one of my games and I felt absolutely terrific,” he says. “All in all, this has been the best year of my life.”

If Hamilton’s next games prove as popular as in the past, he should have many more happy times ahead.

Program	Last Month	Company	Memory
1 Atic Atac	1	Ultimate	48K
2 Lunar Jetman	8	Ultimate	48K
3 Stonkers	—	Imagine	48K
4 Manic Miner	—	Bug-Byte	48K
5 Chequered Flag	—	Psion	48K
6 Hunchback	—	Ocean	48K
7 The Pyramid	—	Fantasy	48K
8 Mr Wimpy	—	Ocean	48K
9 3D Ant Attack	—	Quicksilver	48K
10 Flight Simulation	—	Psion	48K

Figures supplied by W H Smith.

A NEW WORLD OF ADVENTURE

BLACK CRYSTAL



BLACK CRYSTAL A THIRD CONTINENT SERIES ADVENTURE

The Classic, six program adventure game for the 48K Spectrum and 16K ZX81 computers. No software collection is complete without it. "Black Crystal an excellent graphics adventure and a well thought out package." *Sinclair User*, April '83 "Black Crystal has impressed me by its sheer quantity and generally high quality of presentation. I am afraid I have become an addict." *Home Computing Weekly*, April '83 **Spectrum 48K** 180K of program in six parts only **£7.50**

ZX81 16K over 100K of program in seven parts only **£7.50**

WHY PAY MORE FOR LESS OF AN ADVENTURE?

THE CRYPT by Stephen Renton

Prepare yourself for the many challenges that shall confront you when you dare to enter **THE CRYPT**. You will battle with giant scorpions, Hell spawn, Craners, Pos - Negs and if you are unlucky enough — the Dark Cyclops in this arcade style adventure.

Available for the 48K Spectrum at **£4.95**

THE CRYPT



ADVENTURES OF ST. BERNARD



THE ADVENTURES OF ST. BERNARD

An exciting, fast moving, machine code, arcade game where you guide your intrepid St. Bernard through the perils of the icy wastelands to rescue his Mistress from the clutches of the abominable snowman.

Available for 48K Spectrum **£5.95**

STARFORCE ONE

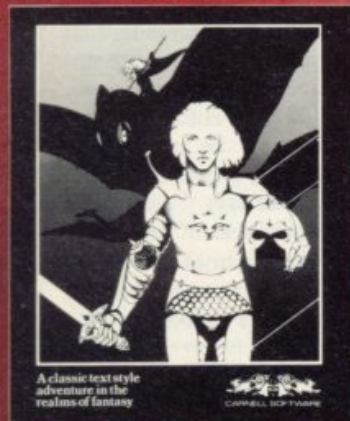
Take on the robot guardians of the central computer in a superbly stylised three dimensional battle game. **(100% machine code arcade action)**

Available for 48K Spectrum **£5.95**

STARFORCE ONE



VOLCANIC DUNGEON



A classic text style
adventure in the
realms of fantasy

CARNELL SOFTWARE

VOLCANIC DUNGEON A THIRD CONTINENT SERIES ADVENTURE

Enter the realm of Myth and Magic in this classic Fantasy Adventure. Battle with Magma and her Evil Allies to rescue the Elfin Princess Imprisoned in a Crystal Coffin Deep within the Volcanic Dungeon. Random Dungeon set ups ensure that you can play this addictive adventure over and over again. Single-key entry cuts out tiresome typing associated with other Text Adventures. Instruction Manual with Map of Dungeon enclosed.

"The whole game mechanism makes for a very Addictive Program, and one that remains a firm favourite with many Adventurers."

Popular Computing Weekly, June 1983.

For the 48K Spectrum or ZX-81 16K
@ **£5.00**

THE DEVIL RIDES IN

I uttered the last incantations as the clock struck thirteen. All fell silent except for a faint rustling in the corner. From out of the shadows they came, all Hell's fury against me but I was not defenseless until the Angel of Death, astride a winged horse, joined the battle. Avoiding his bolts of hell fire, I took careful aim. My chances were slim, but my luck held.

(Fast moving, machine code, all action, Arcade game)

Available for 48K Spectrum **£5.95**

DEVIL RIDES IN




The above are available through most good computer stores or direct from:

CARNELL SOFTWARE LTD.,
North Weylands Ind. Est., Molesey Road, Hersham, Surrey KT12 3PL.

DEALERS: Contact us for your nearest wholesaler.

E FROM CARNELL SOFTWARE



"THE WRATH OF MAGRA" A THIRD CONTINENT SERIES ADVENTURE

The first born has been destroyed. The Black Crystal of Beroth has been banished. The alliance of Evil has been defeated by the armies of Lord Fendal. So ends the Third Age. Now we invite you to write your name in the history of the Fourth Age of the Third Continent.

You will meet friends and enemies, old and new, in the long awaited sequel to Volcanic Dungeon. Using high resolution graphics and combining the best qualities of "Black Crystal" and "Volcanic Dungeon", we will allow you to become part of this tale of revenge.

"The Wrath of Magra" comes as three, 48K programmes on cassette, boxed with instruction manual and book detailing the history of the Third Continent and the many spells you will be using throughout the game. For the 48K Spectrum @ £12.50.

NOTE: "The Wrath of Magra" is a complete adventure. You need not buy "Volcanic Dungeon" or "Black Crystal" to play it.

Available from Feb '84



CARNELL SOFTWARE LTD

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.

ONLY THE BEST BECOME A....

FIGHTER PILOT

48K SPECTRUM
BY D.K. MARSHALL

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

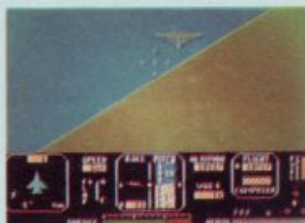
The SUPREME SIMULATION... it leaves the rest at the runway threshold!

£7.95

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

OTHER AMAZING FEATURES

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



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



TAXI
£5.50

Any Spectrum

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



FOOTBALL
£7.95
48K Spectrum

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



NIGHT GUNNER
£6.95
48K Spectrum

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

WIZARDS OF COMPUTER GAMES SOFTWARE



DIGITAL INTEGRATION



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

Please send me the following games for the Spectrum
Fighter Pilot 48K ☐ £7.95
Night Gunner 48K ☐ £6.95
Football 48K ☐ £7.95
Taxi (Any Spectrum) ☐ £5.50

Trade and Export enquiries welcome.

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

Please send to Digital Integration, Dept SU2
Watchmoor Trade Centre, Watchmoor Road, Camberley, Surrey GU15 3AJ

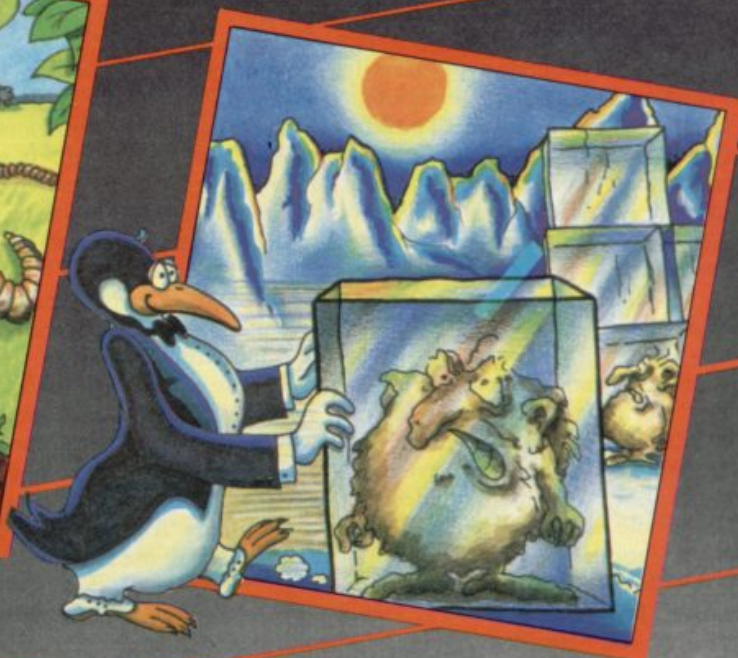
Lifetime Guarantee Cheques payable to Digital Integration
I enclose a cheque/P.O. for _____ Total.
Name _____
Address _____

Or debit my Access/Barclaycard Account No. _____

Tele Sales Camberley (0276) 684959



For The First Time Ever In England



PINGO

Battle in the ice maze with Pingo to destroy the Sno-bees. If you're fast enough you may survive!

ZX Spectrum 48k

5.95

SPACE MISSILE COMMAND

Incoming waves of missiles and only you between the earth and destruction.

ZX Spectrum 48k

5.95

JANGLER

A game for only the most skilful joystick adepts. Has to be experienced to be believed.

ZX Spectrum 48k

5.95

MUSIC COMPOSER

- ★ 3 channel composer
- ★ professional musical notation
- ★ correct phrasing
- ★ 5000 notes
- ★ music sheet scrolled across screen or printer

- ★ fully editable
- ★ synthesizer coming shortly

ZX Spectrum 48k

6.95

Available from your software dealer

proffsoft

Dealer enquiries contact telex
Germany 94966 proffs d.

MOST PEOPLE buy computers with some purpose in mind. A few of them may want to learn about computing and to write programs. It is when that happens that utility routines may be needed to make the task easier.

There is a great variety of utilities available for the Spectrum which compensate for some of the inadequacies. One of the most common types of utility is the toolkit or language extension.

The **Spectrum Super Toolkit**, from Nectarine, provides all the necessary functions a Basic programmer would need. It is also very user-friendly and should help anyone who has the slightest interest in developing programs, no matter whether they be beginner or an expert.

The toolkit will run on the 16K and 48K machine and occupies approximately 2.5K. That means at least 6K on the 16K Spectrum will be available for user programs. That is an achievement for the author, who has included 12 routines in the package.

The exceptional characteristic of the Super Toolkit is the one-key entry system which invokes each of the 12 commands. All you have to do to use a command is hold down the ENTER key and press the command key, such as 'L' for list all variables.

The package is one of the most comprehensive on the market. As well as generating a full re-number of Basic programs, deleting blocks of lines, listing variables and showing the memory used by a program, it will also produce a map of the memory in the computer, including Microdrive and channel information, and read the tape header of any piece of code.

There are no complicated POKES involved in making any of the utilities work. All you need is a RAND USR instruction to enable and to disable it. You will also have to use the keywords PRINT or REM to re-enable its facilities after running one of your programs.

You should have no difficulty using any of the routines, as the toolkit will produce prompts on the screen for information it needs to perform its work. For instance, when you ask for line re-numbering the screen will clear and the computer will ask at which number you want your program lines to start. It will then ask for the step size between each line number. The automatic default, if you press ENTER for each of those prompts, is a line-numbering system starting at 10 and rising in stages.

The manual with the package is just

Packages to help you help yourself

John Gilbert reviews the programming aids now available for the Spectrum

as good as Super Toolkit. It explains each utility command in turn and on the back page provides an uncluttered index of how to access them. It also shows how to turn off the toolkit when you want to use interrupt-driven machine code routines in your programs.

Super Toolkit cannot be recommended strongly enough. It costs £9.95 and fills a big gap in the market.

Spectrum Extended Basic, from CP Software, uses a one-keyword entry system similar to that of the Nectarine toolkit. Once invoked, all the user has to do is type an asterisk and then press the key to activate a desired command. For instance, the 'A' would be pressed if the user wanted to use AUTO line numbering.

The Basic uses approximately 5K of memory in which to operate. Although that is not bad for a package which allows the use of 10 new commands, when compared to the Nectarine product it takes much more memory.

The use of memory by a utility is all-important. A good utility will reside in

memory almost invisible to the programmer, who should be able to do anything with the machine except initialise it, and it should utilise as little memory as possible, so that users can write long programs. A utility which uses a great deal of memory defeats its own purpose.

The Extended Basic could be described more accurately as another toolkit and not a set of machine code patch routines on the existing Sinclair Basic. It will operate with the Sinclair language but the routines included in the package are more in line with a toolkit than an extension of a high-level language.

It includes an auto-line number routine, a real-time clock, continuous scroll function, block code delete and an indication of the current state of the computer memory. It is almost as easy to use and as helpful as the Nectarine toolkit and many of its commands can be incorporated into user programs. Extended Basic is not a competitor to the toolkit but it is, however, a useful



companion package. Spectrum Extended Basic costs £9.95 and is expensive for what it offers.

The other type of utility which is helpful on the Spectrum is the graphics package. Although Sinclair Research included exciting graphics capabilities with the Spectrum, it is often difficult for the programmer working in Basic or the amateur programmer to get the most from the graphics potential.

One of the best ways to highlight a program or give it a title is to increase the size of the lettering and characters on the screen. It could be done with a number of PRINT statements but it is possible, using machine code or POKE routines, to magnify the original character set from the ROM.

A new utility package, **Print Utilities**, from Sinclair Research will allow you to magnify the character set and also to increase or decrease the width of lettering on the screen or on a printer. The software will allow you to use four widths and two heights.

There are two versions of the package, one for the 48K and one for the 16K, although each performs identical tasks. Once it has been initialised you can set up the character height and width using a print command which employs a hash. After that you must put a CHR\$ command and a number. For instance:

```
PRINT 15; CHR$ 28
```

would select a double-height character

set. Other CHR\$ settings would give 32, 42, 16, and 21 characters a line and will also move the cursor left and right and clear the screen.

The different-sized character sets can be used in programs but they can also be used to reproduce listings to make them easier to read. Unfortunately the manual infers that the package is set up for the ZX printer, although with Interface One, which is catered for, output to a dot matrix printer or daisywheel would be possible, using the correct software.

Output to a printer is more difficult than to a screen, as the double-height mode is cancelled after one line is printed and it is not possible to mix different heights in one line of text.

Print Utilities can be obtained for the 48K Spectrum and costs £9.95. For the usefulness of the product that is expensive.

Paintbox is a more powerful graphics utility for the 48K Spectrum. It includes the capacity to manipulate 84 user-definable graphics which are set up in four switchable memory banks. Any one of the four sets can be switched into the 'present' mode, taking the place of the letters A to U.

It is possible to change any of the example characters set up in the package and to save them on tape if you want to use them in your Basic or machine code programs.

Paintbox contains a special facility

which enables the user to put several UDG graphics on the screen together to examine the effect. It is also possible to rotate, inverse, and mirror the graphics with the press of a key.

Another facility is the precision plotter, which will allow you to draw pictures on the screen using lines, circles and arcs. The pictures can be shaded with a selected colour and the colour for INK and PAPER can be changed. The utility looks like the one on the Sinclair Horizons tape, although it is set out

'It is often difficult to get the most from the graphics potential'

slightly better and is more usable so far as Basic programming is concerned.

The screen planner uses a combination of UDG graphics which can be created using the UDG banks and the Precision Plotter.

It allows you to see the finished result of all your work. The package is a powerful graphics aid and, if the demonstrations are any criterion both in the manual and on the tape you could produce some professional screen displays. It is possible for even a beginner to draw reasonable pictures using the package. Paintbox can be obtained from Print and Plotter and costs £7.50.

There are still few utility packages available for the Spectrum and the computer has been on the market for nearly one-and-a-half-years. It seems that most software companies are concentrating on producing arcade games of one kind or another. That is unfortunate, as many Spectrum owners could produce original and interesting programs if they had access to more utilities. It might also encourage more people to start programming if they see what can be done with the utilities available.

Some people may say that it is a little late to start thinking of producing more utilities for Spectrum owners but there are still many users trying to find interesting things to do with a computer. It would certainly be helpful if the few utilities on the market at present became many in the near future.

Nectarine, 837 Yeovil Road, Slough, Berkshire.

CP Software, 17 Orchard Lane, Prestwood, Bucks HP16 0NN.

Sinclair Research, Stanhope Road, Camberley, Surrey GU15 3PS.

Print and Plotter, 19 Borough High Street, London SE1 9SE.

For 16/48K SPECTRUM
SUPER TOOLKIT
FOR SPECTRUM BASIC PROGRAMMERS
 Written by Adrian Jones

Features include:
 - NUMBER (Inc. GOTOs, GOSUBs etc.)
 - LIST VARIABLES
 - "CRUNCH" PROGRAM
 - REPLACE KEYWORD
 - MEMORY USED BY

Also includes: **FUN GAMES**, **Paintbox**, and **Hi-Res drawing board** with full range of commands including: COLOUR CHOICE, PLOT, DRAW, DRAW RADIALLY, CIRCLE, ARC, FILL, ERASE, STORE, FAST OR SLOW CURSOR, CROSSWIRE OR DOT CURSOR - CONTROLLED BY JOYSTICK OR KEYBOARD.

Tandy
TRS-80

The Tandy Four Colour Graphics Printer

£149
Inc. VAT



CGP-115. Creates beautiful graphics in red, blue, green and black. Text mode prints 40 or 80 characters per line at 12 characters per second. Includes serial and parallel interfaces and easily replaceable ink cartridges and standard 4 1/2" paper rolls. 26-1192 £149.00

Tandy The Biggest Name in Little Computers

See Our Extensive Range of Microcomputer Accessories
At Any One of the 340 Tandy Stores Nationwide!

SPEAK EASY

Allophone Speech Unit
for SPECTRUM



ONLY £24.95
all inclusive

- Simple to use
- Uses no memory addresses
- Directly accessible in BASIC
- No extra leads or power pack needed
- Full documentation supplied
- Allophone system gives unlimited vocabulary
- Volume control for internal speaker
- Demonstration tape supplied

Available from:

BELVEDERE ELECTRONICS
Dept. SU/4
15 Belvedere Mount
Leeds LS11 7ED

Overseas orders add £1.25

48K SPECTRUM **Regardez!** **BBC acorn electron**

LANGUAGE LEARNING AIDS FOR FRENCH, GERMAN & SPANISH

Already in use in numerous schools and colleges, these programs provide an immensely powerful aid to foreign language learning. The cassettes include extensive vocabulary lists arranged as a series of lessons, each covering a different subject. A tuition control program enables individual lessons to be loaded and used as required.

Words, phrases etc are presented first in one language, then the other complete with all necessary accents and special characters. Masculine, feminine and neuter words appear in different colours to encourage gender learning. All lessons can be run in three different ways, i.e. learning only, self-test or speed and accuracy test.

The programs are suitable for pupils of all ages as simple commands enable new lessons in vocabulary or grammar to be entered by the user. These may then be edited as required and stored on cassette for later use. Invaluable for homework and exam revision!

Level A Cassettes: Contain the tuition control program and 16 comprehensive lessons for general vocabulary learning.

Level B Cassettes: Contain the tuition control program and 16 lessons including verb lists, adjectives, adverbs and phrases.

Available from dealers, large stores or mail order.

Also Available "THE SPANISH TUTOR"

Kosmos Software

I Pilgrims Close, Harlington, Dunstable, Beds. LU5 6LX Tel: 05255 3942

Kosmos Software, I Pilgrims Close, Harlington, Dunstable, Beds LU5 6LX
Please supply the following programs for the computer
(BBC/SPECTRUM/ACORN ELECTRON) (Prices include postage & packing)

The French Mistress Level A @ £9.95	The French Mistress Level B @ £9.95
The German Master Level A @ £9.95	The German Master Level B @ £9.95
The Spanish Tutor Level A @ £9.95	The Spanish Tutor Level B @ £9.95

Mr Mrs Miss
Address
..... Post code
I enclose a cheque postal order value £ payable to Kosmos Software



COMMODORE 64 • SPECTRUM • BBC • ORIC • DRAGON • TANDY

IF YOU THINK YOU'VE GOT THE BETTER OF YOUR COMPUTER, YOU'D BETTER THINK AGAIN....

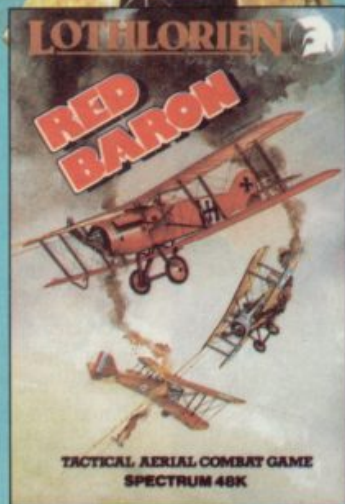
We all enjoy a good action game on our home computers, but after a while doesn't chasing the alien across a screen wear a little thin? That's the time to take on the superior challenge of a Warmaster strategy game — plenty of action, plenty to think about, and plenty of titles to suit every taste.

Take on Warmaster and really put your home computer through its paces.



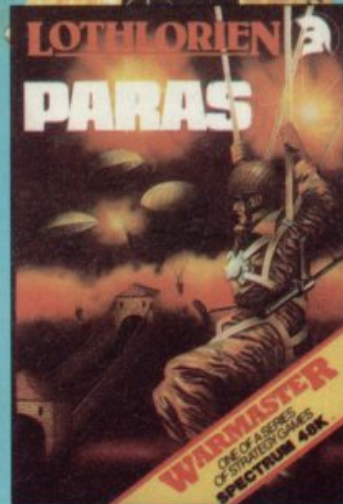
CONFRONTATION

Build-on game that offers a basic format for any modern, non-nuclear conflict. Contains a modern European scenario with facility to create others of your choice using air and land forces. Two-player game.
Spectrum 48K £7.95
BBC-B £7.95



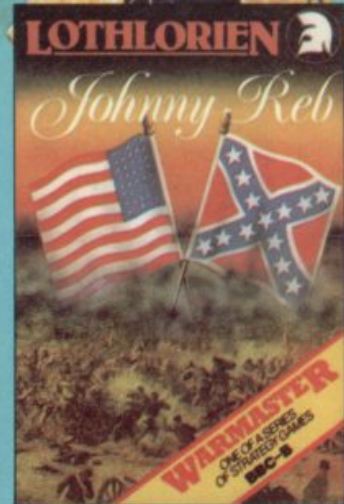
RED BARON

Offers the excitement of arcade action but requires the tactical thought of war games. Pit your biplane against one or two of the Kaiser's aces in this aerial combat game.
Spectrum 48K £5.95



PARAS

Dramatic all-graphics campaign. Your hand-picked force has dropped behind enemy lines to capture a strategic river crossing. Two versions of the game with ten levels of play.
BBC-B £6.95
Spectrum 48K £5.95
Oric 1 48K (coming soon) £6.95



JOHNNY REB

There's still plenty of fight left in the Confederate South as each side selects forces to manoeuvre on a full-graphics battlefield. Play against the computer or challenge a friend.
Spectrum 48K £5.50
Oric 1 48K £6.95
BBC-B £6.95
Dragon 32/Tandy Colour 32K £6.95
Commodore 64 (coming soon) £6.95



DREADNOUGHTS

Suspense-filled high seas drama as the pride of the German Grand Fleet is locked in battle with the Royal Navy. Two-player game.
Spectrum 48K £5.95



BATTLEZONE 2000

Futuristic wargame. Your tanks, missile launchers, infantry etc. have to destroy an all powerful computer-controlled battle machine. Can you save Planet Earth?
BBC-B £6.95

Available from John Menzies, Lightning Dealers and better software shops or clip the coupon for fast delivery.

Please send me (tick box)

Confrontation	Spectrum 48K	£7.95	<input type="checkbox"/>
	BBC-B	£7.95	<input type="checkbox"/>
Red Baron	Spectrum 48K	£5.95	<input type="checkbox"/>
Paras	BBC-B	£6.95	<input type="checkbox"/>
	Spectrum 48K	£5.95	<input type="checkbox"/>
	Oric 1 48K (coming soon)	£6.95	<input type="checkbox"/>

Free colour catalogue listing all Lothlorien games ☐

I enclose a cheque/P.O. for £_____ made payable to M C Lothlorien.

Please debit my Access No. _____ / _____ / _____ Signed _____

Name _____

Address _____

Johnny Reb	Spectrum 48K	£5.50	<input type="checkbox"/>
	Oric 1 48K	£6.95	<input type="checkbox"/>
	BBC-B	£6.95	<input type="checkbox"/>
	Dragon 32/Tandy Colour 32K	£6.95	<input type="checkbox"/>
Commodore 64	(coming soon)	£6.95	<input type="checkbox"/>
Dreadnoughts	Spectrum 48K	£5.95	<input type="checkbox"/>
Battlezone 2000	BBC-B	£6.95	<input type="checkbox"/>

LOTHLORIEN

the mind stretcher



Send to: M C Lothlorien, Dept. Poynton, Cheshire SK12 1AE.
Tel: Poynton (0625) 876642.

56a Park Lane,



SU/4/84

What's cooking?

Gourmet Steve Williams provides food for thought with his recipes for the Spectrum. Liz Leckie reports

SPECTRUM enthusiast Steve Williams has given a new meaning to the phrase menu-driven program. In his quest to make the micro as essential a kitchen gadget as the potato peeler, he has developed a system which could make galloping gourmets everywhere throw away their cookbooks.

His new software range of computer cookbooks uses a menu-driven—Williams prefers ingredient-driven—program to allow harassed housewives to find a recipe to fit every taste, using favourite ingredients or awkward leftovers.

Delicious concoctions like Prawns Louisiana, honey oatmeal bread and yummy date salad can be called up to make menus fit for any occasion. The revolutionary system is the result of only one month's hard work by Williams, his wife Marisa and his brother and sister-in-law.

"I bought my Spectrum 48K six months ago," says Williams, a 30-year-old personnel officer for a computer firm in Leeds. "While I do not have a technical background, I had borrowed micros previously and knew a little about them. I bought a Spectrum because it seemed about the best buy. Also we had the idea of producing software and we thought it was one of the most popular computers."

Now he has produced a series of three tapes, each with more than 70 recipes, which he is marketing under the title **The Computer Cookbook**.

"The most difficult job was finding the recipes, checking and testing them, and then feeding them into the computer. It was a month of very hard work," he says.

"The recipes are ingredient-driven and the cookbook can be used in two ways. It can be a straightforward recipe book in which the program lists all the dishes and you can choose which recipe you would like to read; or you can select up to five from a list of 30 ingredients, like beef, eggs or wine. The program will then search every recipe looking for those, using the ingredients you have chosen."

So a cook with a heap of prawns to use can turn to the Continental tape and

find recipes for mouth-watering meals, including cod in seafood, savoury rice with fish paella, prawn-filled pancakes, or Lisbon soup.

The program, all in Basic, also allows the cook to choose whether cooking instructions should be for a gas or electric oven and it gives the option of measurements in Imperial or metric terms.

Perhaps the most unusual and useful aspect of the idea is the details of quantities of the ingredients of each recipe. As it is called up, the cook can tell the computer how many—any number up to eight—for whom the meal is intended. The computer will then adjust the quantities accordingly, saving time-consuming calculations and costly errors.

"Some of the people we know use the tapes like a shopping list. It works out the quantities and saves buying too many ingredients," Williams says.

He believes that anyone sufficiently interested in computers to own a printer



would be able to take hard copies of individual recipes to use as shopping lists, although no printing commands are incorporated in the program.

Altogether, Williams tried and tested more than 200 recipes for *The Computer Cookbook*, which includes a tape using wholefoods and a Quick Cook tape, as well as the more exotic Continental section.

Looking at the list of delicious dishes, like tarragon artichokes or herring kebabs, as it appears on the screen can make even the laziest people feel like rushing to the cooker.

"We asked a number of people for their trusted recipes and we tried to

select as many unusual dishes as possible. We had to check them all carefully once they were keyed-in. One recipe noted 'add 4 oz. salt', which certainly would have created a yoghurt surprise," he says.

He and his family have stayed slim, despite a month of intensive recipe testing. "I enjoy cooking and my wife and I share doing it. We have found the tapes a great help, particularly the Quick Cook tape, which we wrote first," he says. "You can go home at night and if you do not know what to make, you can find ideas quickly."

One difficulty he faced was fitting all the information into the Spectrum 48K memory. "We were limited by the memory and had to keep the recipes to the bare essentials. There was so much possible data and we had to be very selective."

Each of the tempting dishes has a page to itself and an important factor in drawing up the program was the page design. "We designed each page layout to be clear and easily understood," Williams says.

Now each recipe can be read at a glance and has cooking and preparation times marked clearly. Simplicity is the keynote of the system, as Williams hopes it will be used even by people who know nothing about computers.

"You do not need to understand the software to use the program. All you need to do is load the tape and follow the instructions. We hope it will encourage people to use computers properly and not just play games."

Williams and his wife, who live in a rural belt just off the A1 at the tiny village of Pick Hill, near Thirsk in Yorkshire, are an example of how to bring self-sufficiency and the good life into the micro age. They own nearly three-quarters of an acre round their home—which they converted from a former station house—grow all their vegetables and keep hens.

"We bought the house as a wreck four years ago. We doubled the size, doing all the building work ourselves," he says.

Despite driving 90 miles a day to work and back and keeping the garden

under control, Williams still finds time to be bursting with ideas on how to apply his Spectrum to the everyday problems of life in the country. He is working on programs to help with crop rotation in the garden and also one to monitor egg production.

Eventually Williams, who graduated from Lancaster University in politics and psychology, hopes to set up a family business marketing software.

"I think computers fit very well into our way of life. It is like going back to cottage industries. You can live on a self-sufficient basis, using computers to work from home. It is happening all over as computers spread and take people out of the office environment. They can stay at home and work from the terminal."

Already Williams has sold some 60 cookbook tapes, without advertising. Now, using professional help to duplicate the tapes, he is hoping to interest the big software retailers in his product.

"If you are to run a small mail order business you have all the problems of delivery. I think it is worth selling through the big shops," he says.

At present, anyone interested in buying the tapes, costing £5.95 each or £14.95 for the set, can contact Williams at Station House, Pick Hill, Thirsk, North Yorkshire or telephone him on 0845 567415.

When the Sinclair Interface One system becomes widely available he is hoping to modify the programs for use with a Microdrive for instant loading—at present the program takes nearly five minutes before it is ready—and for vastly-increased data storage. He is also planning to buy a Sinclair QL and to produce software for it.

"Given our experience of business and personnel work we hope to try our expertise in the commercial world, as well as producing software for the Spectrum which is not purely games orientated," he says.

His first interest is in ideas for the home, like an autodialler for the telephone using the Spectrum interface system. With the faster access to data, the user could call a number by keying in a name.

For this far-sighted Sinclair user, all that is just a start. "We would like to build a complete home system, including a home freezer program which would tell you what is in the freezer, how long it has been there, and how it can be used.

"With better luck the computer will be a part of everyone's kitchen and certainly a part of their homes."



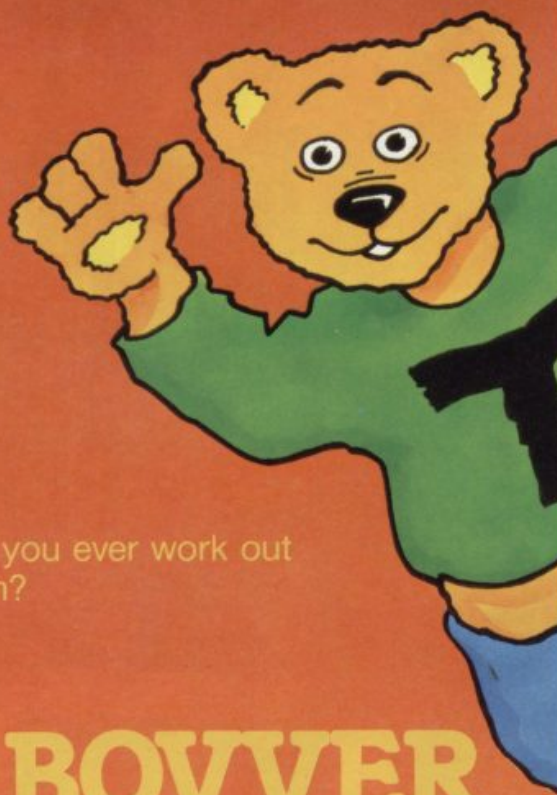
It's no picnic!

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

Or will you get bovered?

Or get the cocktail?

Will you ever reach the 8th round?



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

BEAR BOVVER

£6.95

For 48K Spectrum



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

The REAL Challenge!

For Spectrum

Quincy A superb dice game for 2 to 6 players. 3 throws per go to try and score points by obtaining certain combinations, i.e. 3 of a kind, a run, pairs etc. 13 go's to complete a game. The highest score is the winner! It's a game that is easy to learn but can be won by skilful and thoughtful play. Full colour graphics, on-screen instructions, bonus scores, etc.
Author - Tony Churcher.
Spectrum 48K - £4.95.



Moria A challenging adventure game set in the mines of Moria. You'll have to try and survive encounters with the monsters of Middle-earth while trying to locate Durin's Ring. The Wizard and the Trader may help or hinder you on your journey to find and open the hidden doors to freedom - a game that will really test your character and staying power.
Author - Mike Howard.
Spectrum 16/48K - £4.95.



Jogger Guide your joggers across a 4-lane motorway and crocodile infested river to reach their safe haven through the gap in the fence. Each time a jogger is safely home the next one will have to encounter more lorries and cars on the motorway but fewer crocodiles and logs in the river. Full on-screen instructions. Micode, sound effects and full action colour graphics.
Author - Mike Howard.
Spectrum 16/48K - £4.95.



Encounter A complex and intriguing classic-style text adventure. A girl has been kidnapped by thugs - your job is to locate and rescue her! Everything you need can be found in the game but sometimes you may have to manufacture items. Chemistry knowledge will help! Most commands are verb followed by noun although abbreviations can be used. If the alarm sounds you have twenty moves to stop it before you too are caught. It's worthwhile making a map noting where you find and where as the time limit is only 500 moves.
Spectrum 48K - £5.95.

Available from good computer shops or direct.

All Spectrum Software is available on Micronet 800.

TRADE ENQUIRIES WELCOME.

Severn Software, 5 School Crescent, Lydney, Gloucester, GL15 5TA

WHEN DOES £12 = £8? NOW—with this special subscription offer.

Take a subscription today and you can receive *Sinclair User* for just £8 instead of the usual annual subscription rate of £12.

So you can be sure you never miss a copy and save money, too!

Mail to: ECC Publications Limited: 196-200 Balls Pond Road, London N1 4AQ Yes — I'd like to subscribe to
Sinclair User at the special rate of £8 for 12 issues. I enclose a cheque for £ _____
Please charge my credit card: Card name _____ Address _____ Number _____
Name _____ Signature _____ Date _____

N.B. This offer applies to U.K. subscribers only. Overseas rates available on request.

You might win more than £100 worth of prizes if you can solve

The Puzzle of the Pirated Software



IN CONJUNCTION with Melbourne House, *Sinclair User* is giving away hundreds of pounds worth of prizes in our devilishly difficult Sherlock Holmes competition.

The five first prizewinners will each receive more than £100 worth of software and books from Melbourne House. They will be given all the classic Spectrum software — **The Hobbit, Penetrator, Terror Daktil, Classic Adventure, Spectrum Forth, Melbourne Draw** and the two recent releases, **Sherlock Holmes** and **Hurg**. In addition the winners may choose any three books from the following: **Over the Spectrum, Spectrum Machine Language for the Absolute Beginner, Understanding Your Spectrum, The Complete Spectrum ROM Disassembly, Spectrum Hardware Manual, Spectrum**

Microdrive, Supercharge Your Spectrum, and Spectrum Exposed.

We are also awarding 25 runners-up prizes of the Sherlock Holmes Spectrum game, each one normally retailing for £14.95.

To enter the competition, first read the short story below and then endeavour to discover the clues which Sherlock Holmes perceived unerringly. When you think you have deduced the identity of the thief, complete the entry form below and post it to Sinclair User, 196-200 Balls Pond Road, London N1 4AQ, to arrive not later than April 30, 1984.

Employees of ECC Publications and Melbourne House are ineligible and the editor's decision is final. The solution to the puzzle will be given in the June issue of *Sinclair User*.

HERE IS an extract from the memoirs of Dr Watson:

The various investigations on which I was fortunate to accompany Sherlock Holmes, the grandson of the famous detective, frequently left me baffled and bewildered, though to Holmes the confusion of alibis, clues and lies always appeared crystal clear. One such instance was the Peculiar Puzzle of the Pirated Software.

One April morning, Holmes and I were summoned to the offices of Classic Software Ltd, where a break-in had been discovered. On arrival we were met on the first floor by Mel Bourne, the manager. Visibly agitated, he led us into his office, where the three members of his staff were assembled.

"I was first to arrive this morning and discovered the break-in immediately. I ordered my staff not to touch anything and I telephoned you." Bourne indicated his desk. "The locked

drawer has been levered open and ransacked and you can see how the thief broke in."

Holmes' piercing eyes swept the room, taking in the rifled desk and the broken window behind it. Through the smashed pane he could see the fire escape outside, littered with shards of glass.

"Interesting," he mused. "Tell me, what appears to have been stolen?"

"That's just it," exclaimed the exasperated Bourne. "Absolutely nothing. The only thing of value was this" — and he held up a cassette. "Our latest game. Our rival, Moriarty Micros, would pay a small fortune to get their hands on this."

"Perhaps they did," I interjected, "and merely substituted another cassette."

Holmes slapped me on the back.

"Brilliant, Watson. You have a mind like a rapier. I suggest we load the tape into the office Spectrum without further ado."

Bourne's secretary, Penny Traitor, led the way to the computer room. An untidy mound of hardware and software, trailing wires and cables, covered the table. Moving a pile of blank cassettes to one side, Holmes idly picked up the Spectrum and put it down again hurriedly. It was surprisingly hot.

"I'll get Terry Dactill, our programmer, to load it for you. I'm all fingers and thumbs when it comes to computers," Miss Traitor confessed and she turned to the bespectacled Dactill, who placed the cassette swiftly in the tape deck, rewound it and began the loading procedure. While we waited Dactill related the events of the previous afternoon.

"At about 4.30 I had put the final touches to the game and I called the others in to see it. The four of us played it for almost an hour. It's very addictive, I'm proud to say."

"I'll second that," added Horace Goetzki, the public relations man. "It's a kind of snakes and ladders thing called Lord of the Rungs. Damnably tricky, too; I was hopeless at it."

Dactill took up the story again. "At 5.30 we decided we had better go home and, after rewinding the cassette, I gave it to Mel for safe keeping. The others followed him into his office and stood chatting while I unplugged the equipment in here."

Bourne nodded. "That's correct. I locked the cassette in my desk — nor-

mally I use the safe but as we were late I put it in the top drawer and removed the key. Terry joined us and we all left the building together, Penny locking the main door behind us."

The cassette had finished loading by this time and within minutes of running it was clear that it had not been altered in any way. As the game ended the hi-score chart was displayed. It read.

MEL	11073
TER	9912
HOR	7231
PEN	654

Holmes took out his pipe and lit it, as he was accustomed to do when he had found the solution to a crime.

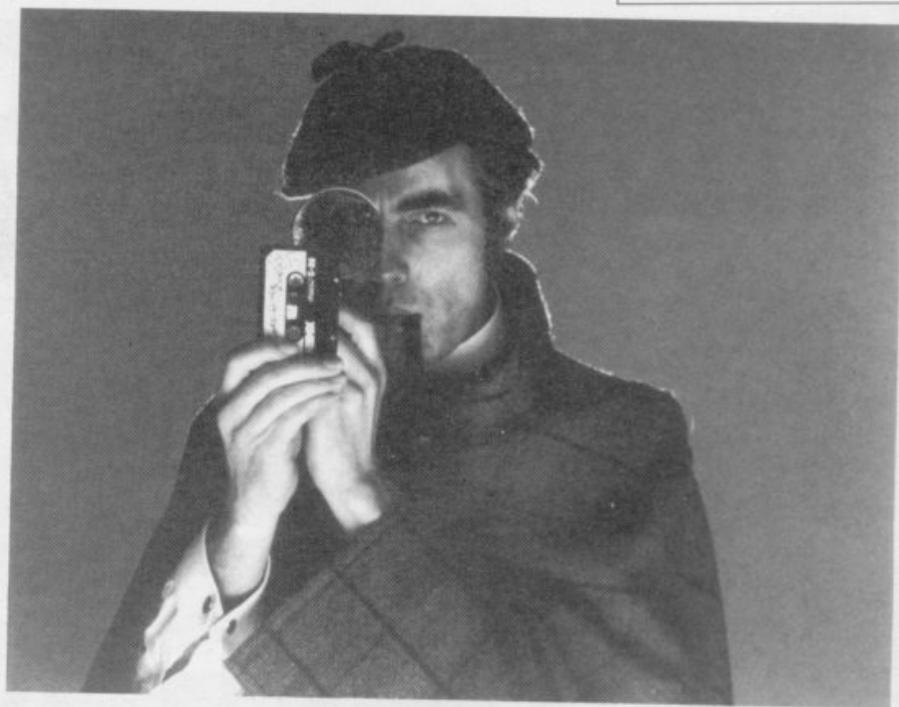
"One final question," he said. "Who has keys to the building?"

"Myself, and Terry," replied Bourne. "Why do you ask? It seems we have been wasting your time, as nothing appears to have been taken after all."

Sherlock Holmes looked up and said, gravely: "I'm afraid you're wrong. A theft has occurred and I'm confident that at this moment Moriarty Micros is duplicating Lord of the Rungs by the thousand."

"Good grief, Holmes," I spluttered. "How on earth do you know that?"

Holmes turned to me and, in the manner of one speaking to a child, said, "Elementary, my dear Watson . . ."



SHERLOCK HOLMES COMPETITION ENTRY FORM

I have deduced that the thief is

My reasons are as follows (please use an extra sheet of paper if necessary)

.....

If I win first prize, the three books I would like are

.....

Name

Address

.....Tel

Put the thrill-power back into your programs with **BIG K!**

KEVIN WAS ONCE AN OBSESSIVE, INTROVERTED MIDNIGHT HACKER...

DURN BUG'S GOT TO BE IN HERE SOMEWHERE - YAWN!!



...UNTIL ONE DAY HE DISCOVERED **BIG K!**

GOSH! THIS IS A-MAZE-ING!



NOW BUGS ARE A THING OF THE PAST...



...THANKS TO **BIG K!**

BIG K is the nation's most colourful, fact-filled, stylish, unusual, obnoxious and irritatingly well-informed computer games magazine.

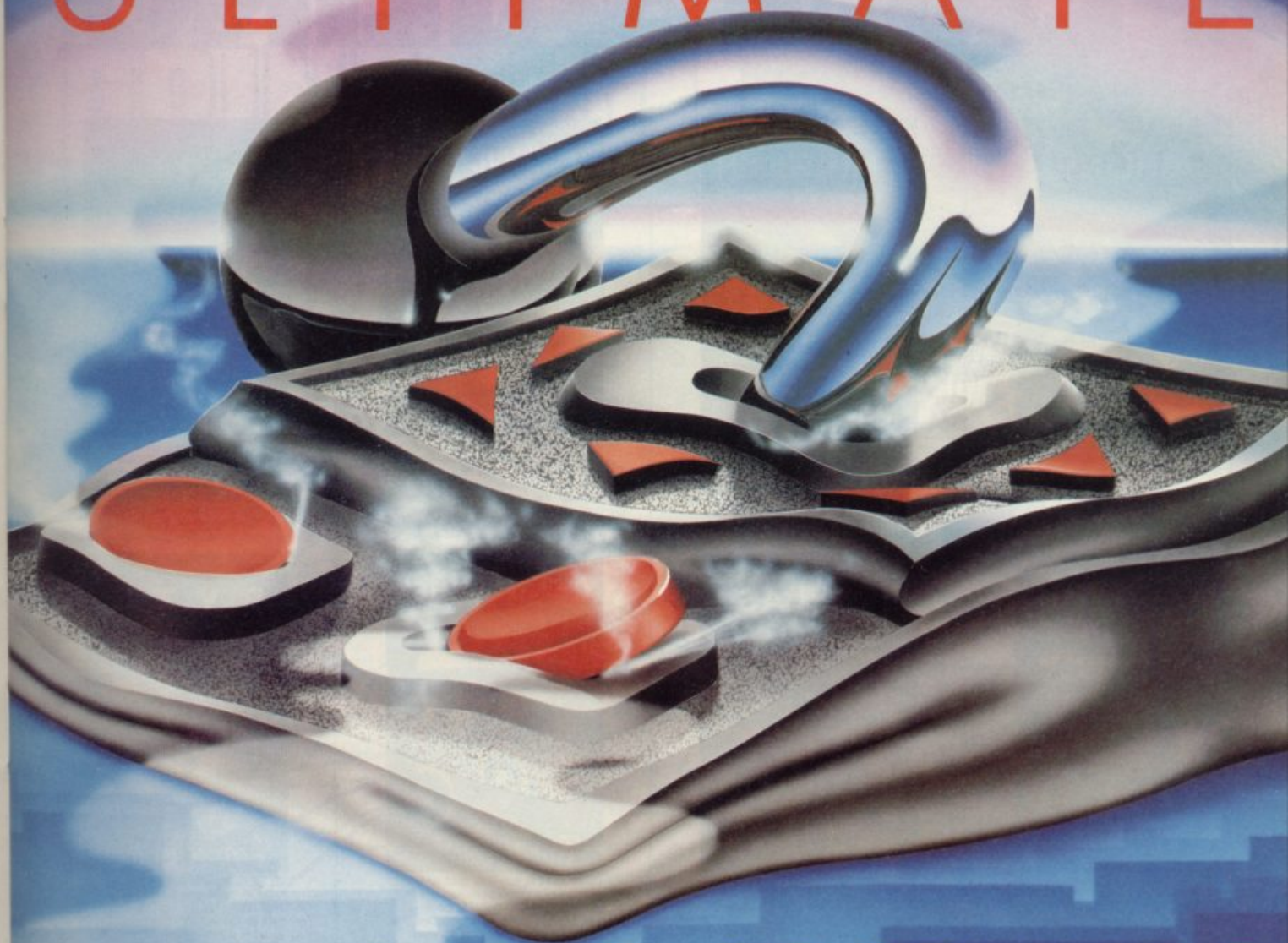
BIG K gives you -

Great games listings for the top micros. Reviews to drive you insane with excitement. Technical know-how to make your fingers itch. Facts to help you expand your micro and your brain.

