

POPULAR Computing WEEKLY

35p 9-15 February 1984 Vol 3 No 6

This Week

Spectrum games

Tony Kendle weaves his way through another selection of Spectrum software including *Lunar Jetman* from Ultimate. See page 16.

Arcade alley

David Kelly talks to arcade operator Alan Rawlinson about the current state of the video games market in the UK. See page 13.

Dragon DOS

Brian Cadge looks at the pros and cons of using the Dragon DOS cartridge on page 25.

New releases

All the latest software games including *Star Trader* from SBC Systems, *Monkey Business* from Artic and *Piballed* from Automata. See page 56.

★ STAR
Follow on BBC B.
See page 10.
GAME ★

News Desk

Japanese invasion is almost here

THE Japanese micro invasion — eight machines, (six pictured here), all running the same MSX operating system and software — is almost here.

The computers — from Sony, Yamaha, Canon, Fujitsu, Sanyo, Pioneer, Toshiba and National — were paraded before the major retailers last week, prior to their arrival in the UK. All of the machines are now on sale in Japan and are shortly to be launched in the US.

The UK versions — adapted to work with our own PAL TV system — now seem quite likely to appear in the Autumn, all priced around £200.

As well as being shown to the buyers from the high street chains, six of the machines were also brought together so that a major European manufacturer — Philips — could finalise details of its own micro entry, also adopting the MSX standard.

continued on page 5



MSX clones, clockwise from bottom left: Sony Hit-Bit, National CF2000, Toshiba Pasopia IQ, Yamaha YIS503, Fujitsu FM-X and Canon V-10

Microchip recedes at toy fair

THE most remarkable aspect of the 1984 British Toy and Hobby Fair, held at Earl's Court last week, — was its lack of micros.

The previous year's show had seen moves from a number of toy companies into home computers. But in 1984, most of them have given up and gone back to concentrating on more traditional toys. Indeed, in all types of toys, the micro chip seems to be receding rather than advancing.

Among the casualties were Mettoy, who went into liquidation last year, and Mattel, whose impressive stand showed only Barbie dolls and hot wheels. Last year's toy fair saw new micros from Video Technology, Creativision and Tomy, none of which were in evidence last week.

However, the tiny collection of computer firms in one corner of the hall each had something interesting to show.

CBS Electronics displayed
continued on page 5

Classified

Classified

Classified

Classified

Computer Swap

01-734 3454

Free readers entries to buy or sell a computer. Ring 01-734 3454 and give us the details.

AQUARIUS
SEE PAGE 53

VALHALLA

SHADOW FOR THE BBC 32K

Shadow will allow you to make security back-ups of your valuable tape software.
★ Any OS ★ 100% machine code ★ Basic I and Basic II ★ 1200 - 300 baud ★ 'Locked' programs
★ Files ★ Any length ★ Easy to use.
Shadow works with 99% of all known programs including 'locked' programs or those containing sections at 300 baud.
FREE Inspector a very useful memory viewing program which displays memory in colour coded sections for ease. Worth £8 on its own. Shadow + Inspector £8 inclusive.

Cheque to

Clares Micro Supplies

Dept PCW, 222 Townfield Road, Winsford, Cheshire
Tel: (06065) 51374

FOR SALE: Fuller master unit with Joystick. Unwanted gift £45. Also Spectrum software including Hobbit, 2200m, flight simulator, etc. Mr T J Cooper, F21 Lincoln Hall University Park, Nottingham MG1 2QU.

LANGUAGE TRANSLATOR and vocabulary tester. French or Germany, for £2, state which language for spectrum send cheque, P.O. payable to: Monksoft Highlands Blue Boys Park, Stroud, Glos GL69JT.

RADOFIN VC5 and telesport cartridge as new £20 o.n.o. also Spectrum software space shuttle £6.00 Chess the turk £7.00 2200m £3.00 hard chess £2.50 many more. Phone 0825 2514 evenings.

LYNX software, gempack 3/4, sultang maze, oh mummy, spanner man, grid attack, all £4 each. Colossal adventure, adventure quest, £5 each or £30 the lot. Ring Stafford (0785) 661745 after 5pm..
SWAP 22" colour tv, 12" b/w tv (both in vgc) for a portable colour tv Tel: 04862-70318.

VIC 20 s/w (all originals) Titles include bewitched, arcadia, and don't panic £3.50 Gridrunner £4.25. Tel: 04862-70318.

BRITAIN'S BEST-SELLING MICRO WEEKLY



BBC SPEECH PRICE BREAKTHROUGH

Speech Synthesizer For
The BBC Computer

Totally unlimited vocabulary is now possible with the revolutionary "SWEET TALKER" Speech Synthesizer for the B.B.C. A or B Microcomputer, any series. The CHEETAH "SWEET TALKER" simply plugs into speech socket IC99 within the computer. No soldering, no cutting of tracks, no headaches. Based on an allophone system you can easily program any word, sentence or phrase and incorporate speech into your software games. Fully tested and guaranteed. Complete with demonstration cassette and full instructions.



UPGRADE YOUR 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

inc. VAT and p&p



Now make your SPECTRUM and ZX81 Talk!

The CHEETAH "Sweet Talker" just plugs into the back of the computer using the existing power supply. Based on an allophone system you can easily program any word, sentence or phrase. Fully cased, tested, guaranteed and compatible with all accessories via rear edge connector. Complete with demonstration cassette and full instructions.

No more lonely nights!

Terrific
Value
at

£29.75

*when ordering please quote
whether Spectrum or ZX81 owner.*

Also available:

16K Rampack for ZX81 **£19.75** 64K Rampack for ZX81 **£44.75**

Prices include VAT, Postage and Packing. Delivery normally 14 days. Export orders at no extra cost. Dealer enquiries welcome.

Send cheque/PO now to:-

**CHEETAH
MARKETING LIMITED**
24 Ray Street,
London EC1. Tel: 01 278 6954

Cheetah, products available from
branches of **John Menzies** *Boots*

WHSMITH
Rumbelows
and all good computer shops

The Team

Editor
Brendon Gore

News Editor
David Kelly

Software Editor
Graham Taylor

Production Editor
Lynne Constable

Editorial Secretary
Cleo Cherry

Advertisement Manager
David Lake

Assistant Advertisement Manager
Alastair Macintosh

Classified Executive
Diane Davis

Advertising Production
Lucinda Lee

Administration
Theresa Lacy

Managing Editor
Duncan Scot

Publishing Director
Jenny Ireland

Popular Computing Weekly,
12-13 Little Newport Street,
London WC2R 3LD
Telephone: 01-437 4343

Published by Sunshine Publications Ltd.

Typeset by The Artwork Group,
55-63 Goswell Road, London EC1,
in association with Ink on Paper Ltd.
Printed by East Midland Litho Printers
Ltd, Oundle Road, Woodstone,
Peterborough PE2 9QR.

Distributed by S M Distribution
London SW9. 01-274 8611. Telex: 261643

© Sunshine Publications Ltd 1984



Registered at
the Post Office
as a newspaper

MEMBER OF THE AUDIT
BUREAU OF CIRCULATIONS
ISSN 0265-0509

How to submit articles

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

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

Accuracy

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

This Week

News	5
British Toy and Hobby Fair	
Letters	7
The silicon myth	
Star Game	10
Follow on BBC B by Andrew Pfahler	
Street Life	13
David Kelly talks to arcade operator Alan Rawlinson	
Reviews	16
Spectrum games by Tony Kandle	
Programming	19
Lynx keyboard bugs	
Spectrum	22
Machine code by Trevor Toms	
Dragon	25
DOS cartridge	
Commodore 64	26
Three colour draw	
Open Forum	35
Six pages of your programs	
Microradio	43
Ray Berry's column	
Adventure	47
Tony Bridge's corner	
Peek & Poke	49
Your questions answered	
New releases	56
Latest software programs	
This week	58
Top 10 plus all this week's software	
Competitions	59
Ziggurat, Puzzle, Losers	

Editorial

Board games are catching up with the micro revolution. An increasing number of software houses are now marketing computer versions of popular board games.

The most successful example so far has been Psion's version of *Scrabble* with its 11,000 word vocabulary. It plays a good game and is difficult to beat, though it is possible to cheat.

There are innumerable versions of chess, draughts, bridge and other card games. Now, games such as *Cluedo*, *Mastermind*, *Go*, *Kensington* and *Mah-Jong* are starting to appear.

Many board game companies originally regarded the advent of home computers as a threat to their livelihood. However, they are now realising that their ownership of the copyright of many of these games is enabling them to move into new markets, rather than being shut out of old ones. Consequently, companies such as Waddingtons and Leisure Genius are either concluding licencing deals with established software houses, or they are recruiting their own in-house teams of programmers.

The time is fast approaching when new games will be released simultaneously on boards and on computers. But I doubt if micros will ever totally supersede dice, cards and boards — there is somehow more satisfaction in winning on a physical board.

Next Thursday

Next week's star game is Z Fred — a version of Q-Bert — for 48K Spectrum by Nicky King.

Subscribe to Popular Computing Weekly

I would like to subscribe to *Popular Computing Weekly*.
Please start my subscription from the issue.

UK Addresses: 26 issues at £9.98 52 issues at £19.95
Overseas Addresses: 26 issues at £18.70 52 issues at £37.40

Please tick relevant box

I enclose my cheque to *Popular Computing Weekly* for

Name

Address

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

LLAMASOFT NEWS

NEW for the 8K Expanded VIC:

HELL GATE

A very fast-paced Arcade game featuring simultaneous control of 4 high-speed laser cannon. Unique game action is easy to learn yet difficult to master. Features include 20 levels to challenge you; automatic Smart bombs; seven-place High Score table with score signature memory feature and full Attract mode. A superb Jeff Minter design presented immaculately on a 25 x 30 screen.

£6.00

COMMODORE 64: After finishing HELL GATE Jeff took a couple of days to pop the code onto the '64. Whilst this is no Revenge or Hover Bover, we are offering HELL GATE 64 at the bargain price of £5.00... an interesting diversion to occupy a little time while you wait for Jeff's next '64 epic, which we can now reveal will be called

SHEEP IN SPACE — for which Jeff promises the usual great graphics and sound — and also a totally new control concept... so prepare to feel extremely sheepish in a few month's time.

Until then — to all our followers

A) HAPPY BLASTING/MOWING/SPITTING ETC.

B) DON'T SHOOT THOSE GOATS!!!

BY JEFF MINTER FROM LLAMASOFT

Jeff



Minter

LLAMASOFT

AWESOME GAMES SOFTWARE

49 MOUNT PLEASANT, TADLEY, BASINGSTOKE, HANTS.

Toy fair

continued from page 1

MSX is a detailed machine specification adopted by the seven Japanese manufacturers designed to solve the continual its Expansion Module 3 for the Colecovision games machine turning it into an Adam computer.

Activision announced it will produce a range of software titles for the Commodore 64 (by March, on cartridge) and Spectrum (by April, on cassette).



Atari showed software for the Spectrum and Commodore 64 for the first time — produced by Atarisoft.

CGL, which markets the Sord M5 computer, announced a deal to market Hobby Robot's RB5X robot. The RB5X, which has an on-board computer, 24k Ram, eight touch bumpers and an ultrasonic detector, talks to an Apple computer in Basic through an RS232 interface. Its UK price will be around £2,500.

Leisure Genius announced a computer version of the board-game *Kensington* to be developed for the Spectrum and Commodore 64 computers.

Invasion

continued from page 1

problem of software incompatibility. By making all the machines broadly the same, MSX cassette, cartridge and disc software will run on any MSX machine. The idea is the brainchild of Microsoft's Japanese subsidiary — all the machines will run a version of Microsoft Basic (MSX Basic) and MS-Dos.

Each MSX machine will be Z80-based (running at 3.6MHz) with 32k Rom and 64k Ram of which typically

Turtle for CBM Logo

VALIENT Designs is a new company which has developed, in conjunction with Commodore UK, a turtle to work with Commodore Logo.

The device is controlled from a Commodore 64 computer via an infra-red link, which has a range of 20 feet.

The Valient Turtle has a pen holder so that the Logo graphics routines written on the micro can be drawn out by the device on a sheet of paper.

Other versions of the turtle are under development for the Research Machines, BBC, Apple and Atari computers. Disc software supplied with the turtle is designed to be compatible with versions of Logo written by Terepin, Krell and LCSi.

The turtle, infra-red com-



municator and interface package will be priced at £160, with substantial educational discounts for schools.

Details from Valient Designs, Unit 14, Park House, 140 Battersea Park Road, London SW11.

● The Commodore 64 version of Logo — written by Terrapin — is now available, coinciding with the company's cut-price 64's offer to schools.

Commodore executives depart

SINCE the resignation of Commodore's founder Jack Tramiel as president and chief executive of the company four weeks ago, four other top executives have also departed.

They are: Donald Richard, acting president of Commodore US, Myrrdin Jones, marketing vice-president, Bill Miller, systems engineering director and Roy Thomas, manufacturing director.

Commodore's shares have also tumbled since Tramiel's departure. By the end of last week they stood at \$36, down \$6.

28.5k is available in Basic. Display is 32 x 24 characters with 16 colours and a high-resolution graphics mode of 256 x 192 pixels. Each micro will have three-channel sound over eight octaves.

Provision is made for twin joystick ports, a Rom cartridge port and a parallel printer interface.

To maintain software compatibility across the MSX machines, the memory maps are the same, as are the details of the external expansion bus and disc interface. All MSX machines have 10 function keys.

The MSX specification

Telecom goes into space

AS a departure from its usual information services, like the weather and recipe for the day, British Telecom has introduced *Spaceline* — a new service covering the latest developments in space.

The weekly bulletin is prepared by Dr David Whitehouse — a leading scientist who has worked with NASA — and is intended to include both up to date news reports as well as more general items on astronomy.

The telephone number to ring for the service, which this week is concentrating on the Challenger Space Shuttle, is 01-246 8055.

leaves very little to be decided by the individual manufacturer except the external styling.

The Sony Hit-Bit is the only machine not to feature a 'professional' quality keyboard. The Yamaha YIS 503 offers an add-on music synthesiser and music keyboard option. The Sanyo can be used with a video recorder and can capture video frames from tape or off-air. The Pioneer machine is designed to fit in a racked system together with a hi-fi. The National CF2000 has twin Rom cartridge slots. And only the Canon V10 and Yamaha YIS 503 have printer interfaces included as standard.

Choice of databases

COMMODORE 64 owners will soon have a choice of telephone database services to join.

Micronet-800, the Prism/Prestel joint venture, plans to produce a Commodore 64 modem in the spring, while Commodore has now decided to go ahead with a plan to provide its own system — Compunet.

Compunet will only be for 64 owners and Commodore will sell its own modem for around £100 by the summer. Compunet will be linked to other databases, like *The Source* in the US, and will also offer facilities like teleshopping and telesoftware. No subscription will be charged, although there will be a connection charge between certain hours and a fee for downloading certain software titles.

New titles from Quicksilva

AMONG five new software titles announced by Quicksilva is *The Snowman*, based on the best-selling book by Raymond Briggs.

In the game, for the 48K Spectrum, you must guide a small boy in constructing a snowman, gathering together the snow, his tie, glasses, trousers, torch, skateboard and balloons.



Raymond Briggs has written a number of successful books including *Fungus the Bogie-man* and *When the Wind Blows*.

The other Quicksilva programs are *Laser Zone* (from the Jeff Minter title), *Fred*, a maze game, and *Dragonsbane*, a graphic adventure, all for the 48K Spectrum, and *Sting* for the Commodore 64.

The REAL Challenge!

For your ORIC, SPECTRUM and CBM 64.