FREE C15 COMPUTER CASSETTE WITH EVERY COPY
BIG K - On sale NOW!

85p

ULTIMATE



THE NOT·SO·SOFTWARE

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

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



Cookie 16/48K ZX Spectrum



Tranz Am 16/48K ZX Spectrum



Atic Atac 48K ZX Spectrum



Pssst 16/48K Spectrum



Lunar Jetman 48K ZX Spectrum



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

ONLY £5.50 EACH

(All games joystick or
keyboard control)

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

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

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

I enclose cheque/PO for £ _____ Name _____

Address _____

Code _____

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

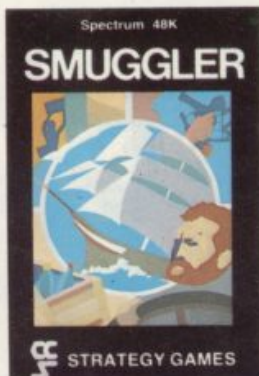


Ultimate Play The Game is a trade name of Ashby Computers and Graphics Ltd., The Green, Ashby de la Zouch, Leicestershire, Tel (0530) 411485. Dealer enquiries welcome.

PLANE SAILING



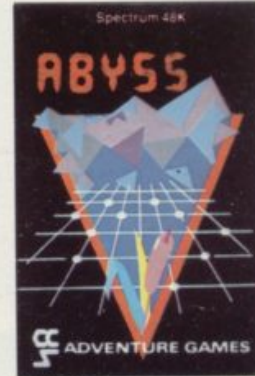
AIRLINE A wing and a prayer will not be enough to turn your £3 million to £30 million in the time allowed, but your financial wizardry will enable you to take over British Airways, or will it? Runs on ZX81 16K — £5 and Spectrum 16K/48K — £6.



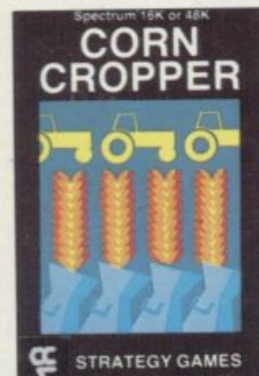
SMUGGLER As master of a 19th century vessel you plough between England and the continent visiting ports to buy and sell your cargo, but beware the customs men, pirates and gale force winds can all run you aground. Runs on Spectrum 48K — £6.



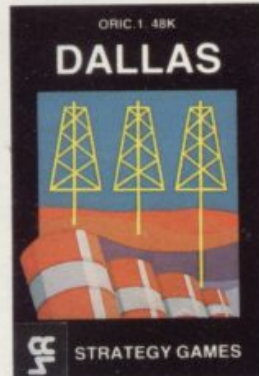
PLUNDER Can you singe the King of Spain's beard. Engage the Spanish ships on the high seas survive their broadsides and plunder the gold destined for the Armada and you might get your Knighthood before Francis Drake. Runs on Spectrum 48K — £6.



ABYSS Can you journey across the long-forgotten Abyss and outwit the evil monsters that lurk in the shadows awaiting the foolhardy and careless adventurer. There are many bridges and many monsters. Will you be the one to make the Abyss safe to cross again. Runs on Spectrum 48K — £5.



CORN CROPPER Limited cash and droughts are two of the problems facing the farmer. Planting fertilizing and harvesting must all be done economically if you are to reap the rewards offered in corn cropper. Runs on ZX81 16K — £5 and Spectrum 16K/48K — £6.



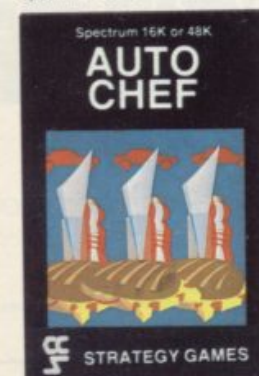
DALLAS Can you amass enough petro dollars to take over the Euving empire. Cut throat business and an eye for the main chance may get you there but you'll need nerves of steel to become the oil king of Dallas. Runs on ZX81 16K — £5 and Spectrum 16K/48K — £6.



GANGSTER Are you cold hearted and callous enough to warrant the title of Don. You need to be if you are to rise to the top of the pile. A quick trigger finger and an even quicker brain are needed to control the mobs and their rackets. Runs on Spectrum 48K — £6.



BYTE Complete the ten circuits you need to build your computer system then return home. Easy. Byte has sent its electronic monsters to harry you through this three dimensional maze of circuitry, if any of them catch you ... Runs on Spectrum 48K — £5.



AUTO CHEF You have a million in capital and need to increase this to £25 million in the shortest time possible. Inflation, strikes, sluggish markets are only some of the hazards to overcome. Runs on ZX81 16K — £5 and Spectrum 16K/48K — £6.



PRINT SHOP In print shop are scheduling, staffing, purchasing and quoting within this time limit will test your business acumen to the full and weekly balance sheets will prove the quality of your decision making. Runs on ZX81 16K — £5 and Spectrum 16K/48K — £6.



BRITISH LOWLAND You are given a racing start for your small sports car company but you have an overdraft to repay and a workforce to be kept happy. Steer your way to success with careful management and industrial relations. Runs on Spectrum 48K — £6.



CAMELOT As the banished Arthur Pendragon you must find seven treasures without falling prey to the Brigands, Dragons and Evil Magicians that stand in your way and make a triumphant return to Camelot to be crowned King. Runs on ZX81 16K — £5 and Spectrum 48K — £5.

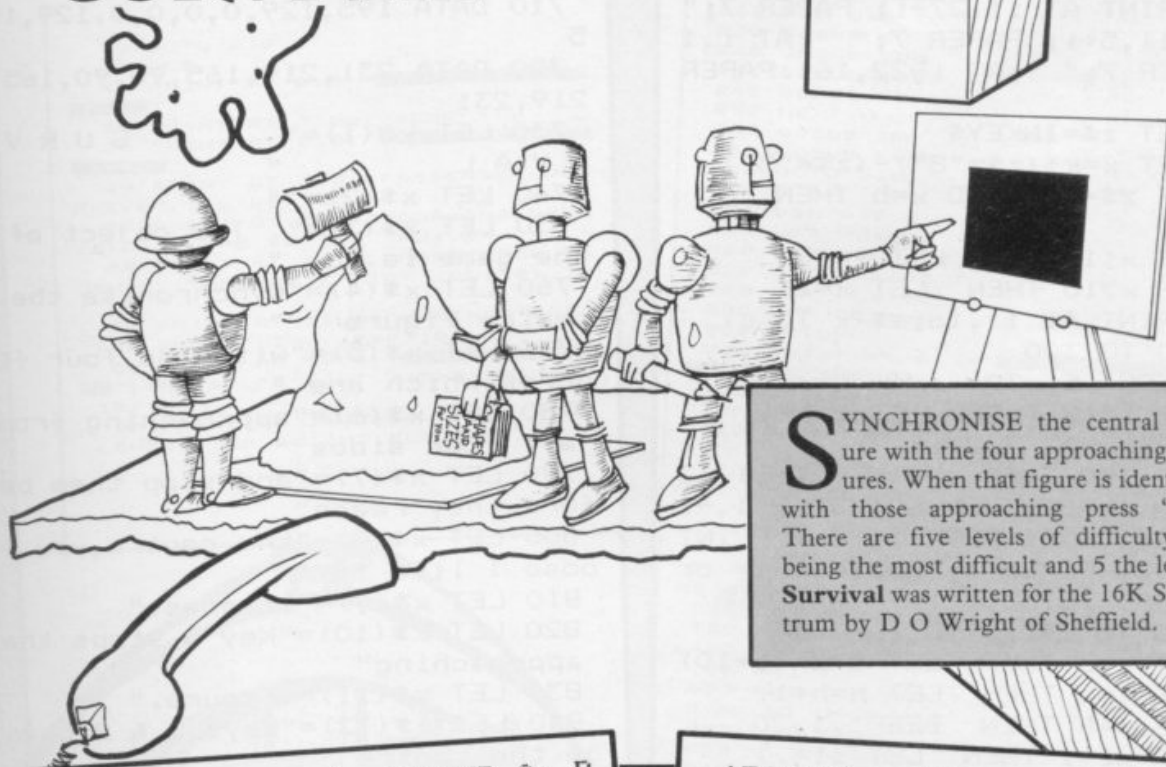
Available from W H Smith, Boots, Rumbelows and all good computer shops or Cases Computer Simulations Ltd., 14 Langton Way, London SE3 7TL.



Strategy Games. They're no pushover

PROGRAM PRINTOUT

SURVIVAL



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.

SYNCHRONISE the central figure with the four approaching figures. When that figure is identical with those approaching press "0". There are five levels of difficulty, 1 being the most difficult and 5 the least. **Survival** was written for the 16K Spectrum by D O Wright of Sheffield.

```
10 INK 7: PAPER 0: BORDER 0: B
RIGHT 1: CLS
20 PRINT AT 10,5;"Instructions
(Y or N)?"
30 IF INKEY$="" THEN GO TO 30
40 IF INKEY$="n" THEN GO TO 8
0
50 IF INKEY$="y" THEN GO TO 7
0
60 GO TO 30
70 DIM x$(20,32): GO SUB 730
80 CLS: PRINT AT 10,2;"Enter
skill level"
90 LET q$=INKEY$
100 IF CODE q$<49 OR CODE q$>53
THEN GO TO 90
110 CLS: PRINT AT 10,2;"Skill
level:"; FLASH 1;q$
120 BEEP .5,0
130 LET s1=VAL q$
140 CLS
```

```
150 LET x=INT (RND*10)+1: LET s
=0: LET h=0: LET l=3
160 GO SUB 600
170 PLOT 55,7: DRAW 0,153: DRAW
153,0: DRAW 0,-153: DRAW -153,0
180 FOR i=2 TO 20: PRINT AT i,7
; INK 3;"(19*ig8)": NEXT i
190 FOR i=5 TO 17: PRINT AT i,1
0; INK 1;"(13*ig8)": NEXT i
200 FOR i=8 TO 14: PRINT AT i,1
3; INK 2;"(7*ig8)": NEXT i
210 PRINT AT 11,7; INK 7;"(19*i
g8)"
220 FOR i=2 TO 20: PRINT AT i,1
6; INK 7;"(ig8)": NEXT i
230 PRINT AT 11,16; FLASH 1; PA
PER 2;"(ig8)"
240 PRINT AT 0,12;"SCORE=";s
250 PRINT AT 6,1;"HITS";AT 7,2;
h
```

Continued on page 68


```

260 PRINT AT 6,27;"LIVES";AT 7,
29;1
270 LET i=1
280 LET a$="abcdifhejg"

290 LET b=INT (RND*10)+1
300 LET i=i+1: IF i=12 THEN GO
TO 420
310 PRINT AT 11,27-i;a$(b);AT 1
1,5+i;a$(b);AT i,16;a$(b);AT i-2
2,16;a$(b)
320 BEEP .02,i
330 FOR q=1 TO (s1*10): NEXT q
340 PRINT AT 11,27-i; PAPER 7;"
";AT 11,5+i; PAPER 7;" ";AT i,1
6; PAPER 7;" ";AT i-22,16; PAPER
7;" "
350 LET z$=INKEY$
360 LET x=x+(z$="8")-(z$="5")
370 IF z$="0" AND x=b THEN GO
TO 470
380 IF x<1 THEN LET x=10
390 IF x>10 THEN LET x=1
400 PRINT AT 11,16;a$(x TO x)
410 GO TO 300
420 BEEP .5,-30
430 IF i=12 THEN LET l=l-1
440 PRINT AT 7,29;1
450 IF l=0 THEN PRINT AT 11,12
; FLASH 1;"GAME OVER": BEEP 1,-1
0: BEEP 1,-20: BEEP 1,-30: PRINT
AT 11,8; FLASH 1;"ANOTHER (Y or
N)?" : GO TO 550
460 GO TO 270
470 IF x=b THEN LET s=s+(b*10)
480 IF x=b THEN LET h=h+1
490 IF x=b THEN BEEP .1,20
500 IF s1=1 THEN LET s1=.1
510 IF h=25 OR h=50 OR h=75 OR
h=100 OR h=125 THEN LET s1=s1-1
520 PRINT AT 0,18;s
530 PRINT AT 7,2;h
540 GO TO 270
550 LET z$=INKEY$
560 IF z$="" THEN GO TO 550
570 IF z$="Y" OR z$="y" THEN F
OR i=1 TO 10: BEEP .1,i: NEXT i:
GO TO 80
580 IF z$="N" OR z$="n" THEN F
OR i=10 TO 1 STEP -1: BEEP .1,i:
NEXT i: CLS : PRINT AT 10,3;"SE
E YOU SOME OTHER TIME !": PAUSE
100: STOP
590 GO TO 550
600 RESTORE 630
610 FOR a=USR "a" TO USR "k"-1:
READ c: POKE a,c: NEXT a
620 RETURN
630 DATA 255,255,195,195,195,19

```

```

5,255,255
640 DATA 255,129,189,165,165,18
9,129,255
650 DATA 0,0,60,60,60,60,0,0
660 DATA 231,195,129,24,24,129,
195,231
670 DATA 153,90,60,255,255,60,9
0,153
680 DATA 129,66,60,60,60,60,66,
129
690 DATA 255,231,231,129,129,23
1,231,255
700 DATA 0,24,24,126,126,24,24,
0
710 DATA 195,129,0,0,0,0,129,19
5
720 DATA 231,219,165,90,90,165,
219,231
730 LET x$(1)="          S U R V
I V A L          "
740 LET x$(2)=""
750 LET x$(3)=" The object of
the game is to "
760 LET x$(4)="synchronise the
centre figure "
770 LET x$(5)="with the four fi
gures,which are "
780 LET x$(6)="approaching from
all four sides "
790 LET x$(7)="and stop them be
fore they reach"
800 LET x$(8)="the centre,you l
oose 1 life if "
810 LET x$(9)="it does."
820 LET x$(10)="Key 0 stops the
approaching"
830 LET x$(11)="figure."
840 LET x$(12)="Keys 5 & 8 chan
ge the centre "
850 LET x$(13)="figure."
860 LET x$(14)=" The computer k
eeps score,number"
870 LET x$(15)="of hits made an
d how many lives."
880 LET x$(16)="The skill level
1 to 5,5 easiest"
890 LET x$(17)=" and 1 hardest.
"
900 LET x$(18)="The skill level
becomes harder "
910 LET x$(19)="every 25 hits."
920 LET x$(20)="          G O O D L
U C K ! ! !"
930 CLS : FOR n=1 TO 20: FOR i=
1 TO 32: FOR q=1 TO 2: NEXT q: P
RINT x$(n,i TO i);: NEXT i:: NEX
T n
940 PRINT AT 21,2; FLASH 1;"Pre
ss any key to start game "
950 PAUSE 0: CLS : RETURN

```


BUSMAN

```

2 REM 10-140      DISPLAY RESULTS
3 REM 200-300     CONTROL
4 REM 500-550     INITIALISE
5 REM 700-995     POLICY DECISIONS
6 REM 1000-1070   NEW RESULTS
7 REM 2000-2150   ANALYSIS/NEW GAME
8 REM 3000-3300   OPTIONS AFTER RESULTS

9 GOTO 210
10 CLS
11 PRINT AT 0,5;" BUSMAN
N "
20 PRINT AT 3,22;"YEAR ";U
30 PRINT AT 5,0;" *** RESULTS
*** "
40 PRINT AT 7,0;"PASSENGER JOU
RNEYS";TAB 20;INT (PJ);"M"
50 PRINT AT 8,0;"(OAP/CHILDREN
/ETC.)";TAB 20;INT (PJ*.2);"M"
60 PRINT AT 10,0;"PASSENGER RE
VENUE";TAB 20;"£";INT (PR*10)/10
;"M"
70 PRINT AT 11,0;"EXPENDITURE"
;TAB 20;"£";INT (EXP*10)/10;"M"
80 PRINT AT 12,0;"GRANT REQUIRED
£";TAB 20;"£";INT ((EXP-PR)*10)
/10;"M"
90 PRINT AT 14,0;"AVERAGE FARE
LEVEL";TAB 20;INT FL

```

```

100 PRINT AT 15,0;"SERVICE LEVE
L";TAB 20;INT SL
110 PRINT AT 16,0;" PRESS "C"
TO CONTINUE GAME "
120 IF INKEY$<>"C" THEN GOTO 12
0
130 CLS
140 RETURN
200 SAVE "BUSMAN"
201 PRINT AT 5,5;" *** BUSMAN
N *** "
202 PRINT AT 10,8;"HAS NOW";AT
15,5;" PRESS A KEY TO START "
203 PRINT AT 10,16;"LOADED";AT
10,16;"LOADED"
204 IF INKEY$="" THEN GOTO 203
205 GOSUB 4000
210 GOSUB 500
220 FOR U=1 TO 5
230 GOSUB 10
240 GOSUB 700
245 GOSUB 1000
246 GOSUB 3000
250 NEXT U
255 GOSUB 10
260 GOSUB 2000
270 GOTO 210
499 STOP
500 DIM P(5,2)
510 LET PJ=530
520 LET PR=71.5
530 LET EXP=85.7
540 LET FL=100
550 LET SL=100
560 RETURN
700 PRINT AT 0,3;" POLICY DECIS
IONS REQUIRED "
705 LET OY=FL
706 LET OZ=SL
710 PRINT AT 2,0;"1 - FARE LEVE
LS"
720 PRINT AT 3,2;"CURRENT LEVEL
=";INT FL;AT 4,18;" (YEAR 1=10
0)."
730 PRINT AT 5,2;"FORCAST EFFEC
TS OF CHANGES"
770 PRINT AT 8,5;"PASS.JOUR.";T
AB 17;"PASS.REV."
775 LET K=INT (RND*10)-5
780 FOR A=INT (FL-20) TO INT (F
L+20) STEP 10
790 PRINT
800 PRINT A;TAB 7;
804 LET V=1
805 LET Y=A
806 GOSUB 1091
810 LET EPJ=EPJ+K
820 PRINT INT EPJ;TAB 17;
830 LET EPR=EPR+K

```

YOU are in charge of a county's bus services for five years in **Busman**, written for the 16K ZX-81 by J Lowther of Heywood, Lancs, for the *Sinclair User* Christmas Competition.

The information relating to the finance, patronage and fares for the previous year is given. You can use it to determine the levels of fares and service increases. The aim is to increase patronage with lower fares and to survive on a lower grant. After the five-year period, an overall assessment is given.

continued on page 70

continued from page 69

```

840 PRINT INT (EPR*10)/10
850 NEXT A
860 PRINT AT 20,5;"ENTER NEW F
FARES LEVEL"
870 INPUT N
880 IF FL/N>.5 AND FL/N<2 THEN
GOTO 900
881 PRINT AT 21,0;"REJECTED BY
GOVERNMENT-TRY AGAIN"
885 GOTO 870
900 LET FL=N
910 CLS
920 PRINT AT 2,0;"2 - SERVICE L
EVELS"
930 PRINT AT 4,0;"EXISTING SERV
ICE LEVEL = ";SL
940 PRINT AT 5,19;"(YEAR 1=100)
"
950 PRINT AT 7,0;"FORCAST EFFEC
TS OF CHANGES"
951 PRINT AT 9,5;"P.JOUR.";TAB
17;"EXPEN."
952 FOR A=(SL-20) TO (SL+20) ST
EP 10
954 PRINT
955 LET V=1
956 PRINT A;TAB 7;
957 LET Y=FL
958 LET Z=A
959 GOSUB 1100
960 PRINT INT (EPJ+K);TAB 17;
962 LET EEXP=EEXP+K
964 PRINT INT EEXP
965 NEXT A
970 PRINT AT 20,0;"ENTER NEW S
ERVICE LEVELS"
972 INPUT N
974 IF N/SL<2 AND N/SL>.5 THEN
GOTO 990
976 PRINT AT 21,0;"REJECTED BY
GOVERNMENT-TRY AGAIN"
978 GOTO 972
990 LET SL=N
992 CLS
995 RETURN
1000 LET V=0
1005 GOSUB 1090
1010 LET PJ=EPJ
1020 LET PR=EPR
1030 LET EXP=EEXP
1040 LET P(U,1)=INT PJ
1050 LET P(U,2)=INT ((EXP-PR)*10
)/10
1070 RETURN

```

```

1080 LET V=0
1090 LET Y=FL
1091 LET Z=SL
1095 LET RAND=INT (RND*5)+3
1110 LET EPJ1=(PJ/4)/(Y/100)
1115 LET EPJ2=(PJ/4)*(Z/100)
1120 LET EPJ=(PJ/2+EPJ1+EPJ2)*.9
5+INT (RND*50)-25
1121 IF V=1 THEN LET EPJ=EPJ1+EP
J2
1125 IF EPJ<5 THEN LET EPJ=5
1130 LET EPR=EPJ*(Y/100)*.135
1135 IF EPR<.1 THEN LET EPR=.1
1140 LET EEXP=(EXP/2*(Z/100))+(E
XP/2)
1150 IF V<>1 THEN LET EEXP=EEXP*
(105+INT (RND*15))/100
1160 RETURN
2000 CLS
2010 PRINT AT 0,0;"PROMOTION RE
ASSESSMENT - PRIVATE"
2020 PRINT
2030 PRINT "PASSENGER JOURNEYS U
ERE "+("UP" AND PJ>530)+("DOWN"
AND PJ<530)+" TO ";INT PJ;" M."
2040 PRINT
2050 PRINT "GRANT REQUIREMENT "+
("ROSE" AND EXP-PR>13.6)+("FELL"
AND EXP-PR<13.6)+" TO £";INT (E
XP-PR);"M."
2060 PRINT
2070 PRINT "FARES "+("ROSE ALARM
INGLY" AND FL>200)+("ROSE" AND F
L<=200 AND FL>100)+("FELL" AND F
L<=100)+" BY ";ABS (INT FL-100);
" P.C."
2080 PRINT
2090 PRINT
2100 PRINT "OVERALL, PERFORMANCE
WAS ";
2110 LET K=PJ/20+(PR-EXP)+(FL/20
)
2111 IF PJ<50 THEN LET K=-5
2112 IF PR-EXP<-250 THEN LET K=-
5
2113 IF FL>500 THEN LET K=-5
2120 PRINT ("EXCELLANT" AND K>30
)+("VERY GOOD" AND K<=30 AND K>2
0)+("GOOD" AND K<=20 AND K>10)+
("ACCEPTABLE" AND K<=10 AND K>0)+
("POOR" AND K<0)+","
2130 PRINT AT 20,0;"PRESS "R
" TO RE-RUN GAME"
2140 IF INKEY$<>"R" THEN GOTO 21
40
2145 CLS
2150 RUN
3000 CLS
3010 PRINT AT 2,5;"OPTIONS AVAIL
ABLE"
3020 PRINT AT 4,3;"1 - NEXT YEAR
S DECISIONS"
3030 PRINT AT 6,3;"2 - REVIEW PR
OGRESS SO FAR"
3040 PRINT AT 8,3;"3 - SAVE GAME
AT THIS POINT"
3050 PRINT AT 10,3;"4 - INSTRUCT
IONS"
3060 LET A$=""
3070 LET A$=INKEY$

```



```

3080 IF A$="1" THEN GOTO 3300
3090 IF A$="3" THEN SAVE "BUSMAN"
"
3100 IF A$="4" THEN GOSUB 4000
3101 IF A$="4" THEN GOTO 3000
3110 IF A$<>"2" THEN GOTO 3010
3200 CLS
3210 PRINT "PERFORMANCE SO FAR"
"
3220 PRINT
3230 PRINT "YEAR";TAB 6;"PASS. J."
";TAB 15;"GRANT";TAB 21;"GRANT/P
ASS."
3231 PRINT
"
3235 PRINT 1;TAB 7;530;TAB 16;14
.2;TAB 22;INT ((14.2/530)*1000)/
1000
3240 FOR B=1 TO U-(U=5)
3250 PRINT
3260 PRINT B+1;TAB 7;P(B,1);TAB
16;P(B,2);TAB 22;INT (P(B,2)/P(B
,1)+1000)/1000
3270 NEXT B
3280 PRINT AT 20,0;"PRESS A
KEY TO CONTINUE"
3290 PAUSE 4E4
3300 RETURN
3910 RETURN
4000 CLS
4001 PRINT AT 0,5;"BUSMAN"
"
4010 PRINT AT 2,0;"CHOOSE FARE
AND SERVICE LEVELS"
4020 PRINT AT 4,0;"FORECAST EF
FECTS DISPLAYED"
4030 PRINT AT 6,0;"REVIEW PROG
RESS AT YEAR END"
4040 PRINT AT 8,0;"FIVE YEARS
TO RUN THE COUNTRY"
4050 PRINT TAB 20;"BUS SYSTEM."
4060 PRINT AT 11,0;"PROMOTION
ASSESSMENT (5 YEARS)"
4070 PRINT AT 13,0;"COMPETITIO
N FROM PRIVATE CARS"
4080 PRINT AT 15,0;"GOVERNMENT
LIMITS FLEXIBILITY"
4090 PRINT AT 18,0;"DECISIONS
NEED TAKING NOW"
4100 PRINT AT 20,0;"PRESS A KE
Y TO CONTINUE"
4110 PRINT AT 20,0;"PRESS A KE
Y TO CONTINUE"
4120 IF INKEY$="" THEN GOTO 4100
4130 RETURN

```

SWEET SHOP

SWEETSHOP, a winner of the Sinclair User Christmas Competition, was written for the 1K ZX-81 by Jason Lowther of Heywood, Lancs.

You are the owner of a sweetshop and have to make a nett profit of at least £100 over five years. Using keys 1 to 4 you can decrease your prices and with keys 5 to 9 you can increase them. If you raise the prices too much you will drive away your customers.

```

1 LET N=NOT PI
2 LET U=CODE "000" *CODE "000"
3 LET K=CODE "1"
5 LET B=N
6 LET E=U*U
7 LET I=E
10 FOR A=50N PI TO CODE "000"
20 PRINT "SWEET SHOP - YEA
R ";A
30 PRINT "INCOME = £";I
40 PRINT "COSTS = £";E
50 PRINT "BALANCE £";I-E
70 PRINT "PRICE ADJUSTMENT?"
71 LET A$=""
75 LET A$=INKEY$
76 IF A$="" THEN GOTO CODE "?"
*K
77 LET J=CODE A$-CODE "4"
78 IF J<-PI OR J>K THEN GOTO 7
79 RAND
80 CLS
81 IF J=NOT PI THEN GOTO CODE
"f" *CODE " "
82 IF AND>,2 THEN GOTO CODE "1"
*K
83 PRINT "PRICE COMPETITION I
NOLDS SALES"
84 LET I=I-(I*(SGN PI/J)*(AND<
J/K))
85 LET J=INT (RAND*J)+CODE " "
90 LET R=SGN PI+INT (RAND*K)/U
95 LET I=INT (I*(R+J/U))
120 LET E=INT (E*R)
125 LET B=B+I-E
130 NEXT A
150 PRINT ("PRICE" AND B>U)+("
CODE" AND B<U)
151 PRINT "RUNNING BAL. = £";IN
T B
155 PAUSE 4E4
160 CLS
170 RUN

```


HOT DOGS

YOU are the owner of a hot-dog stand and have to make as much money as you can in a day. The weather forecast for that particular day is given and that gives you some idea of the amount of business you will do. Use the forecast to determine the number of hot-dogs you will purchase and the price at which you will sell them.

Written for the 16K Spectrum by D Humphries of Farnham, Surrey.

```

1 CLS : PRINT AT 1,2:"(198) (
198) (3*198) (3*198) (2*198
) (3*198) (3*198)"
2 PRINT AT 2,2:"(198:SP:198:SP
P:198:SP:198:2*SP:198:7*SP:198:SP
P:198:SP:198:SP:198:SP:198)"
3 PRINT AT 3,2:"(3*198:SP:198
:SP:198:2*SP:198:7*SP:198:SP:198
:SP:198:SP:198:SP:198)"
4 PRINT AT 4,2:"(198:SP:198:SP
P:198:SP:198:2*SP:198:7*SP:198:SP
P:198:SP:198:SP:198:SP:198:SP:19
8)"
5 PRINT AT 5,2:"(198:SP:198:SP
P:3*198:2*SP:198:7*SP:2*198:2*SP
:3*198:SP:3*198)"
10 DRAW 0,175: DRAW 255,0: DRA
W 0,-175: DRAW -255,0
50 PLOT 70,40: DRAW 110,0: DRA
W 5,1: DRAW 4,4: DRAW 1,5
60 DRAW 0,5: DRAW -127,0: DRAW
0,-5: DRAW 1,-5: DRAW 4,-4: DRA
W 5,-1
100 PLOT 65,65: DRAW 70,0
110 DRAW 9,-1: DRAW 6,-3: DRAW
5,-5
120 DRAW 5,5: DRAW 6,3: DRAW 9,
1
130 DRAW 12,0: DRAW 1,1: DRAW -
1,1: DRAW -123,0: DRAW -1,-1: DR
AW 1,-1
140 PLOT 67,64: DRAW 77,0
150 DRAW 3,-1: DRAW -81,0
160 DRAW -1,-1: DRAW 83,0
170 DRAW 2,-1: DRAW -85,0
180 DRAW 0,-1: DRAW 86,0
190 DRAW 1,-1: DRAW -87,0

```

```

200 DRAW 1,-1: DRAW 87,0
210 DRAW 1,-1: DRAW -87,0
220 DRAW 1,-1: DRAW 117,0
230 DRAW 1,1: DRAW -30,0
240 DRAW 1,1: DRAW 30,0
250 DRAW 0,1: DRAW -29,0
260 DRAW 1,1: DRAW 28,0
270 DRAW 0,1: DRAW -27,0
280 DRAW 1,1: DRAW 25,0
290 DRAW -1,1: DRAW -21,0
300 DRAW 6,0: DRAW 0,1: DRAW 14
,0
310 PLOT 63,60
320 DRAW 0,7
330 DRAW 1,6: DRAW 3,4: DRAW 5,
5: DRAW 6,3: DRAW 9,3
340 DRAW 15,1
350 DRAW 47,0
360 DRAW 15,-1: DRAW 9,-3: DRAW
6,-3: DRAW 5,-5: DRAW 3,-4: DRA
W 1,-6: DRAW 0,-7
380 PAUSE 100: CLS
390 PRINT ""
391 PRINT "" : PRINT "" : PRINT "
": PRINT ""
400 PRINT " HOT-DOGS
"
410 PRINT " In this game you o
wn a hot-dog
one day stall.You have
much profit in-which to make as
as you can"
420 PAUSE 250: CLS
430 FLASH 1 PRINT AT 10,9:"sta
rt the day"
435 FLASH 0
440 PAUSE 60: CLS
443 REM END OF TITLE PAGES
445 REM WEATHER FOR CAST

```



```

450 GO SUB 1200
580 LET Q=25
585 GO SUB 1500
700 PAUSE 70: CLS
710 GO SUB 1600
760 GO SUB 1700
770 PAUSE 150: CLS
780 PRINT "          another 90?"
790 PRINT "          (y/n)"
800 INPUT ,h$
810 IF h$="y" THEN GO TO 1: IF
h$="n" THEN STOP
1200 REM WEATHER FORECAST
1201 PRINT AT 2,4:"WEATHER FORE
CAST"
1202 PLOT 0,0: DRAW 255,0: DRAW
0,175: DRAW -255,0: DRAW 0,-175
1203 CIRCLE 150,40,20
1204 PLOT 130,40: DRAW -10,0: PL
OT 170,40: DRAW 10,0
1205 PLOT 150,60: DRAW 0,10: PLO
T 150,20: DRAW 0,-10
1206 PLOT 136,54: DRAW -7,7: PLO
T 164,54: DRAW 7,7: PLOT 136,26:
DRAW -7,-7: PLOT 164,26: DRAW 7
,-7
1207 CIRCLE 144,45,3: CIRCLE 156
,45,3: PLOT 144,30: DRAW 12,0,PI
/2
1208 PLOT 110,0: DRAW -11,16,PI/
1.4: DRAW -20,15,PI/1.4: DRAW -3
5,19,PI/1.3
1218 PRINT AT 6,7:"TEMP('C) ="
1219 PRINT AT 8,5:"RAIN(%CHANCE)
 ="
1220 PRINT AT 10,6:"SUN(%CHANCE)
 ="
1230 LET O=INT (RND*45)
1240 LET U=INT (RND*100)
1250 LET I=INT (RND*100)
1260 PRINT AT 6,18:O+10
1270 PRINT AT 8,22:U
1280 PRINT AT 10,22:I
1290 FLASH 1: PRINT AT 21,12:"PR
ESS ENTER"
1300 FLASH 0
1310 PAUSE 9999: CLS
1330 IF O>22 THEN LET V$="GOOD-
DAY"
1340 IF O<=22 THEN LET V$="BAD-
DAY"
1350 RETURN
1500 PRINT AT 3,7:"YOU HAVE";AT
3,17:Q
1510 PRINT AT 3,21:"CAPITAL"
1520 PRINT AT 5,6:"YOU HAVE SOME
HOT DOGS
OME MORE
R BATCH
YOU CAN BUY 5
THEY ARE .5 PE
OF 25, HOW MANY

```

```

WILL          YOU BUY?"
1523 PLOT 0,0: DRAW 255,0: DRAW
0,175: DRAW -255,0: DRAW 0,-175
1524 PLOT 70,10: DRAW 100,0: DRA
W 0,20: DRAW -100,0: DRAW 0,-20:
DRAW 0,20: DRAW 30,30: DRAW 100
,0: DRAW -30,-30: DRAW 0,-20: DR
AW 30,30: DRAW 0,20
1525 PRINT AT 19,11;"-HOTDOGS-"
1526 PLOT 85,45: DRAW 100,0
1548 INPUT ,A
1549 LET Q=Q-A*5
1550 PRINT AT 10,7:"YOU NOW HAVE
~";AT 10,22:Q
1560 RETURN
1610 PRINT AT 3,7:"HOW MUCH WILL
YOU          CHARGE PER HO
T DOG          (20P BREAKS-E
VEN),          (MORE THAN 60
P              LOOSES YOUR C
USTOM)"
1611 PRINT AT 12,18:"(192:3*198:
191)";AT 13,18:"(198:92:SP:91:19
8)"
1612 PRINT AT 14,18:"(3*1SP:94:1
98)"
1613 PRINT AT 15,18:"(2*1SP:94:1
98:194)"
1614 PRINT AT 16,18:"(2*SP:198:9
2)"
1615 PRINT AT 17,18:"(2*SP:198)"
;AT 19,18:"(2*SP:198)"
1620 INPUT "P",F
1630 RETURN
1700 PAUSE 50: CLS
1710 PRINT "          HOW THE DAY W
ENT"
1720 PRINT AT 3,5:"YOU SOLD";AT
3,18:"HOTDOGS"
1730 LET X=INT (RND*100)
1731 LET X=X+30
1735 IF V$="GOOD DAY" THEN LET
X=X+25: IF V$="BAD DAY " THEN L
ET X=X-25
1736 IF V$="GOOD DAY" THEN PRIN
T "          YOU HAD GOOD WEATHER": IF
V$="BAD DAY" THEN PRINT "
YOU HAD A BAD WEATHER"
1740 PRINT AT 3,14:X
1750 PRINT AT 5,6:"WHICH MEANS T
HAT ";AT 6,7:"YOU TOOK ~"
1760 PRINT AT 6,17:F/100*%
1800 PRINT AT 8,3:"YOU MADE ~"
1810 PRINT AT 8,13:X*F/100-A*5
1820 IF A*25<=X+30 THEN LET U=Q
+X+30*F/100-A*5
1830 IF A*25>X+30 THEN LET Q=Q+
A*25*F/100-A*5
1840 RETURN

```


BATTLESHIP

YOU are in the fighter X1 and must land and dock with the Battleship Galastica, which is the only battleship you can reach before your fuel runs out. Your computer tells you the co-ordinates of Galastica but there are four dimensions in which it could be. Each dimension is a 4x4 grid. The co-ordinate Y, X shows you your position and after you have destroyed the aliens in your sector you may move towards the Galastica co-ordinates. Once there, if you are asked to make a move you are in the wrong dimension. To change dimension press "d" and the number of the dimension to which you wish to move. Doing this will change your co-ordinates randomly. To change sectors press the appropriate cursor key. If you want to zap the aliens in your sector the keys are "o", left; "p", right; "q", up; "d" down and to line up your sights and "m" to fire. After locating Battleship Galastica you have to land on the special pads on its wing. You approach at high speed and should use the keys "q", up; "o" left and "p" for right.

Battleship Galastica was an entry from the *Sinclair User* Christmas Competition and was written for the 48K Spectrum by Anthony Silas of London NW11.

```

1 LET hi=0
5 LET s=0 LET p=500
10 LET dim=1+INT (RND*4)
20 LET d1=1+INT (RND*4)
30 LET xb=1+INT (RND*4)
40 LET yb=1+INT (RND*4)
50 LET xf=1+INT (RND*4)
60 LET yf=1+INT (RND*4)
70 IF xf=xb AND yf=yb AND dim=
d1 THEN GO TO 1+INT (RND*50)
90 PAPER 0: BORDER 1: CLS
100 FOR a=14 TO 21 STEP 1
102 PRINT AT a,0: INK 1: "(32*19
8)"
104 NEXT a
105 GO TO 110
106 PRINT AT 1,4: "HYPERSPACE JU
MP COMPLETE"
107 PAUSE 0
108 PRINT AT 1,0: INK 0: "
"
110 PRINT AT 15,3: PAPER 1: INK
7: "POSITION OF FIGHTER X1 ")xf)
",")yf)
120 PRINT AT 16,10: PAPER 1: IN
K 7: "DIMENSION ")d1
130 PRINT AT 18,3: PAPER 1: INK
7: "POSITION OF BATTLESHIP ")xb)

```

```

",")yb)
140 PRINT AT 19,7: INK 7: PAPER
1: "DIMENSION UNKNOWN"
142 PRINT AT 21,1: INK 7: PAPER
1: "SCORE=")s) HI=")hi) POWER=
")p
150 LET b=INT (RND*5)
160 IF b<=1 THEN GO TO 250
170 FOR c=b TO 2 STEP -1
175 LET f=7: LET g=16
190 LET xa=INT (RND*31): LET ya
=2+INT (RND*11)
191 IF c-1=1 THEN LET k$="ALIE
N "
192 IF c-1>1 THEN LET k$="ALIE
NS "
194 PRINT AT 1,11: FLASH 1: INK
6: " ")c-1) " ")k$
195 PAUSE 0
196 PRINT AT 21,1: PAPER 1: "SCO
RE=")s) HI=")hi) POWER=")p) "
200 PRINT AT ya,xa: INK 6: "a"
205 PRINT AT f,9: INK 0: " "
210 LET g=g+(INKEY$="p" AND g<3
1)-(INKEY$="o" AND g>0)
215 LET f=f+(INKEY$="a" AND f<1
3)-(INKEY$="q" AND f>2)
220 PRINT AT f,9: INK 7: "f"
225 IF INKEY$="m" THEN GO SUB
241
230 IF INT (RND*10)<>2 THEN GO
TO 196
231 LET l=INT (10+40*RND)
232 PRINT AT 1,7: INK 6: " ")l)
DAMAGE HIT "
233 BEEP .1,2: BEEP .1,1: BEEP
.1,2: BEEP .1,1: BEEP .1,2: BEEP
.1,1
236 LET p=p-1: IF p<=0 THEN GO
TO 500
239 PRINT AT 1,0: INK 0: "
"
240 GO TO 196
241 INK 7: PLOT 0,64: DRAW 9*8,
(13-f)*8: PLOT 255,64: DRAW (9*8
)-255,(13-f)*8: PAUSE 10
242 PLOT OVER 1,0,64: DRAW OV
ER 1,9*8,(13-f)*8: PLOT OVER 1)
255,64: DRAW OVER 1,(9*8)-255,(
13-f)*8
243 BEEP .05,3: BEEP .1,2: IF f
=ya AND g=xa THEN GO TO 245
244 GO TO 196
245 LET s=s+INT (20+30*RND)
246 PRINT AT f,9: INK 0: " "
248 PRINT AT 21,1: INK 7: PAPER
1: "SCORE=")s) HI=")hi) POWER=
")p

```


GALASTICA

```

249 NEXT c
250 IF xf=xb AND yf=yb AND dim=
d1 THEN GO TO 400
255 PRINT AT 1,0; INK 7;"YOU AR
E FREE TO MAKE A MOVE NOW"
260 IF INKEY$="5" THEN GO TO 3
00
270 IF INKEY$="6" THEN GO TO 3
10
280 IF INKEY$="7" THEN GO TO 3
20
290 IF INKEY$="8" THEN GO TO 3
30
292 IF INKEY$="d" THEN GO TO 3
40
295 GO TO 260
300 IF yf<=1 THEN GO TO 260
305 LET yf=yf-1; GO TO 350
310 IF xf<=1 THEN GO TO 260
315 LET xf=xf-1; GO TO 350
320 IF xf>=4 THEN GO TO 260
325 LET xf=xf+1; GO TO 350
330 IF yf>=4 THEN GO TO 260
335 LET yf=yf+1; GO TO 350
340 LET xf=1+INT (RND*4); LET y
f=1+INT (RND*4)
341 IF INKEY$="1" THEN LET di=
1; GO TO 350
342 IF INKEY$="2" THEN LET di=
2; GO TO 350
344 IF INKEY$="3" THEN LET di=
3; GO TO 350
346 IF INKEY$="4" THEN LET di=
4; GO TO 350
348 GO TO 341
350 PRINT AT 1,0; INK 0;"
"
360 FOR n=0 TO 16
365 PRINT AT 7,n; INK 7;".,,"AT
7,(31-n);".,,"
370 BEEP .1,n
380 PRINT AT 7,n; INK 0;" ,,"AT
7,(31-n);".,,"
385 NEXT n
390 GO TO 106
400 PAPER 0; BORDER 1; CLS
410 PRINT AT 1,0; INK 7;"PRESS
's' TO SWITCH TO EXTERNAL";AT 3,
10;"VIDEO CAMERA"
420 IF INKEY$="s" THEN GO TO 4
40
430 GO TO 420
440 CLS
450 PRINT AT 19,0; INK 4;"(26*1
98:6*sP:28*198:4*sP:17*198)"
460 GO TO 600
500 PAUSE 0
505 CLS

```

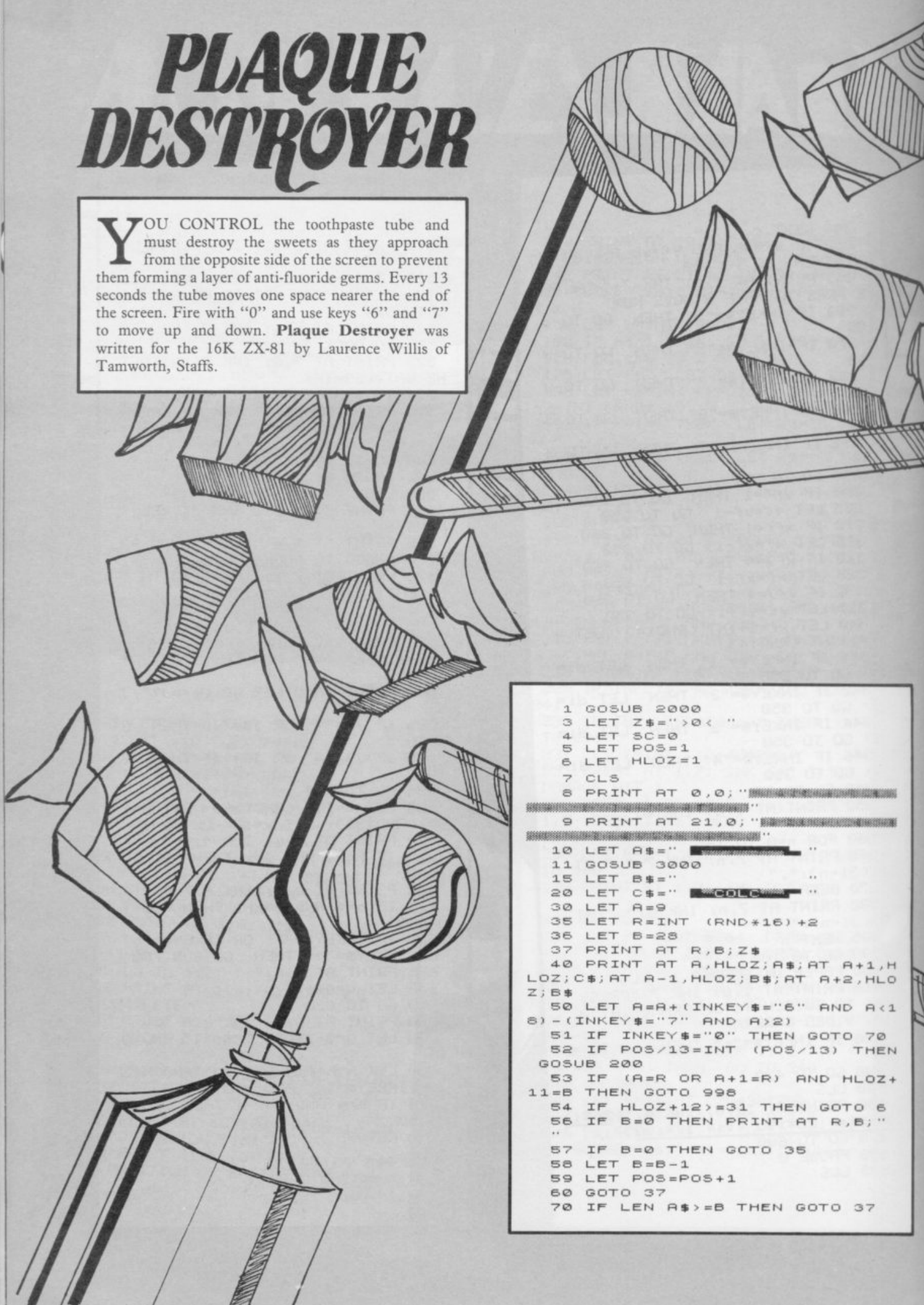
```

510 PRINT AT 3,12; INK 7;"UNLUC
KY"
520 IF p<=0 THEN PRINT AT 5,5;
INK 7;"YOU RAN OUT OF POWER"; G
O TO 524
522 PRINT AT 5,6; INK 7;"YOU FA
ILED TO DOCK "
523 PRINT AT 7,6; INK 7;"WITH T
HE BATTLESHIP"
524 IF s>hi THEN LET hi=s
525 PRINT AT 21,1; INK 7; PAPER
1;"SCORE=";s;" HI=";hi;" POWER=
";p
540 GO TO 500
550 PAUSE 0
555 CLS
560 PRINT AT 3,11; INK 7;"WELL
DONE!"
565 PRINT AT 5,4; INK 7;"YOU HA
VE MANAGED TO DOCK"
570 PRINT AT 7,1; INK 7;"WITH T
HE BATTLESHIP GALASTICA"
572 LET s=s+INT (50+50*RND)
573 IF s>hi THEN LET hi=s
575 PRINT AT 21,1; INK 7; PAPER
1;"SCORE=";s;" HI=";hi;" POWER=
";p
580 INPUT "ANOTHER GO (y/n)?";j
$
585 IF j$="Y" OR j$="y" THEN G
O TO 5
590 IF j$="N" OR j$="n" THEN S
TOP
595 GO TO 580
600 LET y=INT (RND*26); LET h=1
NT (RND*32); LET x=10; LET g=1
610 PRINT AT x,y; INK 4;"h"
620 IF h<>y AND g<=x THEN GO TO
500
622 PRINT AT g,h; INK 6;"u"
625 IF h=y AND g=x-1 THEN GO T
O 550
630 IF INKEY$="p" OR INKEY$="o"
OR INKEY$="q" THEN GO SUB 700
635 PRINT AT g,h;" "
640 LET g=g+1
650 GO TO 620
700 PRINT AT g,h; INK 0;" "
710 LET g=g-2*(INKEY$="q" AND g
>0)
720 LET h=h+(INKEY$="p" AND h<3
1)-(INKEY$="o" AND h>0)
725 IF h=y AND g=x-1 THEN GO T
O 550
730 RETURN

```


PLAQUE DESTROYER

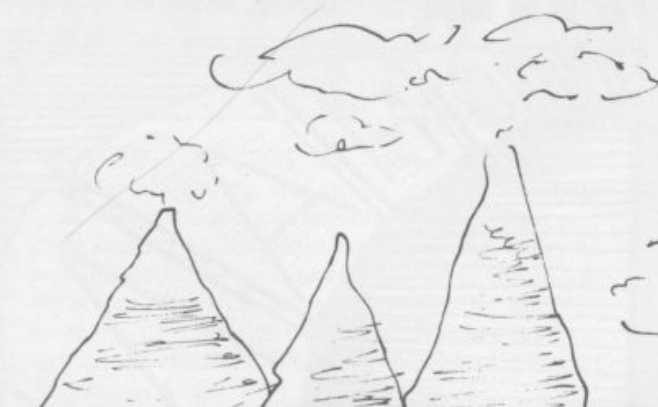
YOU CONTROL the toothpaste tube and must destroy the sweets as they approach from the opposite side of the screen to prevent them forming a layer of anti-fluoride germs. Every 13 seconds the tube moves one space nearer the end of the screen. Fire with "0" and use keys "6" and "7" to move up and down. **Plaque Destroyer** was written for the 16K ZX-81 by Laurence Willis of Tamworth, Staffs.