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. M/Code. sound effects and full action colour graphics.
 Oric Author - Adrian Sheppard
 Spectrum Author - Mike Howard
 Oric 48K - £4.95 Spectrum 16/48K - £4.95



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



Dinky Kong Attempt to rescue your lovely girlfriend who is held captive by the angry gorilla. As you climb the connecting ladders and move along the gangways, the gorilla will be throwing barrels and fireballs at you! The only way to reach her is to leap over these obstacles and progress to the top. M/Code action with sound effects, full colour action graphics, skill levels etc.
 Author - Adrian Sheppard
 Oric 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 too are caught. It's worthwhile making a map noting what you find and where as the time limit is only 500 moves.
 Oric-1 48K - £7.50
 Spectrum 48K - £5.95
 CBM 64 - £7.50

SEVERN SOFTWARE
 SEVERN SOFTWARE
 6 SCHOOL CRESCENT
 LYDNEY
 GLOUCESTER GL15 5TA

Lone Raider As Captain of the spaceship 'Lone Raider' your mission is to save earth from the alien Zugs, who are aiming to destroy all forms of intelligent life in the Universe. The Raider possesses formidable weaponry such as phaser cannons and neutron bombs. Armed with these you will need to battle through the planetry defences to seek the mother ship. She is heavily guarded and your chances of surviving long enough to even glimpse her are slim. Superb graphics, volume control, hi-score, 4 screen scenarios, missiles, fuel dumps, mines, sharks, octupi, mother ship etc. Can be played with keyboard or joystick using the Prize Lid Interface.
 Author - Adrian Sheppard
 Oric-1 48K - £7.50



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 Durins 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.
 Oric Author - Adrian Sheppard
 Spectrum Author - Mike Howard
 Oric 48K - £4.95 Spectrum 16/48K - £4.95



Oric Extended Basic A must for the programmer! Extended Basic offers the user 13 additional commands to the present Oric-1 48K commands and yet only takes up 2K of RAM.
 Features * Commands include Verity, Write, Recall, Find, Scroll, Draw box, Rotate and others. * Takes up only 2K of RAM, so plenty of memory left for user to program. * Demonstration programs - all detailed in the cassette inquiry. * Full instructions.
 Author - Adrian Sheppard
 Oric-1 48K £7.50

All Oric titles available from Laskys.
 Dinky Kong for Oric also available from W.B. Smith.
 Mail order service available on all titles.

Address File Manager This is a new departure for software for the ORIC-1 micro. It will allow you to keep ALL your important records of NAMES & ADDRESSES. Up to 255 can be kept in each file and files can be SAVED & LOADED using an ordinary cassette recorder. This means an unlimited amount of information can be permanently stored in a convenient format.
 Features: * Menu-driven. * Prompted keyboard entry of data with check by surname (handles multiple occurrences). * Saves and loads NAMED files to cassette. * Prints on Screen or Printer. * Up to 255 records can be kept in each file.
 The program gives all information to the user in real-time and can be used by anyone who can operate the Oric-1.
 Author - Mike Howard
 Oric-1 48K - £4.95

ORIC UTILITIES

Oricade A combined assembler, disassembler and editor for the Oric.
 * Handles full 6502 Mnemonics
 * Features Save and Reload M/C.
 * Assembles and disassembles at any address.
 * An essential tool for any serious programmer.
 Author - Adrian Sheppard
 Oric 48K - £4.50

NEW

NEW

LETTERS

Top of the league

I am writing in response to a letter sent in by Peter May of Kent to the *Peek & Poke* section of *Popular Computing Weekly*, 19-25 January.

I think your readers may be interested to know that Addictive Games will be producing a Commodore 64 version of *Football Manager* and we will also be producing versions for the BBC Micro, the Oric, the Dragon 32, the Vic20 and other popular micros. We intend to release the BBC version during February, with others to follow.

Kevin Toms
Addictive Games
7a Richmond Hill
Bournemouth BH2 6HE

The silicon myth

I have owned a computer for over a year now and have come to a conclusion which many of your readers will probably disagree with most strongly. The conclusion is this: I and others have been conned. I shall explain.

After the initial excitement of owning a computer had worn off, I began to think what possible practical use it could be put to. Sure, it played games — very colourful and very sophisticated some of them. Well, they have to be. The demand for new and exciting games is created not only by software companies offering us more earth-shattering, mind-blowing games, but by the public themselves who buy them because they don't want to be reminded that they've spent a small fortune on something that does nothing. They're escaping from the reality that they've been conned. And who by?

But, to get back to my question, what does it do? I suppose I could buy a gadget that would enable my computer to talk. Probably spending long programming hours building up a small vocabulary so that the computer can utter a few meaningless words or phrases. So what? It may amaze and amuse a couple of friends, but

what would soon wear off. It can print. I can spend well over £200 on a printer, but unless I'm in business or have a job that requires one, that would be its use? To print out a computer program? That's very useful.

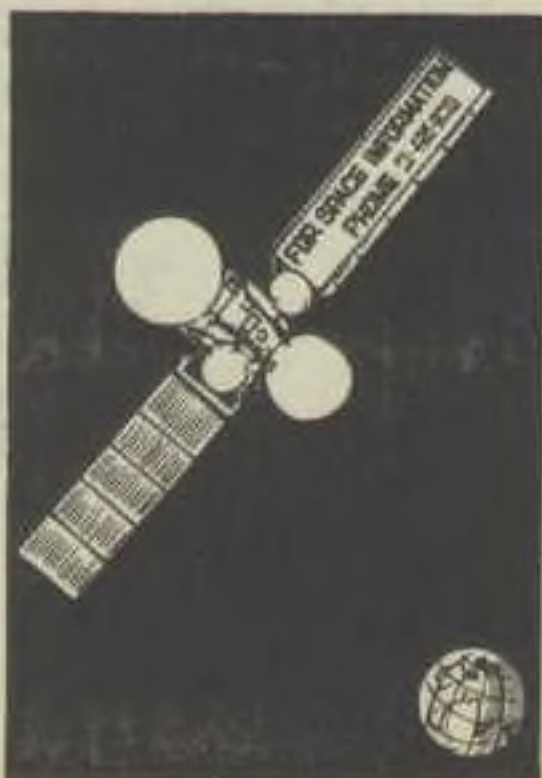
It can run an electric train. Oooh, that's something to look forward to. I'll go and buy one!

Its most useful application is to occupy bored minds. I spend hours blasting silly little aliens that make pathetic noises when destroyed. I move objects around the screen in 3D (WOW). I have a filing system which is capable of finding an item at light speed. But, by the time I have set the damn thing up and loaded the program, I could have already found it in half the time!

The thing that gets me is that no one is prepared to tell the truth. People are too frightened. And it's not surprising. Huge businesses have been built up on the back of the Silicon myth, and many more are being born every week.

Papers, television and in particular computer magazines, help perpetuate the myth that computers are wonderful and fantastic — there's nothing they can't do, because their very existence relies on the public buying them. And, because magazines depend heavily on computer companies' advertising revenue, they are in a sense the companies' mouthpieces.

The magazines do not dare to criticize or question the usefulness or contribution of computers to society. Instead, the magazines are intent on stoking the furnace of a con-



sumer public, which are demanding more and more, because they are told by the media, that they can't live without a computer.

The whole thing is a massive con trick. A home computer is one of the most useless consumer commodities invented.

My advice to anyone teetering on the edge of buying a computer is think. All it can do is play games, talk a bit and, if you can afford it, print a bit. Nothing else. It won't make you clever or wise. And if you believed half of what those mono-sodium-glutamate-glossy adds said, you would be capable of running the world's individual companies and still have change to play a game of *Scrabble*.

John Wheatley
29 Hansler Rd
E Dulwich
London SE22

Conned, huh? A gigantic conspiracy to hide the grim truth that computers don't actually do anything! Well, you may not agree with it, but you must admit it's a heck of a theory.

Halls of the Things

I would like to point out a couple of features which, as far as I know, haven't been discovered yet about *Halls of the Things* by Crystal.

First of all, it is possible to open the lower door without getting all of the rings (ie, for those who would like a sneak preview) and secondly for those of you using black and white tv's, it is possible to turn the whole display into black and white.

To get the bottom door open, just press 2 then press space. And to get the black and white display, press W then press space and to get the colour display back press W then space again.

On my colour tv I get a better picture with Psion's *Flight Simulation* if I change line 1 to read:

10 Border 0 : Paper S: Ink 1 : CLS
but the paper and ink can be changed to:

Paper 1: Ink 4: to give green ground and blue sky.

Finally, can anyone tell me if there is any way of saving a *Screens* without clearing the bottom two lines?

Peter J Moss
3 Bernshall Crescent
Ecclesfield
Sheffield S5 9FB

The latest victim

It's debug time again! The latest victim being Roy Masefield's program on Newton's laws of motion (*PCW*, 12-18 January).

He quotes three standard formulae concerning motion with constant acceleration and then the program manipulates them. However, he clearly states that, given final velocity, distance and time, the equations are impossible to solve.

Wrong. Or, if correct, only so because he's left out the fourth of the standard formulae pertaining to constant acceleration, ie:

$$s = \frac{1}{2}(U + v) t$$

Include this with the three equations he has used already and all relevant problems can be solved. Necessary changes to the program:

(a) Delete the Health Warning "(except ... Time)" from line 20

(b) Change line 260 to:

```
260 GOSUB 595 : GOSUB 580  
and add in
```

```
265 GOSUB 710 : GOSUB 750 : GOTO  
400
```

```
595 LET u = 2 * s / t - v : RETURN  
Then it works perfectly.
```

Fancy That Dept: Galileo had published all this before Newton was born. Newton's achievement was to generalise it all to the case when the force and acceleration aren't constant.

Requiem on the Spectrum machine code series. In the immortal words of Tom Lehrer: More! More! I'm still not satisfied!

Jim Hind
5 Park Street
Southend
Essex SS0 7PA

Your wish, etc, etc. If you look at the Spectrum page in this week's issue, you will find a follow up to our last code series.

WAWR

48K SPECTRUM



VALHALLA

MOVISOFT



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

VALHALLA is normally available from stock, and orders are despatched by return. If, for any reason we are unable to fulfil your order within 14 days of receipt, we will notify you.

VALHALLA cassettes carry an unconditional lifetime replacement guarantee.

TO ORDER: (UK Orders Only) Simply complete the coupon, and FREEPOST with your cheque/P.O. made payable to LEGEND (UK Mail Order).

Credit Card Orders: By phone 9-5:30 Mon to Fri, stating name and address, Card No. and item(s) required.

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

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

MOVISOFT OPERATING SYSTEM UNDER LICENCE

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

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

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



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

Please print name and address
Name.....

Address.....

.....
Credit Card holder's signature.....

POP.W/6

Follow

A new game for BBC B by Andrew Pfahler

The object of this game is to guide your unarmed robot around the screen for 50 seconds, avoiding the deadly red blocks. All the time you are being followed by a red

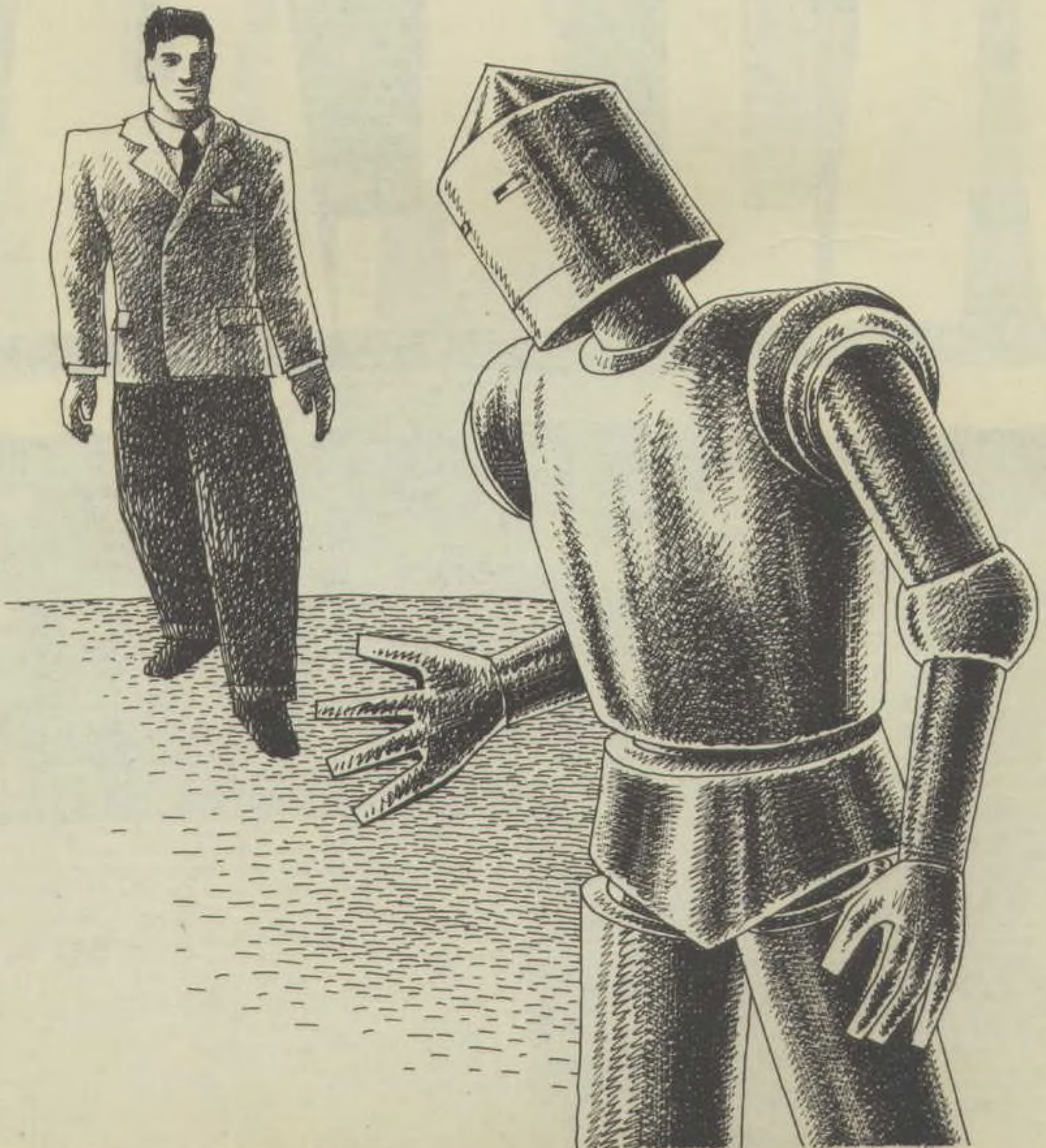
droid (#) who gets faster at each level. A tele-port gate ([]) is provided to move you to a random point on the screen if you can reach it.

This program was written for the BBC model B.