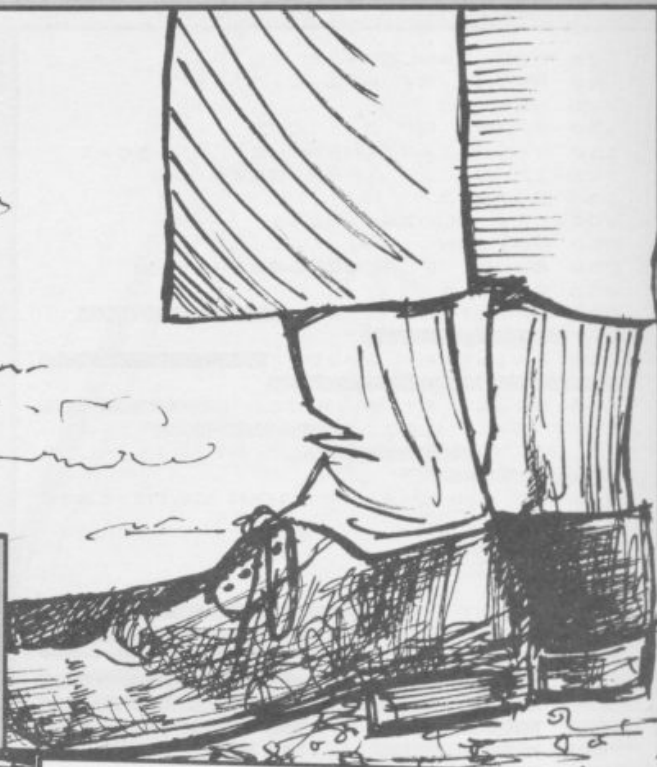
```

1 GOSUB 2000
3 LET Z$=">0< "
4 LET SC=0
5 LET POS=1
6 LET HLOZ=1
7 CLS
8 PRINT AT 0,0;"
9 PRINT AT 21,0;"
10 LET A$=" "
11 GOSUB 3000
15 LET B$=" "
20 LET C$=" "
30 LET A=9
35 LET R=INT (RND*16)+2
36 LET B=28
37 PRINT AT R,B;Z$
40 PRINT AT A,HLOZ;A$;AT A+1,H
LOZ;C$;AT A-1,HLOZ;B$;AT A+2,HLO
Z;B$
50 LET A=A+(INKEY$="6" AND A<1
8)-(INKEY$="7" AND A>2)
51 IF INKEY$="0" THEN GOTO 70
52 IF POS/13=INT (POS/13) THEN
GOSUB 200
53 IF (A=R OR A+1=R) AND HLOZ+
11=B THEN GOTO 998
54 IF HLOZ+12>=31 THEN GOTO 6
55 IF B=0 THEN PRINT AT R,B;"
"
57 IF B=0 THEN GOTO 35
58 LET B=B-1
59 LET POS=POS+1
60 GOTO 37
70 IF LEN A$>=B THEN GOTO 37
  
```


MOUNT TRIO



C LIMB THE MOUNTAIN from your base camp without crashing or falling. If you remain on the path you should have a safer journey. There are various scoring points along the way, the highest score being at the summit of the windswept middle peak. **Mount Trio** was written for the 16K ZX-81 by T Stuttard of Gorton, Manchester.



```

10 REM MOUNT TRIO
20 CLS
30 GOSUB 198
40 LET T=0
50 LET S=0
60 LET SC=100
120 LET X=19
130 LET Y=25
135 PRINT AT X,Y;" "
140 IF INKEY#="5" THEN LET Y=Y-
1
142 IF INKEY#="6" THEN LET X=X+
1
144 IF INKEY#="7" THEN LET X=X-
1
146 IF INKEY#="8" THEN LET Y=Y+
1
150 PRINT AT X,Y;
160 IF PEEK (PEEK 16398+256*PEE
K 16399)=CODE "<9f>" THEN GOTO 5
00
170 IF PEEK (PEEK 16398+256*PEE
K 16399)=CODE "<19>" THEN GOTO 1
000
180 IF PEEK (PEEK 16398+256*PEE
K 16399)=CODE "<1r>" THEN GOTO 1
006
190 IF PEEK (PEEK 16398+256*PEE
K 16399)=CODE "<9e>" THEN GOTO 2
000
192 IF PEEK (PEEK 16398+256*PEE
K 16399)=CODE "<99>" THEN GOTO 2
50
195 PRINT AT X,Y;"<1a>"

```

```

196 GOTO 135
198 FAST
200 FOR N=29 TO 1 STEP -1
205 PRINT AT 21-N,N;"<9e>";AT 1
5-N,N;"<9e>";AT 10-N,N;"<9e>";AT
21,N;"<9e>"
210 NEXT N
215 PRINT AT 10,25;"<19>";AT 10
,5;"<1r>";AT 12,22;"<19>";AT 4,2
5;"<1r>";AT 3,7;"<1r>";AT 10,11;
"<19>";AT 15,25;"<9r>";AT 21,29;
"<9e>";AT 20,29;"<9e>"
218 PRINT AT 7,22;"<9r>";AT 6,2
7;"<9r>";AT 6,4;"<9w>";AT 7,8;"<
9w>";AT 15,6;"<9w>";AT 20,12;"BA
SE CAMP";AT 19,10;"<9e:9r>";AT 1
9,15;"<9e:9r>";AT 19,21;"<9e:9r>"
";AT 17,13;"<9e:9r>";AT 17,18;"<
9e:9r>";AT 0,10;"<9f>";AT 0,21;"
<9f>";AT 0,15;"<99>";AT 0,1;"MOU
NT";AT 0,27;"TRIO"
220 PRINT AT 2,17;"<9r>";AT 4,1
7;"<9r>";AT 4,14;"<9r>"
230 SLOW
240 RETURN
244 INPUT A$
248 IF A$<>" " THEN GOTO 3000
250 CLS
260 LET S=S+SC+1000
270 GOTO 1025
500 CLS
510 LET S=S+SC+100
550 GOTO 1008
1000 CLS

```


MOUNT TRIO

```

1001 LET S=S+SC+20
1002 GOTO 1012
1006 LET SC=SC+80
1007 CLS
1008 LET S=S+SC
1012 PRINT AT 10,10;"SCORE=";S
1020 PRINT AT 11,3;"      PRESS N
EWLINE"
1022 INPUT A$
1023 GOTO 0
1025 PRINT AT 10,10;"TOP SCORE="
;S
1030 INPUT A$
1035 GOTO 0
1060 REM CRASHED
2000 CLS
2010 PRINT AT 10,10;"THE END"
2030 PRINT AT 11,0;"YOU CRASHED"
2040 PRINT AT 12,0;"INPUT 1 FOR
INSTRUCTIONS OR      NEWLINE

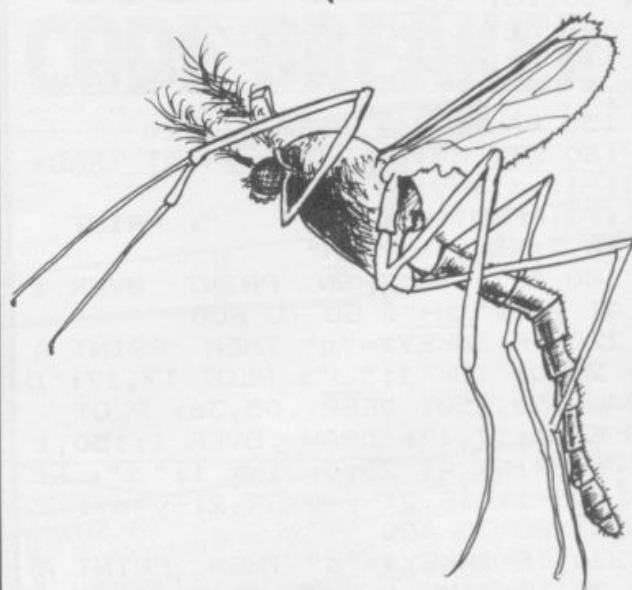
```

```

TO PLAY"
2042 INPUT A$
2044 IF A$<>" " THEN GOTO 2000
2050 INPUT A$
2060 GOTO 0
2080 CLS
3000 PRINT "INSTRUCTIONS, THE OBJ
ECT IS TO
          CLIMB THE MOUNTAIN W
ITHOUT
          CRASHING, USING THE
USUAL
          CURSERS KEYS "
3010 PRINT "KEEP TO THE PATHS OR
YOU WILL
          CRASH, THERE ARE WAY
S OVER THE
          CLIFFS IF YOU CAN FI
ND THEM
          ALSO VARIOUS SCORING
POINTS
          ON THE WAY UP,
"
3020 PRINT "THE TOP SCORE BEING
THE MIDDLE
          PEAK,BUT IT IS VERY
WINDY UP
          THERE, MIND HOW YOU
GO, NEWLINE"
3030 INPUT A$
3040 GOTO 10

```

MOSQUITO



YOU HAVE two spray guns and you must wipe out an invasion of giant mosquitoes from an old Japanese movie. The mosquitoes attack in squads of 20 and you have 50 squirts with which to kill them. If you are unsuccessful and run out of spray the mosquito larvae will then attack in a flying saucer. Use "q" for the left spray and "p" for the right. **Mosquito** was written for the 16K Spectrum by Sam French of Saudi Arabia.

```

10 PRINT AT 0,11;"MOSQUITOS"
"You have two spray guns to shoo
tdown an invasion of giant
mosquitos left over from an old
Japanese movie."
20 PRINT "The left spray is fi
red by key  ""q"", the right by
key  ""p"".
30 PRINT "The mosquitos attack
in squads  of 20. You have only
50 squirts to get them." "If y
ou run out of spray, their larv
ae will attack in a flying sauc
er salvaged from an old  Japa
nese video game."
40 PRINT "Rotsa ruck."
50 PRINT "Press any key to sta
rt."
60 IF INKEY$="" THEN GO TO 60
70 CLS : GO SUB 1000
80 BORDER 2: PAPER 5: INK 0: C
LS
90 LET b=0: LET s=0: LET c=50
100 LET e=29
120 PRINT INK 1;AT 21,0;"(2*ig
8:8*ig3:2*ig8:18*ig3)";c

```

continued on page 80


```

130 PRINT INK 1; AT 20,0; "IE"; A
T 20,10; "IE"
140 LET y=INT (RND*17)+2
145 PRINT AT 21,30; " "; AT 21,3
0;c
150 PAUSE 30: BEEP 0.1,20
160 LET n=y: LET y=y+(INT (RND*
3)-1)-(19=y)+(1=y)
170 PRINT AT n,e; " ": PRINT
INK 2; AT y,e; "GH"
180 IF c<=0 THEN PRINT OVER 1
; AT y,e; "GH": GO TO 600
220 IF INKEY$="q" THEN PRINT A
T 20,0; INK 1; "J": PLOT 17,17: D
RAW 150,150: BEEP .05,36: PLOT
OVER 1; 17,17: DRAW OVER 1; 150,1
50: PRINT AT 20,0; INK 1; "I": LE
T c=c-1: IF 21-y=e OR 21-y=e+1 T
HEN GO TO 400
230 IF INKEY$="p" THEN PRINT A
T 20,10; INK 1; "J": PLOT 97,17:
DRAW 150,150: BEEP .05,36: PLOT
OVER 1; 97,17: DRAW OVER 1; 150,
150: PRINT AT 20,10; INK 1; "I":
LET c=c-1: IF 31-y=e OR 31-y=e+1
THEN GO TO 400
240 BEEP .015,-12
250 IF e=0 THEN PRINT AT y,e; "
": GO TO 410
260 LET e=e-INT (RND*2)
280 GO TO 160
400 LET s=s+1: PRINT INK 0; AT
y,e-1; "CDOD": BEEP 0.3,-25: PA
USE 20: PRINT AT y,e-1; " "
410 LET b=b+1: LET e=29
420 IF b>19 THEN CLS : GO TO 4
40
430 GO TO 140
440 PRINT AT 6,11; "Game Over"
450 PRINT AT 8,11; "Score="; s; AT
10,8; 50-c; "squirts used"; AT 21
,2; "Press any key for a new game
"
460 IF s=18 OR s=19 THEN PRINT
AT 15,6; "Not bad for a klutz."
470 IF s=20 THEN PRINT AT 15,2
; "So awright awready you can
beat a machine. Big deal."
480 IF S<6 THEN PRINT AT 15,2;
"Ya dumb nurd. You can't even
outwit a machine."
490 FOR f=-10 TO 10: BEEP 0.1,
f: BORDER RND*7: NEXT f: BEEP
2,-17: BORDER 7
500 IF INKEY$="" THEN GO TO 50
0
510 PAUSE 120: GO TO 80
600 LET e=29: PRINT AT 21,17; "

```

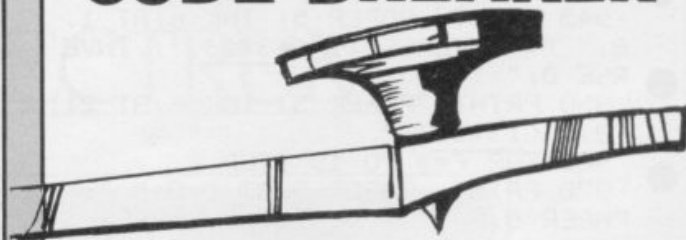
OUT OF SPRAY!!"

```

610 LET e=e-1
620 PRINT INK 2; AT 18,e; "AB ":
FOR i=1 TO 6: BEEP .015,-12: PA
USE 2: NEXT i
630 IF e=22 THEN PLOT 184,25:
DRAW -108,-20: PAUSE 3: PLOT OV
ER 1; 184,25: DRAW OVER 1; -108,-
20
640 IF e=21 THEN PRINT ; AT 20,
9; "FDCF"; AT 19,9; "FDCF"; AT 21,
10; "FF"
643 BEEP .015,-12
645 IF e=21 THEN FOR i=1 TO 20
: BEEP .01,i/4: BORDER INT (i/3)
: NEXT i
650 IF e=12 THEN PLOT 104,25:
DRAW -104,-20: PAUSE 3: PLOT OV
ER 1; 104,25: DRAW OVER 1; -104,-
20
660 IF e=11 THEN PRINT AT 20,0
; "DCF"; AT 19,0; "DF"; AT 21,0; "CF"
665 IF e=11 THEN FOR i=1 TO 20
: BEEP .01,i/4: BORDER INT (i/3)
: NEXT i
670 IF e=6 THEN CLS : PRINT A
T 2,2; "You lose. The good guys w
in.": GO TO 440
680 GO TO 610
1000 FOR f=0 TO 7: READ cg: POKE
USR "A"+f,cg: NEXT f
1010 FOR f=0 TO 7: READ cg: POKE
USR "B"+f,cg: NEXT f
1020 FOR f=0 TO 7: READ cg: POKE
USR "C"+f,cg: NEXT f
1030 FOR f=0 TO 7: READ cg: POKE
USR "D"+f,cg: NEXT f
1040 FOR f=0 TO 7: READ cg: POKE
USR "E"+f,cg: NEXT f
1050 FOR f=0 TO 7: READ cg: POKE
USR "F"+f,cg: NEXT f
1060 FOR f=0 TO 7: READ cg: POKE
USR "G"+f,cg: NEXT f
1070 FOR f=0 TO 7: READ cg: POKE
USR "H"+f,cg: NEXT f
1075 FOR f=0 TO 7: READ cg: POKE
USR "I"+f,cg: NEXT f
1080 FOR f=0 TO 7: READ cg: POKE
USR "J"+f,cg: NEXT f
1090 DATA 0,0,15,63,127,255,255,
3,0,0,240,252,254,255,255,192
2000 DATA 130,16,0,66,0,36,0,72,
65,8,0,66,0,36,0,18
2010 DATA 3,7,14,60,248,248,240,
240,0,32,0,4,64,0,16,0
2020 DATA 128,32,12,30,255,6,0,1
,0,0,60,126,255,124,0,64
2030 RETURN
2040 DATA 255,255,255,24,24,24,2
4,24,0,0,0,0,255,255,255,24

```


CODE SETTER- CODE BREAKER



THE object of the game is for the player to break the code set by the computer or for the computer to break the code set by the player. At the beginning of the program you are given the option of breaking or setting the code. A direct match is indicated by the "★" and an indirect match is indicated by an "o".

If at any point the program goes into the Command Mode, due to your using the BREAK key or on completion of a game, do not use CLEAR or RUN but ENTER GOTO 10.

Code Setter—Code Breaker is one of the entries from the Sinclair User Christmas Competition and was written for the 48K Spectrum by F W Manders of Lincoln.

```

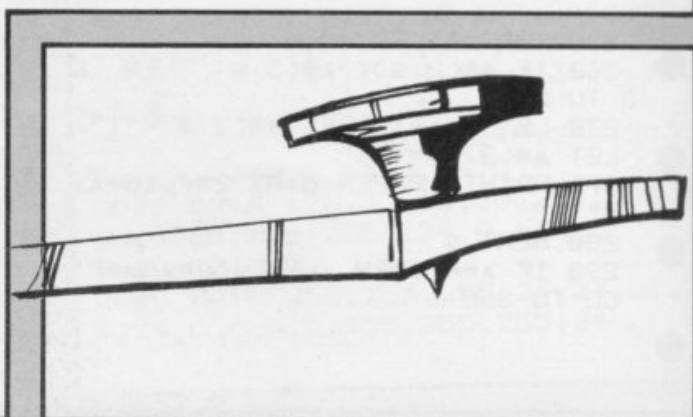
10 CLS : PRINT " CODE SETTER
- CODEBREAKER"
20 PRINT AT 4,0;" Can you find
the 4-digit code quicker than
the Spectrum?"
25 PRINT AT 8,0;"Press ""m"" to
go first""Press ""c"" for co
mputer first"
30 LET gms=0: LET gs=0: LET yo
u=0: LET me=0
35 PAUSE 0
40 IF INKEY#="m" THEN GO TO 1
00
50 IF INKEY#="c" THEN GO TO 9
00
60 GO TO 35
100 LET gs=gs+1: CLS : FOR f=1
TO 10: PRINT AT 2*f,8;
105 PRINT PAPER 5;" ";
110 IF f<10 THEN PRINT PAPER
6;" ";
120 PRINT PAPER 6;f;" +++++ ";
"; PAPER 5;" "; NEXT f
130 PRINT PAPER 5; INK 6;AT 1,
8;" "; INVERSE 1;"(13*93)"; INVE
RSE 0;" "
140 PRINT PAPER 5; INK 6;AT 21,
8;" (13*93) "
150 FOR f=3 TO 19 STEP 2
160 PRINT PAPER 5;AT f,8;" ";
PAPER 6;" "; PAPER 5
;" "
170 NEXT f
180 PRINT AT 0,10;"CODE SETTER"
190 PRINT AT 2,2;"YOU";AT 2,27;
"ME";AT 4,0;"Goes ";gs;AT 4,25;"
Goes ";gms;AT 6,0;"Scr. ";you;AT
6,25;"Scr. ";me
200 DIM a$(3,4)
210 FOR f=1 TO 4: LET a$(1,f)=S
TR$(INT (RND*6)+1): NEXT f
220 FOR f=1 TO 10: LET a$(2)=a$
(1)
225 LET a=0
230 BEEP .25,1: INPUT "I await
your entry";a$(3)
232 IF a$(3)="Q" THEN GO TO
4000
240 PRINT PAPER 6;AT 2*f,12;a$
(3)
250 FOR g=1 TO 4
260 IF a$(2,g)<>a$(3,g) THEN G
O TO 280
270 LET a=a+1: LET a$(2,g)="I":
LET a$(3,g)="Q"
275 PRINT PAPER 6;AT 2*f,16+a;
"*"
280 NEXT g
290 IF a=4 THEN LET you=you+f:
GO TO 360

```

```

300 FOR g=1 TO 4: FOR h=1 TO 4
310 IF a$(2,g)<>a$(3,h) THEN G
O TO 340
320 LET a=a+1: LET a$(2,g)="I":
LET a$(3,h)="Q"
330 PRINT PAPER 6;AT 2*f,16+a;
"o"
340 NEXT h: NEXT g: NEXT f
350 PRINT AT 0,10;" ";a$(2);"
"
355 LET you=you+f
360 BEEP .25,24: PRINT AT 6,5;yo
u: INPUT "Press ENTER to contin
ue";p#
365 IF gs+gms=10 THEN GO TO 40
00
370 GO TO 900
900 LET gms=gms+1: LET rr=1296:
CLS : FOR f=1 TO 10: PRINT AT 2
2-2*f,8;
910 LET ff=11-f
920 PRINT PAPER 5;" "; PAPER 6
;" "; +++++ "; INK 3;ff;
930 IF ff<10 THEN PRINT PAPER

```


[illegible]

WHEN IT COMES TO DISPLAYING THE SPECTRUM...



WE'VE AN IMPRESSIVE LEAD

Surprisingly enough, there's only one high performance BEAB approved colour monitor on the market with an input designed to accept the signal from the Sinclair Spectrum direct.

This same monitor also features a second input to receive T.T.L. signals for use with other micro computers including the BBC B.

This impressive lead over the competition in design specification is more than matched by the brilliance of the colour display, thanks to a standard resolution screen 585 pixels high by 452 wide, and a

MICROVITEC
CUB
COLOUR DISPLAYS

bandwidth of 18 MHz.

Needless to say, this gives colour reproduction far in excess of that available from an ordinary television.

And the monitor in question? – **The 1431/MZ from the MICROVITEC range of CUB colour displays.**

Call at your local dealer or contact us now and we'll rush you full information.

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!



LASERWARP **£6.95**
FOR 48K SPECTRUM

AND NOW

*** Star Trek**

You won't find a more exciting version of this superb tactical role-play game – save the star systems from the Klingon attack. Runs in real time – so you have to make the right decisions fast. Comes complete with Captain's Log & Operating Manual

*** FOR 48K SPECTRUM**

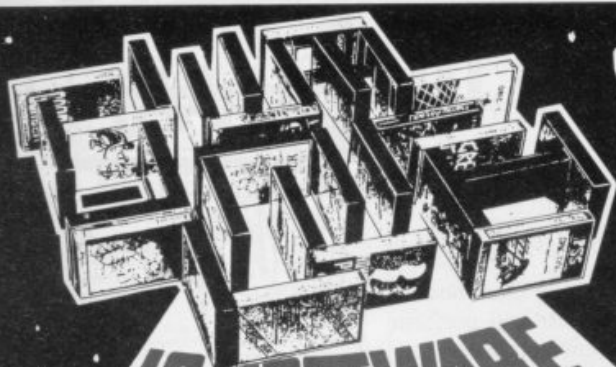
£7.95



**PHONE YOUR
VISA/ACCESS
NUMBER**

MIKRO-GEN

44 The Broadway, Bracknell, Berks RG12 1AG Tel: 0344 427317



IS SOFTWARE YOUR BASIC PROBLEM?

Software Index gives a description of each program listed and provides information on price, program operation, sound, memory required, colour, names and addresses of retailers and in many cases a screen photograph. The whole range of programs are covered in the Index. Games. Education. Utility. Business. Personal Management. Don't let software give you a hard time, get the user guide to microcomputer software.



Too many programs to choose from?
Too little background info and data?

SOFTWARE INDEX

Is your answer.

The most comprehensive magazine listing of Software programs for the eight leading Microcomputers.

● BBC ● COMMODORE 64 ● DRAGON ● VIC 20
● ORIC ● ATARI 400/800 ● SPECTRUM ● ZX81
IN YOUR NEWSAGENT'S NOW

OVER
2,500
PROGRAMS
LISTED

User Guide to Microcomputer Software
SOFTWARE INDEX 1984 No. 2 £1.50

sinclair

EDUCATION EXHIBITION

Organised and Promoted by Computer Marketplace
Supported by **sinclair** Research Ltd.

Central Hall, Westminster, London S.W. 1
Wednesday 28th March 10.00am to 6.00pm
Thursday 29th March 10.00am to 8.00pm
Friday 30th March 10.00am to 5.00pm



The Sinclair Education Exhibition is planned to give all teachers, lecturers and educationalists a unique opportunity to get up to date with the latest developments concerning Sinclair computers. Over 50 leading suppliers as well as Sinclair themselves will be demonstrating hardware, software, peripherals and supplies. All under one easily accessible roof. This is an ideal opportunity to listen to informative talks, try out systems, watch demonstrations and collect literature away from the interruptions of students.

Admission is by ticket only and is limited to educationalists over 18. Every educational establishment in the country is being mailed with tickets, but if you would like more just write to: Ticket Office, Computer Marketplace (Exhibitions) Ltd., 20, Orange Street, London WC2H 7ED, stating your requirements.

to Computer Marketplace (Exhibitions) Ltd,
20 Orange Street, London WC2H 7ED

Please send me _____ tickets for the
Sinclair Education Exhibition

NAME _____

ESTABLISHMENT _____

ADDRESS _____

POSTCODE _____

SU4

Moving sideways in strict rotation

John Kerrigan continues his series

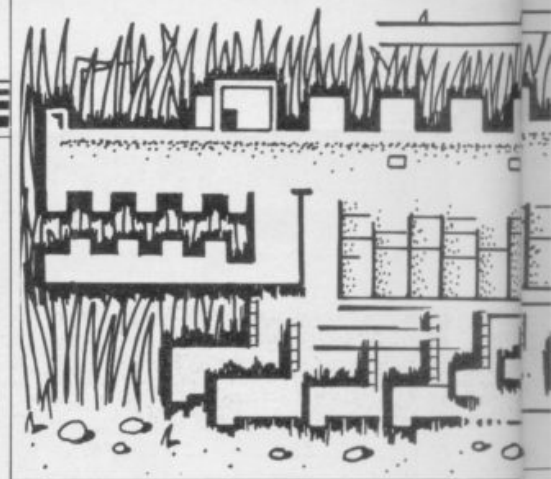
A MACHINE CODE routine for the fast display of large figures on the Spectrum screen was given last month. Now I want to make those figures shift slightly to the left or slightly to the right, one pixel at a time. The obvious applications for straight horizontal slides are birds or fish — characters which can swim or fly. Most moving characters will look better with some straight horizontal slides. A little man may walk across the screen with two frames alternating and creating each step. He will walk less jerkily if there are horizontal slides between each frame alternation.

The routine S4 in box one will perform a right slide. The routine S5 in box two will perform a left slide. Both routines depend on rotate instructions. The Z-80 has a much bigger instruction set than its main competitor, the 6502,

which is used in BBC and Commodore machines. In particular it will perform several subtly different rotate instructions. The two we will use are RR for rotate right and RL for rotate left. Books on machine code normally discuss those instructions in the chapters which explain multiplication. That is because RR can have the effect of halving a number and RL has the effect of doubling a number.

To understand rotate instructions we must look again at every byte in its 8-bit binary form. The article in the February *Sinclair User* explained the relationship between hex numbers and their binary equivalents. The number 43 in normal counting or 2BH is 00101011 in binary.

Rotating right will ensure that the content of the most significant bit, bit 7, is placed in bit 6. The previous content



of bit 6 is placed in bit 5. The previous content of bit 5 is placed in bit 4 and so on until the previous content of bit 1 is placed in the least significant bit, bit 0.

So one would assume that rotating right 00101011 would produce 00010101, or 15H. The two unanswered questions in the last paragraph's description are what happened to the previous contents of bit 0 and what should be the new contents of bit 7. The different rotating right instructions in the Z-80 instruction set have different solutions to those unanswered questions.

RR uses the carry flag in its usual role of bit 8, as well as a sort of bit -1. That is rather like the ace which, in some card games, can be both the highest and the lowest card at the same time. The contents of the carry flag before the instruction are placed in bit 7 and the contents of the carry flag after the instruction will be the previous contents of bit 0.

So if the carry flag is set, that is equals 1, before the instruction, RR on 00010101 will produce 10001010 and, after the instruction, the carry flag will be re-set, that is it will equal zero. That means we can use the carry flag to take the pixel which "drops off" bit 0 of one byte and feed it to bit 7 of the next byte on the same scan. Of course, in screen memory, a 0 means paper and a 1 means ink.

There are several operands on which RR can operate. You can use the instruction on a register. So RR B and RR C are legitimate. RR B would perform the rotate on the byte held in the B register. The byte to be rotated would be the byte held in the register before the instruction and the result of the rotate would be the number in the register after the instruction.

S4, however, uses the instruction RR (HL). Previously I have said that brackets around a two-byte number or a register pair mean contents of. In other words the two-byte number is to be treated as an address in internal memory. In that case the rotate is to be performed on the contents of the ad-

Box 1.

SPECIFICATIONS S4 — Spectrum

GENERAL DESCRIPTION: Shifts the bits within a rectangle of the screen and pixel right. That makes any figure in that rectangle appear to slide to the right. The column of pixels on the left edge of the rectangle will all be re-set (= 0 = paper). The previous contents of the column of pixels on the right edge of the rectangle will be lost.

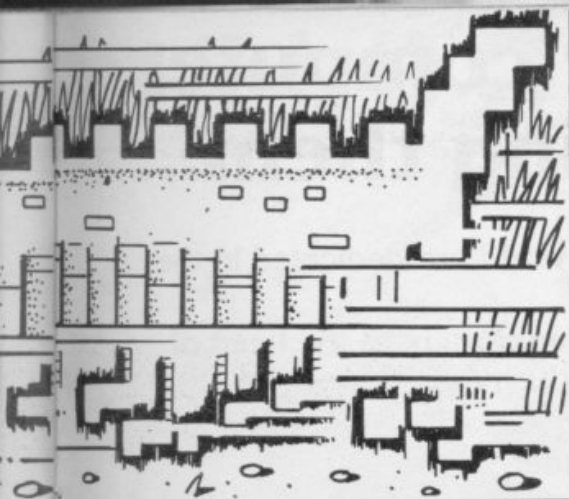
ON ENTRY: V1, a two-byte variable at 71F7H and 71F8H, must point to the top left of the rectangle in screen memory. V2, a two-byte variable at 71F9H and 71FAH, must be set with the low byte containing the no. of scans, or the height, of the rectangle and the high byte containing the no. of bytes per scan, or the width, of the rectangle. S0 (down a scan) must be in memory at 7000H.

ON EXIT: The slide is performed. V1 and V2 have their contents destroyed.

USES: A, B, C, D, E, H, L, V1, V2

7230	00100	ORG 7230H	
7230 2AF771	00110 S4	LD HL,(V1)	;LOCATION IN SCREEN MEMORY
7233 ED4BF971	00120	LD BC,(V2)	;SIZE OF SCREEN AREA
7237 A7	00130 STSC	AND A	;RESET C FLAG
7238 CB1E	00140 NEBY	RR (HL)	
723A 23	00150	INC HL	;MOVE RIGHT ALONG SCAN
723B 05	00160	DEC B	;DEC NO. OF BYTES ON SCAN
723C C23872	00170	JP NZ,NEBY	;BACK TO NEXT BYTE
723F 2AF771	00180	LD HL,(V1)	;LOAD START OF LINE JUST SLID
7242 CD0070	00190	CALL SO	;DOWN A SCAN/AS LAST MONTH
7245 22F771	00200	LD (V1),HL	;STORE START OF NEW SCAN
7248 ED4BF971	00210	LD BC,(V2)	;REPLACE B/BYTES PER SCAN
724C OD	00220	DEC C	;DEC NO. OF SCANS LEFT
724D C8	00230	RET Z	;BACK TO BASIC
724E ED43F971	00240	LD (V2),BC	;STORE AREA LEFT TO SLIDE
7252 C33772	00250	JP STSC	;BACK TO START NEXT SCAN
71F7	00260 V1	EQU 71F7H	
71F9	00270 V2	EQU 71F9H	
7000	00280 S0	EQU 7000H	
0000	00290	END	
00000	TOTAL ERRORS		

NEBY	7238	00140	00170
S0	7000	00280	00190
S4	7230	00110	
STSC	7237	00130	00250
V1	71F7	00260	00110 00180 00200
V2	71F9	00270	00120 00210 00240



dress pointed to by the HL register pair.

The advantage of using HL as a pointer in that way is that we can point HL to the start, or left-most byte, of a scan on the screen and then move right by INCrementing HL, rotating each byte in turn.

As we slide a scan one pixel to the right we must ensure that the new gap on the left is filled with paper. Line 130 of S4, in box one, is that instruction met in the February article: AND A. As explained, it has the effect of re-setting the carry flag. If the carry flag is zero, zero or paper is what will be placed in bit 7 of the first byte of each scan.

The two-byte variable V1 is being used in the same way we used it when displaying a figure. Before the routine

starts it must point to the top left corner of the area we want to slide to the right. The two-byte variable V2, however, is being used in an odd way.

In a sense, it is two variables wrapped into one. One byte tells the routine the height of the area or the number of scans. The other byte tells the routine the width of the area or the number of bytes per scan.

You might wonder why the two pieces of information are both loaded together to and from the BC register pair. The reason is because it is not

possible to load the register B directly from a point in internal memory — outside the machine code program — without loading its paired register. In fact, all such loads, apart from loads to the accumulator, must be to register pairs rather than to individual registers.

In those routines the BC registers are used in a typical fashion to count the number of passes round a loop. That is much in the way that FOR/NEXT variables are used in Basic. In line 160 B is DECremented. If that sets the zero flag, it effects the jump in line 170.

That use of the B register is so common that the Z-80 instruction set has an instruction which will combine the effect of line 160 with the effect of line 170. That instruction is DJNZ. It has the effect of DECrementing B and, if that does not reduce B to zero, performing a relative jump. In that case we could have replaced lines 160 and 170 with the single instruction DJNZ,NEBY. That would have been assembled as a two-byte instruction, whereas the routine in box one uses four bytes for the same effect.

One important difference between the slide left routine in box two and the slide right routine is that, on entry, V1 must point to the top right of the area to be shifted. That is because to slide left we must move across a scan leftwards, carrying the pixel of bit 7 of one byte into bit 0 of the next lowest byte.

Box three contains a Basic program to poke S4 and S5 into memory. It starts at line 270 so that it can be added to the Basic program in last month's article. Last month the alligator was displayed on the screen. This month it slides left if you press the l key and right if you press the r key. Next month we can get nearer a swimming motion with a routine to make it rise and fall scan by scan.

● John Kerrigan runs courses in Z-80 Assembly Language. Details from Alligator Data Ltd, 01-674 8512.

Box 3.

```
270 REM S4 MACHINE CODE
280 DATA 42,247,113,237,75,249,113,167,203,30,35,5
290 DATA 194,56,114,42,247,113,205,0,112,34,247,113
300 DATA 237,75,249,113,13,200,237,67,249,113,195,55,114
310 FOR A=29232 TO 29268: READ B: POKE A,B: NEXT A
320 REM S5 MACHINE CODE
330 DATA 42,247,113,237,75,249,113,167,203,22,43,5
340 DATA 194,104,114,42,247,113,205,0,112,34,247,113
350 DATA 237,75,249,113,13,200,237,67,249,113,195,103,114
360 FOR A=29280 TO 29316: READ B: POKE A,B: NEXT A
370 PAUSE 0
380 IF INKEY$="r" THEN POKE 29175,0: GO SUB 500
390 IF INKEY$="l" THEN POKE 29175,31: GO SUB 600
400 GO TO 370
500 POKE 29176,72: POKE 29177,14: POKE 29178,32
510 RANDOMIZE USR 29232: RETURN
600 POKE 29176,72: POKE 29177,14: POKE 29178,32
610 RANDOMIZE USR 29280: RETURN
```

Box 2.

SPECIFICATIONS S5 — Spectrum.

GENERAL DESCRIPTION: Shifts the bits within a rectangle of the screen one pixel left. That makes any figure in that rectangle appear to slide to the left. The column of pixels on the right edge of the rectangle will all be re-set (= 0 = paper). The previous contents of the column of pixels on the left edge of the rectangle will be lost.

ON ENTRY: V1, a two-byte variable at 71F7H and 71F8H, must point to the top right of the rectangle in screen memory. V2, a two-byte variable at 71F9H and 71FAH, must be set with the low byte containing the no. of scans, or the height, of the rectangle and the high byte containing the no. of bytes per scan, or the width, of the rectangle. So (down a scan) must be in memory at 7000H.

ON EXIT: The slide is performed. V1 and V2 have their contents destroyed.

USES: A, B, C, D, E, H, L, V1, V2

```
7260          00100      ORG 7260H
7260 2AF771    00110 S5   LD HL,(V1) ;LOCATION IN SCREEN MEMORY
7263 ED4BF971 00120     LD BC,(V2) ;SIZE OF SCREEN AREA
7267 A7        00130 STSC AND A      ;RESET C FLAG
7268 CB16      00140 NEBY RL (HL)
726A 2B        00150     DEC HL      ;MOVE LEFT ALONG SCAN
726B 05        00160     DEC B       ;DEC NO. OF BYTES ON SCAN
726C C26872    00170     JP NZ,NEBY ;BACK TO NEXT BYTE
726F 2AF771    00180     LD HL,(V1) ;LOAD START OF LINE JUST SLID
7272 CD0070    00190     CALL SO     ;DOWN A SCAN/AS LAST MONTH
7275 22F771    00200     LD (V1),HL ;STORE START OF NEW SCAN
7278 ED4BF971 00210     LD BC,(V2) ;REPLACE B/BYTES PER SCAN
727C OD        00220     DEC C       ;DEC NO. OF SCANS LEFT
727D C8        00230     RET Z       ;BACK TO BASIC
727E ED43F971 00240     LD (V2),BC  ;STORE AREA LEFT TO SLIDE
7282 C36772    00250     JP STSC     ;BACK TO START NEXT SCAN
71F7          00260 V1   EQU 71F7H
71F9          00270 V2   EQU 71F9H
7000          00280 S0   EQU 7000H
0000          00290     END
00000 TOTAL ERRORS
```

```
NEBY 7268 00140 00170
S0    7000 00280 00190
S5    7260 00110
STSC  7267 00130 00250
V1    71F7 00260 00110 00180 00200
V2    71F9 00270 00120 00210 00240
```


When there are better computer games we will be writing them...

Imagine, the largest most successful software house in the world are dedicated in the pursuit of excellence.

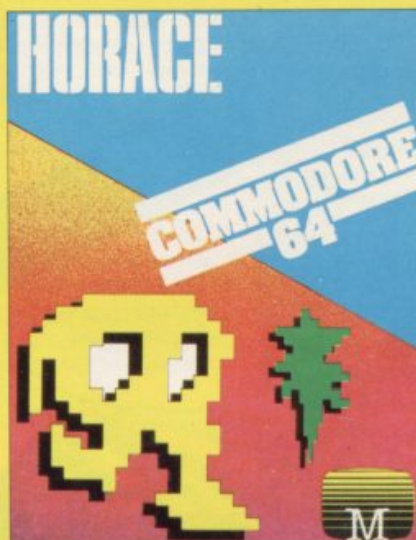
From our massive programming, graphic arts and music department in the heart of Liverpool, the most creative and innovative games in the industry are conceived, created and brought to fruition.

Never before has so much talent been brought together under one roof, to work in unison toward a common goal.... the ultimate in computer entertainment.



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

MELBOURNE HOUSE



Melbourne House has the No.1 bestsellers
for the Spectrum, Commodore 64,
Dragon 32, BBC, Electron and Oric

The Hobbit. Now the best is

"After a very short time I found that 'The Hobbit' was becoming almost a way of life rather than a game, and so when I finished it for the first time I was partly sad because I felt that all the fun and adventure had ended, but I was wrong. Even now I am discovering new things about the game and feel that it will be some time until all of its secrets are revealed to me."

MR. J. STERN, Herts

"I have at last received your 'Hobbit' program and would like to congratulate you on its excellence. After four days of sweat and tears I have completed only 37.5 per cent of the adventure. The program has lived up completely to expectations, and there is no doubt about it being the best production for the Spectrum to date. You have surpassed all others with this program."

"A lot of fun."

COMPUTER

"The excellent graphics. The exciting difference is that it is possible to converse with all the characters, meet and ask them to recommend this game, Tolkien, or novel."

POPULAR COMP

"I am writing to congratulate you on 'The Hobbit'. I think it is one of the most ingenious programs I have had to use. It has kept me stumped for months. I think the effort that has gone into writing a program like this must have been enormous. The effects are brilliant to say the least."

JEREMY CHESTER

"The Hobbit takes first place in the new category of quality and value for money."

SINCLAIR USER

"The graphics in the Adventure are excellent. We have complete 7.5 hours of

graphics. The story is a great plot superior to any other for the

COMPUTER

"The Hobbit is a great game. The Misty Mountains are great. This game is great to play and is No. 1 for fun and excitement."

GORDON DEMPSTER, Scotland

"Thanks again for an excellent game in 'The Hobbit'. I feel I have really got my money's worth out of playing time. Congratulations!"

MR. P. RUSHTON, Leeds

"The most powerful computer game yet invented."

COMPUTER WEEKLY

"Within my circle of friends this game has become something of an obsession. We meet every Friday night at someone's house and spend 3-4 hours on 'The Hobbit'. Friday night would not be the same without 'The Hobbit'."

CHRISTINE VERCHILD, Wilts

"One new Adventure game stands head and shoulders above the rest. It alone almost provides you with a good enough reason to buy a 48K Sinclair Spectrum. Not only does The Hobbit produce drawings of the main scenes, but it also understands proper sentences rather than pairs of words for its commands. It comes with a copy of J.R.R. Tolkien's classic book of the same name. It is the program with the most detailed and best written documentation ever."

WHAT MICRO

"This is an impressively packaged Adventure game which makes good use of the Spectrum's colour graphics. They have not only produced one of the best games for the Spectrum, but given everyone else a lesson in good game design."

PRACTICAL COM

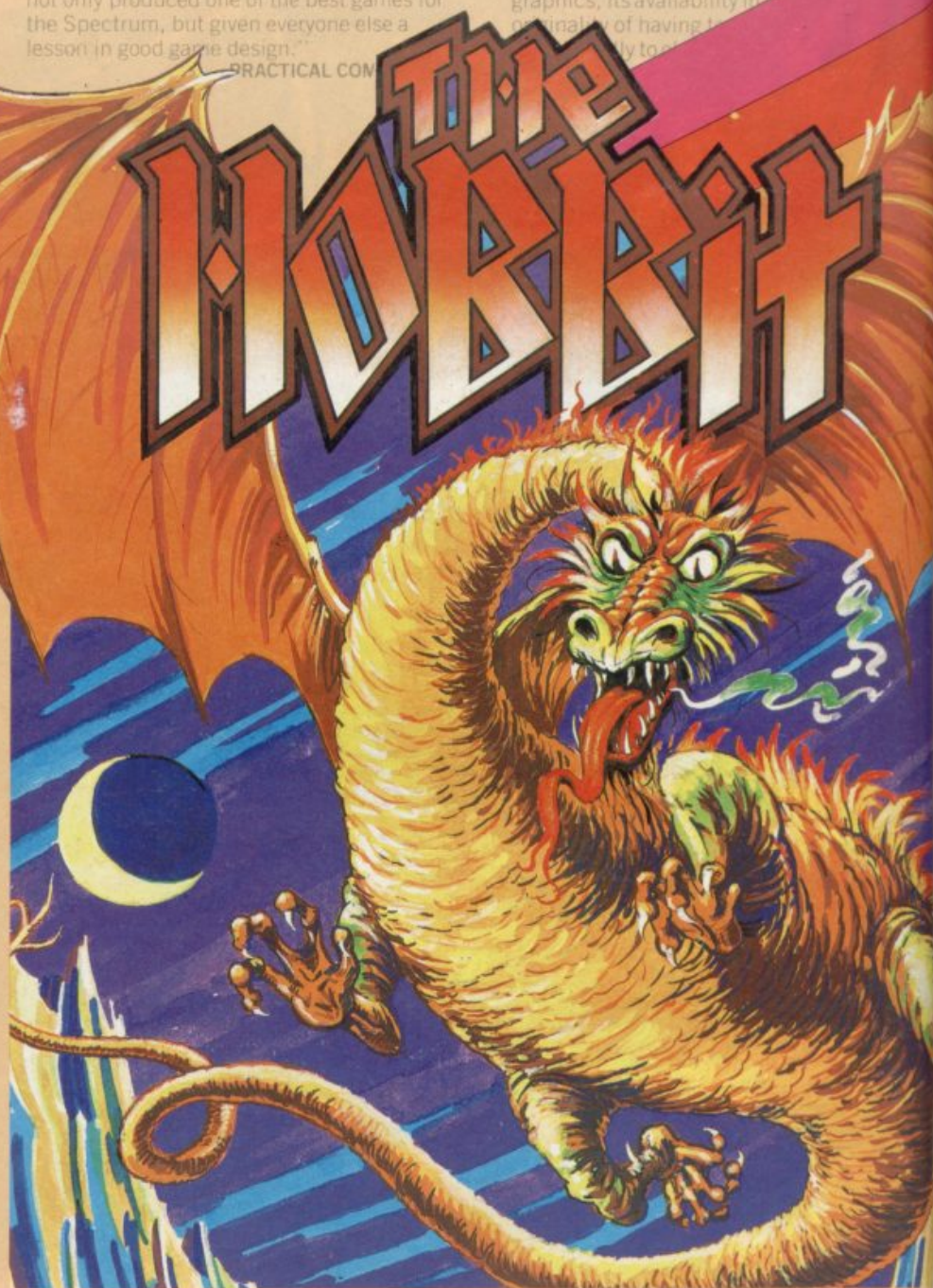
"I am the owner of a copy of 'The Hobbit' which is wonderful entertainment, and very challenging. I have other tapes and publications of yours, all of which are excellent."

MR. D.J. BURGH, Kent

"Having received the most excellent piece of programming I have ever seen, we have had no social life whatsoever. 'The Hobbit' has been dominating our lives since January and many nights have been spent until 3 o'clock trying to conquer it."

SIMON ROGERS, Avon

"I have recently purchased your excellent adventure game 'The Hobbit'. This game is greatly enhanced by the use of colour graphics, its availability in the original form of having to be typed in."



Melbourne House

available for:

"In my software library, your program 'The Hobbit' takes first place."
DAVID MAXWELL, London

"I am the proud owner of your excellent program 'The Hobbit' and have already had many happy, restful, relaxing hours trying to solve its puzzles."

**SPECTRUM
COMMODORE 64
ORIC 1
BBC**

"I congratulate you on a superb program. I have enjoyed it immensely. I must thank you for producing such a clever product, it was worth every penny of the purchase price."

MRS. J. RYCRAFT, Northampton

"The Hobbit' is a beautifully constructed, frantically-maddening, tortuous, gloriously inconsistent, thoroughly spooky adventure — far better than I could have hoped for and certainly the finest of the dozen or so adventure programs I have. In short, I congratulate the four who sweated for a year and a half."

MR. PETER JONES, South Glam

"Nothing is certain in this Adventure, but uncertainty! Add to this the brilliant graphics that are used to describe many of the locations and we have an Adventure that is going to become a classic for the Spectrum."

POPULAR COMPUTING WEEKLY

"...we are not eating food...we are losing sleep...and it's great! We are lost, in the Hobbit program."

MR. JOHN HARRIS, Kuwait

"The children were immediately enthusiastic about the program (even dedicated footballers gave up some playtimes to use it!). Many children borrowed copies of 'The Hobbit' from the library to read for themselves."

JUNIOR EDUCATION MAGAZINE

"The Hobbit' arrived and single-handedly set the standard for adventure games to come, with its sophisticated mixture of advanced language analysis and beautifully detailed graphics."

MICRO ADVENTURER

"I bought your program for my ZX Spectrum and you supply called it excellent for the money. I find it very realistic. The graphics are accurate. It sticks to the book, which is a very compelling feature."

JOHN CASSIDY, Essex

"I have recently purchased a Sinclair Spectrum I decided to buy 'The Hobbit' since I have been doing a literature project based on 'The Hobbit' with my class of 10 and 11 year old children. Over the last 10 weeks the children, having read the book, have been attempting the program with my assistance. Let me congratulate you on a most entertaining program."

MR. K. REID AND CLASS 7, Nottingham

"I have more of your program than a professional programmer."

POPULAR COMPUTING WEEKLY

"The most unique fact about this program is that the user instructions are contained in the completely original and unique Hobbit program. It is a very good idea to read the computer manuals."

"I purchased 'The Hobbit' a long ago and since then I have been engrossed in the game, and I am beginning to feel like a wizard to talk to me about my adventures in 'The Hobbit'."

"The use of the features which makes 'The Hobbit' special. The addition of graphics as good as these adds a whole new dimension to the Adventure. It is certainly a marvellous game, which should set the standard for future Spectrum adventures."

ZX COMPUTING



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

Correspondence to:
Melbourne House
Church Yard
Tring
Hertfordshire HP23 5LU

All Melbourne House cassette software is unconditionally guaranteed against malfunction.

Trade enquiries welcome.

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

SPECTRUM

- ☐ Spectrum "The Hobbit" 48K £14.95
- ☐ 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
- ☐ Classic Adventure 48K £14.95

COMMODORE 64

- ☐ Commodore 64 "The Hobbit" £14.95
- ☐ Commodore 64 Hungry Horace £5.95

DRAGON 32

- ☐ Dragon 32 Hungry Horace £5.95

BBC

- ☐ BBC "The Hobbit" Model B £14.95

ORIC 1

- ☐ Oric 1 "The Hobbit" 48K £14.95

VIC 20

- ☐ Cosmonauts, Unexpanded VIC 20 £5.95
- ☐ Wizard & Princess, Unexpanded VIC 20 £5.95

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

Please add 80p for post and pack **£ ...8**

TOTAL **£ ...**

I enclose my ☐ cheque
☐ money order for **£ ...**

Please debit my Access card No.

Expiry Date

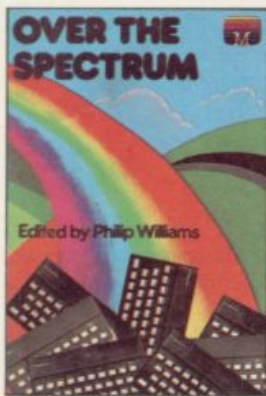
Signature

Name

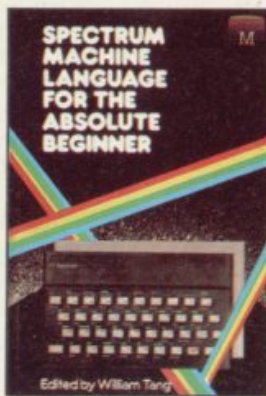
Address

Postcode

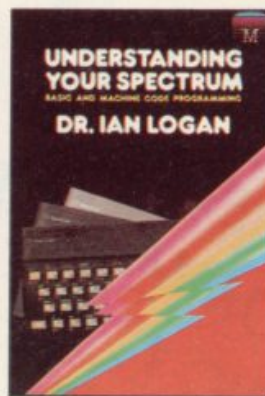
Access orders can be telephoned through on our 24-hour ansafone (01) 858 7397. **SU4B**



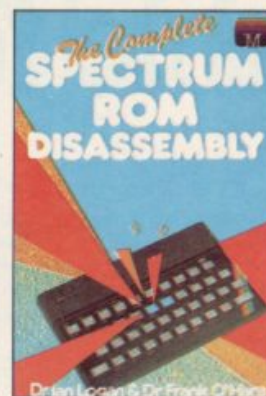
Over The Spectrum. 30 exciting, easy to enter programs designed specifically for the Spectrum. "A collection of truly outstanding programs." — Educational Computing. "A book that will continue to offer advice and instruction as your own skill increases." — ZX Computing.



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



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

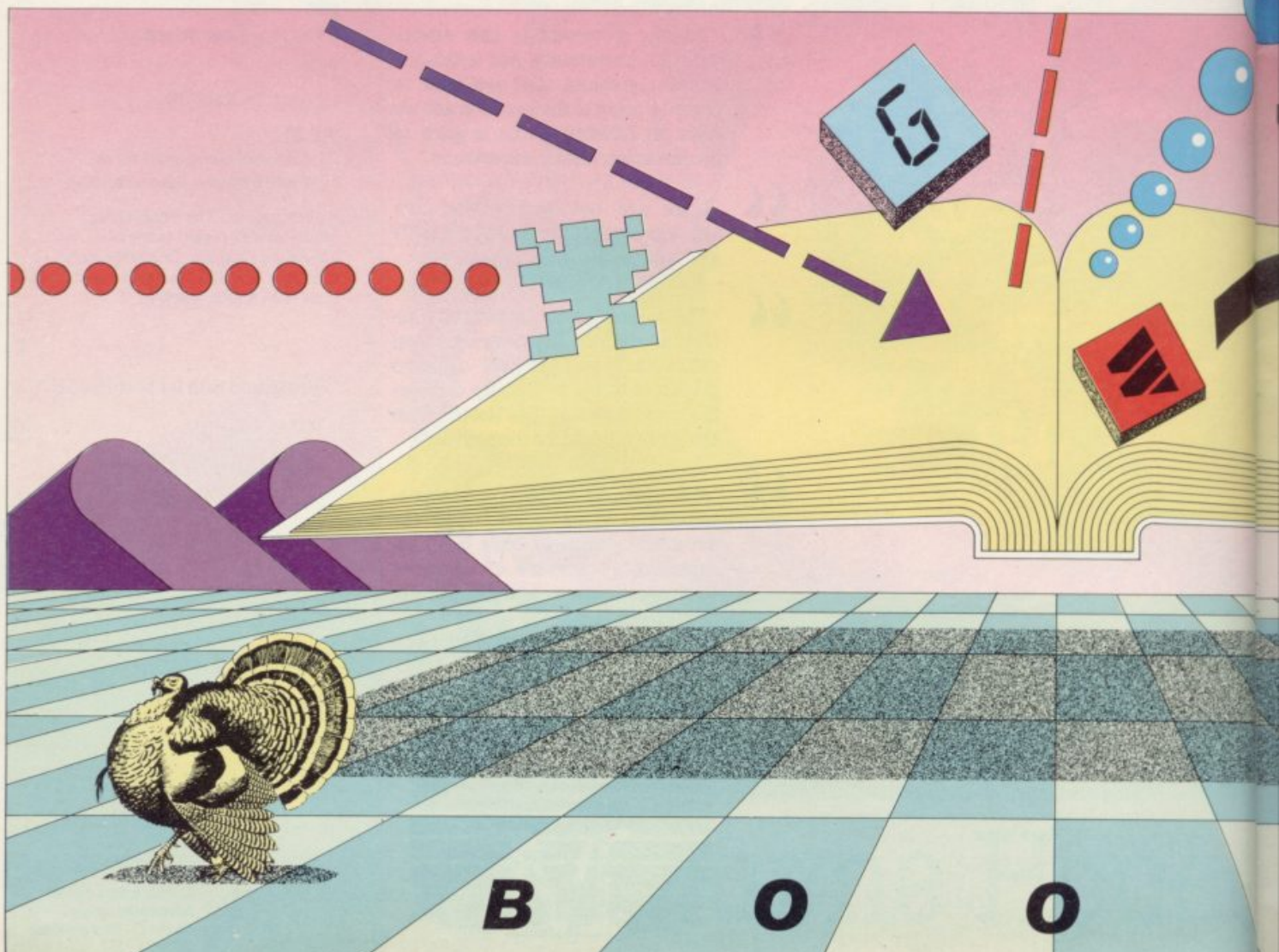


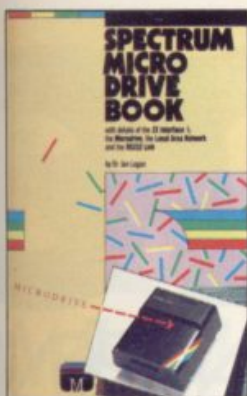
The Complete Spectrum ROM Disassembly. For the serious programmer who wants to get right to the heart of the Spectrum 16K ROM control program. "A useful and interesting book." — Personal Computer News. "The detail is ingenious." — Educational Computing.



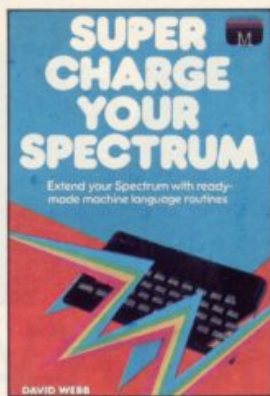
Spectrum Hardware Manual. An in-depth explanation for the hobbyist who wants to know how the Spectrum works. "The second most useful book you can buy — the first being the programming manual that comes with your machine." — Personal Computer News.

MELBOURNE





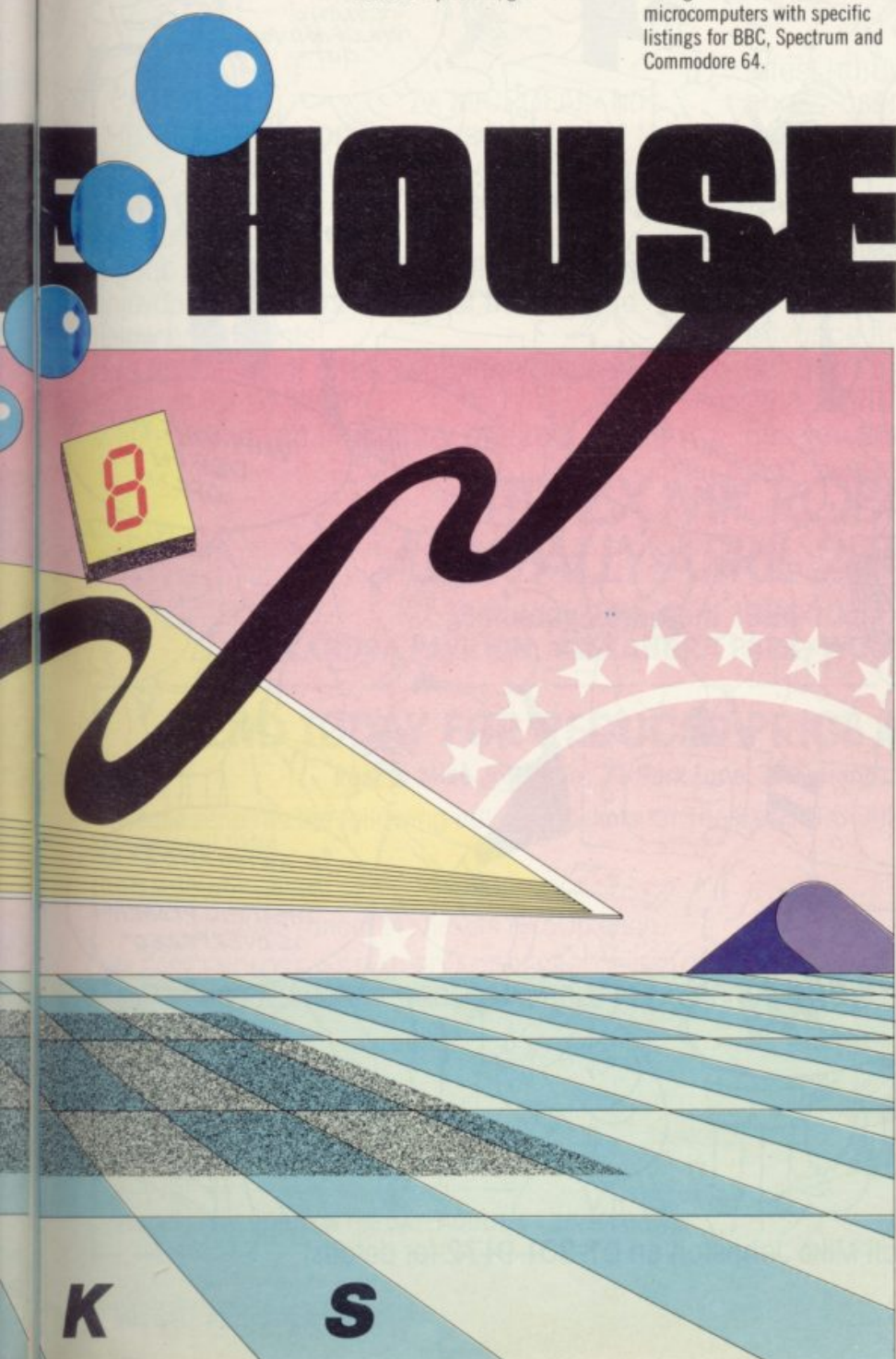
Spectrum Microdrive. In this book Dr. Ian Logan gives a detailed explanation of the Spectrum Microdrive — how it works, its capabilities from BASIC and Machine Language and the networking and RS232 possibilities



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



C&VG Book Of Adventure In this unique book, Keith Campbell will lead you through various facets of adventure games, including the history of adventure games, how to play them and a hall of fame. He then presents a complete program listing. Suitable for all microcomputers with specific listings for BBC, Spectrum and Commodore 64.



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

Correspondence to:
Church Yard
Tring
Hertfordshire HP23 5LU

All Melbourne House cassette software is unconditionally guaranteed against malfunction.

Trade enquiries welcome.

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

SPECTRUM

Books

<input type="checkbox"/> Over The Spectrum	£4.9
<input type="checkbox"/> Spectrum Machine Language for the Absolute Beginner	£5.9
<input type="checkbox"/> Understanding Your Spectrum	£6.9
<input type="checkbox"/> The Complete Spectrum Rom Disassembly	£9.9
<input type="checkbox"/> Spectrum Hardware Manual	£5.9
<input type="checkbox"/> Spectrum Microdrive Book	£5.9
<input type="checkbox"/> Supercharge Your Spectrum	£5.9
<input type="checkbox"/> C&VG Book of Adventure	£5.9

Software

<input type="checkbox"/> Spectrum The Hobbit 48K	£14.9
<input type="checkbox"/> Penetrator 48K	£6.9
<input type="checkbox"/> Terror-Daktil 4D 48K	£6.9
<input type="checkbox"/> Melbourne Draw 48K	£8.9
<input type="checkbox"/> H.U.R.G. 48K	£14.9
<input type="checkbox"/> Abersoft Forth 48K	£14.9
<input type="checkbox"/> Classic Adventure 48K	£6.9

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

I enclose my ☐ cheque
☐ money order for £

Please debit my Access card No

Expiry Date

Signature

Name

Address

Postcode

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



ZX MIC

FOR A QUID (OR LESS) YOU CAN SPEND



ROFAIR

AWHOLE DAY ENJOYING YOURSELF!



ZX MICROFAIR has become a household word for anyone interested in discovering what's the latest gizmo for their SINCLAIR computer!

A good day out at a reasonable price and an enjoyable day spent amongst friends and fellow enthusiasts!

Let's face it, what other exhibition gives you so much for so little?

Where would you find under one roof all the

latest hardware, software, books, user groups, programming aids, peripherals and add-ons for your Sinclair Computer?

There's even a bring-and-buy sale, bars, buffets and a place to relax after a hard day's looking!

So book your place now by sending for an advance ticket at reduced cost.

But don't forget the date: ALLY PALLY 28th APRIL 1984.

See you there.

11TH ZX MICROFAIR. ALLY PALLY APRIL 28TH 1984.

Saturday 28th April 1984 10am – 6pm.

ALEXANDRA PAVILION, ALEXANDRA PARK, WOOD GREEN, LONDON N22.

SEND TODAY FOR REDUCED PRICE ADVANCE TICKETS!

Post to Mike Johnston, 71 Park Lane, Tottenham, London N17 0HG.

Please send me the following advance tickets for The ZX MICROFAIR on 28th April 1984:

.....Adult tickets @ £1.00 each

.....Children (under 14) tickets @ 50p each

PLEASE ENCLOSE A STAMPED ADDRESSED ENVELOPE AND MAKE CHEQUES/POSTAL ORDERS PAYABLE TO ZX MICROFAIR.

Name

Address

PRICES AT THE DOOR ON THE DAY: ADULTS £1.25, KIDS 60p

11th
ZX MICROFAIR
ALEXANDRA PALACE
APRIL 28TH 1984

SINCLAIR BUSINESS USER

April 1984

Accounts manager

Mike Wright reports on a new private finance program

IF YOU are one of those who feel that your micro should be used for more than playing games, Fulwood Software has produced the Account Management System for the 48K Spectrum. It consists of two programs, the Master Control Program and the Data Control Program, one on each side of the cassette. The instruction manual covers a mere five sides of the cassette label and one of them is taken up on an introduction and explanation as to why there are two programs.

AMS is designed to keep a record of all the usual transactions which arise in keeping a set of private accounts. The system can cope with up to five accounts. They are set up initially as current account, deposit account, access, Barclaycard and building society, although a facility exists for changing the names in the MCP. Each transaction can be grouped into one of 26 categories, defined as a-z, and for each category a budgeting target can be set.

In addition to changing the names of accounts, the main purpose of MCP is to set up and keep track of standing orders. It is also used to record the transfer of money between the five accounts and to delete transactions. By comparison, DCP is used for recording the day-to-day transactions of writing cheques, using a cash card and crediting the accounts. It is also used to name the transaction categories, setting budget targets and checking how far apart are target and reality.

When AMS is first used, MCP must be loaded. Once loaded, it asks the user whether to load an old data file or to create a new one. Creating a new data file involves setting a starting date for

the financial year, a password and the current date. The password, unfortunately, is only an added embellishment, since the programs can be broken into easily and a warm re-start achieved using GOTO 71, bringing the user back to the main menu. That gives the user seven options. The first five give access



to the five accounts, while six and seven save and verify the data. Option six ends the sessions after the save and verify while seven goes on to the load DCP.

Each of the first five options leads to the same subsidiary menu with four

'There is no display of the data once it has been entered'

options — add a standing order, amend a standing order, delete a transaction, and change account name. Each of those options then prompts for the appropriate input but there is no display of the data once it has been entered.

The prompts for adding a standing order are:

IN or OUT of account — i or o.

Transfer account number — i.e., 1 to 5 corresponding to the main menu.

A four-character identifier for the standing order. Another two characters are added by the program to give an exceptional code.

The amount.

The frequency of payment, either 1 — monthly; 2 — quarterly; or 3 — annually.

The date of the first payment.

The number of payments.

The transaction category — a-z.

An 18-character description of the transaction.

Once that has been completed only the amount and dates of payment are shown and confirmation requested. The other options prompt in a similar fashion, although less information is usually required. Once the user is satisfied that the password and standing orders have been set the data can be saved and verified. If DCP is to be used it must then be loaded; the process takes about seven-and-a-half minutes.

DCP starts by inviting the user to press enter to load the data file. In fact, pressing enter causes the password to be requested before loading the data file. The main menu for DCP offers access to one of the five accounts or of closing and saving the data.

The subsidiary menu for the five accounts also offers five options. The first two allow the account to be credited or debited and lead to similar displays prompting for the date of the transaction, the amount, the cheque or

Continued on page 97

Continued from page 96

receipt number, the details — up to 18 characters — and the category — a-z — of the transaction. Once again the details are not shown after they have been entered, nor is the user asked to confirm them.

The third option gives the balance in the account on the current date. Option four allows for a statement to be printed for all transactions on a set date. That lists the transactions by date, number — the identifying cheque, receipt or standing order number — the amount, balance and whether debit or credit. Only a maximum of 10 transactions is shown on the screen at any time, with instruc-



tions on how to obtain more details or the next page or obtain a printout at the bottom of the screen. Unfortunately when a printout is obtained those instructions are also printed, so if more than one page of statements is required the overall cohesion of the presentation is spoiled. The last option allows, via another menu, transaction categories to be set up, named and assigned a budget target. It will also list the categories with their names and targets and compare the balance and target for any category graphically.

Despite the use of menus and prompts, AMS cannot really be described as user-friendly. While some error-trapping is built into the system, the major trap is the user. That can be illustrated by the fact that initially it will accept an amount with characters in it — e.g., £ u.89 — and then breaks down two or three steps later when it tries to use that value. It is regarded as satisfactory for February to have 29 days in a non-leap year. The overall impression is of a program which has been considered only from the point of view of what it will do but not how it is done or, perhaps most important, who is to use it.

Account Management System is available from Fulwood Software and costs £7.95.

Experience required for project planner

CPA software helps make business decisions

THE MAJORITY of business programs for the ZX-81 and Spectrum are based on the traditional areas of word processing, databases, spreadsheets and finance — payroll and ledger — packages. In a different area entirely the Hilderbay Critical Path Analysis program is more concerned with project planning.

CPA is a method of determining those activities in a project where a delay in the activity will cause a delay in the whole project. It can be applied to all projects where activities are started and stopped independently and which, in some cases, must be performed in a particular order. CPA has been used successfully in many fields. They include planning production, scheduling maintenance, town planning and construction. It can also be used for everyday tasks such as planning a shopping expedition or decorating, although its use in such areas is usually restricted to exercises for those being taught the methodology.

The program is designed for use by those who already have a background in

'The program is easy to use but gives very little protection against typing errors'

CPA. That is made obvious by an impressive-looking manual which occupies two sides of A4 paper, with one of them devoted to background. Before the program can be run the usual network diagram shows the numbered activities and their duration, and cost if desired. The start and end points of the activities are also numbered independently.

Once the program has been loaded using LOAD "CPA", it asks whether a printout is required. Having entered either Y(es) or N(o) the master menu is displayed. That reminds the user of the elements of the network, gives instructions on how to get a warm re-start — i.e., without losing the data already entered — and the five options. They are SAVE problem on tape; LOAD problem from tape; enter a NEW problem; MODIFY existing data; SOLVE existing problem.

Initially the second option will be

selected to enter a new problem. The program prompts for the number of activities in the network and also warns that existing data will be deleted. If that has been chosen by mistake, entering 0 returns directly to the master menu, keeping the old data.

After that the program continues to prompt for the start node, end node, duration and cost for each activity in turn. Once the data for an activity has been entered it is displayed with the activity number and the user is asked to confirm that it is correct.

Pressing any key except Y starts the data entry for that activity again. Once the data for the last activity has been entered the information for all activities is displayed. Pressing any key causes the calculation of the problem. When completed, the display shows the nodes of the activity, the earliest start time for the activity, the latest ending time, the float or amount of time an activity can be delayed without delaying the project and the cost.

Also shown is a critical path through the network and the cost of that path. Although the critical path is displayed on-screen, for some reason it is omitted from the printout; duration and cost remain.

The program is easy to use but gives very little protection against typing errors. The manual we received with the program makes a passing reference to an example. It seems to bear little relation to the figures in the manual. The program restricts the number of nodes to being fewer than the number of activities, which is not mentioned anywhere in the documentation but can be avoided by creating dummy activities with no duration.

Improvements could be made by printing all critical paths through a network and also by giving the user the option to add activities once a problem has been set up. CPA will analyse large networks reasonably satisfactorily provided the user is prepared to tolerate its limitations. For those who wish to use a more complete package, Hilderbay also produces the Project Planning Package at £120 plus VAT.

Critical Path Analysis is available from Hilderbay Ltd at 8-10 Parkway, Regents Park, London NW1 7AA and costs £15 inclusive of VAT.

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.

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

SU4

The Spectrum Sound Synthesiser

- ◆ Gives 3 channels of sound with envelope control for special effects.
- ◆ Has own integral amplifier and speaker and can be used to amplify the spectrum sound.
- ◆ 21/0 port, which can be used to interface joysticks, printer, etc.
- ◆ Plugs straight into the back of your spectrum. No wiring or soldering.
- ◆ Supplied with very comprehensive documentation, with demonstration and utility programmes on tape.



Now available Kit for use
as Centronics Printer
Interface.

£17.95 + 50p (P & P).

CAN BE USED WITH BOTH

16K & 48K

ONLY £28 + 80p (P & P)

Send cheque or postal order to:—

Signpoint Ltd.,
166a Glynn Road,
London E.5.

Tel: 01-986 8137.

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

AGF

MICRODRIVER

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.

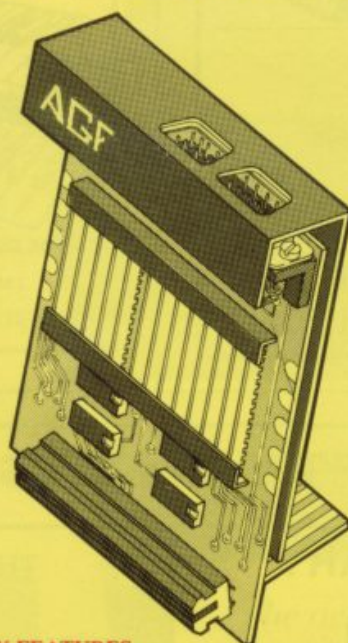
Programming is achieved by a two-digit code, which is looked up on the Programming Chart supplied, for each direction and firing button. These two numbers are then selected on a pair of leads which are clipped onto appropriately numbered strips on the interface.

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

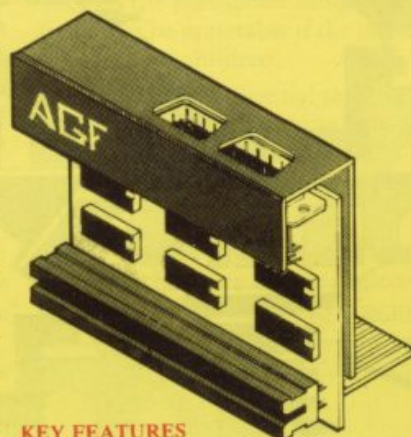
Following in the footsteps of our extremely popular original interface, which has sold over 1,000 worldwide since October last year, we have improved its performance.

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/ Snake	: Apocolypse Software	£4.95
3D Tanx	: DK Tronics	£4.95
Splat!	: Incentive Software Ltd	£5.50
Phoenix	: Megadodo Software	£5.50
Escape	: New Generation Software	£4.95
3D Tunnel	: " "	£5.95
Knot in 3D	: " "	£5.95
Cyber Rats	: 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	† Psst
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, Shipnal,
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 ☐ ZX SPECTRUM ☐ Please tick

FINAL TOTAL

DEALER ENQUIRIES WELCOME

EXPORT PRICES ON APPLICATION

THE PRECISE NATURE of human intelligence, and in particular the way in which humans learn, has been the subject of detailed study by psychologists and others for many years. With the advance of electronics and the growing power of computers, machine intelligence has become a matter of importance for engineers as well.

The two fields were united in the work of Alan Turing, who published the first detailed work on the theory and practice of game-playing by machines as an illustration to his fundamental question: can a machine think? Turing forecast that the development of high-speed computers would make possible the mechanisation of every form of thought process, an idea which was considered revolutionary, or even heretical, in the 1950s. Turing died before technology could provide the means for a practical demonstration of his ideas but many others, notably Shannon, carried-out related research through the years and today it seems possible that the machine may rival or even surpass the thinking power of the human brain.

The structure of many games make them good vehicles for the examination of thought processes. First we must exclude from consideration the arcade type of game, because those games, while calling for great ingenuity on the part of the programmer, are too restrict-

'After a given number of games the program is infallible'

ed to provide real material for the idea of a mechanical type intelligence.

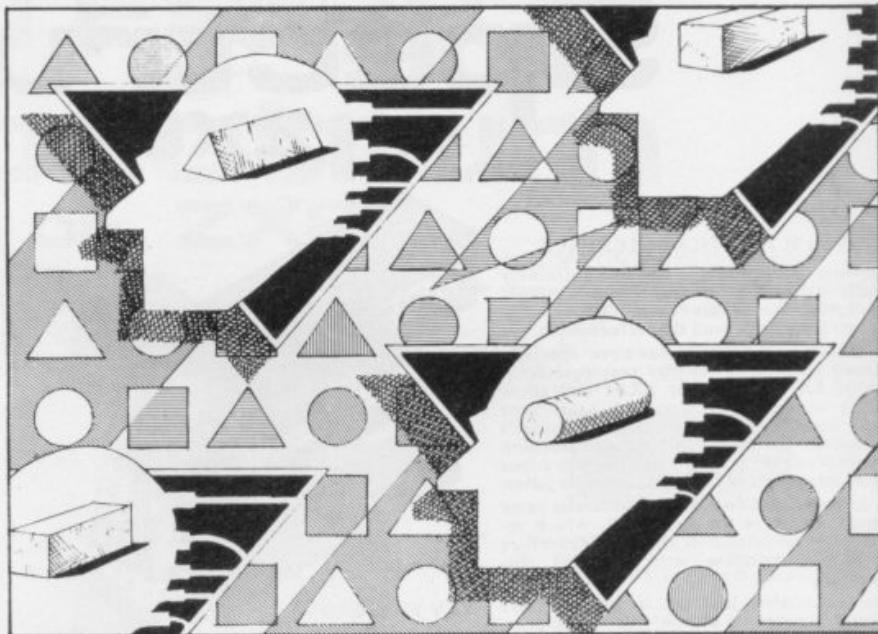
Second, we should exclude the type of game where the computer is acting as a referee between human players, recording and storing moves and scores but taking no part in the game.

We might define the type of game in which intelligence plays an essential part as a contest in which each player has to devise a long-term strategy and react in the short term with suitable tactics to preserve the validity of the strategy in the light of an opponent's moves. Some games which would satisfy the definition are Noughts and Crosses, Five-in-a-row, Nim, Othello, Draughts, Chess and many card games.

They may be divided into two categories, completely specified and incompletely specified. In a completely-specified game it is possible to state

Thinking

J McAllister describes how to teach a micro



whether, given correct play by both sides, the outcome is a win for player one, a win for player two, or a draw. Noughts and Crosses is a completely specified game which player two can always win or draw. At the other extreme, chess is incompletely specified because the total number of possibilities is so great that they have not all been computed.

For a completely specified game, an obvious method would be to store all the possible positions so that the machine could respond by evaluating them all before moving. The program would be shortened by eliminating no-hope moves. That type of program, though it may again call for great programming skill, could at most be considered to be the equivalent of the lowest form of animal instinct.

At a higher level there is the idea of compressing the strategy into a single rule or a set of rules for correct play. An example is to be found in Nim, where the strategy is compressed into a rule for preserving the parity of the binary representation of the position. That could be considered to be analogous to the human ability to abstract and generalise.

Probably the most powerful game-playing by machine is to be found in

chess. Computer programs or machines dedicated to chess-playing are so far advanced that they can give grand masters a game. The more powerful the program, the further ahead it can look to analyse the position and the more complex are the various compressions of strategy with which it is equipped.

To qualify as intelligent, a machine or program should not only have the ability to analyse, abstract, generalise, remember and compare, but also the ability to improve with experience—that is to learn. A program with that ability eventually will be able to do things which it was not programmed originally to do and it is in that aspect that future advances in mechanical intelligence are likely to be made.

A famous short story of a few years ago, *Flowers For Algernon*, dealt with a mentally defective boy who found himself transformed for a short period into a genius but eventually relapsed into a moronic condition. Initially the program of that name has no idea of how to win a game but after a few games its play improves; and, after a given number of games, variable by the programmer, it is infallible, being in possession of the perfect compressed strategy.

The game is trivial and of no great interest, the main point of the program

of Algernon

being how the machine learns to play correctly. Two players take turns to remove objects from a pile of 21 and the loser is the player who has to take the last object. It is a completely specified game with a very simple strategy which results in a win for player two.

A player may take one, two or three objects at a time, so all player two has to do is to remove a number to bring the total removed on that turn to four. Then, after five turns, $5 \times 4 = 20$ objects have gone and it is left to player one to take the last.

Only a complete idiot could fail to win as player two if he was in possession of that simple rule. That is what the machine is initially and, if left with three objects, it is as likely as not to take all three and say "you win".

The program, however, while not equipped with the perfect strategy at first, is equipped with the means to discover it — intelligence? — and as the number of games played increases it begins to improve until eventually it plays faultlessly.

In the program, line 10 and the subroutine give instructions and may be omitted.

Lines 15-25 initialise.

Lines 30-45 and the variable Z prevent foul play by the human player.

Lines 40-75. The variable M decides whose turn it is — M=0 means the human to play. K is the number taken

ing is promoted by encouraging favourable responses. If desired, it could be arranged that C was either left at its old value or even decremented when the machine lost.

That would mean that the machine would have to win games through mistakes on the part of the human to learn and might be preferable if the game is to be played by children.

Line 145. It is essential to input "Y" at this stage if the machine is to learn, since each time the program is RUN all variables are initialised and the program relapses into idiot status.

The field of artificial intelligence is one which has been largely neglected by amateurs but it has many fascinating

aspects and is an area in which the amateur could make a real contribution to computing. Think of the discoveries which have been made by amateur astronomers, for instance.

An immediate development of the program would be to allow the machine to play first in its turn. In their case it could not be equipped with a perfect win strategy, nor with the means to discover one, but an interesting possibility would be to program it to learn to play an optimum game — to take advantage of any mistakes by the human opponent to reach a winning position.

The program and developments of it should also provide useful material for young children working with numbers.

'The field of artificial intelligence has many fascinating aspects'

and if legal that is subtracted and the remainder is displayed. M is also used in the learning process.

Lines 80-120 decide the machine's move. That is random but within the rules so long as C is less than 10. If C is equal or greater than 10, the machine makes the perfect move contained in line 85.

Lines 125-145 decide who has won, print a message and adjust C. The variable C increases by 2 if the machine wins and by 1 if the human wins. That is in accord with the theory that learn-

```

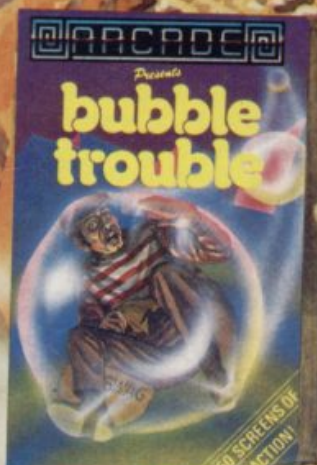
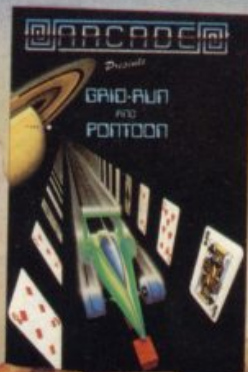
10 GO SUB 175
15 FLASH 0:CLS
20 LET C=0:LET Z=0
25 LET N=21:LET Q$="21 graphics 5:" PRINT Q$
30 IF Z=1 THEN PRINT:PRINT "Play the game. Take 1, 2 or 3, but not more than the
total."
35 PRINT "You take?";
40 LET M=0:INPUT K:PRINT K;
LET Z=0
45 IF K>N OR K<1 OR K>3 OR K<>
INT K THEN LET Z=1
50 IF Z=1 THEN GO TO 30
55 LET N=N-K:LET Q$=Q$ (TO N)
60 PRINT "which leaves"; N
75 PRINT Q$
80 LET M=1:LET P=1+INT (3*RND)
85 IF C>9 THEN LET P=4-K
90 IF N=2 THEN LET P=1
95 LET N=N-P
100 INPUT "Press ENTER for my move"; RS
105 PRINT "I take ";P;" leaving ";N
110 LET Q$=Q$ (TO N):PRINT Q$
115 IF N<2 THEN GO TO 125
120 GO TO 35
125 LET D=D+N
130 IF D=1 THEN PRINT "You win."
135 IF D<>1 THEN PRINT "I win,"
140 LET C=C+D
145 INPUT "Play again? (Y/N)"; A$
150 IF A$="Y" OR A$="y" OR A$="" THEN CLS:GO TO 25
155 PRINT "Thanks for the game.":PRINT:PRINT
160 STOP
175 PAPER 7:INK 0:PRINT "This program demonstrates the ability of machine to learn
from experience. A very simple game is used as an example."
180 PRINT "In this game two players take turns to remove 1, 2 or 3 bricks from a row of 21.
The player who takes the last brick loses."
185 PRINT "With correct play the result should always be a win for player two (the
machine), but the machine does not know this to start with and is likely to make stupid
mistakes."
190 PRINT "The machine learns from experience and eventually it cannot be beaten. To
allow this to happen, you must press key Y when asked to play again."
195 INPUT "Press ENTER to start, A$:RETURN

```


ARCADE

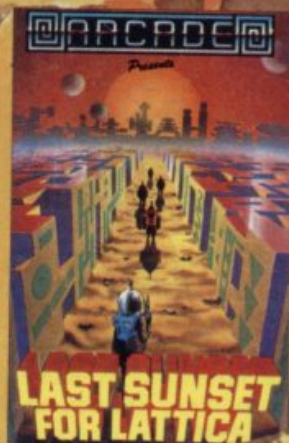
GAMES THAT FIGHT BACK!

YES THEY'RE TOUGH — BUT YOU'VE GOT TO ADMIT — THEY'RE FUN...



COMING SOON!

THE ZONE



SO FAR YOU HAVE RACED FOR YOUR LIFE AGAINST ANDROID CARS: YOU HAVE BEEN STRANDED MILES UNDERGROUND SEARCHING FOR DIAMONDS, YOU HAVE TAKEN ON THE MAFIA SINGLE HANDED AND SAVED A PLANET FROM EXTINCTION.

..... NOW IN OUR LATEST GAME YOU ARE A BURGLAR IN SEARCH OF LOOT — IN HOT PURSUIT ARE THE MOST FEARFUL SECURITY FORCE EVER ASSEMBLED!

EVEN IF YOU SURVIVE ALL THIS — BEYOND, LIES THE TERROR OF THE ZONE!!

All these games are available for ZX Spectrum 48K for the incredible price of only £5.50 each including P&P VAT etc. Just complete the mail order form for prompt dispatch by return of post.