Program Notes

Lines

20-210	Sets the scene
220-270	Gives the instructions
290-330	Sets the skill level
360-630	Sets variables etc
640-1000	Controls game
1020-1100	Successful level control
1110-1240	Unsuccessful level control




```

10 CRASH=0
20 MODE 7
30 PRINT "** SURVIVAL*"
40 PRINT "'THE OBJECT IS TO GUIDE YOUR UNARMED*"
50 PRINT "ROBOT ROUND THE COURSE FOR 50 SECONDS."
60 PRINT "AFTER WHICH YOU WILL BE DEEMED*"
70 PRINT "TO BE COMPETENT AT THAT LEVEL AND*"
80 PRINT "WILL BE TRANSFERRED TO THE NEXT ONE."
90 PRINT "A TELE-PORTER IS SITUATED IN EACH*"
100 PRINT "LEVEL THROUGH WHICH YOU MAY JUMP TO*"
110 PRINT "A RANDOM POSITION.THE WALLS MAY*"
120 PRINT "ALSO TELE-PORT YOU TO A RANDOM SPOT*"
130 PRINT "BUT THEY ONLY WORK AT RIGHT ANGLES TO*"
140 PRINT "THEMSELVES AND MAY LAND YOU ON ONE*"
150 PRINT "OF THE ELECTRIFIED BOXES SCATTERED*"
160 PRINT "AROUND THE COURSE.THESE ARE DEADLY!"
170 PRINT "EACH LEVEL IS PROTECTED BY A KILLER*"
180 PRINT "DROID WHO WILL FOLLOW YOU UNTIL EITHER*"
190 PRINT "HE GETS YOU OR YOU PASS TO THE NEXT*"
200 PRINT "LEVEL.LUCKILY THE'RE NOT TOO BRIGHT."
210 PRINT " HIT A KEY*"
220 A=GET
230 CLS
240 PRINT "'* CONTROLS ARE*"
250 PRINT "***** :=UP*"
260 PRINT "***** Z=LEFT X=RIGHT*"
270 PRINT "***** /=DOWN*"
280 A=GET
290 PRINT "***** LEVEL?*"
300 LEVEL=VAL(GET#)
310 IF LEVEL>9 OR LEVEL<1 THEN 300
320 LEVEL=LEVEL+10
330 LEVEL=LEVEL/10
340 PRINT "***** HIT A KEY*"
350 A=GET
360 MODE 1
370 VDU 24,30;30;1200;1020;
380 COLOUR131
390 CLS
400 GCOL0,128
410 CLG
420 VDU 5
430 X%=640:Y%=312
440 X1%=0:Y1%=0
450 X2%=RND(900)+100:Y2%=RND(900)+100
460 S%=LEVEL*10
470 VDU 23,250,24,60,36,255,189,165,36,102
480 VDU 23,251,255,255,255,255,255,255,255,255
490 A#=CHR$(250)
500 B#=CHR$(251)
510 FOR A=1 TO LEVEL*11
520 GCOL0,1
530 MOVE RND(900)+100,RND(900)+100
540 PRINT B#
550 NEXT
560 B#="#*"
570 MOVE X2%-10,Y2%-20
580 PRINT "[ ]"
590 GCOL0,0
600 MOVE X%,Y%
610 PRINT CHR$(251)
620 GCOL0,1
630 TIME=0
640 REPEAT
650 MOVE 0,1
660 PLOT 1,1279,0
670 GCOL0,0
680 MOVE X%,Y%
690 PRINT A#
700 MOVE X1%,Y1%
710 PRINT B#
720 MOVE X2%-10,Y2%-10
730 PRINT "[ ]"
740 GCOL0,1
750 *FX 21,0
760 IF INKEY(-73) THEN Y%=Y%+25:SOUND 0,-15,2,1:
IF Y%>1020 THEN Y%=RND(900)+100:SOUND 0,-10,3,
1:GOTO 800
770 IF INKEY(-105) THEN Y%=Y%-25:SOUND 0,-15,2,1:
IF Y%<60 THEN Y%=RND(900)+100:SOUND 0,-10,3,
1:GOTO 800
780 IF INKEY(-98) THEN X%=X%-25:SOUND 0,-15,2,1:
IF X%<30 THEN X%=RND(900)+100:SOUND 0,-10,3,1:
GOTO 800
790 IF INKEY(-67) THEN X%=X%+25:SOUND 0,-15,2,1:
IF X%>1170 THEN X%=RND(900)+100:SOUND 0,-10,
3,1:GOTO 800
800 IF X%>X2% AND X%<X2%+40 AND Y%<Y2% AND
Y%>Y2%-40 THEN X%=RND(900)+100:Y%=RND(900)+
100:GCOL0,0:MOVE X%,Y%:PRINT CHR$(252):GCOL0,1
810 IF POINT(X%,Y%)<>0 AND POINT(X%,Y%)<>3
THEN CRASH=1
820 IF POINT(X%,Y%-30)<>0 AND POINT(X%,Y%-30)<>3
THEN CRASH=1
830 IF POINT(X%+15,Y%)<>0 AND POINT(X%+15,Y%)<>3
THEN CRASH=1
840 IF POINT(X%+15,Y%-30)<>0 AND POINT(X%+15,
Y%-30)<>3 THEN CRASH=1
850 IF X1%>X%-(S%-1) AND X1%<X%+(S%-1) AND
Y1%<Y%-(S%-1) AND Y1%>Y%+(S%-1) THEN CRASH=1
860 IF X1%>X% THEN X1%=X1%-S%
870 IF X1%<X% THEN X1%=X1%+S%
880 IF Y1%<Y% THEN Y1%=Y1%+S%
890 IF Y1%>Y% THEN Y1%=Y1%-S%
900 MOVE X%,Y%
910 GCOL0,2
920 PRINT A#
930 MOVE X1%,Y1%
940 GCOL0,1
950 PRINT B#
960 MOVE X2%-10,Y2%-20
970 GCOL0,3
980 PRINT "[ ]"
990 GCOL0,1
1000 UNTIL CRASH=1 OR TIME/100>50
1010 IF CRASH=1 THEN 1110
1020 MODE 7
1030 PRINT TAB(10,10)"LEVEL COMPLETE"
1040 PRINT TAB(10,15)"NEXT LEVEL"
1050 PRINT TAB(10,17)"BE READY"
1060 S%=S%+2
1070 TIME=0:T=RND(600)
1080 REPEAT:UNTIL T<TIME
1090 LEVEL=LEVEL+0.3
1100 GOTO 360
1110 SOUND 0,-10,5,10
1120 MODE 7
1130 PRINT TAB(15,10)"YOU'RE DEAD"
1140 PRINT TAB(3,12)"YOU DIDN'T SURVIVE LONG ENOUGH"
1150 PRINTTAB(12,14)"YOU SURVIVED FOR"
1160 PRINTTAB(6,16)TIME DIV 100;"SECONDS"
1170 PRINTTAB(15,18)"AT LEVEL";LEVEL*10-10
1180 IF LEVEL*10-10>10 AND LEVEL*10-10<20 PRINT "
NOT TOO BAD"
1190 IF LEVEL*10-10>20 AND LEVEL*10-10<30 PRINT "
FAIRLY GOOD"
1195 IF LEVEL*10-10>30 THEN PRINT " FAR OUT"
1200 A=GET
1210 *FX21,0
1220 CRASH=0
1230 GOTO230

```


TIREd of endless battles with orcs?
 CONFUSED by interminable corridors and
 limitless caves?
 BORED by all the same old adventures?

TRY **The CRICKLEWOOD INCIDENT**
 and
Wings of War

Two new and different adventures from Salamander Software.

In **WINGS OF WAR** you play Lt. Roger Wilcoe, reluctant hero. The time is November 1942 - you must parachute into occupied France, disguised as a German Officer, infiltrate a secret arms laboratory hidden in a chateau, steal the plans and the prototype of a new bomb, and make good your escape back to Blighty.

ROGER WILCOE
 Star of Wings of War.

In **THE CRICKLEWOOD INCIDENT**, you, Arnold Q. Volestrangler the 14th heir to the Volestrangler fortune, find yourself bored out of your mind and looking for something to do until the laundrette opens. There's nothing for it but to leave your padded cell and search the wilds of London, Moscow, Hanoi and Wigan for the elusive Holy Grail. NOT for sheep of a sensitive disposition.

MAVIS NASTY
 Not the star of the Cricklewood Incident.

Tape duplication
 by DATACLONE.

Stimulate yourself for only £7.95 each.

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

Cheques or postal orders payable to:

Salamander
 SOFTWARE

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

Look for these other new releases from Salamander Software

DRAGON - DRS (sophisticated database) £14.95

TURTLE GRAPHICS (Educational & fun) £9.95

BBC

BBC/ELECTRON

- **EAGLE** (original arcade action) £7.95

- **TURBO COMPILER** (BASIC compiler) £9.95

Now available are versions of our best selling 737 Flight Simulator for BBC disk and ACORN Electron.

Electric avenue

David Kelly talks to Alan Rawlinson from the Family Leisure Centre

The Family Leisure Centre in Old Compton Street, London, is one of a chain of seven successful West End amusement arcades operated by Alan Rawlinson.

His office is a cramped prefabricated room beneath the Old Compton Street premises. For company, he has a phone which rings continually.

A likeable, but rather shy individual, Alan was uncertain what to make of this interview. Being a purveyor of one-arm bandits — or their modern equivalent — he is accustomed to receiving a hostile press.

"There was a time," he says, "when any trouble or punch-up was blamed on us. Since video games like *Space Invaders* though, people seem to have come to accept the arcades more."

The microchip has revolutionised the coin-operated machine industry with electronically operated games taking over. In the Old Compton Street arcade there is now only one of the old electro-mechanical machines — a life-size model of a Western gunfighter. The microprocessor has beaten the other machines to the draw.

Traditional fruit machines were the first to succumb, more than eight years ago. Instead of the drums spinning randomly, a micro generates a random number and chooses the winning line at the instant the player presses the 'start' button.