Arcade are committed to original game concepts so look out for new titles in the Arcade range. TRADE ENQUIRIES WELCOME. Phone Orpington 35639 10 a.m. — 6 p.m. or write to Arcade Software Ltd, Technology House, 32 Chislehurst Road, Orpington, Kent BR6 0DG.

TO: ALL MAIL ORDERS

Qty.	Item	Item Price £	Total £

DON'T FORGET YOU CAN ALWAYS ORDER ON THE TELEPHONE WITH YOUR CREDIT CARD. TRADE ENQUIRIES WELCOME.

*I enclose a cheque/postal order payable to **ARCADE SOFTWARE LTD.** for

£..... *Please charge to my Access/Barclaycard account no.

*Please delete/complete as applicable

Signature:

Name: Mr/Mrs/Miss

Address:

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 subtring 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

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

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.xcons.): 16K ZX81: 10x21, 15x18, 20x13, 16K Spectrum: 8x8, 48K Spectrum: 10x45, 25x35, 50x25. SIDE B: Solutions of simultaneous equations.

TAPE 6: STATISTICS (*), (+) £14.95

SIDE A: STATISTICAL TESTS AND DISTRIBUTIONS. Chi-square, Students t-, F-, Mann-Whitney U, Wilcoxon's Signed Rank tests and Chi-square, Students t-, F-, Binomial, Poisson and Normal distributions. Data on many samples can be entered at once, sorted and basic statistics displayed. Capacity examples (samp.xobs.): 16K ZX81: 1x230, 2x110, 5x45, 16K Spectrum: not available, 48K Spectrum: 2x1300, 10x250, 20x125.

SIDE B: DESCRIPTIVE STATISTICS. Analysis of ungrouped or grouped data. Ungrouped data sorted and grouped. Output includes mean, mean deviation, standard error, skewness, kurtosis, moments, Pearson's coefficient, etc. A comprehensive histogram with up to 30 class intervals, class frequencies, midpoint values. Capacities: ZX81: 450, 16K Spectrum: 200, 48K Spectrum: 2000.

TAPE 7: BIBLIOFILE £9.95

An academic indexing program to keep record of books and articles. Loading and saving of files, printing and listing of up to 150 records in a file, searching for an entry and sorting records into alphabetical order. It is possible to modify, delete and add a record.

EDUCATIONAL SERIES

INTRODUCTION TO ECONOMICS SET (48K Spectrum only): Basic concepts are introduced by extensive use of graphics, examples and exercises.

MICROECONOMICS I (+) £9.95

SIDE A: Demand and supply analysis, demand theory, cost-benefit analysis. SIDE B: Budget line analysis, indifference curves, decision making in a market economy.

MICROECONOMICS II (+) £9.95

SIDE A: Cobb-Douglas production function, linear programming and exercises on linear programming. SIDE B: Theory of the firm, elasticity of demand, CES production function.

MACROECONOMICS (+) £9.95

IS/LM curves, national income determination, aggregate demand and supply analysis, multipliers.

ECONOMIC GEOGRAPHY (+) £9.95

SIDE A: Von Thunen's model of agricultural land use. Locational rent and principle of diminishing returns. SIDE B: Models of agricultural and urban land use.

(*) Programs with INPUT, CHANGE, LPRINT and SAVE-DATA facilities. Spectrum versions of tapes 4 and 6 also embody MERGE/READ DATA facilities. A common data file can be used with these programs.

(+) Recommended for "A" Level, first year university and poly students.

PLEASE SEND A5 SIZE S.A.E. FOR INFORMATION ON MICRODRIVE-BASED PACKAGES.

Tapes 1-6: £60. Introduction to economics set: £35.

All inclusive prices for the U.K. For overseas orders add 50p per cassette. Dealers enquiries welcome.

Cheques payable to: **UNIVERSITY SOFTWARE, 29 St. Peter's Street, London N1 8JP. Telephone: 01-359 0978**

Theodora Wood assesses teaching programs for older children

The classroom

AS CHILDREN pass into their teens the limitations imposed by lack of basic skills are no longer applicable. Programs therefore can be produced with a far greater proportion of written text. Following from programs designed for younger children, many packages rely on the demonstration and examine formula and there is far less emphasis on the entertainment aspect. This month, I shall look at programs which are complementary to school work up to O level. Some incorporate games, some are straight revision packages, others are demonstration models.

Astro Maths — Spectrum 48K, ZX-81, Scisoft £6.95 — illustrates how software houses have mixed games with learning, appealing to the games player by offering a reward for correct answers in the form of zap-the-alien-ships. Unfortunately, although the graphics of the spaceships seem exciting when first shown, the game is a pale shadow of games available. The ships do not appear on the screen and the player is presented with an X to move over an invader which is only a square. Control of movement by means of a cursor is also rather shaky and slow.

The bulk of the program is concerned with testing in two areas — decimals to fractions and percentages. Parameters range from easy to difficult and the time-span for answering the questions can be as little as 20 seconds to as much as five minutes 20 seconds. Fractions to decimals deals with questions such as "Type-in the following fraction as a decimal — $20/41 = ?$ ".

The program notes suggest that calculators could be used and for this kind of fraction a calculator would certainly save a great deal of time spent in long division, though obviously it provides practice in it. Percentages tests knowledge in this area by such questions as "What percentage of 200 is 14?". The game is the same and also the parameters, which unfortunately cannot be changed without reLOADing the program.

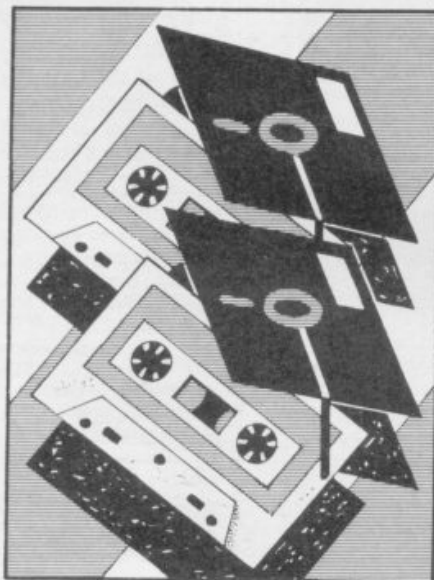
By contrast, **Mathskills II** — Spectrum 48K, Griffin, £9.99 — is a nonsense revision package aimed at complementing courses up to O level in

mathematics. The subjects dealt with are areas, perimeters, simple equations, percentages, sets and Venn diagrams. Operating rather like a textbook, instructions are given at the beginning of each section, and even when attempting the questions there is a help facility in case the formulae have been forgotten — a useful revision aid.

After each question has been answered there is the game, different for each section. It is in the form of a ball reaching a goal if five correct answers are given, as in the case of percentages.

Although not really a game in the interactive sense of the word, that diversion breaks up the tedium of answering questions, giving a short break between each one. When the student has completed a section, a certificate is displayed giving the number of questions answered correctly or incorrectly, also expressed as a percentage.

The section on sets and Venn diagrams is especially clear and would certainly be an aid, not only to students,



but also to parents whose own school curriculum did not cover these concepts.

Sequencing — Spectrum 48K, Chalksoft, £6.95 — demonstrates the textbook formula by providing examples of sequences, halving, Fibonacci, prime, square, triangular and multiples of three and nine. Two or three pages of explanation precede each sequence be-

ing displayed on the screen. Unlike **Mathskills II**, which uses the computer to act as a marker, thus pinpointing areas of the subject which need more revision, this is a demonstration tape and has no inherent advantage over a textbook, except that the student sees the sequences built on the screen rather than being presented with the complete set of figures on a page.

For a complete teaching package, **Angle** — Spectrum 48K, Chalksoft,

**'A demonstration
tape has no
advantage over a
textbook'**

£11.25 — attempts an introduction to the concept of angle. Four programs are included in the package. Program A demonstrates the concept graphically by showing circles turning through quarters, halves and full turns, and when that has been done the idea of degrees is introduced.

Then follows a program to test these ideas based on a multiple-choice format. Program C moves into a demonstration mode to explain the use of a protractor to measure angles with graphics demonstrations. The testing mode in program D, however, reveals how closely a textbook format has been followed and the user has to hold up a protractor to the television screen to measure the angles. Come back pen and paper, all is forgiven.

Arnold Wheaton's **Angle Turner** — Spectrum 48K, £13.95 — covers the same ground but has strategies for testing which are not so tied to the conventional. Designed originally for use in the classroom, it is a thorough exploration of the concept embodied in its title. Two tapes and a users' handbook are included.

The demonstration package operates on a menu. The user has a choice of quarter turns, right angles, 45-degree, 10-degree and one-degree turns. The practice mode is designed "to reinforce the concept of angle as a quantity of turn" and test on each of the demonstration models, identifying such aspects as how many right angles?

keys

For more complicated options of 10- and one-degree units the computer draws an angle and the user is asked to estimate the angle. The margin of error can be fixed at the beginning of the program, as can the number of incorrect attempts before help is given in the form of calibrations round the circle so the pupil can count. Calibrations also reinforce a correct answer. After eight questions, or whatever number set, the mode changes and the pupil has to stop the circle being drawn when it reaches a given angle.

The tutorial program draws a shape and gives the number of degrees in digital form at the side; the child has to study the shape and then it is re-drawn; pressing any key will stop the drawing process at the desired point. There is a danger that children will just match the reading given in a box to the one required but pressing T will hide the shape readout and prevent that. The packaging is excellent and although that

of the exercise there is a choice of analysis or the menu.

The analysis option is useful, as it shows the correct forms of the verb which have been entered incorrectly by use of a bar of colour, thus highlighting the forms which need revision. Accents, circumflexes and cedillas are obtained by entering graphics mode and pressing the appropriate key.

The list of verbs shows all the verbs to be tested and the tests on meanings does precisely that, from English to French or vice versa. Tense French covers that area of revision in a thorough way and would certainly help users to concentrate on those forms of verbs where they had a weakness, even into the realms of the past historic.

Buying commercial programs can prove to be expensive, however, and for keyboard wizards there is the alternative of writing their programs. *Educational Uses of the Spectrum*, a Sinclair computer guide, by Tim Hartnell, Christine Johnson and David Valentine — John Wiley, £6.95 — would be of great assistance in writing programs such as those reviewed.

The first five chapters deal with basic programming, which would be superfluous for anybody who had worked through the Spectrum manual. The sec-

'The immediacy of feedback to the user would not only save hours of classroom time but also be of assistance at home for revision'

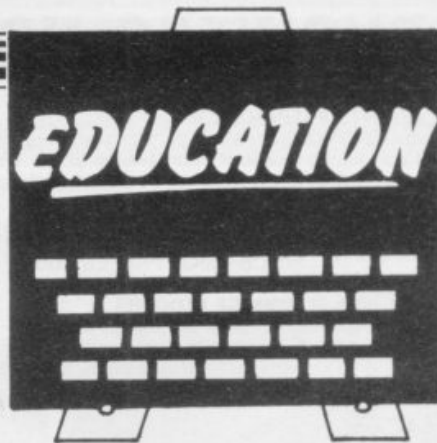
is no guide to the quality of the program, good design is always a delight, no doubt reflected in the price.

Another area which is susceptible to rote learning and testing is that old chestnut of French irregular verbs and their changes through the tenses. **Tense French** — Spectrum 48K, Sulis Software, £9.95 — would be equally useful at home or in the classroom. Once LOADED there is a menu with choices of change of tense — the program starts in the present tense; a list of verbs; tests on meanings; test on one verb; and a test on all/some verbs.

The choice of tenses covers the range, including the subjunctive. Once a tense has been chosen, either of the two testing situations can be chosen. When choosing one verb the user is presented with the verb of his choice and has to type-in the correct form of the verb after the initial preposition has been given. A score out of eight is built at the side of the screen and at the end

tion on using the Spectrum for advanced mathematics includes routines to cover series, square roots and quadratic equations, as well as graphics sections to cover such concepts as sine design and tangent curves for demonstration purposes.

Testing routines are also supplied and there is a useful section on primary school work with the Spectrum. The book is designed for parents and teachers and, although the price is high compared to works of fiction, it is about average for a computer publication, and the savings would be considerable if the



routines were used in place of commercial software.

Examples of software produced for the older child for the Spectrum have an immediate advantage over traditional methods in the immediacy of feedback to the user, and programs such as **Mathskills II** and **Tense French** would not only save hours of classroom time spent in testing but also be of assistance at home to identify and revise areas where a pupil was having difficulty.

It has to be said, however, that there is a relative dearth of secondary software produced so far. The market in the field has been dominated mainly by the smaller software houses, as the larger educational suppliers have been producing mainly for the school market, mostly for the BBC micro and the Research Machines models.

That is likely to change as software houses 'Spectrumise' programs previously available only to schools. Heine-mann has started the trend by adapting programs such as **Car Journey**, **Ballooning** and **Special Agent** for the age range up to 13 from a suite of programs produced by a team of teachers working at Dudley, called The Dudley Programs, and tentative plans are afoot to adapt more titles. **Understanding Your Weather**, **Dairy Farmer** and **Town Planner** are three of the possible candidates. Arnold Wheaton is inclined to do the same.

There are many titles available in the games section which are educational without relying on the demonstrate-and-examine formula. Programs such as **The Hobbit** develop problem-solving skills and encourage a logical approach, without being specifically educational packages.

Title	Machine	Publisher	Price	Gilbert Factor
Astro Maths	Spectrum 48K ZX81	Scisoft	£6.95	6
Mathskills II	Spectrum 48K	Griffin	£9.99	7
Angle	Spectrum 48K	Chalksoft	£11.25	5
Angle Turner	Spectrum 48K	Arnold Wheaton	£13.95	7
Tense French	Spectrum 48K	Sulis	£9.95	7
Sequences	Spectrum 48K	Chalksoft	£6.95	5

BUSINESS USERS

SPECTRUM 48K

ACCOUNTS PREPARATION

Produces Prime Entry Listings, Nominal Ledger, Trial Balance, Profit and Loss Account and Balance Sheet with supporting schedules. 73 nominal ledger accounts and automatic VAT calculations.

Sole Trader/Partnership (Up to 4) £25.00

Limited Company £25.00

(Combined Price £35.00)

SALES AND PURCHASE LEDGERS

Produces day book, sales/purchases and VAT analyses, debtors/creditors listings and statements. 250 accounts and 1000 monthly transactions. Automatically calculates VAT.

£25.00

ZX-81 16K

ACCOUNTS PREPARATION

31 nominal ledger accounts

Sole Trader £17.50

Limited Company £17.50

(Combined Price £25.00)

SALES AND PURCHASE LEDGERS

Produces day book, sales/purchase and VAT analyses, debtors/creditors listings, statements.

50 accounts and 200 monthly transactions.

Sales £20.00

Purchases £20.00

(Combined Price £25.00)

All programs have been professionally developed and are being used by practising accountants and small businesses. Supplied on cassette with operating instructions.

Full details:

HESTACREST LIMITED

P.O. Box 19, Leighton Buzzard, Beds. LU7 0DG

Tel 052-523 7785



COMPUTERS AT WORK IN THE

VEGETABLE GARDEN????



Here, at last, is a really practical use for the home computer. To ensure optimum utilisation of your plot and avoid that glut of vegetables during some months and nothing at all for others, here is the...

VEGA-TABLE

This versatile and easy to use program for the 48K SINCLAIR SPECTRUM computer is designed to help you decide what to have in your vegetable garden and when, where and how much to plant. You have only to divide the plot into manageable sections and then you move around it selecting and positioning crops as you wish. They "grow" before your eyes! You can see immediately if you are planting too close together or wasting space and you are guided into a straightforward 3 year rotation scheme.

You finish your planning with a clear picture (literally) of exactly where everything will be on your plot and a chart giving the date each crop is to be sown, when it should be ready for planting out and the likely harvesting season. You even get an estimate of the yield you might expect.

Stored within the program are details of over 40 varieties of commonly grown vegetables e.g. planting distances, sowing and harvesting dates etc. All carefully researched and verified.

Well worth £6.75 inc. VAT, p&p

Order now from:

VEGA SPACE SYSTEMS LTD.

Box 11, 28 Watford Road,

St. Albans, Herts.



campbell systems

The very best in machine code for the ZX Spectrum

Masterfile Spectrum 48K

YES - Microdrive compatible!

Acclaimed as the definitive filing system for the 48K Spectrum - MASTERFILE'S machine coded flexibility gives you 32K (max) per file - 26 fields per record - up to 128 characters per field - multiple level searches for numeric or character comparisons -

PERSONNEL SUMMARY (Sorted by surname)		
Employee	Dept.	Salary
Campbell B.A.	Admin	Secret
Campbell J.A.	Guest	Secret
Campbell J.A.	Program	Secret
Davidson L.A.	Admin	13545
Ding J.	Admin	9000
Ewing J.A.	Chairman	90000
John	Sales	15500

EXAMPLE ONE RECORD PER PAGE...	
Southfork Ranch, Dallas, Texas, USA.	
NAME Ewing J.A.	
DEPT Chairman	SALARY £90000
STOCK DA	GRADE X
Disassembler	
Press N for next page of...	
Press D twice to see full menu	
Press R then 1-4 to switch to another report	

Data presentation in any one of 36 user-defined displays which may be sequenced by any field - multiple level searches for numeric or character comparisons - USER BASIC for tailored processing.

Stock Summary sorted by Part Ref		
Ref	Description	Cost Quant
SUT	Widget, size 5	20.55 345
AGH	Antigravity hook	99.99 0
DA	Disassembler	5.95 50
GM	GULPHAN Gate	5.95 2400
MY	Mint holes	.10 25000
P13	13-amp Plugs	1.00 600
SHF	MASTERFILE	15.00 540
SHU	SHF Update	2.00 1000

SUMMARY by DEPARTMENT	
Admin	Campbell B.A.
Admin	Keats J.
Admin	Davidson L.A.
Admin	Zimmerman A.
Chairman	Ewing J.A.
Guest	Campbell J.A.
Programmer	Campbell Systems
Sales	Harrods

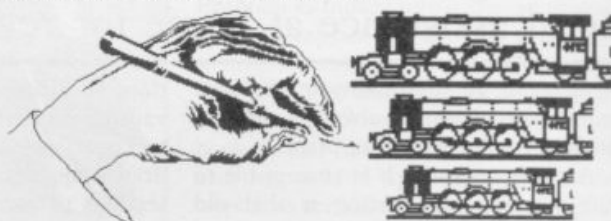
"... the most comprehensive of the data-bases ..."

Sinclair User June 1983

With example file and detailed manual £15.00

Drawmaster Spectrum 48K

DRAWMASTER is the ultimate DRAW AND PAINT utility for the Spectrum - compose your own HI-RES pictures with 8 direction 2 speed hand draw keys - fast fill - enlarge/reduce facility for all or part of the screen plus all the Spectrum colours and attributes - over 50 commands in all.



With detailed instructions £6.95

DLAN DISPLAY LANGUAGE Spectrum 16/48K

DLAN ('dee-lan') DISPLAY LANGUAGE is a powerful machine coded interpreter for generating DYNAMIC TEXTUAL DISPLAYS for advertising and education - all commands are single letter or symbol -



THEN
CYCLES
YOUR
DISPLAY
FOR AS
LONG AS
YOU
NEED...

With 4-way scroll of 11 specially designed typefaces through user-defined windows - With detailed manual £7.95

All programs mailed 1st class by return.
Prices include VAT and postage within Europe.

SAE for full list.

Dept. (SU) 15 Rous Road, Buckhurst Hill,
Essex, IG9 6BL England 01 504 0589



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 4

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 ELM SHOTT LANE, CIPPENHAM, SLOUGH, BERKS. TEL. (06286) 63531

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: SU4 32 - 33 LANGLEY CLOSE, REDDITCH, WORCESTERSHIRE.
B98 0ET. TELEPHONE: (0527) 21429 (21439 Answerphone)



World Class Darts



48K SPECTRUM

2 games in one
world class
&
killer
£6.95 (inc. p.p.)

tape includes
bonus game
mistermind
£6.95 (inc. p.p.)

Mix n' Match



48K

48K

Stock Control

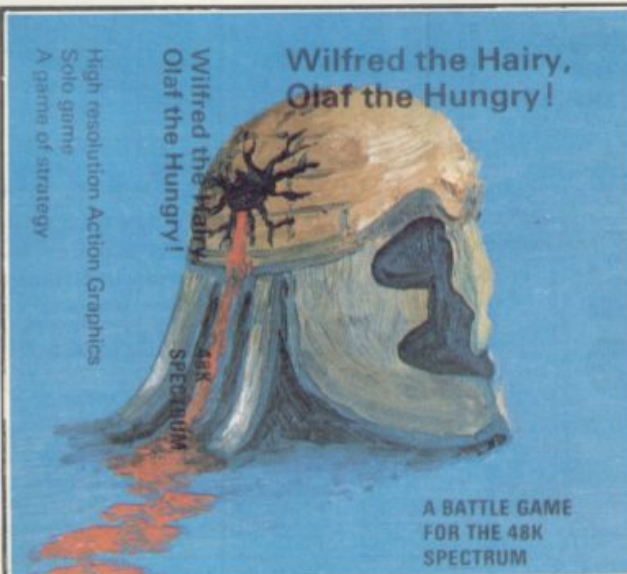
48K A specialist programme for the small business, which not only keeps track of over 400 items, but automatically prints out lists of items that require re-ordering and also ALPHABETICAL RETAIL PRICE LISTS as and when required.

£10.95 (inc. p.p.)

PLEASE SEND CHEQUE / POSTAL ORDERS TO:

7. moss carr avenue. kelghley. yorkshire.

TRADE ENQUIRIES WELCOME



WILFRED THE HAIRY, OLAF THE HUNGRY!

It is the age of the Vikings!, the world is constantly under attack by the power-mad army of 'Wilfred the Hairy'. You have a castle to defend and continents to capture, but beware! plagues of RATS destroy your supplies and send you scurrying home. Rampant FLEAS infest Wilfred sending him to his castle to delouse.

You control Olaf's army but watch out! Wilfred analyses every move you make and so creates a STRATEGY for attack. A game of high resolution action graphics to stretch your powers of LOGIC to the limit — you can only win by lateral thinking!

A SOLO game for the SPECTRUM 48K

£5.50 (inc. VAT & First Class Postage)
Despatch within 48 Hrs. (Overseas add 10%)

Quantity I enclose a Postal Order/Cheque payable to MICROBYTE
please send me Name
Wilfred the Hairy £5.50 Total Address
£..... Postcode.....

MICROBYTE 19 WORCESTER CLOSE, LICHFIELD, STAFFS WS13 7TD



"POOLSWINNER"

THE ULTIMATE POOLS PREDICTION PROGRAM

- PREDICTS** Not just SCOREDRAWS, but NOSCORES, ALWAYS and HOMES.
- IT WORKS** We **guarantee** the program performs significantly better than chance.
- ADAPTABLE** "Poolswinner" allows the precise prediction formula to be set by the user — you can develop and test your own unique method. Probabilities are given on **every** fixture — choose as many or as few selections as you wish.
- EASY TO USE** Fully menu driven, with detailed instruction Booklet.
- DATABASE** The program comes complete with the largest database available — over 20,000 matches. The database automatically updates as results are fed in.
- SPECTRUM (48K) ZX-81 (16K) £15.00 (all inclusive)**
- We produce databases for those developing their own prediction program. 2 years results £7.50. 5 years results £12.50.
- Also "COURSEWINNER" — Computer aided horse betting — £9.50
- Available from dealers, or direct (return of post) from . . .

Selec Software

37 Councillor Lane,
Cheshire, Cheshire
061-428 7425

DEALER ENQUIRIES WELCOME



One figure
that can
blow your
computer's
mind

A voltage spike in the mains supply can wreak havoc with a computer. It can measure more than 3,000V — far above your equipment's safety limits.

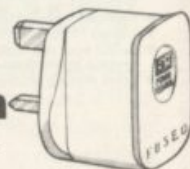
In the office, it leads to program crashes and the loss of hours of expensive work.

For a supplier, it can mean frequent callbacks, damage to equipment and damage to your reputation.

Voltage spikes happen too often — and all it takes to guard against them is a plug.

B & R's PowerCleaner. It costs just £9.09 + VAT, fits in place of an ordinary plug, and limits any power surge to a safe level. Fit it to every computer and v.d.u., and a voltage spike should never damage your business again.

Write for your nearest stockist



PowerCleaner



Because it's not worth the risk

B & R Electrical Products Limited, Temple Fields, Harlow.
Essex CM20 2BG. Tel: Harlow (0279) 34561. Telex: 81140.

NEW!
For ZX Spectrum 48K



Computertutor can give your child a head start with games that really make fun out of learning

Children of today are fascinated by computers. With micros already used in schools throughout the country their involvement in education and in our daily lives is increasing all the time.

To give young children a head start we've created, with parents, teachers and, of course, children, the Clever Clogs series, designed to appeal to children in the 3-7+ year old age group. Help them develop basic skills, stimulate imagination and increase their self-confidence. Unlike similar products, each Clever Clogs program offers a wider choice of games to play. And each game can be made more "difficult" by simple editing of the tape and resetting new questions. In this way you can keep up with your child's progress — even link the questions into work they're doing at school.

The Clever Clogs series can be used by your whizzkid on their own with initial help from you.

Price of each program £6.50
(incl. Vat, P & P). Overseas orders
£1 extra per tape for airmail delivery.
Money back guarantee.

Trade enquiries invited.



AVAILABLE
AT
W H SMITH

PARTY TIME for Age 3 yrs +

With parent's help even tiny tots will love to play these party games. They can 'blow out' the candles on a cake, sing along with nursery rhymes, even draw on the screen. If you have a printer you can record your Clever Clogs artistic efforts and watch their progress as they develop new skills. Because each Clever Clogs program offers a choice of games to play and has the facility to increase the 'difficulty' factor your children won't grow out of them so quickly.

JUNGLE JUMBLE for Age 5 yrs +

At this age less parental help and guidance are necessary. Your child will continually be seeking new experiences and will enjoy his/her mind being challenged. Clever Clogs satisfies both criteria.

Correct answers to questions build up a picture of an animal — is it a real one? That's up to the player. Take your choice and create your own unique zoo. Then enter the great Safari Park chase . . . the possibilities are endless!

WHIZZ QUIZ for Age 7 yrs +

A game of skill and chance for 1-4 players that will get your whizzkids thinking hard. But Clever Clogs of this age like a challenge. You can proceed from the general knowledge questions already programmed and you can enter up to 100 questions of your own — there's tremendous scope here for the really clever. Clever Clogs! Watch them develop their three "R"s and in a way that will fascinate you as much as them.

*Also for ZX Spectrum 81 (16K)

Please send me: I enclose cheque, PO payable to Computertutor, or please debit my credit card, for the Total £

copies of PARTY TIME (3 yrs +) at £6.50 per tape
copies of JUNGLE JUMBLE (5 yrs +) at £6.50 per tape
copies of WHIZZ QUIZ (7 yrs +) at £6.50 per tape
*Also for ZX 81 (16K)

Name

Address



Card no.

Postcode

Please allow 7 days for delivery

Computertutor, P.O. Box 3, St Neots, Huntingdon.
Cambs PE19 3NW Telephone: (0480) 213969

cp software | Spectrum Programs

SUPERCHES 3.0

ABSOLUTELY GUARANTEED ABLE TO BEAT ALL OTHER SPECTRUM CHESS PROGRAMS

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

At the tournament level Superchess 3.0 has a look-ahead of five to seven ply (moves) in the middle game, and ten to twelve ply in the end game. This gives Superchess 3.0 a substantial advantage against other chess programs and promises the experienced player an interesting and challenging game of chess.

Unlike other chess programs, Superchess 3.0 is not just a brute-force calculator, but employs artificial intelligence techniques to allow deeper searching along the main lines of play.

FEATURES:

- 10 levels—all play within tournament time limits.
- First level made especially easy for beginners.
- Easy to use—help menus provided.
- Recommended move option.
- Change sides and level during game.
- Self play mode.
- Set up/change position.
- Technical information—how the program 'thinks'.
- Program's internal score for position displayed.
- Number of evaluated positions displayed.
- Library of opening moves.
- Select your own colour scheme for graphic board display.
- Solve mating problems—up to mate in four.



48K SPECTRUM—Price £8.95

PINBALL WIZARD

—For any Spectrum

Superb, colourful fast-action graphics and sound give this game the feel of a real arcade pin-table.

With realistic launch, flippers, bumpers, high-score, bonus scores and freeball features.

Be a Wizard!

FOR ANY SPECTRUM £5.95



FOR ANY SPECTRUM

BRIDGE PLAYER

PLAY AN ENTIRE GAME OF BRIDGE AGAINST YOUR SPECTRUM —WITHOUT GETTING IN THREE FRIENDS FOR THE PURPOSE

Dealing—the program shuffles, deals and sorts the cards to produce randomly dealt hands. An almost infinite number of hands are therefore possible, with all kinds of distributions.

Bidding—is in the familiar ACOL system, including Stayman and Blackwood conventions. You bid your hand while the Spectrum bids the other three hands.

Card Play—you play from your own and dummy's hands, which are displayed as they would be at the bridge table, with the program playing the other two hands.

Scoring—at the end of each hand the score is calculated, including honours, slam and rubber points. Both the old and new scores are displayed in the usual manner.

Replay—at the end of each hand, all four hands can be displayed and, if desired, the hand replayed.

48K SPECTRUM
BRIDGE PLAYER—£8.95

An ideal complement to the Bridge Player Program:

Bridge Tutor (Beginners)—£5.95
Bridge Tutor (Advanced)—£5.95



SPECIAL OFFER:

Bridge Player and both
Bridge Tutors—£18.95

Plus for 48K Spectrum unless otherwise stated:

PLUS for 48K Spectrum:

FLOATING POINT FORTH with EDITOR	£13.95	DRAUGHTS	£5.95
INTEGER FORTH	£9.95	BACKGAMMON	£5.95
SUPERCHES II	£7.95	SNAIL LOGO (Turtle Graphics)	£9.95
SUPERCHES I (16K ZX81)	£4.95	COLOSSAL CAVES	£6.95
16K SUPERCHES (16K Spectrum)	£6.95	GOLFING WORLD	£5.95
REVERSI	£6.95	SPECTRUM EXTENDED BASIC	£9.95

SUPERCODE

—for 16K and 48K Spectrum

100+ ROUTINES

This is a superior machine code tool kit with one hundred machine code routines that are relocatable for use in your own BASIC and/or machine code programs, the combined user friendly BASIC program, 48k Spectrum only, gives easy access to all routines: • Index of routines. • Call up details of each routine including all information required to tailor the routine to your needs. • Demonstration of how the routine works under software control, the demonstration is repeatable. • Save and verify individual routines. • Comprehensive user guide.

1. Block Memory Insert	24. Sci-Fi Character Set	47. Wait-Key
2. Block Line Delete	25. Memory Available	48. Strings to Upper Case
3. Chr\$ Swap	26. Line Renumber	49. Strings to Lower Case
4. Chr\$ Scramble	27. Uni-Note Sound-Gen	50. Program to Upper Case
5. Super-Renumber	28. Dual-Note Sound-Gen	51. Program to Lower Case
6. 2 Byte Converter	29. Uni-Beep Simulator	52. Confuse
7. Dec→Hex Converter	30. Multi-Beep Simulator	53. Clarify
8. Hex→Dec Converter	31. Screen Fill	54. Space Saver
9. Remkill Condenser	32. Screen Store	55. Screen Overprint
10. On Error Goto	33. Screen Exchange	56. Screen Invert
11. On Break Goto	34. Protect Program	57. Clear All
12. Free-Scroller	35. Block Copy	58. Ink Change
13. Non-Deletable Lines	36. Contract	59. Paper Change
14. Border Effects	37. Expand	60. Flash On
15. Screen Search	38. Expand Rem	61. Flash Off
16. Variables Search/List	39. Append	62. Bright On
17. 24-Line Printing	40. Count Program	63. Bright Off
18. Star Draw	41. Tape Header Reader	64. Screen-Print
19. Flash Switch	42. Address	65. Random Number Generator
20. Bright Switch	43. Checker-Board	
21. Paint Shape	44. Remove Colours	
22. Record Sound	45. Display Memory	
23. Replay Sound	46. Hex Loader	

Routines 66-100: Screen routines

SUPERCODE £9.95

Also available at Boots, W.H. Smith and all good computer shops.

DELIVERY: UK—prices include VAT and postage & packing. Send SAE for Catalogue.

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

Send Cheque, Postal Order or Access No. to:
CP SOFTWARE, Dept PCW1A
17 Orchard Lane, Prestwood,
Bucks HP16 0NN



GLOSSARY

Basic — Beginners' All-purpose Symbolic Instruction Code. A programming language resembling English which is used by beginners because most popular microcomputers have it as standard.

Bug — an error in a program.

EPROM — Erasable Programmable Read-Only Memory. Semi-permanent storage. Information is not erased if the power is turned off in the computer. Programs can be erased by subjecting the memory chips to ultraviolet light. The memory can then be re-programmed using an electrical device called an EPROM blower.

Interface — RS232 and Centronics. A device which enables other computers or add-ons, such as printers, to be connected to the computer. It converts non-standard signals from add-ons to the standard signals of the computer in use.

Kilobyte — (K). A measurement of memory size. Most machines use 16K as a minimum but 48K is generally agreed to be necessary for serious work.

Machine code — an electronic pulse code used by the computer to perform functions and communicate with memory and other devices.

Mnemonics — abbreviated instructions — for example LD for Load — used in machine language programming.

Motherboard — an external printed circuit board which is used like a multi-way plug planner. It enables other printed circuit boards, such as graphics boards and colour boards, to be slotted-in.

Port — a link to the outside world which can be used by programs and the computer.

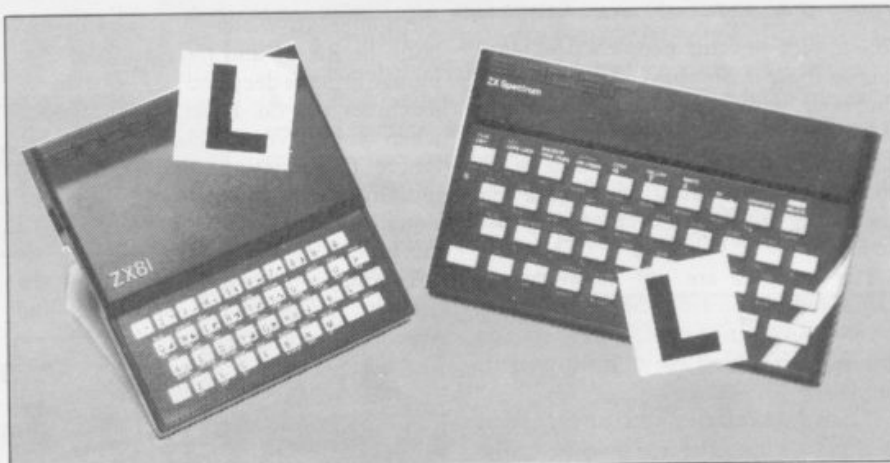
PCB — printed circuit board. A board which has on it the electronic circuits of the computer.

RAM — Random Access Memory. Information and programs can be stored in this type of memory as electronic pulses which conform to a set of numbers — machine language — in which programs are represented in the computer. When the power is turned off the information will be lost.

ROM — Read Only Memory. Information stored in this type of memory is not lost when the power is switched off.

Software — programs which control the operation of the computer.

Syntax error — a bug caused by incorrect use of a programming language.



Our easy-to-follow guide for new owners

The basic route to a habit-forming hobby

BUYING a Sinclair machine can be the start of a life-time's obsession with home computing. It is easy, however, to become discouraged if everything does not go according to plan from the beginning.

For those with only a little knowledge of computers and their capabilities, the best way to approach the machines is to abandon any ideas for special uses. While the 48K Spectrum is big enough for simple uses in small businesses, the range of Sinclair computers does not contain machines for major uses. It is better to become accustomed to the many facilities and then decide how you wish to use them.

Begin by unpacking your machine, overcoming your surprise at its size and weight and, following the manual, set up the system. If you cannot get the K on the screen, check that everything is plugged into its correct socket and re-set the machine by pulling-out the power plug for one second and try tuning-in again. If still nothing appears, check the power supply unit by shaking it. If it rattles, return it. If it is satisfactory, check your system with that of a friend.

If you have a Spectrum you will have received an introductory booklet which explains what the computer can do and giving detailed instructions on how to set it up. Also included is a fault-finding guide.

Once the K appears you are ready to begin learning about your machine. It can prevent family arguments if you can afford a separate television set for your system. It also makes life easier if you find somewhere to leave your equipment

set up permanently. You will find that a few power sockets are needed and a four-way block connector on a short length of extension cable will help to tidy trailing leads.

When using a Spectrum, a television set has to be more finely-tuned than when using a ZX-81 because of the added dimension of colour. If the set is not tuned properly, the colours will look hazy instead of sharp and clear. If no colour can be seen when it is switched on, the power supply or the television set may be at fault.

Some users have experienced some difficulty with some television sets, which include Hitachi, Grundig and Toshiba. Sets which many people have found compatible include the Sony Trinitron, Fidelity and Ferguson. Recent changes in the ULA should make more sets compatible.

The manuals are written in great detail and are reasonably easy to follow. Some of the chapters may not seem immediately relevant but it is worthwhile reading them as you might miss something important.

Patience is needed at that stage to learn the ways in which the computer will accept information. It is tempting to try to enter programs before you are ready but that is likely to lead to errors. For example, words like AND, THEN and AT should not be typed-in letter by letter.

By the time you have reached chapter 11 in the ZX-81 manual and chapter 19 in the Spectrum manual you should have accumulated sufficient knowledge to be

continued on page 114

Starter pack

continued from page 113

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.

CROSS COUNTRY

YOU ARE a cross country runner represented by a 'v'. Part of the course you run includes a field full of cows. Avoid the cows as they rush towards you to complete a successful run and to reach home safely.

Cross Country was written for the unexpanded ZX-81 by Timothy Green of Sandy, Beds.

```
3 FOR F=1 TO 60
4 IF F=60 THEN GOSUB 10
5 NEXT F
10 LET H=16
20 LET S=0
30 PRINT AT 21,INT (RND*31)) "*"
"
40 PRINT AT 10,H)
50 IF PEEK (PEEK 16398+256*PEE
```

```
K 16399)=23 THEN GOSUB 120
60 PRINT "v"
70 SCROLL
80 IF INKEY$="5" THEN LET H=H-
1
90 IF INKEY$="8" THEN LET H=H+
1
100 LET S=S+1
101 IF S=500 THEN GOSUB 500
110 GOTO 30
120 PRINT AT 9,H) ("9v"SP:9t:30*
SP:9t:13P:9t)
130 PRINT AT 12,0;"BAD LUCK/PRE
SS NEWLINE TO PLAY"
140 INPUT Z$
145 CLS
150 GOSUB 10
500 PRINT AT 12,0;"WELL DONE/RU
N COMPLETED"
505 PRINT AT 16,H) ("13P:9v:30*1
SP:95:2*1:95:20*13P:9t:2*97:9v)
"
510 PRINT AT 14,0;"PRESS NEWLIN
E TO PLAY"
520 INPUT X$
525 CLS
530 GOSUB 10
```


SLEEPING BEAUTY

```

2 LET B=NOT PI
3 LET S=NOT PI
5 LET X=INT (RND*CODE "A")
6 IF X>CODE "2" THEN LET X=-X
7 LET Y=INT (RND*CODE "A")
8 IF Y<CODE "2" THEN LET Y=-Y
9 LET D=SQR (X*X+Y*Y)
10 PRINT INT D;"km->castle"
11 PRINT "N/S/E/W?"
12 GOSUB CODE "A"
13 LET X=X+(D$="N")-(D$="S")
14 LET Y=Y+(D$="E")-(D$="W")
15 IF X=NOT PI AND Y=NOT PI TH
EN GOTO CODE "9"
16 LET D=INT (RND*CODE "$")+PI
/PI
17 LET D$=("OGRE" AND (D<VAL "
6"))+("SWORD" AND (D>VAL "5") AN
D (D<VAL "9"))
18 IF D>=VAL "9" THEN GOTO VAL
"9"
19 PRINT "found";D$;"n\l"
20 IF D$="OGRE" AND S=PI/PI TH
EN GOTO CODE "0"
21 IF D$="SWORD" THEN LET S=PI
/PI
22 IF D$="SWORD" THEN GOTO VAL
"9"
23 IF D$="OGRE" THEN PRINT "wa
it(7)run(6)"
24 GOSUB CODE "A"
25 IF D$="7" OR D$="6" THEN GO
TO CODE D$
26 IF D$<>" " THEN GOTO CODE "7
"
27 GOTO VAL "9"
28 LET S=NOT PI
30 LET B=B+PI/PI
31 PRINT "OGRE DEAD BY SWORD"
32 GOSUB CODE "A"
33 GOTO VAL "9"
34 IF RND*VAL "9">PI/PI THEN G
OTO VAL "9"
35 PRINT "dead"
36 STOP
37 PRINT "princess
wake";B;"d
ead ogre"
38 INPUT D$
39 CLS
40 RETURN

```

SLEEPING BEAUTY is a 1K adventure game by Kevin Wright of Northgate, Hull who wrote it because his friends believed a 1K adventure game written in Basic was impossible to program. The object is to reach the princess who is sleeping in the castle. You must kill the ogres who are placed along your route by the wicked fairy. You are armed with the swords which are distributed by good fairy. Lower-case characters represent inverse letters.

The variables

A VARIABLE is a location within the computer memory which stores a value such as a number or a string of characters.

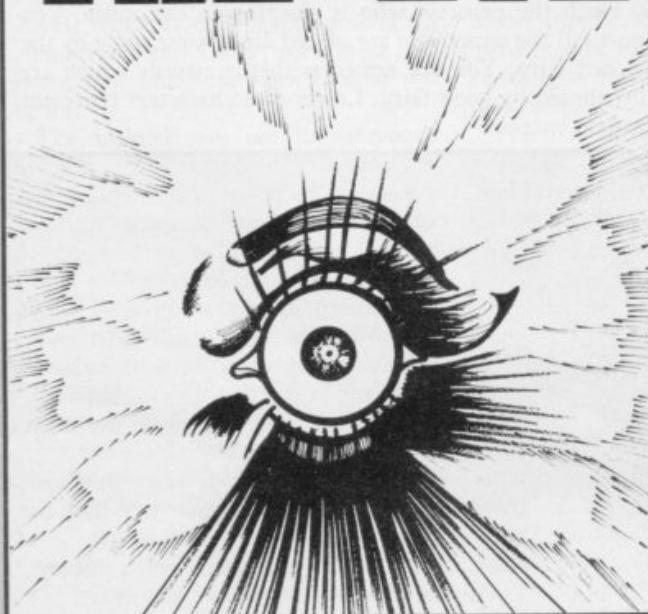
The variables used in the program are:

- B the number of battles fought and won.
- S if you own a sword then 'S' will equal 1. Otherwise, S will equal 0.
- X and Y Those contain your co-ordinates on the castle floorplan grid.
- D That will be used for different purposes during the program, but it is used mostly to hold the value of your distance from the castle.
- D\$ A chain or string of characters which indicates the direction in which you are travelling.

The Program lines

- 2 and 3 make the values of B and S equal to 0.
- 5-8 put random position numbers in X and Y.
- 9 uses the square root function to find your distance from the castle.
- 10 and 11 display your position and the directions in which you can move on the screen.
- 12 calls the subroutine, a program within a program, starting at line 38. That routine will prompt you to enter a string of characters which will be put into the variable D\$.
- 13 and 14 find your new position on the map grid.
- 15 if X and Y both equal 0 then you have reached the castle. If that condition is true, go to line 37; if not, continue to next line.
- 16 finds a random integer between 1 and 13.
- 17 if D equals a number between 1 and 5 put "OGRE" into D\$. If D is between 6 and 8 put "SWORD" into D\$.
- 18 if D is greater than 9 then go to line 9.
- 19 print what you have found on the screen.
- 20 if you encounter an OGRE and you have a SWORD then go to line 28.
- 21 and 22 if you found SWORD put 0 into S and then go to line 9.
- 23 and 24 if you met OGRE and you have a SWORD then the options available are displayed and prompt for a response.
- 25 go to line 34 or 35 depending on the number you get from the input, entry, routine.
- 26 if you have not put in a response allowed by the computer go to line 35.
- 28-30 make S equal 0 and increase B by one for the number of battles won.
- 31 and 32 display a message and wait for NEW LINE.
- 34 and 35 depends on lines 25 and 26 and gives you a random chance of dying.
- 36 STOPs you as you are dead.
- 37 congratulations and number of battles won.
- 38-40 player-response entry routine used in line 12.

THE EYE



WHEN THE PROGRAM is RUN a large flickering eye is displayed on the screen and that is accompanied by a sound effect. Pressing any key will produce a flashing border and a different sound effect along with a message from Big Brother. **The Eye** is a beginners' program written for the 16K Spectrum by S Burke of Buckhurst Hill, Essex.

```

1 REM BIG BROTHER
2 BORDER 0: PAPER 0: PAPER 0:
INK 6: CLS
3 PLOT 0,100
4 DRAW 255,0,PI/1.4
5 DRAW -255,0,PI/1.5
6 INK 2
7 PLOT 80,45: DRAW 100,100,55
6
8 FOR z=65 TO 1 STEP -1
9 IF INKEY$("<>") THEN GO SUB
100
10 LET x=RND*10
11 LET Y=RND*10
12 BEEP .003,Z
13 INK RND*7: PLOT 128+X,82+Y
14 NEXT Z
15 GO TO 8
100 PRINT #0: FLASH 1;" SMILE
BIG BROTHER IS
WATCHING YOU "
101 FOR L=1 TO 80: OUT 254,0: O
UT 254,255: NEXT L
102 INPUT INKEY$
103 RETURN
    
```



SHOOT THE NUMBER

YOU MUST SHOOT the numbers as they move up the screen. The numbers are mixed with letters and if you hit a letter by mistake or if you miss a number the game will end. You are then told how long you lasted. **Shoot The Number** was written for the 1K ZX-81 by John Gregory of Preston, Lancs.

```

1 LET S=0
9 SCROLL
10 LET X=INT (RND*20)+28
11 PRINT AT 21,10;CHR$ X
15 PRINT AT 10,0;"X";AT 10,0;C
HR$ ((S-S)*S)
16 IF INKEY$("<>") THEN GOTO 20
17 GOTO 9
21 PRINT AT 10,1;"*****";A
T 10,1;"
22 PRINT AT 10,10;
23 IF PEEK (PEEK 16398+256*PEE
K 16399)<38 THEN GOTO 30
24 PRINT AT 0,0;"SCORE=";S;0
30 LET S=S+1
31 GOTO 9
    
```


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.

TASWORD TWO THE WORD PROCESSOR

48K
SPECTRUM

64 CHARACTERS PER LINE ON THE SCREEN AND TO PRINTERS!
MICRODRIVE COMPATIBLE — instructions supplied

"The number of on-screen prompts, together with the excellent manual, make it ideal — even for an absolute beginner."

PERSONAL COMPUTER WORLD September 1983

"What makes a word processor more or less versatile is its control features. Tasword Two offers an impressive selection and the tutor program succeeds in demonstrating them admirably."

ELECTRONICS AND COMPUTING November 1983

"Tasword is showing a degree of sophistication that business computers took many years to develop."

WHAT MICRO? October 1983

TASWORD TWO The Word Processor*

Your Spectrum becomes a **professional** word processor with TASWORD TWO. TASWORD TWO gives you an amazing **64 characters per line** on your screen. This is ideal for standard A4 paper and TASWORD TWO prints your text just as it appears on your screen.

Tasword Two drives the following interfaces:

Cobra RS232 I/O Port	Kempston Interface
Euroelectronics Interface	Morex Interface
Hilderbay Interface	Tasman Interface
Sinclair ZX Interface 1	ADS Interface

The same program drives these interfaces. A short easy to follow set of instructions takes you through setting up your Tasword Two to drive the interface you have or choose to buy. Tasword Two also drives the ZX printer.

Tasword Two is readily adapted for the microdrives to give super-fast saving and loading of both program and text. The microdrive instructions are supplied with the Tasword Two manual.

£13.90 fully inclusive mail order price.

TASWORD TWO TUTOR

TASWORD TWO comes complete with a manual and a cassette. The cassette contains your TASWORD TWO and TASWORD TWO TUTOR. This teaches you word processing using TASWORD TWO. Whether you have serious applications or simply want to learn about word processing, TASWORD TWO and TASWORD TWO TUTOR make it easy and enjoyable.

TASWORD TWO £2 Demonstration Cassette

See for yourself the powerful features of TASWORD TWO. Send just £2 for the Tasword Two demonstration cassette. A voucher is included which gives you £1 off the price of TASWORD TWO.

All prices include VAT and post and packaging

* Available from larger branches of Boots

For further information on all these products send an s.a.e. with "Tasman Brochure" written on the flap.



Send cheque/P.O. or Access number with order.
Telephone Access orders: Leeds (0532) 438301

TASWIDE — 64 characters per line!

A machine code utility program, TASWIDE **doubles** the information that your own programs can display. Make a simple change to your print statements and your output appears on the screen at 64 characters per line instead of the normal 32. Both print sizes can be mixed on the screen. 16K and 48K versions supplied on the same cassette.

£5.50 fully inclusive mail order price

TASMATH 1

Mathematics education. Three programs on one cassette: TASIMEQ — simultaneous equations
TASQUAD — quadratic equations
TAS-TRIG — trigonometry of right angled triangles.
Available for the 16K and 48K Spectrum and for the BBC model B.

£5.95 fully inclusive mail order price

TASPRINT

A must for dot matrix printer owners! Print your program output and listings in a choice of five impressive print styles. Drives all the printer interfaces listed under Tasword Two and all dot matrix printers with bit image graphics capabilities. You can also use TASPRINT to print Tasword Two text files. TASPRINT gives your output originality and style! Send s.a.e. for brochure which includes TASPRINT output.

£9.90 fully inclusive mail order price

TASMAN PARALLEL PRINTER INTERFACE

Plug into your Spectrum and drive any printer fitted with the Centronics standard parallel interface. Supplied complete with ribbon cable and driving software. The cassette includes LLIST, LPRINT, and **text** screen copy software for all centronics printers. The user changeable interface software makes it easy to send control codes to your printer using the method so successfully pioneered with Tasword Two. The cassette **also** contains fast machine code high resolution screen copy software for Epson, Star, Seikosha, Shinwa, and Tandy Colour Graphic (in colour!) printers. Send s.a.e. for brochure which includes sample print-outs and a full list of printers supported by screen software. Compatible with microdrives/ZX Interface 1.

£45 fully inclusive mail order price

TASMAN RS232 PRINTER INTERFACE

Specification and software as above but drives printers fitted with the RS232 standard interface. A low cost route to printing — especially suitable for use with the Tandy Colour Graphic printer and the Brother portable typewriter/printers. Supplied complete with cable — please specify whether 4 pin DIN or 25 way D plug required.

£38 fully inclusive mail order price

TASMAN SOFTWARE

Dept. SU

17 HARTLEY CRESCENT LEEDS LS6 2LL

Introducing . . .

MICROHOLICS ANONYMOUS

. . . a new force in microcomputer software.

At M.A. we have many years experience of systems analysis and assembly language/machine code programming of microcomputers and mainframes. Using this experience we produce high quality state-of-the-art software products, superior in both function and value for money to other similar products on the market.

and

ULTIMON

. the ultimate ZX Spectrum monitor.

In every respect ULTIMON is a typical M.A. product. It is a machine code monitor for the 48K ZX Spectrum and as such provides many facilities which are similar to those provided by other monitors viz:

Alter memory, Set breakpoints, Disassembly, Display flags, Go (start/resume execution), Convert hex/decimal, List breakpoints, Modify registers (by name), display program status (registers), Display memory (hex and char), Copy memory, Search memory, ZX printer output, Quit (return to basic), Microdrive compatibility, etc.

It is not our intention to extol ULTIMON because it has the elementary features which any self-respecting monitor should have. Rather we would draw your attention to those features which, we are sure you will agree, make ULTIMON the only ZX Spectrum monitor worth YOUR consideration.

VIDEO SWAP (Selectable)

This feature alone probably represents the greatest single advance in ZX Spectrum monitor facilities since their inception. When you select video swap ULTIMON and your own program have separate video displays. Your own program's display is never affected by ULTIMON output and you can switch between the displays at will. All ULTIMON facilities are available without restriction. Debugging graphics programs becomes a positive pleasure!

MULTIPLE (SOFT) BREAKPOINTS

We won't labour the subject of what can go wrong when monitors overwrite three bytes of your program to set a breakpoint, or the near impossibility of trying to interrupt execution of a loop on each iteration. Suffice it to say that ULTIMON's breakpoints are non-overwriting, you do not have to reset them to resume execution and you may have up to twenty active at once. You can, of course, also set breakpoints in ROM.

CONSTANT STATUS WINDOW (Selectable)

You may elect to have the program status (registers, current instruction disassembly) constantly on display while in command input mode. This applies equally in video swap mode and does not affect your program's display.

BREAK KEY INTERRUPTION

You may break into your program's execution at ANY time. No more having to pull out the plug on runaway loops!

ERROR DETECTION/ANALYSIS

ULTIMON detects and interrupts execution when you program jumps out of bounds (calls to ROM exempted), POPs the stack pointer too far, or tries to execute an invalid instruction. Furthermore, when it jumps out of bounds (e.g. by issuing a RET following unmatched PUSHes and POPs), ULTIMON takes you right to the source of the problem and tells you where it jumped FROM. No more system crashes on jumping out of bounds!

ZX PRINTER OUTPUT

You may elect to have ULTIMON's output directed to the ZX printer. The screen is then never used by ULTIMON (until you decide otherwise) and your program's screen output is never affected. Your program may also use the ZX printer either alone or at the same time as ULTIMON.

BREAK ON CHANGE

ULTIMON will, on request, continuously monitor the contents of a named register pair or a specified area of RAM and generate a break condition when the contents change. If you've ever had a program which accidentally overwrites itself, you will appreciate the value of this feature.

SINGLE STEP/TRACED EXECUTION

You may single step your program's execution with single keystrokes or hold down the key for repeated single stepping. Alternatively you may request traced execution at any one of ten speeds. In both cases ULTIMON output is the same as that produced for any break condition and includes one or more interruption codes and a disassembly of the instruction about to be executed.

HOT KEYBOARD

ULTIMON minimises your keying requirements by using a 'hot' keyboard technique (like INKEY). Full Sinclair keyboard debounce and repeat key capability are used and no delimiters (commas, spaces) are required. Shift keys are required only for specification of alternative register names. Invalid input is refused at the individual character level by non-acknowledgement.

DOCUMENTATION

The ULTIMON manual is of very high quality and contains, in addition to a complete description of the facilities provided, a comprehensive sample session. This session demonstrates most of the features available and provides sufficient introductory training for you to begin using ULTIMON straight away.

ULTIMON costs only £13.50 (POST FREE) but orders received before 1st April 1984 will be charged at the special introductory price of £12.50

Reference manual alone £1.50 (Refundable against eventual purchase)

ACCESS/P.O. orders by return (Cheques must be clear)

Telephone orders (24 hours):

0642-787389

or mail order from:

MICROHOLICS ANONYMOUS

Lord Nelson House (SU)

21 High Street, Yarm

Cleveland TS15 9BW



Dealer enquires welcome

SINCLAIR USER April 1984

BRIDGE SOFTWARE

THE NIGHT SKY

(for any Sinclair Spectrum)

An observer's guide to the stars visible from the UK (48 to 58 North)

Discover the fascination of the limitless heavens.

Create brilliant hi-res starcharts with

THE NIGHT SKY and your Spectrum

- Features over 700 different stars
- 50 constellations identifiable
- Sky colour indicates day, night or twilight
- Make your TV screen a mini planetarium
- 5 magnitudes distinguished
- Over 4 million different skyscapes
- Ideal for serious astronomers and novices alike

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

Send £8.90 for cassette and Manual

EPHEMERIS

(for any Spectrum and ZX81 16k)

Simply enter any date, time, longitude, latitude... then select SUN, MOON or planet from the Menu

Printout includes all the information you need:-

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

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

STATISTICS I

(for any Spectrum and ZX81 16k)

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

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

STATISTICS II

(for Sinclair Spectrum 48k)

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

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

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

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

Full money back guarantee. Trade enquiries welcome



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

TRANSFORM LTD.

Business Software

FOR SMALL BUSINESSES AND THE SELFEMPLOYED

Business Bank Accounts

This program enables you to make debits under 17 sub-headings. Statements includes totals of all subheadings.

ZX SPECTRUM 48K £10.75

Sales Day Book

For all your invoices, this program will enable you to prepare statements of outstanding invoices. Program will also calculate VAT.

ZX SPECTRUM 48K £10.75

Purchase Day Book

Keeps a complete record of all your purchases under 17 sub-headings. This program will also calculate VAT.

ZX SPECTRUM 48K £10.75

Business Packs

Incl. Bank Account, Sales, Purchase programs.

ZX SPECTRUM 48K £25.00

Stock Control

Handles 900 lines, includes details of supplier. Program has full search facilities enabling you to search & update all lines from one supplier. It is also possible to deduct items from stock.

ZX SPECTRUM 48K £10.75

Invoicing

This Program will print out invoices, calculate discounts and VAT. The program will calculate totals from unit prices, giving the description of each unit price.

ZX SPECTRUM 48K £15.00

Word Processing by Tasman

Tasword Two is a powerful word processing program that will perform all the functions available on large word processors. The program will give you on screen 64 characters per line.

ZX SPECTRUM 48K £13.90

Masterfile by Cambell Systems

This is one of the best data systems available for the ZX Spectrum. This program has many uses in a small business.

ZX SPECTRUM 48K £15.00

Dlan by Cambell Systems

Use your Spectrum to sell your products. Dlan will display your message in up to 11 different typefaces. Will scroll in any direction.

ZX SPECTRUM 48K £7.95

64 Column Generator by Tasman

You can use this program within your programs to display 64 columns of screen.

ZX SPECTRUM 16-48K £5.50

Payroll by Byte One

This payroll program will handle up to 40 employees and can calculate NIC, PAYE, superannuation and many other deductions. This is a very user friendly program and extremely good value.

ZX SPECTRUM £19.95

Omnicalc by Micro Sphere

The best spread sheet for the ZX Spectrum 48K 99 columns 250 rows.

£9.95

All the above programs include VAT, post and packing. A VAT invoice will be sent with all purchases.

PROFESSIONAL KEYBOARD £69.95 add £2.00 p&p

PRINTERS

All the above programs will now run on a full size printer, we can now offer you a complete package including interface and printer.

Centronics interface for ZX Spectrum ... £39.14

Seikosha GP100A printer £178.25

Epson RX FT printer £265.00

Epson FX80 printer £381.60

Many other printers available send SAE for details on software and printers.

Please add VAT to the prices of printers and interfaces and £5.00 for postage of printers.



TRANSFORM LTD.

41 Keats Ho Porchester Mead Beckenham Kent

Tel: 01-658 6350

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.

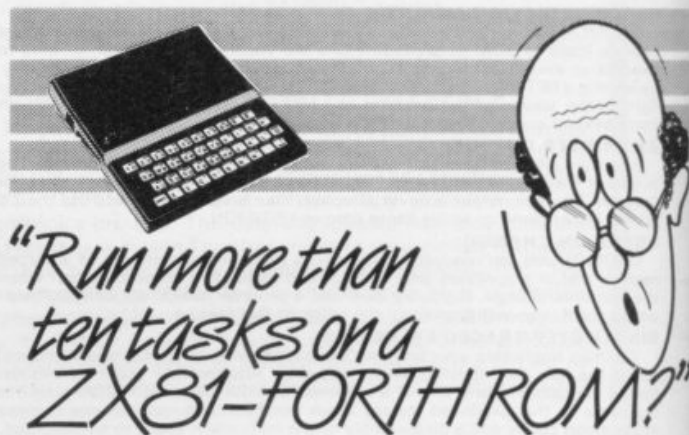
★ **USES 48K to the full!**

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.



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

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

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

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

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

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

Skywave SOFTWARE

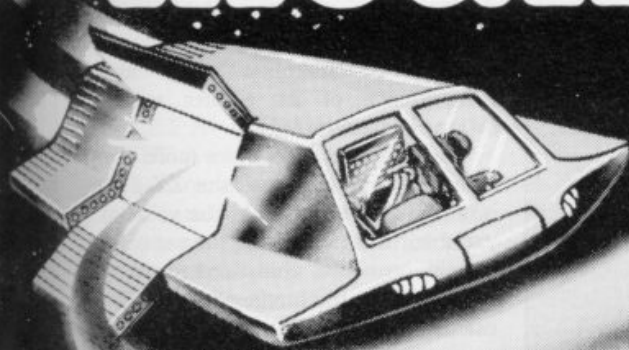
David Husband
73 Curzon Road, Bournemouth,
BH1 4PW, ENGLAND.
Tel: (0202) 302385.
International +44 202 302385.

SINCLAIR USER April 1984

R&R

SOFTWARE

means value



At R&R we believe that value comes first, and we make it our business to ensure that we provide good quality programs at realistic prices . . . for your enjoyment.

ALL ARCADE GAMES NORMALLY HAVE CHOICE OF KEYBOARD OR JOYSTICK CONTROL. Should you have difficulty in obtaining our products from your local Dealer please send cheque or Postal Order indicating titles requested, for return of post service.

CHOPPER X-1

(For any ZX Spectrum)

You command the Spectrum Chopper X-1 Gunship—Your mission is to repel invading forces and save the earth. An action packed original game in full machine code.

R.R.P. £5.50

GALAXY WARLORDS

(For any ZX Spectrum)

A fast action machine code space game in which you defend your position as Galaxy Warlord against attacking enemy starships. Both your patrol-ship and rockets are steerable. The enemy never seem to give up! Full colour action graphics and sound for just

R.R.P. £5.50

JUNIOR ARITHMETIC

(For any ZX Spectrum)

An excellent educational program for 6-9 year olds. The fun way to learn and practice Addition, Subtraction, Multiplication and Division. Mistakes are corrected and explained, along with a running total of correct answers. Terrific value at just

R.R.P. £4.95

SPECTIPEDE

(For any ZX Spectrum)

Enjoy the thrill of this full machine code arcade game. Battle to keep the Spectipepe at bay but watch out for a very unpredictable spider which is out to get you. For 1 or 2 players with top score and on-screen high score feature.

R.R.P. £5.50

GOLF

(For any ZX Spectrum)

Enjoy a game of golf in the comfort of your own home! With the choice of a 9 or 18 hole course and the challenge of Fairway, Rough, Trees, Bunkers, Water & Green. Displays are in realistic colour graphics with full score cards. No two games are alike!

R.R.P. £3.75

GNASHER

(For any ZX Spectrum)

The 'famous' arcade maze game with fast machine code action, excellent graphics, colour and sound. Eat-up all the dots before the Ghosts eat you, or beat them! An energy pill which will allow you to eat them! Hours of addictive fun with on-screen scoring and high-score tape-save capability for just

R.R.P. £4.95

STAR TREK

(For 48K Spectrum only)

One of the original computer space games, but this program has many up-dated features normally only found on larger computer versions. Test yourself as Starship Commander as your mission takes you to the outer reaches of the Galaxy to protect Federation Space, the Starship and yourself! Excellent value at

R.R.P. £4.95

OTHER COMPUTERS?

Send S.A.E. for a full list of our growing range of software now available for ZX81 and ORIC-1 Computers.

R&R

SOFTWARE

DEALER ENQUIRIES WELCOME

R&R Software Ltd.
5 Russell Street, Gloucester GL1 1NE.
Tel (0452) 502819

CALLING ALL PROGRAMMERS . . .

WANTED New, Quality Software.
Send us your latest Program
for evaluation — NOW.

AVAILABLE FROM LEADING DEALERS NATIONWIDE

ZX equivalents

Andrew Hewson explains how you can convert your programs to run on a different machine

PROBLEMS of converting programs written to run on one machine so that they run correctly on another are the subject of a number of queries. Correspondents who have raised the topic include Shawn Woodhouse of Harrogate, Chris Fowler of Sheffield, and Glen Lewis of Walthamstow. Most requests concern the conversion of ZX-81 programs to run on the Spectrum but Fowler in particular

asked for details on the conversion of ZX-80 programs.

Sinclair Basic is not upwards-compatible, i.e., it is not necessarily possible to transfer a program written for the ZX-80 on to the ZX-81 or Spectrum. Usually, however, only a relatively small number of alterations is required. The converse is not true, because generally a program written for a more sophisticated machine will use facilities

which are not present and cannot be emulated on a predecessor. Thus I have assumed readers are interested either in converting ZX-80 programs to run on the ZX-81 or converting ZX-81 programs to run on the Spectrum.

All the software facilities available on the ZX-80 can be mimicked on the ZX-81 but the latter machine is less economical of memory space as a consequence of its greater sophistication. For example:

The ZX-81 use 85 bytes more in the systems variables area; the ZX-81 requires five bytes to hold the value of a variable, thus permitting the use of non-integer numbers, compared to the two bytes used by the integer-only ZX-80. A calculator stack therefore is required; constants in a ZX-81 program are held both in their character and in their numeric form so that an extra six bytes per constant are required; two bytes per program line are used by the ZX-81 to hold the line length.

There is no equivalent usage by the ZX-80. Hence it will often be necessary to prune a 1K ZX-80 program to load it into a ZX-81.

All ZX-80 commands and functions have exact counterparts on the ZX-81 except for the TL\$ function, the DIM command, the division operator and the RND function. These are dealt with as follows:

The TL\$ function is a special case of the ZX-81 slicing facility and is replaced by (2 TO). For example:

LET A\$=TL\$(A\$) becomes LET A\$=A\$(2 TO).

Array indices start at 0 on the ZX-80 and 1 on the ZX-81 so that

```
DIM B(5)
PRINT B(0)
```

is meaningful only on the ZX-80. Hence one is added to every array subscript.

Numbers are converted to integers explicitly on the ZX-81 using the INT function before division. For example:

```
LET B=B/5 becomes
LET B=INT(B)/5
```

The ZX-80 random number function RND (N) generates a random integer between 1 and N inclusive, whereas on the ZX-81 RND generates a random

ZX-80 Code	Character	ZX-81 Code	ZX-80 Code	Character	ZX-81 Code
0	space	0	148	inverse *	151
1	space	11	149	inverse /	152
2	graphics	5	150	inverse =	148
3	graphics	131	151	inverse >	146
4	graphics	1	152	inverse <	147
5	graphics	2	153	inverse ;	153
6	graphics	4	154	inverse ,	154
7	graphics	135	155	inverse .	155
8	graphics	6	212	"	11
9	graphics	8	213	THEN	222
10	graphics	9	214	TO	223
11	graphics	10	215	;	25
12	£	12	216	,	26
13	\$	13	217	)	17
14	:	14	218	(	16
15	?	15	219	NOT	215
16	(	16	220	—	22
17	)	17	221	+	21
18	—	22	222	*	23
19	+	21	223	/	24
20	*	23	224	AND	218
21	/	24	225	OR	217
22	=	20	226	**	216
23	>	18	227	=	20
24	<	19	228	>	18
25	;	25	229	<	19
26	,	26	230	LIST	240
27	.	27	231	RETURN	254
128	graphics	128	232	CLS	251
129	inverse "	139	233	DIM	233
130	graphics	133	234	SAVE	248
131	graphics	3	235	FOR	235
132	graphics	129	236	GOTO	236
133	graphics	130	237	POKE	244
134	graphics	132	238	INPUT	238
135	graphics	7	239	RAND	249
136	graphics	134	240	LET	241
137	graphics	136	243	NEXT	243
138	graphics	137	244	PRINT	245
139	graphics	138	246	NEW	230
140	inverse £	140	247	RUN	247
141	inverse \$	141	248	STOP	227
142	inverse :	142	249	CONT	232
143	inverse ?	143	250	IF	250
144	inverse (	144	251	GOSUB	237
145	inverse)	145	252	LOAD	239
146	inverse —	150	253	CLEAR	253
147	inverse +	149	254	REM	234

Table 1. A list of ZX-80 character codes and their ZX-81 equivalents.



● Please address problems and queries to Andrew Hewson, Helpline, Graham Close, Blewbury, Oxfordshire.

number in the range 0 to 1. Thus, for example:

```
LET A=RND (N) becomes
LET A=1+INT (N * RND)
```

The character codes used by the ZX-81 are listed in appendix A of the operating manual. The codes for both letters and numbers in both normal and inverse video are the same as those used by the ZX-80 but the remainder are mostly different. Table one lists the ZX-81 equivalents for the non-alphabetic or numeric codes used by the ZX-80. Reference should be made to the table when converting CHR\$ or CODE commands.

The ZX-80 uses fewer system variables than the ZX-81 and most of them have direct equivalents as listed in table two. Note that the variables area occurs below the display file in the ZX-80 but above it in the ZX-81 and so conversion of a program which manipulates the

ZX-80 address	No. of bytes	ZX-81 address	ZX-81 name
16384	1	16384	ERR-NR
16385	1		
16386	2	16391	PPC
16388	2		
16390	2	16394	E-PPC
16392	2	16400	VARS
16394	2	16404	E-LINE
16396	2	16396	D-FILE
16398	2	16398	DF-CC
16400	2	16400	VARS
16402	1	16418	DF-SZ
16403	2		
16405	2	16408	X-PTR
16407	2	16427	OLDPPC
16409	1		
16410	2	16432	T-ADDR
16412	2	16434	SEED
16414	2	16436	FRAMES
16416	2		
16418	2		
16420	1	16441	S-POSN
16421	1	16442	
16422	2		

Table 2. ZX-80 system variables and their ZX-81 equivalents.

VARS, D-FILE and DF-CC variables is particularly difficult.

On the ZX-80 the FRAMES counter is incremented 50 times per second, whereas on the ZX-81 it is decremented, except bit 15, and that difference should be taken into account during program conversion.

Just as the ZX-81 uses more RAM space than the ZX-80, so, in turn, the Spectrum uses more than the ZX-81. The principal reason is the high-resolution Spectrum display which uses 6,912 of the 16,384 bytes in RAM in the 16K Spectrum, compared to 792 bytes used by the 16K ZX-81. So it is unlikely that a full-size 16K ZX-81 program can be adapted to run in a 16K Spectrum.

Table three lists the ZX-81 character codes which have a direct Spectrum equivalent. In a few cases the character is different, although the function is the same, in which case both versions are shown in the table. For example, the exponentiation operator is ** on the ZX-81 — code 216 — and ^ on the Spectrum — code 94.

Much of the software which runs the calculator in the Spectrum has been copied straight from the ZX-81 and that is reflected in the manner in which the character codes in the two machines, although dissimilar, march in step. The ZX-81 codes for AT, TAB, CODE through to NOT are all 21 more than the codes for the same characters on the Spectrum. It is intriguing to note that the VAL\$ function, which is present on the Spectrum — code 174 — but is not present on the ZX-81 logically would have had a ZX-81 code of 195, a code which is "not used" according to appendix A of the ZX-81 manual.

Bearing in mind that the ZX-81 was designed and built long before the Spectrum, the implication is that Sinclair intended that the ZX-81 should have a VAL\$ function but it was omitted at the last minute.

Six half-tone graphics characters in the ZX-81 do not appear in the Spectrum character set but it is a straightforward matter to create user-defined characters as required. The data for each of the characters is listed in table form. Five more ZX-81 characters have no Spectrum equivalent:

ZX-81 graphics code

8
9
10
136
137
138

Spectrum user-defined graphic equivalent

170,85,170,85,170,85,170,85
0,0,0,0,170,85,170,85
170,85,170,85,0,0,0,0
85,170,85,170,85,170,85,170
255,255,255,255,85,170,85,170
85,170,85,170,255,255,255,255

Table 3. Definitions of Spectrum UDG characters for ZX-81 graphics characters not present in the standard Spectrum character set.

116 Graphics command
120 K/L mode toggle
127 Cursor
228 SLOW
229 FAST

It is unlikely that any of the first three would be used explicitly in a program and so no substitute is given. The FAST command turns the ZX-81 display, speeding program execution by a factor of about four and the SLOW command turns it on again. Those commands can almost always be omitted when a program is transferred to the Spectrum, except when the FAST command has been included to prevent the user inspecting the display, in which case CLS can be substituted.

Finally, there are four characters which require special substitutes. They are "" — the paired double quotes character — SCROLL, PLOT and UNPLOT. They are dealt with as follows:

The paired double quotes character, which denotes a string within a string,

'Usually only a small number of alterations is required'

is replaced by two successive double quotes characters.

The SCROLL command, which moves the display up by one line, is replaced by INPUT;

PLOT X,Y is replaced by PLOT 4*X+2, 4*Y+2. The latter is not identical because the Spectrum pixel size is much smaller and the point will appear slightly off-centre but the difference is unlikely to be important.

UNPLOT X,Y is replaced by PLOT INVERSE 1; 4*X+2, 4*Y+2.

Table five lists the ZX-81 system variables and the Spectrum equivalents. There are several points to be noted:

The ZX-81 system variable D-FILE at 16396 which points to the beginning of the display file has no Spectrum equivalent, because the Spectrum display lies at the bottom of RAM at address 16384.

The FRAMES counter is two bytes long on the ZX-81 — and bits 0 to 14

continued on page 124

ZX-81 code	Character	Spectrum code	ZX-81 code	Character	Spectrum code
0	space	32 or 128	118	NEWLINE/ENTER	13
1	graphics	130	119	RUBOUT/DELETE	12
2	graphics	129	126	number	14
3	graphics	131	128	graphics	143
4	graphics	136	129	graphics	141
5	graphics	138	130	graphics	142
6	graphics	137	131	graphics	140
7	graphics	139	132	graphics	135
11	"	34	133	graphics	133
12	£	96	134	graphics	134
13	\$	36	135	graphics	132
14	:	58	193	AT	172
15	?	63	194	TAB	173
16	(	40	196	CODE	175
17	)	41	197	VAL	176
18	>	62	198	LEN	177
19	<	60	199	SIN	178
20	=	61	200	COS	179
21	+	43	201	TAN	180
22	-	45	202	ASN	181
23	*	42	203	ACS	182
24	/	47	204	ATN	183
25	;	59	205	LN	184
26	,	44	206	EXP	185
27	.	46	207	INT	186
28	0	48	208	SQR	187
29	1	49	209	SGN	188
30	2	50	210	ABS	189
31	3	51	211	PEEK	190
32	4	52	212	USR	192
33	5	53	213	STR \$	193
34	6	54	214	CHR \$	194
35	7	55	215	NOT	195
36	8	56	216	** / ^	94
37	9	57	217	OR	197
38	A	65	218	AND	198
39	B	66	219	< =	199
40	C	67	220	> =	200
41	D	68	221	< >	201
42	E	69	222	THEN	203
43	F	70	223	TO	204
44	G	71	224	STEP	205
45	H	72	225	LPRINT	224
46	I	73	226	LLIST	225
47	J	74	227	STOP	226
48	K	75	230	NEW	230
49	L	76	232	CONT/CONTINUE	232
50	M	77	233	DIM	233
51	N	78	234	REM	234
52	O	79	235	FOR	235
53	P	80	236	GOTO/GO TO	236
54	Q	81	237	GOSUB	237
55	R	82	238	INPUT	238
56	S	83	239	LOAD	239
57	T	84	240	LIST	240
58	U	85	241	LET	241
59	V	86	242	PAUSE	242
60	W	87	243	NEXT	243
61	X	88	244	POKE	244
62	Y	89	245	PRINT	245
63	Z	90	247	RUN	247
64	RND	165	248	SAVE	248
65	INKEY\$	166	249	RAND/	
66	PI	167		RANDOMIZE	249
112	cursor up	11	250	IF	250
113	cursor down	12	251	CLS	251
114	cursor left	8	253	CLEAR	253
115	cursor right	9	254	RETURN	254
117	EDIT	7	255	COPY	255

Table 4. ZX-81 character codes and their Spectrum equivalents.

continued from page 123

only are used — and three bytes long on the Spectrum.

The COORDS variables are different, reflecting the difference in the PLOT resolution in the two machines.

The ZX-81 printer buffer, PRBUFF, is 33 bytes long and lies within the system variables area starting at address 16444. The Spectrum printer buffer is 256 bytes long, so that it can hold high-

'It is essential to understand the function of the code'

resolution characters, and lies below the systems variables area.

A word of warning. It is not possible to guarantee that a given program can be transferred from one machine to its successor. If the program author has made use of PEEKs or POKEs, it is essential to understand the function of his code on the original machine before designing the equivalent to run elsewhere. Usually that means entering the code into the first machine and analysing it dynamically.

ZX-81 address	No. of bytes	Spectrum address	Spectrum name
16384	1	23610	ERR NR
16386	2	23613	ERR SP
16388	2	23730	RAMTOP
16390	1	23617	MODE
16391	2	23621	PPC
16394	2	23625	E PPC
16396	2		
16398	2	23684	DF CC
16400	2	23627	VARS
16402	2	23629	DEST
16404	2	23641	E LINE
16406	2	23645	CH ADD
16408	2	23647	X PTR
16410	2	23650	STKBOT
16412	2	23653	STKEND
16414	1	23655	BREG
16415	2	23656	MEM
16418	1	23659	DF SZ
16419	2	23660	S TOP
16421	2	23560	LAST K
16423	1	23552	KSTATE
16425	2	23637	NXTLIN
16427	2	23662	OLDPPC
16430	2	23666	STRLEN
16432	2	23668	T ADDR
16434	2	23670	SEED
16436	2	23672	FRAMES
16438	1	23677	COORDS
16439	1	23678	COORDS
16440	1	23680	PR CC
16441	1	23688	S POSN (col)
16442	1	23689	S POSN (lin)
16444	22	23296	PRBUFF
16477	30	23698	MEMBOT

Table 5. ZX-81 system variables and their Spectrum equivalents.

"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 HOURS)**

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

RICHARD SHEPHERD SOFTWARE

ELM HOUSE, 23-25 ELMSHOT 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

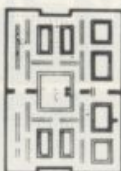
SPECTRUM

ORWIN SOFTWARE

ZX-81

FOR 16K SPECTRUM

(will also run on 48K Spectrum)



CASSETTE A
GHOST GOBLER
Eat the ghosts before the ghosts eat you. Eat a star and you can chase the ghosts for a while.

ALIENKILL Control lasers, rockets, and a force-field to stop the aliens from landing.
MOUSETRAP Trap the mouse in the corner but not anywhere else.
REVERSI A game of skill with simple rules but sophisticated tactics. Play against the computer.
LASER DEFENCE Control the laser sight to shoot down the alien ships. Machine code sound routines.

Ten programs for £6
TANK BATTLE For 2 players simultaneously or play against the computer. Each player has 2 rotate controls and move and fire controls. The tanks fire steerable missiles.
PHOEBUS A puzzle.
BLACKSPOT Gobble the stars and avoid running into black spots created by crossing your own path.
CUBE Manipulate a cube any size from 2x2x2 to 7x7x7.
MINEMFIELD Collect the crowns while avoiding the mines and the electrified fence.
plus an extra...
GRAPHIC DEMO Did you know your Spectrum could do all this?

EDUCATIONAL COMPENDIUM FOR 16K/48K SPECTRUM £6

All these programs on one cassette.

These programs were developed for use in a Junior School and have been in regular use there for some time. Older people also find them interesting and fun.

TORTOISE GRAPHICS: an educational graphics language.
16K version commands include: forward, left and right through a specified angle, wipe, pen up and down, paper and ink colour, macro, edit.
48K version has extra commands including: backward, quit, cancel, printer and tape commands, auto, home, variables, loops.

TORTRAIL & TORMAZE: 16K games using the forward, left and right commands. These are good for learning a feeling for distances and angles and are fun to play.
REVEAL: an addictive 16K word game. A piece of writing has had its letters rubbed out and you have to find out what they are. You buy letters or try to predict them. Included are 20 textfiles to be solved and a textmaker which will let you input your own text and store it on tape for someone else to solve.
EQUATION INVADERS: a 16K game to make simple equations more interesting.

CENTIPOID PLUS THREE for 48K SPECTRUM. £6



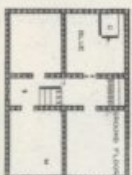
CENTIPOID (machine code). Centipoid is a full-feature arcade game with mushrooms, spiders, webs, scorpions, goblins, indestructible dead segments of centipoids that drop down on you, and, of course, the centipoids themselves.

You can choose your own control keys. It is playable from the keyboard or using any joystick interface which, like ACF Interface II, makes the joystick behave like keys on the keyboard.

Plus these games in Basic for the 48K Spectrum on the same cassette.



PANIC



HOUND

3D TIC TAC TOE
A 3D game of skill played against the computer.

CASSETTE 1: eleven programs (including 7 in machine code): React, Invaders, Planet Aliens, Maze of Death, Planet Lander, Bouncing Letters, Bug Spat, I Ching, Co-debreak, Robots, Basic Hangman.
for 1K ZX-81
£3.80

CASSETTE 2: ten games in Basic: Reversi, Awari, Laser Bases, Wordmaster, Rectangles, Crash, Roulette, Pontoon, Penny Shoot, Gun Command.
for 16K ZX-81
£5

CASSETTE 3: eight programs (including 1 in machine code): Starship Trojan, Star-trek, Princess of Kral, Battle, Cube, Kalabraz, Secret Messages, Martian Cricket.
for 16K ZX-81
£5

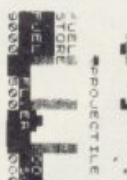


ZX-SCRAMBLE with 3 stages. Bomb and shoot your way through the fortified caves.

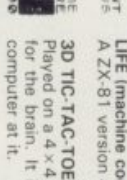


GUNFIGHT (machine code)
INVADERS (machine code)

"quantity as well as quality"
Sinclair User, Oct '82
"If each game was on a separate tape and selling for £5 each I would still recommend them"
ZX Computing, Oct/Nov '82

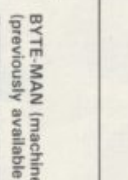


GALAXY INVADERS (machine code)
Fleets of swooping and diving alien craft to fight off.

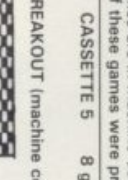


SNAKEBITE (machine code)
Eat the snake before it eats you. Variable speed (very fast at top speed).

"Definitely good value for money at £6... A smooth clear display and a relatively fast response from the keys. Graphics are as good as you will ever get on the 81"
What Micro? Nov '83



BYTE-MAN (machine code)
(previously available from Mindseye)

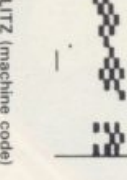


BREAKOUT (machine code)
PLANETOIDS (machine code)
Rotate, move, fire and hyper-space controls. Wide range of choice of speed and difficulty.

"New polish on old favourites... the quality of the software and the smooth action displays created on the screen make the programs worthwhile for anyone who has a ZX-81 and plays games using it... It is pleasant to see that Orwin's kind of quality is available again."
Sinclair User, Sept '83



SPACE RESCUE (machine code)
(previously available from Mindseye)



BUTTZ (machine code)
DODGEMS (machine code)
Dodge the computer's car while eating the dots.

"Among the best reviewed was Cassette 5 from Orwin Software. For a mere £6, you get eight top-quality games. All the games are of very high quality and would cost £4 or £5 if sold separately... Many of the other software houses could learn a lesson from these."
What Micro? Games supplement, Nov '83



MERCHANT (Basic)
Make your fortune on trading voyages in the Mediterranean and beyond.



DRAUGHTS (machine code)
Three skill levels.

"Among the best reviewed was Cassette 5 from Orwin Software. For a mere £6, you get eight top-quality games. All the games are of very high quality and would cost £4 or £5 if sold separately... Many of the other software houses could learn a lesson from these."
What Micro? Games supplement, Nov '83

7 of the 8 games are in machine code because it is much faster than Basic.



Please make your cheques payable to ORWIN SOFTWARE and send your order to ORWIN SOFTWARE, Dept OSU, 26 Brownlow Road, London NW10 9OL.

Send SAE for detailed catalogue

Trans Cash
5054342

For orders placed at the Post Office

GRAFPAD

...for as many uses
as YOU
can imagine!



BBC MODEL 2 • SPECTRUM COMMODORE 64

With Grafpad you can now add a new dimension to your computer enjoyment, but most important, it helps you create your own application programmes by the simple use of the Grafpad!

The Grafpad comes complete with a cassette comprising two programmes.

THE FIRST PROGRAMME

displays the co-ordinates of your screen area. The co-ordinates are based on the screen with a grid size of 1023 x 1279 pixel, also in the Grafpad giving you a grid size of 320 x 256 pixels!

THE SECOND PROGRAMME

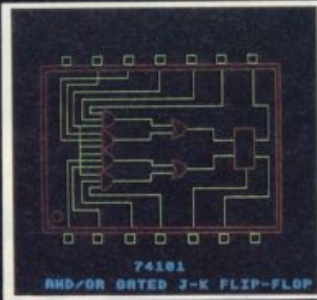
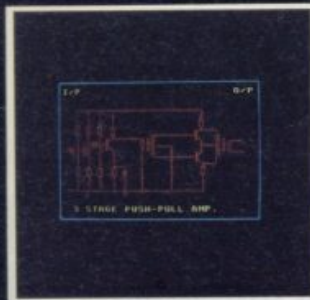
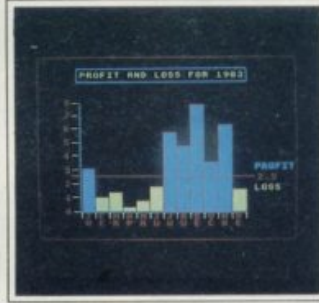
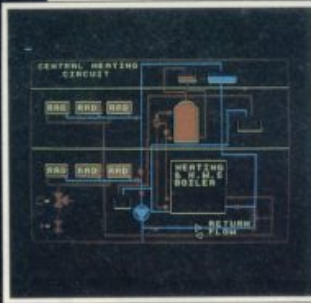
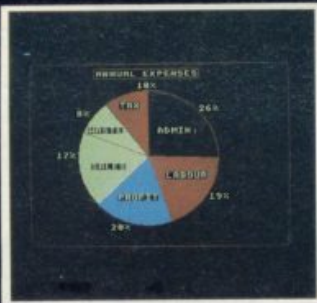
provides you with the utilities for circles, squares, triangles, free-hand, erasing line-drawing etc, and of course, full "Fill-in" facility in 16 different colours by the simple use of the pen!

Draw from a simple apple to a computer circuit - store in cassette or disk, perhaps transfer direct to a printer - in black and white or full glorious colour!

Purchase unique C.A.D. (Computer Aided Designs) programme and add further enjoyment and professionalism to your computer designs!

The Grafpad comes complete with Operational Manual, Programmes, The Grafpad and Pen and it simply plugs in your computer.

(Size: 25mm height x 55mm width x 260mm depth)
Weight: 1.2 kg (Gross)



(The above designs were drawn by a 12-year-old at our showrooms!)

HOW TO ORDER:

BY TELEPHONE:

If you are an American Express, Barclaycard, Diners Club or Access Card Holder simply telephone us giving your Card No., Name, Address and item(s) required and your orders will be dispatched within 48 hours!

BY POST:

Simply fill in the coupon, enclosing your cheque/P.O. made payable to: BRITISH MICRO, or use the special section for Credit Card Holders, and post to the address below. Please allow 14 days for delivery.

Post to: BRITISH MICRO, UNIT Q2, PENFOLD WORKS
IMPERIAL WAY, WATFORD, HERTS. WD2 4YY

Please send me Grafpad for:

☐ BBC MODEL 2

☐ SINCLAIR SPECTRUM
(Please tick)

☐ COMMODORE 64

Qty.	Item	Ex. VAT	Inc. VAT	Total
	Grafpad Complete	£125.00	£143.75	
	C.A.D. Programme	£18.00	£20.70	
		Postage, Packing & Insurance		£5.00
		TOTAL		£

I enclose my cheque/P.O. for £.....

I prefer to pay with my American Express, Barclaycard, Diners, Access Card
(Please cross out whichever is not applicable)

CARD NO.

SIGNATURE

NAME

ADDRESS

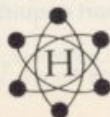
Address above must be the same as card holder.

- DEALER INQUIRIES WELCOMED
- SPECIAL DISCOUNTS FOR EDUCATIONAL AUTHORITIES

BRITISH MICRO

A HEGOTRON GROUP COMPANY

Unit Q2, Penfold Works,
Imperial Way, Watford, HERTS WD2 4YY
TEL: (0923) 48222. TELEX: 946024



ONLY ACES SURVIVE IN ...

NIGHT GUNNER

48K SPECTRUM

BY R.J. SWIFT

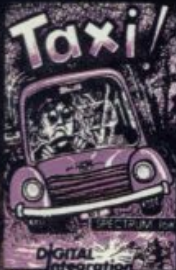
JOYSTICK COMPATIBLE
(Kempston, AGF, Sinclair,
Protek and Others)

£6.95

— THE AMAZING
AIR BATTLE
SCENARIO THAT
STRETCHES YOU
TO THE VERY LIMIT —
GUNS BLAZING, ENEMY
FIGHTERS ATTACK FROM
ALL DIRECTIONS — 3D
GROUND ATTACK SORTIES
AND THERE'S STILL THE
FLIGHT BACK HOME.

OTHER AMAZING FEATURES
* 30 GROUND ATTACK MISSIONS
* REALISTIC 3D EFFECTS
* EXPLOSIVE SOUND
* 1 OR 2 PLAYERS EACH
WITH 4 LEVELS OF DIFFICULTY
* HIGH SCORE TABLE
* SELF DEMONSTRATING
* TITLE PAGE

TAXI
£5.50
Any Spectrum



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



FOOTBALL
£7.95
48K Spectrum

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



FIGHTER
PILOT
£7.95 48K Spectrum

Joystick compatible.

A spectacular flight simulation of the world's
most exciting jet fighter with stunning 3-D
cockpit view and the most realistic air to air
combat ever seen on the spectrum!

Please send me the
following games for
the Spectrum

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

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

Trade and Export enquiries
welcome.