Then came the first video games — the *Pong* tennis game, Atari's driving game *GT-10* and the big one — *Space Invaders*. "There has never been a game as successful as *Space Invaders* was between 1974 and 1975. At its peak, we had one arcade with 30 identical machines. The maximum number of the same game you ever get in one arcade now is about four."

The incredible success of *Space Invaders* was a hard act to follow and, to date, no other game has even come close to equalling its popularity.

Asteroids was the next big game, followed quickly by *Galaxians*, which was the first video game with a colour display screen. Then came *Centipede* and driving games like *Monaco* and the more recent *Pole Position*.

Alan has always viewed video games as 'novelty' games, classing them alongside the electro-mechanical Jesse James. The bread-and-butter of an arcade has always been the fruit machines. "Even at their peak, video games only equalled the slot machines. Then about 50 percent of my machines were novelty games — the figure is now down to around 10 percent."

"This is about the same as the number of the old electro-mechanical novelty games we had before video games existed." He is sure home computers are partly responsible for the drop in video game popularity —

if people can play the games at home, then they don't need to come to the arcades.

"The first home computer games were so inferior to the arcade versions that none of the arcade manufacturers took much notice. Some of the systems I have seen now — there is hardly any difference."

Possibly a costly mistake on the video machine company's part — only two weeks ago the only UK arcade company — Century Electronics — went into liquidation. And only very recently have arcade companies begun to think about licencing their games for home computers — like Sega with *Frogger*.

Earnings from a video game machine usually drop off quite markedly after the first eight weeks. To break even, a machine has to bring in around £1500 in two months. With the decline in video game popularity, the machines have become almost a liability. "Most smaller town high-street arcades have taken out their video machines."

A similar video game slump has afflicted the American arcades and one idea to get things moving again has been laser disc-based video games. On the face of it, they sound very exciting — the player controls the sequence of a Disney-type cartoon or video of a race. Rather like being one of the characters in a film, actually influencing the course of the plot.

In the US, these laser-disc games have been very successful — notably titles like *Astron Belt* (the first laser game) and *Dragon's Lair* (a cartoon drawn by an ex-Disney artist). Over here, however, their performance has been rather disappointing.

"If you compare them with a top printed-circuit board game like *Star Wars* or *Pole Position* they may be as good — they are no better."

Alan reckons there are two reasons for this. Most people find laser-disc games confusing at first. Often the action is very discontinuous with blanks on screen as the system searches the laser-disc for the next section of the game.

Also, US arcades are not allowed to have slot machines — gambling is restricted to just a couple of states. As a result, the video game slump really hurt. Whereas the UK arcades simply pulled out the videos and put in more fruit

machines, their US equivalents were shutting down *en masse*. The laser disc games were greeted as the saviour of the US arcades and Alan feels the US success of the machines has been exaggerated.

Other problems with operating laser-disc games are cost — around double that of buying an ordinary video game, and maintenance — the laser-disc technology is not well suited to continuous use in a commercial environment. Some laser-disc units spin the disc at over 1,800 rpm.

"To try to make the action continuous, they are now talking of speeding the disc up even further!

"All of these problems at the moment put a laser-disc game out of the reach of the small high street arcade.

"The latest idea is to use a film of someone like Daley Thompson and you have to compete with him in the Olympics, which sounds very interesting.

"But I still don't see laser games becoming hugely successful. If anything the whole video games industry is settling down.

"There is another generation of customers coming in now and the video game has properly become part of arcade life.

"Right now the hit games are *Star Wars*, and *Track and Field*. Also *Pole Position* still keeps on going. All the other games have settled down at a much lower income. We also have *Crossbow* — a new shooting game — which looks like it is going to be strong."

As to the future Alan points to two innovations. A system has been developed to play from a laser disc into computer Ram memory — which could possibly eliminate the biggest problems with laser disc games — that of discontinuity of play.

The other appeals much more to Alan and takes its cue — rather surprisingly — from home computers. A Japanese company, Data East, has developed a cassette-based arcade machine. The arcade buys one machine and loads in different games from cassette.

"With games having such a short active life it is an obvious way to go, and it gets round the biggest problem for arcades — that of expense. Why have a video game in the arcade when it costs half as much again as a slot machine and has a much shorter life?"



ISCOM

9 Winchester St, Dept 1
ACTON, LONDON W3

Affordable Hardware & Software
Mail Orders only.
Offers Valid until 30/4/84

ZX Spectrum 16K £90, 48K £115
Printer £35, Light pen £15, Kempston Interface £9.
Commodore 64 £180, VIC 20 £125
Printer MPS 801 £220.
BBC B £375 ORIC 48K £125
MCP-40 £100, Col Monitor £200
Quick shot Joystick £9.

New and Top 50 Software

CMB 64 Software: Hobbit 64 RRP 14.95 OUR P. 13 Manic Miner, Crazy Ballon, Galaxy 64, UGH, Kong, Scramble, Squash Frog, Quantic Warrior, Dancing Feat, Krystals of Zong RRP 7.95 OUR P. 6.70 Hoever Bover, Altair 4, RRP 7.50 OUR P. 6.40 Colossal Adventure, Snow Ball RRP 9.90 OUR P. 8 Kick Off, Widows Revenge RRP 6.99 OUR P. 5.90 Hunch Back, Mr Wimpey, Super Pipeline, Lazer Zone, Jammin RRP 6.90 OUR P. 5.80 Transylan Tower RRP 6.50 OUR P. 4.90 Quasar 64 RRP 5.99 OUR P. 4.80

Spectrum Software: Valhalla, Hobbit RRP 14.95 OUR P. 11.50 Fighter Pilot, Hunter Killer RRP 7.95 OUR P. 6.50 Ant Attack, Death Chase, Kick Off, Skull, Classic Adventure, TRAXX, Penetrator, Hunch Back, Strike Attack RRP 6.95 OUR P. 5.50 Doomsday Castle, Romells Revenge, Urban Upstart RRP 6.50 OUR P. 5 Bird and the Bees, Jetset Wille, Manic Miner, The Omega Run, Ornetron, 30 SEIDDAB Attack, Kong, Micro Bot, Pinball Wizard, Pool, Mr Wimpey, Harrier Attack, Wheelie, Revenge of the Mutant Camel RRP 5.95 OUR P. 4.70 Altic Atac, Schuba Dive, Jet Pac, Lunar-jet Man, Pssst, Cookie, Alchemist, Zzoom, Stonkers, ZipZap, Arcadia RRP 5.50 OUR P. 4.45

SEND LARGE SAE FOR OUR FULL CATALOGUE.
Prompt dispatch upon Return of Cheque.
Cheque/P.O. to above address.

WANTED

The very best machine code arcade games
for Dragon, Commodore 64, BBC and Electron

Company Reg. No. 1703670

V.A.T. No. 392 1083 60

Director: L. Manley
Software: J. Morrison
Secretary: I. Blend



Software & Hardware
Systems Design Specialists

J. Morrison (Micros) Ltd.

1 Glensdale Street, Leeds, LS5 9JJ

Telephone (0532) 480982

Dear Software Writer,

Because our software is so popular, and up until now we have written everything ourselves, we are finding it difficult to keep up with the demand for new games from us.

For the very first time we have decided to look at software written by other people. As you will appreciate, we have a hard-won, first class reputation to maintain and therefore we will only consider the very best games. We are looking for arcade games for the Dragon, Commodore 64, BBC and Electron.

If you feel that your software can match the quality of our existing games then call us on Leeds (0532) 480982.

In return you can expect immediate action, honest and fair dealings at all times, substantial sales and a fair reward for your efforts.