Please send to Digital Integration, Dept SU2

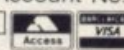
Watchmoor Trade Centre, Watchmoor Road, Camberley, Surrey GU15 3AJ

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

Name _____
Address _____

Or debit my Access/Barclaycard Account No.

Tele Sales Camberley (0276) 684959



WIZARDS OF
COMPUTER GAMES
SOFTWARE



DIGITAL
INTEGRATION



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

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



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

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

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

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

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

For those who only require medium resolution we also have a model (370 x 470 pixels) at £149.95 (excluding VAT) which is equally excellent value for money.

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

most other leading micros.

And naturally there's a years full guarantee.

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

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

Now available from John Menzies.

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

- _____ High Resolution Colour Monitor(s) at
£229.95 each (ex. VAT).
_____ Medium Resolution Colour Monitor(s) at
£149.95 each (ex. VAT).
_____ Connection lead(s) at £6.00 each.

I understand carriage per monitor will cost an extra £7.00.
(N.B. A High Resolution Monitor including VAT, lead, and carriage costs £279.39. A Medium Resolution Monitor including VAT, lead and carriage costs £187.39).

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

Please state the make of your computer _____

Name _____

Address _____

Telephone: _____

Opus.
Opus Supplies Ltd.

SU

MODEL REFERENCE	1302-2 High Resolution	1302-1 Medium Resolution
RESOLUTION	580 x 470 Pixels	370 x 470 Pixels
C.R.T.	14"	14"
SUPPLY	220/240v. 50/60Hz	220/240v. 50/60Hz
E.H.T.	Minimum 19.5kv Maximum 22.5kv	Minimum 19.5kv Maximum 22.5kv
VIDEO BAND WIDTH	10MHz	6MHz
DISPLAY	80 characters by 25 lines	80 characters by 25 lines
SLOT PITCH	0.41mm	0.63mm
INPUT-VIDEO	R.G.B. Analogue/ TTL Input	R.G.B. Analogue/ TTL Input
SYNC	Separate Sync on R.G.B. Positive or Negative	Separate Sync on R.G.B. Positive or Negative
EXTERNAL CONTROLS	On/off switch and brightness control	On/off switch and brightness control

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.

Why wait any longer?

Only £39.95 including VAT and P&P.



Now make your Spectrum and ZX-81 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! Simply incredible at **£29.75** (Please quote when ordering whether Spectrum or ZX81 owner)

16K RAM Pack for ZX-81
64K RAM Pack for ZX-81

£19.75
£44.75

Prices include VAT, postage & packing. Delivery normally 14 days. Export orders at no extra cost. Dealer enquiries welcome.

Send cheque/PO now to:

CHEETAH MARKETING LTD
Dept SU/4
24 Ray Street
London EC1 R3 DJ
Tel: 01-278 6954

32K RAM Pack and "SWEET TALKER" also available from larger Branches of

John Menzies



WH SMITH

Powerful pull of the evil timelords

Quentin Heath finds that classic text-only adventures can still hold their own

SOME PEOPLE may wonder where the good old text-only adventure games, such as those from Artic Computing, have gone. The advance of graphics and animated adventures, as explored in *Mind Games* in February, seem to have overshadowed this type of game.

Melbourne House started the move towards this type of game with *The Hobbit* last year and since then it has continued with the serious, from companies such as Digital Fantasia and Carnell, to the silly, from Automata with its *Pi-man* and *Uncle Groucho*.

Most of those graphics adventures are entertaining and worth the money but the textual adventure still holds a formidable place in the market. That is because, with graphics excluded, there is more memory with which to produce complicated plots. Having no graphics facilities also makes the author concentrate on conveying the atmosphere of an adventure to the player and using psychological tricks to beguile the unwary adventurer.

A good example of the state of the art in textual adventures is *Lords of Time*, the first part of a saga of the same name, from Level Nine Computing. It also shows what can be achieved by somebody who has been designing computer games for only a few months.

Lords of Time, for the 48K Spectrum, is about a band of evil Timelords, with no connection with Dr Who, who want to warp the course of Earth's history. To defeat their evil aims the player must travel through time to collect nine objects which will, if used correctly, restore the flow of time to its correct path.

You will receive your mission instructions from Father Time, if you can discover his whereabouts. Finding him is a matter of elimination, as he will convey his message to you through the only item which has nothing to do with time, or is timeless. It might help you to look upon him as a figure such as Dorian Gray, or Alice.

It is a good idea to pick up any objects you may find during your quest.

At first you may have difficulty collecting all the items you need, as you can carry only a few items in your hands at one time. A pack on your back might help but you will soon realise that you need to act like a magpie and find a nest into which you can put the objects until you need them. The pack will not count as an object and you should find it at the end of a country lane.

Unlike the unfortunate Dr Who, you will have some control over your time machine.

The author provides you with nine cogs which make up a wheel of time. If



you can learn to control them you should be able to land in any of the nine time zones you desire. It is, however, best to start in time zone one as you will find objects and tests which will be important when you reach the higher time zones.

It would be useful to make a map but, because of the complexity of the game, it is better to produce a plan for each time zone, together with a page of notes for each of those subsections of the adventure than to try to produce one overall plan. Some kind of plan is needed if you are to take this adventure seriously, as each time zone is like a mini adventure in its own right.

One of the most intriguing and helpful aspects is that you can learn by your mistakes better than in most other adventures with which I have dealt in this column. It is helpful to be killed by the giant Mammoth or Allosaurus in the pre-historic time period, as it will show you how to react, and what is expected in the way of weapons the next time you

encounter either of those fearsome beasts.

I will endeavour to give some more clues to the solution of this mystery in Hints and Tips but it would take several months to give clues to them all.

The complexity of the plot is achieved partly by the data compilation and compression techniques used by Level Nine Computing in programming its games. That means that, to some extent, the bounds of memory availability become less important as data is squeezed into the memory available. Measuring information in the number of bytes or kilobytes it could, for instance, be possible to store 60K of data in only 40K, which is all you would have on a 48K Spectrum.

It is difficult to chart progress but as a general hint the timescape is structured so that you start when the earth was young, in the Ice Age, continue through Roman and Viking times, go through mediaeval and Tudor history and arrive in the present in a fairly battered state. The adventure does not finish in the present, however, as you will have to visit the near and far future to battle the Lords of Time.

If you know something about ancient history or archaeology you may be able to find your way round the adventure better than the player who knows little of house design during the Roman occupation of Britain.

The designer of both the plot and scenarios spent many months researching the finer points of scenic description with reference to such locations as Roman villages. The research was so deep that many of the locations are from descriptions of real places. The descriptions are so powerful in some cases that you can picture the locations without difficulty.

Level Nine Computing is one of the only companies I know which provides a back-up service for its adventurers. If you have difficulty with any part of the adventure you can send for a clue, using an envelope which has Fly back with a clue printed on it.

Level Nine is at 229, Hughenden Road, High Wycombe, Bucks HP13 5PG.

HINTS AND TIPS

A little cog will make
The wheel go around.
The rubbish beneath the
Thatch is not what it seems.
If you go too far and turn about
A mammoth task you will find out.
Cavemen will kill
More out of fright than hate.



SPECTRUM USERS

NOW AVAILABLE—THE ULTIMATE IN GAMES ACCESSORIES

THE FOX PROGRAMMABLE JOYSTICK INTERFACE

The Interface with:

- ★ Total compatibility with **all** games.
- ★ Proven compatibility with the Microdrive.
- ★ Built in memory to store up to 16 different game keytops.
- ★ Battery back up so no loss of memory after power off.
- ★ Trickle charge batteries used so they recharge whilst in use (no replacement needed).
- ★ Only one two-position switch for simplicity of use (no loose wires or clips to attach).
- ★ Accepts any Atari type joystick.
- ★ Fully cased with through port for further expansion.
- ★ Can be used as a pseudo ROM for personal tool kit.



Just plug in switch on and play the game with Fox only **£34.95 INCL.**

Due to demand delivery will be 4 weeks

ALSO AVAILABLE—THE FOX 48K SPECTRUM UPGRADE UPGRADE YOUR 16K to 48K

The kit reviewed as "Easiest to Fit" and "Best value for Money"
Simple insertion, no soldering required, full instructions and guaranteed.
Move on up to 48K

only **£20.99 INCL**

**The above interface was reviewed
as the easiest program of all
joystick interface on the market
Feb Sinclair User.**

Send now to:
Fox Electronics Ltd,
141 Abbey Road, Basingstoke,
Hants RG21 9ED
Tel: 0256 20671.

Please send me

☐ Interface

☐ Upgrade

Name

Address

I enclose £

or please debit my Barclaycard

No. ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐

Callers welcome by
Appointment





STOP PRESS: NEW SPECTRUM DOMINOES 16K/48K £4.95

ZUCKMAN

ZX81 (16K)

- * ALL MACHINE CODE (10K)
 - * FOUR INDEPENDENT GHOSTS
 - * HIGH-SCORE 'HALL OF FAME'
 - * AUTHENTIC ARCADE ACTION
 - * TITLE/DISPLAY MODE
- ONLY £4.95 INC. P&P**

★ ZX Spectrum ^{New}

FROGGY 16K or 48K

SPECTRUM VERSION OF ARCADE GAME WITH FULL ARCADE FEATURES:-

* Fabulous Hi-Res Colour Graphics
* Authentic Sound Effects - 3 Tunes
* 3-D Logs, Swimming & Diving Turtles
* 3 Lanes of Multi-coloured vehicles
* On-screen Score, Hi-Score, Time-bar
* Snake, Alligators and Baby Frog
* Top 5 High-Score initials table
* Demonstration Game routine

Your home-sick frog must leap across a busy main road, then onto logs and turtles in the river to reach safety of the river-bank frog homes.

THIS MACHINE CODE GAME MUST BE SEEN TO BE BELIEVED!!

ONLY £5.95 INC. P&P



FROGGY

ZX81 (16K)

- * MOVING CARS, LOGS, TURTLES
 - * ALLIGATORS, DIVING TURTLES
 - * FOUR 'SCREENS' OF ACTION
 - * ALL ARCADE FEATURES
 - * ENTIRELY MACHINE CODE
- ONLY £4.95 INC. P&P**



DJL SOFTWARE

**DEPT SU4, 9 TWEED CLOSE, SWINDON,
WILTS SN2 3PU Tel: (0793) 724317**

Trade enquiries welcome Export Orders: Please add £1.00 per tape airmail
Dealer enquiries: Tiger Distribution, 4 Victoria Road, Widnes, Cheshire.
051-420 8888.

ORDER FORM

Name

Address

Please send me the following

I enclose cheque/P.O. No for £
SEND TO: DJL Software, Dept SU4, 9 Tweed Close, Swin-
don, Wilts SN2 3PU.

Sometimes even
the best of friends
need something
new to say
to each other...



“I want

To get that excited feeling back again.
Lots more software. But I can't afford it all the time.
Lots of new programs. I know all mine backwards.
To swap notes with other people who love computers.
To know more about computers. And to use what I know.
Most of all I want my computer to do more!

and I don't want

To have a lot of hassle.
Or spend a fortune.
Or have to tramp for miles to find it all.”

Prestel™ and the Prestel symbol are trademarks of British Telecommunications.

See
Micronet 800
for yourself at Laskys,
Spectrum UK, and other
leading micro retailers.



You get

An amazing new world of fun and learning. A system that puts more muscle into many popular makes of micro. Dozens of free computer programs and scores of exclusive software bargains. *Through your own 'phone line.* A whole sophisticated 2-way communication system. Prestel[™] – the world's biggest viewdata system, under your control.

and you don't have to
spend a fortune to get it all now.

MICRONET 800, Scriptor Court, 155 Farringdon Road,
London EC1R 3AD Tel: 01-278 3143.

I would like full details on Micronet 800.

Name

Make/Model of Micro

Address

Telephone

MICRONET 800, Scriptor Court, 155 Farringdon Road,
London EC1R 3AD Tel: 01-278 3143.

micronet
800

It's enough to blow the mind of any micro



One of the many faces on Prestel

Due to an exclusive distribution agreement, DEAN are now able to offer the **ALPHACOM 32** Thermal Printer at the fantastically reduced price of **£59.95** inclusive of VAT.

Includes full interfacing to the **ZX 81** or **SPECTRUM**. Uses the standard Sinclair print commands (**COPY**, **LLIST**, **PRINT**).

Quiet, maintenance-free — high-speed operation. Paper rolls only **£1.00** per roll — 25 metres long.

Alphacom 32

This thermal printer, now available in the UK, is the standard printer which has sold in tens of thousands for use with the American version of the **ZX 81**.

DEAN ELECTRONICS LIMITED
Glendale Park, Fernbank Road,
Ascot, Berkshire SL5 8JB
Tel. 0344 885661 Telex 849242



Or from selected branches of W H Smith, John Menzies, Greens, Laskys, Spectrum Group.

Please send me Printer(s) at £61.95 and boxes of paper (10 rolls per box) at £12 per box — all inclusive of post and packing.

Total £ cheque / PO enclosed or debit my Access/Barclay card account No.

Name and address

SU

SPECTRUM COMPATIBLE PRINTER



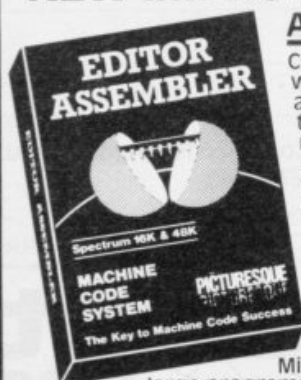
Also available — **Alphacom 42** compatible with Commodore 20/64, BBC Centronics, Dragon, Atari at **£99.95** (+£2 p/p) includes selected interface.

The Key to Spectrum Machine Code Success.

Picturesque's **MACHINE CODE SYSTEM** is used and recommended by professional software writers, yet the excellent documentation and the friendly, easy-to-use programs have been highly recommended for beginners.

You will only buy one Machine Code System, so buy the best, the one the professionals use.

NEW IMPROVED PROGRAMS — MICRODRIVE COMPATIBLE



ASSEMBLER

Completely self-contained with its own line editor, giving an easy-to-read 40 column tabulated listing. Auto line numbering, line renumbering and auto tabulation make this one of the fastest and easiest Assemblers to use. 5-character label names. Decimal, Hex or ASCII constants. **SAVE/LOAD/VERIFY** both the listing and Machine Code to cassette/MICRODRIVE/NETWORK.

Assemble from cassette or Microdrive into memory for very large programs. Customise to most Centronics printer interfaces, or RS232 (with Interface 1) for 80 column printout. **FAST ASSEMBLY** — 1k of code in 7 seconds. Assembler Directives: — **ORG**, **END**, **DEFB**, **DEFW**, **DEFL**, **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** (inc. 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.

**PICTURESQUE
PICTURESQUE
PICTURESQUE**

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.

Name	Machine	Company	Type	Gilbert factor	Name	Machine	Company	Type	Gilbert factor
ABC Liftoff	48K Spec.	Longman	Education	*	Brewery	48K Spec.	CCS	Strat.	8
Abyss	48K Spec.	CCS	Adventure	6	Bridge Tutor	16K Spec.	CP	Mind Game	8
Accounts (Limited company)	16K ZX-81	Hestacrest	Business	*	British Lowland	48K Spec.	CCS	Sim.	*
Accounts (Limited Company)	48K Spec.	Hestacrest	Business	*	Bubble Bugs	16K ZX-81	Romik	Arcade	6
Accounts (Sole Trader)	16K ZX-81	Hestacrest	Business	*	Bubble Trouble	48K Spec.	Arcade	Arcade	*
Accounts (Sole Trader)	48K Spec.	Hestacrest	Business	*	Bug Blaster	16K Spec.	Crystal Comp.	Arcade	*
Ace in the Hole	48K Spec.	Add-on	Adventure	*	Bugaboo	48K Spec.	QS	Arcade	7
Address File	48K Spec.	SD Micro	Business	*	Business Bank Account	16K ZX-81	Transform	Business	*
Address Manager	48K Spec.	OCP	Business	7	Business Bank Account	48K Spec.	Transform	Business	*
Adven. St. Bernard	48K Spec.	Carnell	Arcade	7	Byte	48K Spec.	CCS	Adventure	*
Adventure 1	16K ZX-81	Abersoft	Adventure	6	Byter	16K ZX-81	Protek	Arcade	*
Adventure I	48K Spec.	Abersoft	Adventure	6	Calpac 1-2	16K ZX-81	Calpac	Education	*
Adventure Isl.	48K Spec.	Contrast	Adventure	*	Calpac 1-3	16K Spec.	Calpac	Education	*
Air Traffic Controller	16K Spec.	Hewson	Sim.	6	Car Journey	16K Spec.	Heinemann	Education	*
Airline	16K ZX-81	CCS	Sim.	7	Cargo	16K Spec.	Sinclair	Education	*
Airline	48K Spec.	CCS	Sim.	7	Caribbean Trader	48K Spec.	E. Midland	Adventure	*
Airliner	16K Spec.	Protek	Sim.	6	Caribbean Trader	48K Spec.	E. Midland	Adventure	7
Alchemist	48K Spec.	Imagine	Adventure	*	Cartoon Animation	48K Spec.	Fowler	Utility	*
Alien Dropout	16K ZX-81	Silversoft	Arcade	*	Cash Controller	48K Spec.	Shepherd	Business	7
Allsort S-1	48K Spec.	A Firminger	Utility	7	Cassette 1	1K ZX-81	Orwin	Arcade	*
Alphabet	16K Spec.	Widget	Education	*	Cassette 2-5	16K ZX-81	Orwin	Arcade	*
Alphabet Games	16K Spec.	Sinclair	Education	*	Cassette A	16K Spec.	Orwin	Arcade	*
Android One	16K Spec.	Vortex	Adventure	*	Castle Spellous	48K Spec.	Sinclair	Education	8
Android Two	48K Spec.	Vortex	Arcade	*	Caterpillar	16K Spec.	CDS	Arcade	*
Ant Attack	48K Spec.	QS	Arcade	8	Cavernfighter	16K Spec.	Bug-Byte	Arcade	*
Apocalypse	48K Spec.	Red Shift	Mind Game	*	Centi-bug	16K Spec.	DK Tronics	Arcade	*
Apostrophe	16K Spec.	Sinclair	Education	7	Challenge	16K Spec.	Temptation	Trad.	*
Aquarius	16K Spec.	Bug-Byte	Arcade	6	Character Gen	16K Spec.	Spectrasoft	Utility	*
Arcadia	16K Spec.	Imagine	Arcade	5	Chequered Flag	48K Spec.	Sinclair	Arcade	8
Arcadian	16K Spec.	J K Greye	Arcade	6	Chess Tutor 1	48K Spec.	Sinclair	Education	*
Arcane Quest	48K Spec.	Add-on	Adventure	*	Children's Compendium	16K Spec.	Dymond	Game	*
Armageddon	48K Spec.	Silversoft	Arcade	*	Chuckie Egg	48K Spec.	A & F	Arcade	8
Aspect	16K Spec.	Bug Byte	Utility	5	Chuckman	48K Spec.	Add-on	Arcade	*
Assassin	16K Spec.	Spectrasoft	Arcade	*	City Defence	16K Spec.	Mikro-Gen	Arcade	*
Assembler	48K Spec.	Artic	Utility	6	Collector's Pack	48K Spec.	Sinclair	Business	7
Asteroids	16K ZX-81	Silversoft	Arcade	8	Colossal Caves	48K Spec.	CP	Adventure	8
Asteroids	16K ZX-81	Software Farm	Arcade	6	Colour Clash	16K Spec.	Romik	Arcade	4
Astral Convoy	16K ZX-81	Vortex	Arcade	*	Compiler	48K Spec.	Softek	Utility	6
Atic Atac	48K Spec.	Ultimate	Arcade	8	Composer	48K Spec.	Contrast	Utility	2
Attack on New York	16K Spec.	Fry	Arcade	*	Conflict	16K ZX-81	Martech	Strat.	7
Audio Sonics	16K Spec.	Work Force	Utility	4	Conflict	48K Spec.	Martech	Strat.	*
Auto Chef	16K Spec.	CCS	Sim.	*	Cookie	16K Spec.	Ultimate	Arcade	*
Auto Chef	16K ZX-81	CCS	Sim.	*	Corridors/Genon	48K Spec.	New Gen.	Arcade	9
Avenger	16K Spec.	Abacus	Arcade	*	Cosmic Guerilla	16K Spec.	Crystal Comp	Arcade	8
					Countabout	48K Spec.	Longman	Education	*
					Counting	16K Spec.	Starter Soft	Education	*
					Counting	16K Spec.	Widget	Education	*
					Countries of the World	16K Spec.	Hewson	Utility	8
					County Cricket	48K Spec.	Allanson	Trad.	6
Backgammon	16K Spec.	Hewson	Mind Game	*	Creepy Crawler	16K Spec.	Mikro-Gen	Arcade	*
Backgammon	48K Spec.	CP	Mind Game	7	Crevasse and Hotfoot	16K Spec.	Microsphere	Games	7
Ballooning	16K Spec.	Heinemann	Education	*	Critical Path Analysis	16K ZX-81	Hilderbay	Business	6
Baltic Patrol	16K Spec.	E. Midland	Arcade	*	Critical Path Analysis	48K Spec.	Hilderbay	Business	*
Bank Account Syst.	48K Spec.	K Gouldstone	Business	8	Cruise Attack	48K Spec.	Mikro-Gen	Arcade	*
Bank Raid	16K ZX-81	J M Senior	Game	*	Cruising	16K Spec.	Sunshine	Arcade	4
Bank Robber	16K ZX-81	Romik	Arcade	6	Cry Wolf!	48K Spec.	Add-on	Adventure	*
Bank Verifier	48K Spec.	SD Micro	Business	*	Crypt	48K Spec.	Carnell	Adventure	6
Baron	16K Spec.	Temptation	Arcade	*	Cyber Rats	16K Spec.	Silversoft	Arcade	7
Barrow Quest	16K ZX-81	Sherry	Adventure	*	Cyber Zone	48K Spec.	Crystal Comp.	Arcade	*
Base Invaders	16K Spec.	Imagination	Arcade	*	Cyborg Wars	16K ZX-81	Stratagem	Strat.	7
Base Invaders	48K Spec.	Work Force	Arcade	6	Cycle Planner	16K Spec.	Medidata	Utility	4
Battle 1917	48K Spec.	CCS	Strat.	8					
Battle of Britain	48K Spec.	Microgame	Strat.	*	Dallas	16K Spec.	CCS	Sim.	6
Battleships	16K ZX-81	JRS	Strat.	*	Dallas	16K ZX-81	CCS	Sim.	6
Beamscan	48K Spec.	Beamscan	Utility	9	Database	48K Spec.	Microl	Business	7
Bear Bovver	48K Spec.	Artic	Arcade	8	Death Chase	16K Spec.	Micromega	Arcade	6
Beta Basic	16K Spec.	Betasoft	language	9	Deffendar	48K Spec.	Mikro-Gen	Arcade	*
Beyond Basic	48K Spec.	Sinclair	Utility	*	Defusion	48K Spec.	Incentive	Arcade	*
Big Match Soccer	16K Spec.	Winters	Strat.	*	Demolition	16K ZX-81	Comp. Rntls.	Game	*
Biorythms/Pyramids of Egypt	16K Spec.	Spectrasoft	Game	*	Demon	48K Spec.	Micocosm	Utility	*
Birds and Bees	48K Spec.	Bug-Byte	Arcade	8	Demon Chase	48K Spec.	Mansfield	Arcade	4
Black Crystal	16K ZX-81	Carnell	Adventure	7	Demon Lord	48K Spec.	MCE	Adventure	5
Black Crystal	48K Spec.	Carnell	Adventure	7	Derby Day	48K Spec.	Comp. Rntls.	Game	*
Black Dwarf's Lair	48K Spec.	Newsoft	Adventure	*	Designer	16K Spec.	Matrix	Utility	*
Black Hole	16K Spec.	Quest	Arcade	6	Destroyer	16K Spec.	Winters	Game	*
Black Planet	48K Spec.	Phipps	Adventure	7	Detective	48K Spec.	Arcade	Adventure	7
Blade Alley	48K Spec.	PSS	Arcade	*	Devil Rides In	48K Spec.	Carnell	Arcade	7
Blind Alley	16K Spec.	Sunshine	Arcade	7	Devils of Deep	48K Spec.	Shepherd	Adventure	*
Brag	48K Spec.	T Lebon	Trad.	7	Di-Lithium Lift	48K Spec.	Hewson	Arcade	*
Brain Damage	48K Spec.	Silversoft	Arcade	*	Diamond Quest	48K Spec.	CCS	Adventure	4
Breakaway	16K Spec.	Procom	Arcade	*	Diamond Trail	48K Spec.	Gilsoft	Adventure	7

Name	Machine	Company	Type	Gilbert factor	Name	Machine	Company	Type	Gilbert factor
Dictator	16K Spec.	Bug Byte	Strat.	*	Games Tape 1-2	16K Spec.	Sospan	Game	*
Diet	48K Spec.	DK Tronics	Utility	*	Games Tape 2	16K ZX-81	J K Greye	Game	*
Diet Master	48K Spec.	Diet Master	Utility	6	Games Tape 3	16K ZX-81	J K Greye	Game	*
Dietician	48K Spec.	Keysoft	Utility	4	Gangsters	48K Spec.	CCS	Strat.	8
Dietron	16K Spec.	Custom	Utility	6	General Election	48K Spec.	Bug-Byte	Sim.	1
Digger Dan	16K Spec.	Ocean	Arcade	*	German Master	48K Spec.	Kosmos	Education	*
Dimension Destructors	48K Spec.	Artic	Arcade	8	Ghost Hunt	16K Spec.	PSS	Arcade	*
Disassembler	16K Spec.	dK' Tronics	Utility	7	Gnasher	16K Spec.	R & R	Maze	8
Display	16K Spec.	Work Force	Utility	*	Go To Jail	48K Spec.	Automata	Trad.	*
DIY Book-keeping	48K Spec.	RAMTOP	Business	*	Gobble-a-Ghost	16K Spec.	CDS	Arcade	*
DLAN	48K Spec.	Campbell	Utility	*	Gobbleman	16K Spec.	Artic	Arcade	*
Do Not Pass Go	16K ZX-81	Work Force	Strat.	*	Gobbleman	16K ZX-81	Artic	Arcade	*
Do Not Pass Go	48K Spec.	Work Force	Strat.	6	Gobbler	16K ZX-81	Software Farm	Arcade	*
Dodge City	48K Spec.	Phoenix	Arcade/adventure	7	Godzilla and Martians	16K Spec.	Temptation	Arcade	7
Door Slammer	16K ZX-81	Cathedral	Arcade	7	Golden Apple	48K Spec.	Artic	Adventure	7
Dr. Whom	16K ZX-81	D. Biggs	Adventure	*	Golf	16K Spec.	R & R	Sim.	7
Draft	16K ZX-81	Myrmidon	Business	*	Golf	16K Spec.	Virgin	Sim.	8
Draughts	48K Spec.	CP	Mind Game	7	Golf	48K Spec.	DK Tronics	Sim.	*
Dungeon Master	48K Spec.	Crystal Comp.	Adventure	8	Gorgon	48K Spec.	Phipps	Adventure	*
Dungeons of Doom	16K ZX-81	Woosoft	Adventure	*	Gorilla	16K Spec.	D Hornsby	Game	*
Dungeons of Doom	48K Spec.	Temptation	Adventure	*	Grand Prix	16K ZX-81	dK' Tronics	Arcade	*
Dymonoids	16K Spec.	Dymond	Game	*	Graphics	16K ZX-81	IPA	Utility	*
Earth Defence	16K Spec.	Artic	Arcade	5	Graphics Toolkit	16K ZX-81	JRS	Utility	9
Editor/Assembler	16K Spec.	Picturesque	Utility	8	Great Britain Ltd	16K ZX-81	Hessel	Strat.	*
Education One	16K Spec.	Lerm	Education	*	Great Britain Ltd	48K Spec.	Hessel	Strat.	7
Educational	16K Spec.	Startersoft	Education	*	Greedy Gulch	16K ZX-81	Phipps	Adventure	7
Elektro Storm	48K Spec.	PSS	Arcade	*	Grid run/Pontoon	48K Spec.	Arcade	Trad./Arcade	*
Engine Diagnostic	48K Spec.	Spectrasoft	Utility	*	Ground Attack	16K Spec.	Silversoft	Arcade	6
Escape	16K Spec.	New Generation	Maze	8	Ground Force Zero	16K Spec.	Titan	Arcade	*
Eskimo Eddie	16K Spec.	Ocean	Arcade	*	Guitar Tutor 1	48K Spec.	Harlequin	Education	*
Espionage Isl.	16K ZX-81	Artic	Adventure	*	Guitar Tutor 2	48K Spec.	Harlequin	Education	*
Espionage Isl.	48K Spec.	Artic	Adventure	5	Gulp 2	16K ZX-81	Campbell	Arcade	*
Everest Ascent	48K Spec.	Shepard	Adventure	6	Gulpmann	16K Spec.	Campbell	Arcade	*
Evolution	48K Spec.	Microsphere	Game	*	Halls of Things	48K Spec.	Crystal Comp.	Adventure	9
Ext	48K Spec.	Abbex	Arcade	6	Handwriting	48K Spec.	Chalksoft	Education	*
Extended Basic	16K Spec.	CP	Utility	7	Hang Glider	16K ZX-81	S Electronics	Arcade	6
Family Games Pack	16K Spec.	Hornby	Game	*	Hanoi King	48K Spec.	Contrast	Mind Game	*
Fantasia Diamond	48K Spec.	Hewson	Adventure	*	Haunted Hedges	16K Spec.	Micromega	Arcade	6
Farmer	16K Spec.	CCS	Sim.	*	Heathrow	16K Spec.	Hewson	Sim.	8
Farmer	16K ZX-81	CCS	Sim.	*	Hidden Letters	16K Spec.	Poppy	Education	*
Fighter Pilot	16K ZX-81	Digital Int.	Sim.	5	High Noon	48K Spec.	Work Force	Arcade	9
Fighter Pilot	48K Spec.	D. Integ.	Simulation	*	High-resolution Invaders	16K ZX-81	Odyssey	Arcade	*
Finance Manager	16K Spec.	OCF	Business	9	Hobbit	48K Spec.	Sin/M.Hse.	Adventure	9
Fireflash	16K Spec.	Abacus	Arcade	5	Hole	48K Spec.	Add-on	Adventure	*
Firework Music	16K Spec.	Soft Cottage	Education	8	Home Computer Pack	16K Spec.	SD Micro	Bus.	*
Flight Sim.	16K ZX-81	Sinclair	Sim.	6	Hopper	16K Spec.	PSS	Arcade	6
Flight Sim.	48K Spec.	Sinclair	Sim.	6	Horace and the Spiders	16K Spec.	Sinclair	Arcade	8
Flippit	16K Spec.	Sinclair	Puzzle	7	Horace Goes Skiing	16K Spec.	Sinclair	Arcade	8
Football	16K Spec.	Winters	Sim.	*	Horror Atoll	48K Spec.	Add-on	Adventure	*
Football	48K Spec.	D. Integ.	Utility	*	Hot Dot Spotter	16K Spec.	Longman	Education	*
Football Manager	16K ZX-81	Addictive Gms.	Sim.	*	Hse. Living Dead	48K Spec.	Phipps	Arcade	*
Football Manager	48K Spec.	Addictive Gms.	Sim.	7	Hunchback	48K Spec.	Ocean	Arcade	*
Football Pools Program	16K ZX-81	Hartland	Utility	*	Hungry Horace	16K Spec.	Sinclair	Arcade	8
Football Pools Program	48K Spec.	Hartland	Utility	*	Hunter Killer	48K Spec.	Protek	Strat.	9
The Forest	48K Spec.	Phipps	Simulation	*	I Ching	48K Spec.	Sirius	Game	*
Fort Apache	16K ZX-81	Contrast	Strat.	8	I Ching	48K Spec.	Salamander	Utility	7
Forth	16K ZX-81	Sinclair	Language	7	Inca Curse	16K ZX-81	Sinclair	Adventure	*
Forth	48K Spec.	Sinclair	Language	7	Inca Curse	48K Spec.	Sinclair	Adventure	6
Forth	48K Spec.	Melbourne Hse.	Language	9	Inkos	48K Spec.	Chalksoft	Sim.	*
Four Rules of Number	16K Spec.	Micro Master	Education	*	Integration	16K Spec.	University	Utility	8
Four Rules of Number	16K ZX-81	Micro Master	Education	*	Integration	16K ZX-81	University	Utility	8
FP Compiler	16/48 Spec.	Softek	Utility	9	Intermediate English 1-2	16K Spec.	Rose	Education	*
Fred	48K Spec.	QS	Arcade	*	Intermediate English 1-2	16K ZX-81	Rose	Education	*
Freez Beez	48K Spec.	Silversoft	Arcade	*	Intermediate Maths 1-2	16K Spec.	Rose	Education	*
French is Fun	48K Spec.	CDS	Education	5	Intermediate Maths 1-2	16K ZX-81	Rose	Education	*
French Mistress	48K Spec.	Kosmos	Education	*	Invaders	16K ZX-81	Abersoft	Arcade	*
French Voc Test	16K Spec.	Tutorial	Education	*	Invaders	16K ZX-81	Bug Byte	Arcade	*
French Voc Test	48K Spec.	Tutorial	Education	*	Invaders	16K ZX-81	Silversoft	Arcade	*
Froggy	16K Spec.	DJL	Arcade	7	Invaders	16K ZX-81	Odyssey	Arcade	8
Froggy	16K ZX-81	DJL	Arcade	7	Invaders	1K ZX-81	Selec	Arcade	7
Fruit Line	16K Spec.	P A Hanson	Game	*	Invasion Body Snatch.	48K Spec.	Crystal	Arcade	9
Fruit Machine	16K Spec.	dK' Tronics	Game	6	Invasion Force	16K Spec.	Artic	Arcade	8
Full-screen Breakout	1K ZX-81	New Generation	Arcade	*	Invincible Isl.	48K Spec.	Shepard	Adventure	8
Galectians	16K Spec.	DK Tronics	Arcade	*	Island	48K Spec.	Crystal	Adventure	4
Galactic Trooper	16K Spec.	Romik	Arcade	3	Island	48K Spec.	Virgin	Adventure	7
Galactic Trooper	16K ZX-81	Romik	Arcade	6	Jackpot	48K Spec.	Comp. Rntls.	Arcade	*
Galactic Warriors	16K Spec.	Abacus	Arcade	6	Jericho Road	48K Spec.	Shards	Adventure	*
Galaxians	16K Spec.	Artic	Arcade	6	Jet Pac	48K Spec.	Ultimate	Arcade	8
Galaxy Attack	48K Spec.	Sunshine	Arcade	4	Jogger	16K Spec.	Severn	Arcade	*
Galaxy Conflict	16K ZX-81	Martech	Strat.	*	Johnny Reb	48K Spec.	Lothlorian	Sim.	*
Galaxy Conflict	48K Spec.	Martech	Strat.	*	Jumbly	48K Spec.	D K Tronics	Quiz	*
Galaxy Jailbreak	16K ZX-81	Romik	Arcade	6	Jungle Adventure	48K Spec.	CCS	Adventure	4
Gambling Tape	16K Spec.	Dymond	Game	*	Keysounder	16K Spec.	S and G	Utility	*
Games	16K ZX-81	P Teakle	Game	*	King Arthur	48K Spec.	E. Midland	Simulation	*
Games 2	16K ZX-81	JRS	Game	*	Knight Rider	48K Spec.	Hewson	Arcade	*
Games Designer	48K Spec.	QS	Utility	7	Knight's Quest	16K ZX-81	Phipps	Adventure	*
Games Pack 1	16K Spec.	A Burnham	Game	*	Knight's Quest	48K Spec.	Phipps	Adventure	6
Games Tape 1	1K ZX-81	J K Greye	Game	*	Krazy Kong	16K ZX-81	PSS	Arcade	*

Cassette Round-up

Name	Machine	Company	Type	Gilbert factor	Name	Machine	Company	Type	Gilbert factor
Labyrinth	16K Spec.	Axis	Arcade	4	O Level Physics	16K Spec.	Homestudy	Education	*
Language Devel. Series	16K Spec.	Glasson	Education	*	O Level Physics	48K Spec.	Think Tank	Education	*
Language Devel. Series	16K Spec.	Micro Master	Education	*	Odds-on	16K Spec.	RSD	Game	*
Language Devel. Series	16K ZX-81	Glasson	Education	*	Oligopoly	48K Spec.	CCS	Strat.	7
Language Devel. Series	16K ZX-81	Micro Master	Education	*	Omnicalc	48K Spec.	Microsphere	Business	9
Las Vegas	16K Spec.	Temptation	Strat.	*	Oracle's Cave	48K Spec.	Doric	Adventure	8
Last Sunset Lattica	48K Spec.	Arcade	Arcade	*	Orbiter	16K Spec.	Silversoft	Arcade	7
Lazatron	48K Spec.	Contrast	Arcade	*	Original Superchess	16K ZX-81	CP Software	Trad.	*
Lazer Zone	48K Spec.	QS	Arcade	*	Original Superchess	48K Spec.	CP Software	Trad.	*
Leap Frog	16K Spec.	CDS	Arcade	*	Ostron	16K Spec.	Softtek	Arcade	*
Learn Basic	16K Spec.	Logic 3	Education	*	Othello	16K Spec.	CP Software	Trad.	*
Learn to Read 1-5	48K Spec.	Sinclair	Education	7	Othello	16K Spec.	M.O.I.	Trad.	*
Learning Read 1	16K Spec.	Poppy	Education	*	Othello	16K ZX-81	M.O.I.	Trad.	*
Leopard Lord	48K Spec.	Add-on	Adventure	4	Party Time	48K Spec.	C. Tutor	Education	*
Light Cycle	16K Spec.	PSS	Arcade	*	Pascal Compiler	48K Spec.	Hi-Soft	Language	*
Linear Progging	16K Spec.	University	Utility	*	Pat the Postman	48K Spec.	Mikro-Gen	Arcade	*
Linear Progging	16K ZX-81	University	Utility	*	Pathfinder	16K Spec.	Widget	Education	*
List File	48K Spec.	SD Micro	Utility	*	Payroll	16K ZX-81	Hilderbay	Business	*
Lojix	16K Spec.	Virgin	Mind Game	3	Payroll	32K ZX-81	Soft Tech	Business	*
Looney Zoo	48K Spec.	Phipps	Arcade	*	Payroll	48K Spec.	Hilderbay	Business	9
Lost Island	16K ZX-81	JRS	Adventure	*	Payroll	48K ZX-81	Soft Tech	Business	*
Lost Over Bermuda	48K Spec.	Add-on	Adventure	*	Peek	16K Spec.	Zen	Utility	*
Luna Crabs	16K Spec.	Micromega	Arcade	7	Penetrator	48K Spec.	Mel. Hse.	Arcade	7
Lunar Jetman	16K Spec.	Ultimate	Arcade	*	Pengy	16K Spec.	Micromania	Arcade	4
Machine Code Test Tool	16K Spec.	OCP	Utility	7	Personal Banking System	16K ZX-81	Hilton	Business	*
Machine Code Test Tool	16K ZX-81	OCP	Utility	7	Personal Banking System	48K Spec.	Hilton	Business	*
Mad Martha	48K Spec.	Miko-Gen	Adventure	*	Personal Financ.				
Mad Martha II	48K Spec.	Miko-Gen	Adventure	*	Management Syst.	48K Spec.	Fulwood	Business	*
Magic Meanies	16K Spec.	CDS	Arcade	2	Personal Reminder	48K Spec.	SD Micro	Utility	*
Magic Mountain	16K ZX-81	Phipps	Adventure	*	Pharaoh's Tomb	16K ZX-81	Phipps	Adventure	*
Magnets	48K Spec.	Sinclair	Education	*	Pi-Balled	48K Spec.	Automata	Arcade	7
Mailing List	16K ZX-81	Hestacrest	Business	*	Pi-Eyed	48K Spec.	Automata	Adventure	6
Make-a-Chip	48K Spec.	Sinclair	Education	*	Pilot	16K ZX-81	Hewson	Sim.	7
Manic Miner	48K Spec.	Bug-Byte	Arcade	9	Pimania	16K ZX-81	Automata	Sim.	*
Mansfield Park	48K Spec.	Sussex	Education	7	Pimania	48K Spec.	Automata	Sim.	7
Marks Book	16K Spec.	Lerm	Utility	*	Pinball	16K Spec.	Winters	Game	*
Master Toolkit	16K Spec.	OCP	Utility	*	Pirate	48K Spec.	Chalksoft	Education	*
Masterfile	48K Spec.	Campbell	Business	8	Pitman Seven	16K Spec.	Visions	Adventure	*
Masterfile 16	16K Spec.	Campbell	Business	*	Planet of Death	16K Spec.	Artic	Adventure	6
Matcalc	16K Spec.	Work Force	Utility	*	Planetoids	16K Spec.	Sinclair	Arcade	8
Maths Tutor	16K Spec.	AD Software	Education	*	Plunder	48K Spec.	CCS	Strat.	8
Matrix Operations	16K Spec.	University	Utility	7	Polynomials	16K Spec.	University	Utility	8
Matrix Operations	16K ZX-81	University	Utility	7	Polynomials	16K ZX-81	University	Utility	
Maze Chase	16K Spec.	Hewson	Arcade	8	Pontoon	48K Spec.	Contrast	Trad.	3
Maze Death Race	16K ZX-81	PSS	Arcade	*	Pool	16K Spec.	Bug Byte	Game	7
Maze Death Race	48K Spec.	PSS	Arcade	*	Pre/early school				
Maze Man	16K ZX-81	Abersoft	Arcade	*	cassettes	16K Spec.	Essex	Education	*
Maziacs	48K Spec.	dK' Tronics	Arcade	8	Primary Arithmetic	16K Spec.	Rose	Education	*
Mazogs	16K ZX-81	Bug Byte	Arcade	*	Primary Arithmetic	16K ZX-81	Rose	Education	*
MCoder	16K Spec.	PSS	Utility	8	Print Shop	16K Spec.	CCS	Sim.	8
MCoder	16K ZX-81	PSS	Utility	8	Print Shop	16K ZX-81	CCS	Sim.	*
Melbourne Draw	48K Spec.	Melbourne Hse.	Utility	7	Print Utilities	16K Spec.	Sinclair	Utility	*
Merchant of Venus	16K ZX-81	Crystal	Adventure	7	Pro-Golf	16K Spec.	Hornby	Game	7
Meteor Madness	16K Spec.	Spectresoft	Arcade	*	Programme				
Meteor Storm	16K Spec.	Quicksilva	Arcade	7	Enhancement Package	16K ZX-81	R and R	Utility	*
Meteoroids	16K Spec.	dK' Tronics	Arcade	7	Programmer's Dream	16K Spec.	Work Force	Utility	8
Meteoroids	16K Spec.	Softtek	Arcade	6	Proteus	16K Spec.	Abacus	Arcade	5
Micro Prolog	48K Spec.	Sinclair	Language	8	Pssst	48K Spec.	Ultimate	Arcade	7
Micropen	16K Spec.	Contrast	Utility	*	Puckman	16K ZX-81	Hewson	Arcade	*
Milypede	16K Spec.	Add-on	Arcade	7	Punctuation Pete	16K Spec.	Heinemann	Educational	*
Mined Out	16K Spec.	Quicksilva	Arcade	7	Purchase Ledger	16K ZX-81	Hestacrest	Business	*
Mines of Saturn/Return to Earth	16K Spec.	Miko-Gen	Adventure	*	Pyramid	48K Spec.	Fantasy	Arcade	8
Money	16K Spec.	Poppy	Education	*	Quazar	16K Spec.	Rose	Mind Game	4
Monitor/Diss.	48K Spec.	Sinclair	Utility	8	Quest	48K Spec.	Hewson	Adventure	7
3D Monster Chase	16K Spec.	Romik	Arcade	3	Quetzalcoatl	48K Spec.	Virgin	Adventure	8
Moon Alert	48K Spec.	Ocean	Arcade	*	Quick Thinking	48K Spec.	Mirror	Education	*
Moon Buggy	16K Spec.	Visions	Arcade	*	Quill	48K Spec.	Gilsoft	Utility	9
Moria	16K Spec.	Severn	Adventure	*	Quincy	16K Spec.	Severn	Strat.	*
Mountains of Ket	48K Spec.	Incentive	Adventure	8	Raider Cursed Mine	48K Spec.	Arcade	Arcade	*
Mr Wimpey	48K Spec.	Ocean	Arcade	7	Ramopoly	48K Spec.	J Fletcher	Game	*
Mr. Men	48K Spec.	Mirror	Education	*	Rapedes	16K Spec.	Visions	Arcade	*
Muncher	16K Spec.	Silversoft	Arcade	*	Red Weed	48K Spec.	Lothlorian	Simulation	7
Muncher	16K Spec.	Silversoft	Arcade	6	Regression	16K Spec.	University	Utility	8
Murder at Manor	48K Spec.	Gemtime	Adventure	7	Regression	16K ZX-81	University	Utility	*
Music Maker	48K Spec.	Bellflower	Utility	3	Renumber Delete	16K Spec.	Work Force	Utility	*
Music Master	48K Spec.	Sinclair	Education	*	Renumber Delete	16K ZX-81	Work Force	Utility	*
Namtir Raiders	16K ZX-81	Artic	Arcade	8	Repulsar	16K Spec.	Softtek	Arcade	*
Nanas	16K Spec.	Miko-Gen	Arcade	*	Rescue	48K Spec.	Computer Rent	Arcade	*
Night Gunner	16K ZX-81	Digital	Sim.	5	Rescue	48K Spec.	Ocean	Arcade	*
Night Sky	16K Spec.	Bridge	Utility	*	Reversi	16K Spec.	Sinclair	Trad.	8
NightFlite	16K Spec.	Hewson	Sim.	5	Rider	16K Spec.	Virgin	Arcade	6
Nineteenth C. Eng. 1984	48K Spec.	Sussex	Education	8	Road Toad	16K Spec.	DK Tronics	Arcade	7
Nowotnik Puzzle	16K Spec.	Phipps	Game	7	Robot Panic	16K Spec.	Soft Mill	Arcade	1
Nowotnik Puzzle	16K ZX-81	Phipps	Game	*	Robot Riot	48K Spec.	Silversoft	Arcade	*
Number 6	16K Spec.	Prime	Education	*	Rommels Revenge	48K Spec.	Crystal	Arcade	8
O Level Chemistry	16K ZX-81	Calpac	Education	*	Roulette	16K Spec.	Newsoft	Trad.	*
O Level Chemistry	48K Spec.	Calpac	Education	*	Roulette	48K Spec.	Dymond	Trad.	*
O Level French Revision	16K ZX-81	Rose	Education	*	Roundsby Incident	48K Spec.	Add-on	Adventure	*
O Level Maths	16K Spec.	Homestudy	Education	*	Royal Birkdale	48K Spec.	Ocean	Simulation	*
O Level Maths Revision	16K ZX-81	Rose	Education	*	Sales Day Book	16K ZX-81	Transform	Business	*

Cassette Round-up

Name	Machine	Company	Type	Gilbert factor	Name	Machine	Company	Type	Gilbert factor
Sales Day Book	48K Spec.	Transform	Business	*	The Devil Rides In	16K Spec.	Carnell	Arcade	*
Sales Ledger	16K ZX-81	Hestacrest	Business	*	The Forest	48K Spec.	Phipps	Sim.	*
Santa	16K Spec.	Artic	Arcade	*	The Great Western	16K Spec.	New Soft	Game	*
Satan's Pendulum	48K Spec.	Minatron	Adventure	7	The Great Western	16K ZX-81	New Soft	Game	*
Scrabble	48K Spec.	Sinclair	Trad.	8	The Key	16K Spec.	Keysoft	Utility	*
Scuba Dive	48K Spec.	Durrell	Arcade	9	The Orb	48K Spec.	Computer Ren.	Adventure	*
Secret Valley	16K Spec.	Newsoft	Adventure	*	The Pyramid	48K Spec.	Fantasy	Arcade	7
Secret Valley	16K ZX-81	Newsoft	Adventure	*	The Settler	16K Spec.	BSS	Utility	*
Security Shelter	48K Spec.	Add-on	Arcade	*	The Settler	16K ZX-81	BSS	Utility	*
Self-teach Program	16K Spec.	Anvil	Education	*	The Turk	48K Spec.	OCP	Trad.	8
Self-teach Program	16K ZX-81	Anvil	Education	*	Three Games Cassette	1K ZX-81	McGraw Hill	Various	8
Sentinel	16K Spec.	Abacus	Arcade	7	3D Seiddab Attack	48K Spec.	Hewson	Arcade	7
Serpents Tomb	16K ZX-81	Vortex	Adventure	*	3D Strategy	48K Spec.	QS	Mind Game	8
Shape Sorter	16K Spec.	Widget	Education	*	3D Tunnel	48K Spec.	New Gen.	Arcade	9
Shark Attack	16K Spec.	Romik	Arcade	*	Time Bandits	16K Spec.	New Soft	Adventure	*
Sheepwalk	48K Spec.	Virgin	Game	7	Time Bandits	16K ZX-81	New Soft	Adventure	*
Sheer Panic	16K Spec.	Visions	Arcade	7	Time Gate	48K Spec.	QS	Arcade	8
Ship of Doom	48K Spec.	Artic	Adventure	7	Time Quest	48K Spec.	Mikro-Gen	Adventure	*
Shiva Special I	16K Spec.	Shiva	Games	*	Tobor	48K Spec.	Add-on	Arcade	7
Shopping List	16K Spec.	SD	Utility	*	Tomb of Dracula	16K ZX-81	Felix	Adventure	*
Sideways Copy	16K ZX-81	D King	Utility	*	Tomb of Dracula	48K Spec.	Felix	Adventure	*
Six Games	16K ZX-81	A Stubbs	Various	5	Trace	16K Spec.	Zen	Utility	*
Sky Raider	16K Spec.	C M Smith	Arcade	*	Trace	16K Spec.	Texgate	Utility	8
Slippery Sid	16K Spec.	Silversoft	Arcade	8	Trace	16K ZX-81	Texgate	Utility	7
Slow Loader	16K Spec.	ELR	Utility	9	Tradewind	48K Spec.	WDS	Strat.	*
Snail Logo	48K Spec.	CP	Educ/Lang.	8	Train Game	16K Spec.	Microsphere	Game	9
Snooker	48K Spec.	Visions	Arcade	*	Transylvanian Tower	48K Spec.	Shepherd	Adventure	7
Softalk 1-2	48K Spec.	CP	Utility	8	Tranz Am	48K Spec.	Ultimate	Arcade	*
Solaris	48K Spec.	Softel	Adventure	*	Traxx	48K Spec.	QS	Arcade	7
Solo Whist	16K Spec.	Video Soft.	Trad.	*	Troon	48K Spec.	Hornby	Game	8
Sound FX	16K Spec.	dK' Tronics	Utility	6	Tube Train Terror	48K Spec.	JRS	Game	*
Space Fighter	16K Spec.	Winters	Arcade	*	Tutankhamum	48K Spec.	Micromania	Arcade	8
Space Intruders	16K Spec.	QS	Arcade	7					
Space Lanes	16K Spec.	Cathedral	Arcade	*	Urban Upstart	48K Spec.	Shepherd	Adventure	*
Space Raiders	16K Spec.	Sinclair	Arcade	6	Use and Learn	16K Spec.	Microl	Utility	8
Space Raiders	16K ZX-81	Sinclair	Arcade	*	Utility File	48K Spec.	SD Micro	Business	*
Space Station Zebra	48K Spec.	Beyond	Arcade	6					
Space Trek	16K ZX-81	JRS	Arcade	*	Valhalla	48K Spec.	Movisoft	Adventure	7
Space Zombies	16K Spec.	Mikro-Gen	Arcade	*	Vampire Village	48K Spec.	Terminal	Adventure	4
Spanish Gold	48K Spec.	Chalksoft	Education	*	Velnor's Lair	48K Spec.	QS	Adventure	8
Speak and Spell	48K Spec.	S and G	Education	*	Voice Chess	48K Spec.	Artic	Trad.	9
Spec. Assembler	48K Spec.	Artic	Utility	*	Volcanic Dungeon	16K ZX-81	Carnell	Adventure	*
Spec. Bug	16K Spec.	Artic	Utility	*	Volcanic Dungeon	48K Spec.	Carnell	Adventure	6
Spec. Compiler	48K Spec.	Softtek	Utility	7	Vortex	16K Spec.	JK Greye	Arcade	5
Spec. Editor/Assembler	16K Spec.	Picturesque	Utility	8	Vu-Calc	16K Spec.	Sinclair	Business	7
Spec. Forth	48K Spec.	Abersoft	Language	9	Vu-File	16K Spec.	Sinclair	Business	8
Spec. Forth	48K Spec.	CP	Utility	8	Vu3D	48K Spec.	Sinclair	Utility	8
Spec. Frogs/Showdown	16K Spec.	Artic	Arcade	*					
Spec. Gobbleman	16K Spec.	Artic	Arcade	*	War 70	48K Spec.	CCS	Strat.	8
Spec. Invaders	16K Spec.	Artic	Arcade	*	Warlock of Firetop				
Spec. Invasion Force	16K Spec.	Artic	Arcade	*	Mountain	48K Spec.	Penguin	Arcade	*
Spec. Microchess	16K Spec.	Artic	Trad.	8	Warlord	48K Spec.	Lothlorian	Sim.	*
Spec. Monitor	16K Spec.	Picturesque	Utility	8	Wheelie	48K Spec.	Microsphere	Arcade	7
Spec. Scramble	16K Spec.	Work Force	Arcade	7	Whizz Kid	48K Spec.	C. Tutor	Education	*
Spec. Sound	16K Spec.	M Afzal	Utility	*	Who Dares Wins	48K Spec.	E. Midland	Adventure	*
Spec. Tape Copier	16K Spec.	S Giza	Utility	*	Wizard's Warriors	16K Spec.	Abersoft	Arcade	*
Special Agent	16K Spec.	Heinemann	Education	*	Word Fit	16K ZX-81	Ram Writer	Game	6
Spectadraw 2	48K Spec.	McAlley	Utility	*	Word Processor	48K Spec.	Microl	Business	*
Spectipede	16K Spec.	R and R	Arcade	8	World Info	48K Spec.	Wimsoft	Utility	*
Spectral Invaders	16K Spec.	Bug-Byte	Arcade	8	World of Illusions	16K ZX-81	Constrast	Adventure	4
Spectral Panic	16K Spec.	Hewson	Arcade	5	Wrath of Magra	48K Spec.	Carnell	Adventure	*
Spectres	16K Spec.	Bug-Byte	Arcade	6					
Spectron	48K Spec.	Virgin	Arcade	6	X Ray	16K Spec.	Zen	Utility	*
Speech Marks	48K Spec.	Sinclair	Education	7	Xadom	48K Spec.	QS	Arcade	4
Spellbin	16K Spec.	Startersoft	Education	*					
Splat	48K Spec.	Incentive	Arcade	8	Yahtzi	48K Spec.	Work Force	Trad.	*
Spreadsheet	48K Spec.	Microl	Business	7	Yomp	16K Spec.	Virgin	Arcade	7
Star Gazer	48K Spec.	CRL	Utility	8					
Strike Four	16K Spec.	Spectresoft	Various	4	Zeus Assembler	48K Spec.	Sinclair	Utility	9
Styx	16K Spec.	Bug-Byte	Arcade	7	Ziggurat of Dread	48K Spec.	Add-on	Adventure	*
Sub	16K Spec.	Romik	Arcade	*	Zodiac F	48K Spec.	Stellar	Utility	7
Super Play I	16K Spec.	Video	Games	*	Zodiac I	16K ZX-81	Stellar	Utility	*
Superchess II	48K Spec.	CP	Trad.	8	Zodiac II	16K ZX-81	Stellar	Utility	*
Superchess Three	48K Spec.	CP	Mind Game	9	Zuckman	16K ZX-81	DJL	Arcade	8
Supercode	16/48K Spec.	CP	Utility	*	ZX 1K Chess	1K ZX-81	Artic	Trad.	*
Superspy	48K Spec.	Shepherd	Adventure	5	ZX Compiler	16K ZX-81	Silversoft	Utility	*
Swag + Voyager	16K ZX-81	Howard	Arcade	*	ZX Draughts	48K Spec.	CP	Trad.	*
Tai	16K ZX-81	PSS	Game	*	ZX Forth	16K ZX-81	Artic	Language	8
Tank Battle	16K Spec.	dK' Tronics	Game	8	ZX Forth	48K Spec.	Artic	Language	8
Tape Breaker	16K Spec.	Spectrasoft	Utility	*	ZX Invasion Force	16K ZX-81	Artic	Arcade	*
Tape Copier	16K Spec.	Lerm	Utility	*	ZX Panic	1K ZX-81	Selec	Arcade	4
Taswide-64	16K Spec.	Tasman	Utility	*	ZX Screenkit	4K-64K ZX-81	Picturesque	Utility	*
Tasword	48K Spec.	Tasman	Business	8	ZX-81 1K Games Pack	1K ZXZ-81	Crystal	Games	9
Tasworld II	48K Spec.	Tasman	Business	9	ZX-81 Pocket Book	16K ZX-81	Phipps	Games	*
Teach Data	48K Spec.	B Farris	Education	*	ZX-81 Remload	16K-64K			
Teacher Data	48K Spec.	B Farris	Education	8					
Teacheraid	16K Spec.	B Farris	Education	*	ZX-Bug	16K ZX-81	Artic	Utility	*
Tennis	16K Spec.	Winters	Game	*	ZX-Chess I	16K ZX-81	Artic	Trad.	*
Tenpin	16K ZX-81	Phipps	Game	*	ZX-Chess II	48K Spec.	Artic	Trad.	*
Terror from The Deep	48K Spec.	Add-on	Adventure	*	ZX-sideprint	16K ZX-81	Microsphere	Utility	*
Test Match	48K Spec.	Computer Ren.	Sim.	*	ZXAS	16K ZX-81	Bug Byte	Utility	*
Text	16K ZX-81	Contast	Bus.	8	ZXDB	16K ZX-81	Bug Byte	Utility	*
The Castle	48K Spec.	Bug Byte	Adventure	*	ZXED	16K Spec.	dK' Tronics	Utility	*

PSYCLAPSE & BANDERSNATCH
COMMODORE 64 48K SPECTRUM

REINFORCEMENTS ARRIVE!



After eight weeks of total concentration by our four master programmers Psychapse & Bandersnatch, the two most original computer games ever conceived are entering the final phase of creation. Now the Imagine 'A Team' have been joined by (from left to right) Steve Cain, Ally Noble, Dawn Jones, Abdul Ibrahim and Fred Gray.

Steve, Ally and Dawn are three of the most accomplished graphic artists in the country and Abdul and Fred are two highly respected musicians.

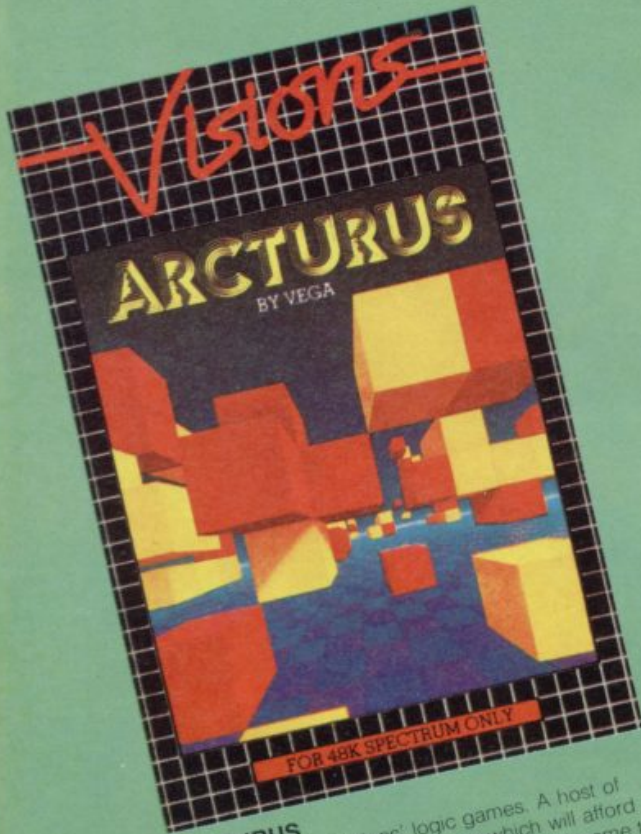
Their task is to enhance these magnificent games with dazzling animation, stunning effects and electrifying music.

Psychapse & Bandersnatch, a treat for your senses, coming soon from Imagine.



PLAY 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 with
not entir
your pur
days and

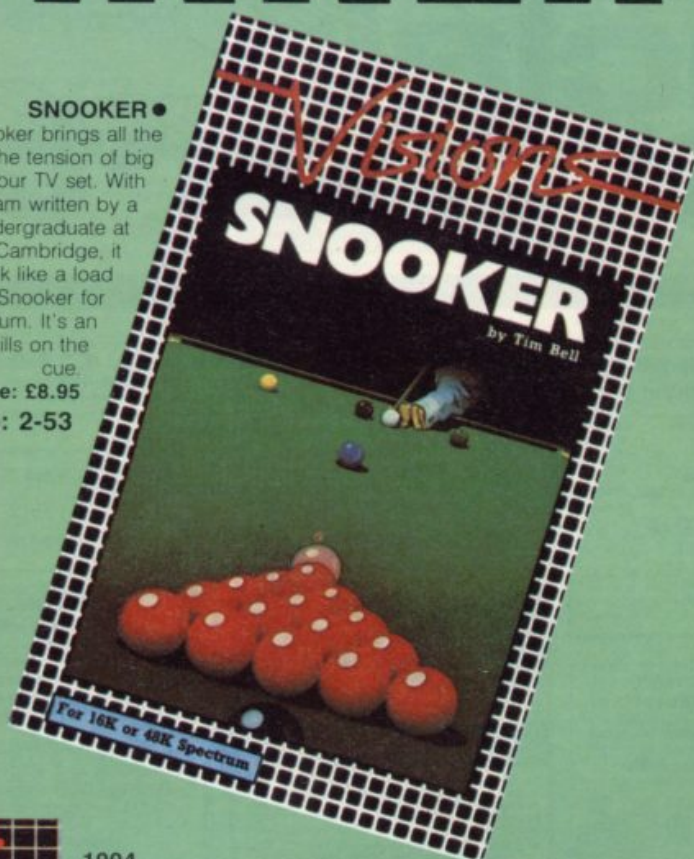
WINNERS

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

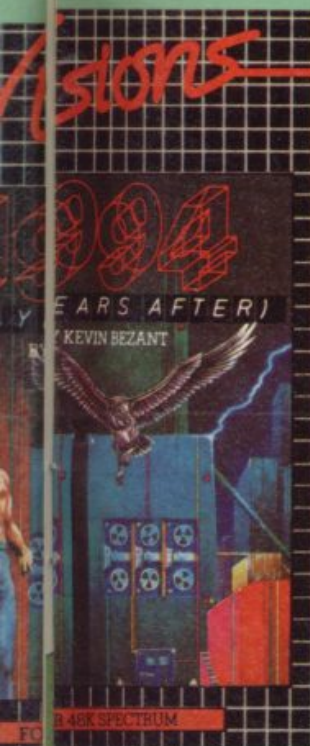


1994

The game has eight screens which get progressively more difficult. The object of the game is to take Smiffy from Screen 1 to Screen 8 and to get to and from each screen you must pick up the key which lies within the screen that will open the exit door. The hazards include stepping onto and off, up and down lifts going over droids and avoiding plasma bolts that are constantly being fired at you. For the Spectrum 48K.

Cassette price: £9.95

Ref. No: 2-56



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

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

With complete confidence. If you are not completely satisfied with the quality of your purchase return it to us within 7 days and we will provide a replacement.

Sinclair Supermart

HOMESTUDY LTD

TRELEIGH WOODS FARM
REDRUTH CORNWALL

48K SPECTRUM

PHYSICS 'O' LEVEL REVISION PROGRAMS
A.E.B. SYLLABUS 052 1984/5 £26 THE SET

MATHEMATICS 'O' LEVEL REVISION PROGRAMS
LONDON SYLLABUS B (361) 1984/5 £30 THE SET
CAMBRIDGE SYLLABUS D (4004) 1984/5 £30 THE SET

WE GUARANTEE YOUR EXAMINATION SUCCESS
OR WE WILL REFUND THE FULL PURCHASE PRICE

SPECTRUM 3D DESIGNER

No pre plotting — draw simple or complex designs direct to screen — flip in and out of 2D or 3D, rotate, scale, move around screen, change depth of 3D projection etc. Let the kids design their own cars, spacecraft etc. Runs on 16K or 48K. £4.95 including P&P.

MATRIX SOFTWARE Dept FT,
79 Mildenhall, Tamworth, Staffs

LEARN ABOUT ELECTRONICS WITH YOUR SPECTRUM 48K

New structured independent learning package for beginners—designed by electronics engineers—includes:

- Computer generated animated graphics
- Learners guide
- Kit of components
- Practical guidance and exercises.

Package suitable for beginners, GCE/CSE, C&G etc. and covers basic semi-conductor theory. Price £9.95 p&p. Cash with order to:

E.T.S.I., 117 Loughborough Road,
Kirkcaldy KY1 3DD.

DISCOUNT SOFTWARE

SPECTRUM	12 page catalogue including	R.P.P.	Our Price
MANIC MINER	(BUS BYTE)	5.95	4.95
WAD WARTHA 8	(MELBOURNE)	5.95	5.50
HOBBIT	(BOOM)	14.95	11.95
COMMODORE 64	(SHEPHERD)	6.50	5.00
STREET ASSENT	(BOOM)	5.50	4.50
DO RUN			
BOB	(S.K. Troncal)	6.95	5.95
BUCKLE PUZZLE	(S.K. Troncal)	6.95	5.95
DICTIONARY			
BOB	(ARTIC)	5.95	4.95
ASTEROIDS	(WIRGIN)	5.95	4.95
KILLER CAVERNS			
DRAGON			
CRISIS	(U. MORGAN)	7.95	6.95

C.W.D. P&P: 50p 1. 10p. 2 or more post free SAE for 12 page catalogue for most computers to Discount Software, 45 Brunswick, Gracknall, Bucks.

SPECTRUM SPELLING GAME

Hold your child's attention with this fascinating way of spelling. When a word is correctly spelt, the object appears on the screen, eventually building up a complete picture. Uses familiar words with large easy-to-read characters. Includes animated graphics. Suitable ages 4+.

£4.95 (incl. p+p for 48K Spectrum).

Court Software

84 Old Bath Road, Charvil, Reading RG10 9QL

SPECTRUM REPAIR SERVICE VERY FAST

Send your faulty Spectrum, briefly describing faults to:

Trident Enterprises Ltd,
37 Linden House,
Common Road,
Langley, Slough,
Berkshire SL3 8TT

or Phone Slough (0753) 48785 Monday to Saturday. Only £12.50 + Parts and Postage. We also repair all Commodore Systems.

SPECTRUM/ZX-81 REPAIRS

Fast efficient service

Acesure Ltd,
43 Old St,
Ashton-u-Lyne,
Lancs.

Tel: 061-339 8266

LOCATOR IS EDUCATION

Full range of programs for the SPECTRUM and ZX-81 from INFANT to GCE. Most makes in stock. GAMES TAPES: 3 for price of 2. SAE (9 x 4) for catalogue and Special Offers.

12 FERNHALL DRIVE, REDBRIDGE, ESSEX IG4 5BN. Tel: 01-550 5575

ZX SPECTRUM JOYSTICK ADAPTOR LEAD

For use with Interface 2.

Enables a Joystick to simulate cursor control keys (5 to 8), O FIRE.

Only £7.99 (inc. p&p)

Abtron, 38 Rydens Avenue,
Walton-on-Thames,
Surrey KT12 3JP

SPECTRUM OWNERS!!!

DISCOUNT GAMES +
FREE C10 BLANK CASSETTE
with every game purchased

PYRAMID £5.25

THE ALCHEMIST £5.25

Send cheque/P.O. to: Software Mart,

175 Edwarebury Lane, Edgware,
Middlesex HA8 8ND.

Other Spectrum Games available at
discount prices — All with FREE
Cassette. Send S.A.E. for details.

TEACH YOUR CHILD

ZX Spectrum 16 or 48K

(All programs include keyboard overlay)



HIDDEN LETTERS Reading comprehension and spelling game Age 5 on £6.00

MONEY 3 levels Age 3-10 £6.50

TELLING THE TIME 7 Programs, including clock for child to set Age 3-10 £7.00

LEARNING TO READ 1 Age 2-5 £6.50

4 All-graphics pre-reading games

POPPY PROGRAMS, Richmond House, Ingleton, Carnforth LA6 3AN
Computer Trade Association Member

ZX-81

UNIQUE TAPE CONTROLLER

Let your ZX-81 control your tape recorder during SAVING and LOADING. Inverse video white characters on a black screen.

FREE

Do you have ZX-81 SAVE/LOAD problems? Then simply send a cassette recorded using your computer together with the type name of your tape recorder. You will receive your cassette by return of post informing you of the cure to your problem.

M.E.A.C. DESIGNS, P.O. Box 145, Dept SU, Camberley, Surrey GU17 7ES.
S.A.E. with any enquiries.

PROGRAM FREEZE? DATA GONE HAYWIRE?

Usually caused by a voltage spike.

Annoying, may damage equipment or programs—a 13 amp POWER CLEANER plug top in place of your existing one (its physically almost identical) could protect more than one piece of kit. (£10.70 inc. P & P).

Also available:

Fused 4 socket in line resident 13 amp trailing adaptor—tidy up the plug top jungle.

£8.50 (inc. P & P).

Or S.A.E. for details: money back if disappointed.

MAILECTRIC LTD
31 WALKER AVE, BOLTON
GRTR. MANCHESTER BL3 2DY
phone 0204 45894

SPECTRUM INTERFACES

ADC8.2	8 Channel Analogue Input	£52
REL4.2	4 Channel Relay Switch box	£58

CAPTURE DATA CONTROL DEVICES

Ask for data sheet or send order with cheque/P.O. inc £1 p&p.

Tel: 024 028 630. Harley Systems Ltd, Box 7,

The Pepperboxes, Great Missenden, Bucks.



Manageress:
Sally Mitchell
Dept S/U

Westward Ho!

Devon, EX38 1HF

Bring your computer with you, all our self-catering luxury caravans and chalets have a colour T.V. for your personal use, also all main services, shower, h&c, etc. Cleanliness assured, highly recommended. No dogs. For free colour brochure call Sally on (023-72) 2238 now, or write.

ZX SPECTRUM DISCOUNT SOFTWARE UP TO 20% OFF R.R.P.

TITLE	R.R.P.	Our Price
The Hobbit	14.95	11.99
Harrier Attack	5.50	4.65
Hunchback	6.90	5.90

For current catalogue send S.A.E.

To A&H Software, 11 Blenheim Close,
Highlight Park, Barry, S. Glam CF6 5AN
or Phone: (0446) 743489

★ ★ BAR CHARTS ★ ★ LINE GRAPHS ★ ★

AT LAST! 2 programs that enable SPECTRUM users to display vital information on coloured charts/graphs in seconds.

- BAR CHARTS—COLOUR, WIDTH OF BAR & SPACING OPTIONS BARS IN 1, 2, 3, 4, 5 OR 6 ALTERNATE COLOURS UP TO 28 BARS ON ONE DISPLAY
- LINE GRAPHS—6 COLOURS AVAILABLE FOR SUPERIMPOSING DATA 20 LINES POSSIBLE 20 POINTS PER LINE
- SAVE TO TAPE FACILITY • BLACK/WHITE BACKGROUND OPTION • AUTO-MATIC SCALING OF Y-AXIS • EXPONENTIAL INDICATOR • LABELLING & TITLING OPTIONS • FACILITY FOR EXPANSION OF DATA ALONG THE X-AXIS • TABULATION OF DATA & LABEL DESCRIPTION OPTIONS

• A MUST FOR ALL PERFORMANCE ANALYSTS & BUSINESSMEN •

INTERESTED? Send cheque/P.O. for £7.50 incl. p&p for BOTH programs. To R. E. Maple, 5 Telford, 43 Westbury Road, Brentford, Essex CM14 4JS. SUPPLIED on Quality cassette with full instructions. QUICK despatch.

THIS'LL TEACH YOU A LESSON!!

(...or two)

GCE O LEVEL/CSE Cassettes for the 48K SPECTRUM with COLOUR and MOVING GRAPHICS

PHYSICS 5 Programs for £6.50

CHEMISTRY 5 Programs for £6.50

OR BOTH for £12

think tank Educational Software
Dept SU44, 35 Wellington Road,
Wimbledon Park, London SW19 9EG

The rate for classified advertising in the

**sinclair
supermart**

is only £10.00 per single column centimetre.

DATASHEET

—a very easy to use full screen editor with search and sort facilities: 48K Spectrum

1. You define the headings you want, eg names addresses, dates, numbers, ages, codes etc.
2. You type in the information in the appropriate columns.
3. DATASHEET will machine-code sort the columns alphabetically, numerically; scroll forwards, backwards; search for a key word or character string; display from any lines.
4. You print or save your amended records, to extend or edit as the need arises.

Send cheque/PO for £6.95, or see for details P. 8 Software 8 Beechwood Road, Chippenham, Wiltshire SN14 0EZ.

WINNER TAKES IT ALL!

Super quiz game for 48K Spectrum, supplied with one hundred 'reasonable' general knowledge questions. Easy to use, for 2 or more players 100's more questions available. 'Easy', 'reasonable' and 'very hard' categories, more details with main program only £4.45 inc P&P.

DJH SOFTWARE

179 Cornish Road, Chipping Norton, Oxon OX7 5LA.

0 LEVELS

48K Spectrum Tullion 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.

A TOTAL OF 80K ON EACH TAPE (4 PROGRAMS)

One tape £9.95 both tapes £16.95

GCE TUTORING 40 BRIMMES HILL WIDMER ENB HIGH WYCOMBE BUCKS

D.I.Y. FOR MICRO COMPUTERS — VOL. 1

Let your MICRO assist you to work out the quantities of Building Materials for your home improvements and repairs, using a:

**DRAGON 32 & 64
SPECTRUM 48K
B.B.C. 32K**

SIDE 1 of the cassette gives guidance and calculates the average materials for BRICKLAYING, CONCRETING, TILING & PAVING, PAINTING & WALL-PAPERING, and also converts 20 units of measurement from Metric/Imperial and Imperial/Metric.

You may 'enter' in Metric or Imperial Units, the results being given in the Metric Units of sale.

SIDE 2 gives ADVICE & HINTS on the above subjects, plus HEALTH AND SAFETY and METRICATION.

£5.00 (or s.a.e. for details) to:

D. A. Hanson, 4 South Cottages, Shenley Lane, London Colney, Herts AL2 1AD.

PAYROLL

SPECTRUM/ZX-81 with ZX printer

50 employees 48K £19.95
12 employees 32K £17.50

Easy to use. Includes SSP. Prints pay-slips, P11D, monthly, yearly, tax, NIC, SSP, details.

SOFT-TECH, 31 Lamps, Hoddesdon, Herts, EN11 8EH.
Tel: 01-520 6051.

MONEY FROM YOUR MICRO

Do you want to join the growing number of people making a living from the computer revolution? Our latest publication is packed with ideas for you to consider. Why not make money from your computer knowledge? This book gives you plenty of ideas for local and national services and products, and practical advice on how to start your own business of home.

"A LIVING FROM YOUR MICRO" **£3.60**
From: **Scorby Soft**, Main Street, Flixton, Scarborough YO11 3UB.

SPECTRUM MIC CODERS!

DON'T READ THIS IF ALL YOUR PROGRAMS WORK FIRST TIME

However, the rest of us do make mistakes. But now, you can dramatically reduce debugging time. DEMON is a purpose built monitor that harnesses your MAC code program. DEMON constantly displays diagnostic information about your program, and allows you to stop, examine, change, and resume processing. Thus you run and debug simultaneously. DEMON features:

- Break key and/or Break points
- Step one instruction at a time, or run continuously
- Change registers/storage at any time
- Keep selected registers/storage on the screen continuously
- DEMON is load address independent (i.e. LOAD's almost anywhere)
- Compact size of DEMON ideal for 16K Spectrum
- Simple to use menu panels (no need to keep flicking through a lengthy manual)
- Slow down/stop/trace ROM (See exactly how those ROM routines actually work in action)
- Hex or Decimal input/display
- Diagnostics to any part of screen, or printer
- Switch DEMON on/off at will. Jump back to BASIC + more.

All inclusive price of only £9.95 (16K or 48K Spectrum only).

Cheques and P.O.'s to

MICROCOSA
68 The Glade, Clayhall, Ilford, Essex IG5 6NF.

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 £8.00
1K ZX-81

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) £10.00

50% royalties paid for top programmes!!!

Send cheque or P.O. to
The Btronics Co., Penjerrick House,
Budock, Nr. Falmouth, Cornwall.

ZX81 SPECTRUM, DRAGON, BBC AND VIC SOFTWARE LENDING LIBRARY

We have for hire from 50p (inc. post) programs for your computer.

£5 life membership (less than the cost of a single game!) brings you the SOFTWARE LENDING LIBRARY membership kit, catalogue and news letter.

Send cheque or PO for £5 to:
SOFTWARE LENDING LIBRARY
PO Box 3, Castleford, West Yorks
Stating name, address and computer type.

All tapes used with manufacturers' permission.

SPECTRUM REPAIRS

Rapidly fixed Spectrums £15 fully inclusive.

RA ELECTRONICS
50 Kimberley Road
Lowestoft, Suffolk NR33 0TZ
Tel: (0502) 66289



24 SELECTIONS for 48K
Specky lets YOU choose 24 selections for the trouble chance football pools. Shows you how to enter them, and then actually checks the results for you. Adds fun to doing your coupon whilst making winning dividends a real possibility. guarantees 6 draws if 9 within the 24 selection. Keeps stakes low for all 3 pools companies. (This is not a pools prediction program but an obvious MUST as a back up to one).

Cheques or Postal Orders for £12.95 to:

NEW DIMENSION

3 Chestnut Crescent, East Kilbride, Glasgow G75 9EL.

ZX-81 + 16K + Games + Joystick Interface. Also magazines no extra cost. Bargain at £65 ono. Leads etc included. Tel: 04946 71744 between 5pm and 7pm.

SPECTRUM TAPES — Cosmic Guerilla, Ground Attack, 3D Tanx, Cyber Rats, Tunnel, Centipede, Knot in 3D, E4, ZX-81 — Mazogs £5. Kelwood BP2 Backpack £15. All post paid: Kelso (0573) 23242.

HOMETEXT WORD processing for the 48K Spectrum with LPrinter. Edit save/load and wordwrap up to 150 lines of 96 characters. Send £5.95 to D. Evans, 10 Ridgeway, Lisvane, Cardiff CF4 5RS. Tel: 757956.

DK'TRONICS LIGHT pen for 16/48K Spectrum with interface, demo cassette and full instructions. Draw high-res pictures on your T.V. screen! Unwanted gift, hardly used, only £14. Bookham 56327.

FOR SALE DK'Tronics Spectrum keyboard. As new £37 ono. Guildford 67799, after 5pm.

SPECTRUM SPEEDLOAD. Halve your waiting time! This short program lets you SAVE/LOAD at 3000 BAUD, with any tape command. Cassette (48K) £3.95. Ness Micro Systems, 100 Drakes Avenue, Inverness.

TURN YOUR SPECTRUM into a powerful home/business management machine with our range of utility programs, data bases, ledgers, stock control etc. Send see for details: SD Systems (SU), PO Box 24, Hitchin, Herts.

16K SPECTRUM UPGRADE. Full details of how to Upgrade 16K (Series 2) Spectrum to 48K. Send 50p/sae — 13 Guadalupe Avenue, Melton Mowbray, Leics LE13 1HB.

WORDGAME — Spectrum 48K, 3 levels of word difficulty, 3, 4, or 5. Letters deleted 2000 Words. £2.50. Robinsons Enterprises, 206 Little Marlow Rd, Marlow, Bucks. SL7 1HX. Marlow 2505.

16K ZX-81 DK Tronics keyboard 4K graphics Rom and sound box £57 worth of software including black crystal flight simulation 6 months old £115 o.n.o. Tel: 061-626 2385.

10 ASSORTED GAMES for 16K Spectrum inc. Air Raid, U Boat, Snail Race, Tree Eater, etc; only £2.75. C. Webb, 20 Bowen Road, Rushall, Tunbridge Wells, Kent TN4 8ST.

SPECTRUM 16/48K YATZY The ancient 5 dice game for up to 3 players. Full instructions included. Only £4.95. Send cheque/PO to R. Morgan, 14 Conygar Close, Clevedon, Avon BS21 6AP.

FOR SALE ZX-81 with Memotech 32k, Keyboard, Centronics, High resolution Graphics, Code assembler, Word processor, 10" Seiko-sha 100a printer, BiPak Zon81, Tape recorder, Porta-Case, Software, Books, Teaching Lab, Over £800's worth. As a package £500. Owner updating. Tel: 01-531 5054.

SPECTRUM 16/48K "Raquel" presents her games pack for age 16 and over only (state age when ordering), only £3.75. Cheques etc. to I. Brooks, 17 Malvern Coleman Street, Southend, Essex.

16K ZX-81 £35. 18 games on 8 cassettes £20 (worth £40). Sinclair Learning Lab (easy book with 6 tapes) £7 (worth £19). All £55. Tel: Blackpool 0253 883628 (evenings only).

ZX-81 16K. New, 11 month guaranteed, books, games, £50. Tel: Swanley 66409.

MOREX RS232 Centronics interface for Spectrum 16/48K for sale with RS232 lead. Uses LPRINT LPRINT etc. Complete with Manual and Software. Almost new, very reliable £30 o.n.o. Cardiff 757956.

ORIGINAL SPECTRUM TAPES. £3 Timegate. Flight Simulation, £2 Leapfrog, Ground Attack, Tanx, Zoom, Arcadia, Invaders, Tunnel, Kong, Avenger, Sentinel, Avenger, Star Trail. £5 Valley plus some books. Details: York 490933.

GRAPHICS DESIGNER KIT! Create graphics on wipe-clean sheet. Useful pen erasing your design after use; £2 including p&p to G.P.M. Print Services, 15 Kingswell Ride, Cuffley, Herts. EN6 4LH.

FREE SOFTWARE EXCHANGE. Two free swaps on joining Allchange Software Club. Reliable, efficient, low cost service. SAE please. Allchange Software Exchange Club, Dept S.U., 35 Foredyke Avenue, Hull HU8 0DS.

SPECTRUM TRADE Secrets. New booklet includes making programs unstoppable, unlistable, invisible. How to reveal such. With hints/tips and Microdrive supplement. £3. ZX-GUARDANTEED. 29 Chadderton Drive, Unsworth, Bury, Lancs.

16/48K 'CHARACTER-DESIGNER' Create own GRAPHICS superb colour. SAVEing, LOADING option £5.50 (P&P). **'MUSICASSETTE'** — enjoy MOZART Sonata K. 545, BACH's Air on G-String — £4.50 (P&P) and NOTES INCLUDED. CHIBUR, 3 Lonsdale Street, Leicester LE2 1BP.

WANTED ZX-81 or Spectrum and hardware. State fullest particulars. Must be very reasonably priced. Mr M. Pawley, 9 Leicester Road, Broughton, Astley, Nr Leicester.

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 Proprietors are not liable for any loss from any cause whatever, nor do they accept liability for printers' errors. The Advertisers 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 advertisers, or any infringement of copyright, patent or design therein. The placing of any order will be deemed to be an acceptance of these conditions.

Advertisement Index

Addictive Games.....	21	Melbourne House	89-93
AGF Hardware	100, 101	Microlyte.....	110
Alphasoft	110	Microholics Anonymous	119
Arcade Software	104	Micromega	133
Artic Computing	60	Micronet 800	134, 135
B&R Products	111	Microsphere	44
Belvedere Electronics	58	Microvitec	83
Betasoft	105	Mikro-Gen	84
Bridge S/W	119	New Generation Software	50, 51
British Micro	127	Ocean Software	6, 7
CCS	66	Opus Supplies	109
CP Software	112	Orwin Software	126
Cambridge Computer Store	105	Owen, T. J.	120
Campbell Systems	108	Oxford Comp Publishing	10
Carnell Software	48, 49	Picturesque	136
Cascade Games S/W	10	Print & Plotter	45
Chetah Marketing	130	Profssoft	53
Compusound	110	Protek	8, 42
Computertutor	111	Quicksilver	148
Crystal Computing	16	R & R Software	121
DJL Software	125	Romantic Robot	17
DRG Business Machines	98	Selec Software	111
Datel Electronics	32	Severn Software	61
Dean Electronics	136	Signpoint	99
Digital Integration	52, 128	Sinclair Education Exhib	85
East London Robotics	14, 15	Sinclair Research	22, 23
Fantasy Software	24	Skywave	120
Filesixty	31	Softach	41
Fox Electronics	132	Software Library	17
Generation	51	Software Supermarket	27
Griffin Software	13	Software Workshop	142, 143
Hartland Software	41	Spectadraw	10
Hestacrest	108	Tandy Corporation	56
Hewson Consultants	147	Tasman Software	118
Hornby Software	99	Transform	120
IPC Magazines	64, 85	Ultimate	65
Imagine	36, 88, 141	U-Microcomputers	17
Incentive Software	41, 43	University Software	105
Interface	43	Vegaspace	108
Kelwood Computer Cases	129	Vortex	4
Kempston	2	Voyance	5
Kernow Software Services	99	Walkers Computer Services	28
Kosmos	56	Zeal Marketing	146
Level 9	9	ZX Microfair	94, 95
Lothlorien	57		

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.

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 Z5
FIGHTER**



Will you accept this mission?

In your Z5 Luna Hover Fighter you must penetrate the 3 successive Seiddab defensive zones and destroy their command base.

The state of your fighter and its armaments along with status reports of the Seiddab defences is given below.

Good luck! May the power be with you.



• LASERS •

Short range weapon system. Iridium powered. Powered up and operational.



• MISSILES •

Long range weapon system. Radar homing duodec warhead. Armed and ready to fire.



• RADAR •

Long range, over the horizon sensors. Tuned to the plasma output of Seiddab hover fighters.



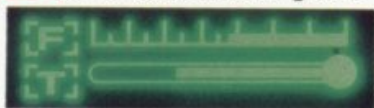
• NAVIGATION •

Locked on to the Seiddab command base. Head up path display.



• SHIELDS •

Di-lithium powered. Combat power level. Status all green.



• GAUGES •

Long range propelluene tanks. Status full. Combat shielded. Hull temperature status low.



£5.95

£7.95

£5.95

This is the latest and most difficult mission in the long running struggle against Seiddab aliens – are you prepared to accept this mission?

Available for 48K Spectrum from all leading software dealers including Boots, John Menzies, Spectrum Computer Centres, etc.

Available for other popular home micros soon.



Hewson Consultants
56B Milton Trading Estate,
Milton, Abingdon, Oxon OX14 4RX.

KNOW YOUR ENEMY



• DAB TANKS •

Robotically controlled. Ytsan missiles – armed. Susceptible to laser strikes.



• SEID HOVER FIGHTERS •

High power, low manoeuvrability strike craft Plodium missiles – armed. Susceptible to missile or laser strikes.



• AERIAL MINES •

Contain proximity fuses, explodes on detecting hoverfighter. Susceptible to laser strike.



• MISSILE SILO •

Final line of defence – self activating. Hewstron Warhead. Susceptible to laser strike.



• COMMAND BASE •

Your objective – heavily defended requires many strikes to destroy – you must not fail.

Microspeech
Compatible

3D LUNATAACK

SEND S.A.E. FOR
FULL COLOUR
CATALOGUE

Quicksilver programs are available from: Boots, W.H. Smiths, J. Menzies, Microdealer, HMV, Hamleys, John Lewis, Computers for All and all reputable specialist computer stockists.

All titles available from Quicksilver Mail Order
P.O. Box 6, Wimborne Dorset BA21 7PY.

48K SPECTRUM • TIME GATE Author: John Hollis £6.95
COMMODORE 64 • PURPLE TURTLES Authors: Mark & Richard Moore £7.95
VIC 20 + 3K or 8K RAM • SKYHAWK Authors: Steve Lee/Charles £7.95
DRAGON • MINED OUT Authors: I & C Andrew/Incentive £5.95
BBC MODEL • THE GENERATORS Author: Dave Mendes £5.95

48K SPECTRUM
FRED £6.95
Author: Indescomp
Action beneath the
Pyramids!
Feared Fred the Intrepid
Archaeologist searches the
creepy catacombs below the
tomb of 'Tootiecamoon'
for the fabled treasures
amidst monstrous mummies,
ghastly ghosts, bats and rats!

48K SPECTRUM
DRAGONS BANE £6.95
Authors: M. Preston,
P. Hunt, R. Rose, D. Moore.
A mythical graphic
adventure in the dark and
deadly halls of Earhstone
Castle. Battle Dragons,
Vampires, Sphinx, Zombies,
Skeletons, Ghyphons and
other legendary beasts to
rescue the beautiful Princess
Paula.

48K SPECTRUM
RAYMOND BRIGGS
THE SNOWMAN £6.95
Author: David Shea
An enchanting game based
around episodes of Raymond
Briggs' amazingly successful
book.
48K SPECTRUM
ANT ATTACK £6.95
Author: Sandy White
Battle the Ants in the soft
solid 3D city of Anteschner.

COMMODORE 64
BUGABOO (THE FLEA)
£7.95
Author: Indescomp
Jump your way out of the
caves with Bugaboo the flea
but beware of the fearsome
Dragon as you jump around
the exotic vegetation.

NEW RELEASES!
COMMODORE 64
STING £4 £7.95
Author: Anton Hinxman
Hive-cave action!
Bertie Bee needs help
defending the hive. Fight off
the invading swarms, battle
the bees and defend your
Queen!

...THE YEAR OF THE GAME LORDS.

QUICKSILVER