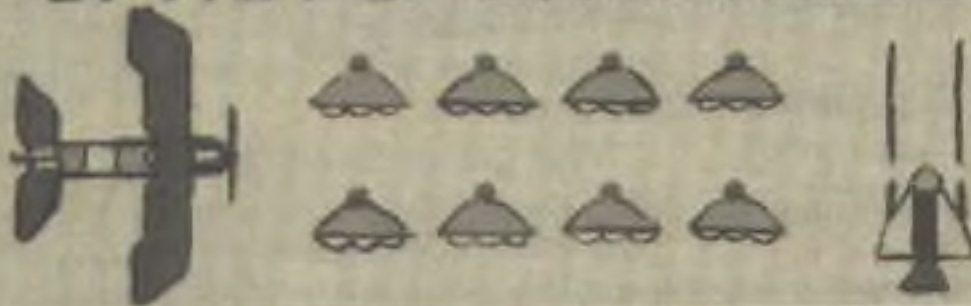
Yours sincerely,

Lynne Manley

Lynne Manley
Director



MULTI-COLOURED
SPRITE-GRAPHICS



Actual ZX screen printout

NOW FOR THE 48K ZX SPECTRUM MULTI-COLOURED SPRITE-GRAPHICS

A new UTILITY program: Replace User Defined Graphics with Multi-Coloured Sprites and greatly improve your games.

FEATURES:

Demonstration program: Character Generator program: Instruction program
Create any size characters up to full screen.
Choose colour, bright and flash for each character square.
Save character data: Create animated characters.
Beginners guide on how to use Sprites.

Remarkable Machine code routine prints Multi-Coloured Sprites instantly.
Unprints Sprites Fully restoring background.

Only £6 including p&p

From: B. SIDES SOFTWARE

4 Willesden Road, Cefn-Glas, Bridgend, South Wales CF31 4RE

For 16/48K SPECTRUM

SUPER



FOR SPECTRUM
BASIC PROGRAMMERS

Written by Adrian Jones

EMULATED KEYBOARD ENTRY

LIST VARIABLES · BLOCK DELETE

TAPE HEADER READER

"CRUNCH" PROGRAM

RECOVERING THE DUTCH, GUSSES AND

FREE MEMORY · PROGRAM LENGTH

MEMORY USED BY VARIABLES

REPLACE KEYWORD

NECTARINE

From all good stockists or direct from

NECTARINE

837 Yeovil Road, Slough SL1 4JH

Send £10.70 incl p&p

Audiogenic LTD

REQUIRED

FIELD SUPPORT REPRESENTATIVES

WE NEED two young, energetic people to work with our sales force giving field support to our products. If you have a keen interest in microcomputers and are repping or working in sales you may be what we need.

YOU WILL be keeping contact with our dealer network working in association with our distributors as an essential part of the company's communications and support structure.

WORKING FROM HOME. One based in the Home Counties and one in the Midlands. Your enthusiasm and knowledgeable approach to the home computer industry will earn you responsibility, excitement and a car in a package with around £10,000.

CALL ANNE FOSTER NOW ON 0734 586334

AUDIOGENIC LTD
34-36 Crown Street
Reading, Berks

THANK YOU!

for your response to our call for games programs. We enjoyed evaluating them, but you didn't send enough

PLEASE SEND MORE!

Immediate evaluation as usual, to: Ron Heyes,

KACE INTERNATIONAL
32 AVON TRADING ESTATE,
AVONMORE ROAD, LONDON W14
or TEL: 01-602 7355 (Ext 35)

ALSO WANTED —
Freelance machine code programmers

PARAMOUNT SOFTWARE

A Registered Trading Name of Workstations Ltd.



VIC 20 8K or 16K Expansion

CHOCABLOC — A fast moving, pure Machine Code action game, with Chocabloc our hero trying to sort out some Real Cool Choc Bars — until everything goes crazy and the action is on! Arcade standard. Fully featured. Excellent sound and graphics. Keyboard or Joystick.

£6.50

OUTBACK — Can you use the very sophisticated defence set-up to beat off the cunning Swagmen? How long will you survive? Pure Machine Code action. Fully featured. Superb colour and graphics. A game with a difference. Joystick.

£5.50



Any VIC 20



VIC 20 8K or 16K Expansion

COUNTDOWN — Time is important. Accuracy essential. Courage mandatory. But above all, Nerve is the prime attribute needed for your mission as an agent in the crack S.M.U. A Superb Arcade/Graphical Adventure. Keyboard or Joystick.

£5.50

MEGAWARZ — Where does your fantasy go when your mind leaves your body? Megawarz will take you there you can be sure. High resolution, multi-colour graphics. Sprite graphics. Synthysound. Pure Machine Code action. Arcade standard. A magical planetary trip. Keyboard or Joystick.

£7.50



Commodore 64



Dragon 32

CASTLE OF DOOM Fully implemented graphical adventure. A compelling and devious plot which retains excitement and interest to the end — if you ever reach the end! An experience in adventuring not to be missed. It's user friendly too!

£6.50

JOGGER — Truly a jogger amongst joggers. If you have trotted with the rest, now run with the best. Machine Code action. Superlative sound. Creative colour. A quality programme from Paramount. Joystick.

Any VIC 20. £5.50

TRADE ENQUIRIES

Tel: (0642) 604470

WRITING MARKETABLE PROGRAMMES?

Hitch your wagon to PARAMOUNT. Send for evaluation and terms.

Paramount Software, 67 Bishopton Lane, Stockton, Cleveland, TS18 1PU. (England)

Chocabloc	£6.50	<input type="checkbox"/>	Name.....
Outback	£5.50	<input type="checkbox"/>	Address.....
Countdown	£5.50	<input type="checkbox"/>
Jogger	£5.50	<input type="checkbox"/>
Castle of Doom	£6.50	<input type="checkbox"/>
Megawarz	£7.50	<input type="checkbox"/>

I enclose cash/cheque/P.O. for £.....
Overseas orders add 50p per item.

Food for thought

Tony Kendle is pursued by gastronomic ghouls in this round-up of Spectrum software

I always find the New Releases pages of PCW disturbing in the extreme. There can be no doubt that the ranks of Spectrum software are swelling faster than most people's bank accounts can tolerate and with the quality of the games improving all the time, making a choice becomes harder and harder (remember the old days when everyone you knew had a copy of *Hungry Horace*?). However, there are some games that will inevitably stand out from the crowd.

Foremost amongst these are the offerings from Ultimate; this company must receive the credit for rewriting the definition of Spectrum arcade software and it would be difficult to match their quality. This is shown to full advantage in the new 48K sequel to *Jetpac* called *Lunar Jetman*.

Although at the time it came out I said it couldn't be bettered, *Jetpac's* graphics look poor alongside those of *Lunar Jetman*, especially the design of the attacking aliens and the superb lunar rover. The new game offers the same central protagonist — a hovering spaceman — but the object of the game is much more complex and involves many more features to test skill.

The idea is that you are in your rover, travelling the surface of an alien planet looking for bombs, laser gun turrets or other such paraphernalia with which to equip your

This is the one criticism I could make of this game — it scores low on initial playability. Although there must be lots to see and do in a 48K game, my copy could probably have been written in 5K for the amount I survive long enough to enjoy. In the end I resorted to cowering inside my rover, hiding from the aliens until my turn ran out and a missile spelt my colourful demise (yes *Lunar Jetman* has both a time and a fuel limit to add to the difficulty so all you *Jetpac* hi-score cheats who stood in one spot blasting away are in for a hard time). Despite being fiendishly difficult to play, this is a program that you would be crazy not to buy.

Mr Wimpy is one of the latest "arcade favourite" conversions offered by Ocean Software. Ocean have lately had considerable success with their version of *Donkey Kong* which seems to be the one that stands out from the huge ranks of the competition. *Mr Wimpy* is based on the possibly less well known game of *Burger-time* and graphically at least is a satisfying imitation of the original, considering the limitations of the Spectrum.

The object of the game is to charge your man up and down ladders and over the various ingredients of some huge hamburgers which then bounce down the screen.

in the burgers or to hurl pepper at them and there is a limited amount of this useful condiment on each screen.

The most contentious aspect of *Mr Wimpy* is the opening level which is unrelated to the original game. Here you have to collect the various ingredients for your hamburger by chasing from one side of the screen to the other, avoiding mobile man-eating manholes. There is also a grinning bug called Waldo who is harmless aside from stealing whatever you are carrying, thereby forcing you back to the start.

The holes are relatively easy to avoid and thus it should only be a matter of time before you collect all the necessary objects, but in reality you become so frustrated by Waldo's kleptomania that you make rash moves and are lucky to reach the following levels with many lives left.

For one would happily sacrifice three of my five lives for a chance to blast Waldo apart with a laser, but after long deliberation I decided that the challenge does add to an already enjoyable game. My only regret is that if a game ever needed the wonderful music of the arcade original then *Mr Wimpy* is it, although you are treated to an occasional rendition of the *Wimpy* advert theme.

Scuba Dive from Durell is a game I thoroughly enjoyed because of the superb graphics and animation. The plot is extremely simple — you play the title role and your task is to swim the depths of the ocean collecting pearls from oysters as they open and close on the sea bed. To complicate things, you have to keep an eye on your oxygen levels and return all treasure to your boat on the surface before you score any points at all; this does require discipline and skill.

The real enjoyment comes from avoiding the teeming sea-life such as giant squids and great white sharks; if you are skilful you can sneak past an octopus into lower caverns where you will find giant clams, treasure chests and an even more spectacular range of marine life.

My only worry is that the game itself is far from earthshaking in concept and once you get the hang of avoiding the clams and other man-eaters, there seems to be little progress to be made except in terms of the score. This suspicion appears to be confirmed by the fact that you are given a facility for saving and loading your previous hi-score charts.

But, having said that, in our house the game was constantly being loaded in, even if it was for short periods at a time, and if you think it's the kind of thing you will enjoy then you could not find a better written programme than this. If you do tire of it, you can always leave the wonderfully animated title screen running — it's better than a goldfish bowl.

In contrast *Jumbly* from Dk'Tronics presents such a challenge that it almost



craft. These can later be used to destroy the enemy missile bases which are dotted about the planet. Added to your problems are the various craters that impede the passage of your rover and must be filled in, at great personal risk, before you can proceed.

The problem is that when killed by the fast and furious aliens, as you inevitably are, rather than vanishing in a puff of smoke as in *Jetpac*, you are dramatically blown across the screen leaving more and bigger craters where you land.

Gradually, the ingredients collect at the bottom as four complete burgers and you are then faced with a new harder screen.

Of course it is not all as easy as it sounds because you are constantly pursued by highly malevolent spoons, fried eggs and frankfurters (and I am happy to say that the loopy running motion of the latter, which was one of the funniest things I have seen on an arcade game, has been reasonably well reproduced). Your only protection from the gastronomic ghouls is to squash them

becomes demoralising, although that does not detract from another superb piece of programming. Do you remember those small slider puzzles that consist of a picture or a set of words made up of lots of small interlocking squares with one missing — the idea being to jumble the square up and then try to rearrange them in the correct order. Well, *Jumbly* is based on the same principle, but is made fiendishly difficult because the ten pictures are not only complex but also animated and continue to move after they have been mixed up.

I failed miserably with my first attempts at the initial screen which was a relatively easy alphabet puzzle. Successful completion of each picture, within the preset target number of moves, gives you a title to type in and you can then proceed to the next level. I ended up thanking the kind soul who sent a list of the titles with the review copy, else it would have taken me months or years to see all ten screens. I have completely the wrong kind of temperament for this game, but for those of you who like traditional puzzles it is indispensable.

To add to the incentive, completing all screens gives you a codeword allowing you to enter a competition to design a picture for *Jumbly II*, thereby winning £150. Incidentally, each screen is accompanied by appropriately wacky and vaguely pertinent music which can, thankfully, be turned off once frustration reaches danger point.

Space Station Zebra from Beyond Software comes with a very well designed and presented cassette inlay — reminiscent of

their colour adverts you may have seen. The game itself also has a reasonably high standard of professionalism with nicely defined graphics and smooth movement.

The scenario is a rotating space station under attack from oncoming solo aliens which you first locate on the long range scanner. Keeping a close eye on your energy and shield levels, you then try to "shoot-em-up" with your two laser beams by controlling vertical and horizontal sights.

Some of you may now be thinking that this sounds a bit familiar and it is — the game constantly reminded me of *3D Timegate*, although it was thankfully free of interminable screens of opening blurb. *Timegate* was innovative in many ways and although I feel the graphics of *Space Station Zebra* are an improvement, I found *Zebra* much harder to play successfully and there seemed to be less to look forward to with no planets to land on or attack.

However, for those of you looking for this type of game it is very well produced despite lacking great originality, and a look at the picture of a typical screen on the cassette inlay will give you a good idea of



what you will receive.

I flinched when I read the cassette blurb for *Double Trouble* from Starlite — The Key To Entertainment, because I'm getting very tired of twee puns on Clive Sinclair and the Spectrum. In this case you have to protect the "potty pedestrians" of Spectrumville from killer cars on the Sinclair Road. Unfortunately, the program lived up to this initial bad impression which was a huge disappointment as I usually enjoy "painter" style games.

The potty pedestrians are a static graphic of a loving couple around which you, as Tarmac Tim, have to paint double yellow lines. You are awarded points for the number of lines you manage to paint and at the end of the shift you receive a bonus for the number of pedestrians still alive.

Playing the game was confusing and erratic and success depended more on the random placing of the cars and couples than any skills of your own. The cars moved in a very jerky way, despite being "100% machine code arcade action" and had the ability to knock down Tim from a good centimetre's distance.

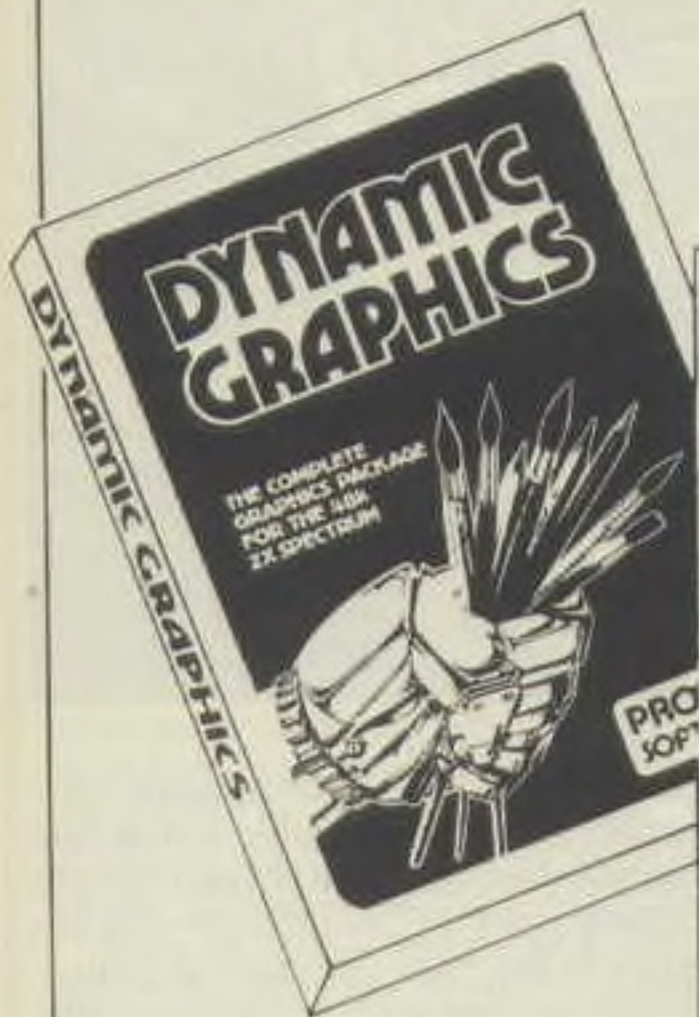
To add to the disillusionment, I played several games where I lost all of my lives instantaneously due to a random placing of one of the cars right where you stand at the beginning. Also, I suspect that the ability of the cars to wrap around the screen whilst you cannot caused the occasional inexplicable demise of my character at other times.

I'm afraid that this game is prone to these irritating bugs and simply does not stand up against the standard of the competition; in fact it is not much better than you could get from any good magazine listing.

So, in summary, there are some excellent games appearing now for the Spectrum, but there still seems to be room for the substandard attempts. The best advice is to ignore what the cassette inlay claims and try to find a specialist shop that will let you see what you are buying — for a typical price of £6 a game that is not too much to ask.

Firm	Program	Price	Value (1-10)
Ultimate The Green Ashby-de-la-Zouch Leics	<i>Lunar Jetman</i>	£5.50	9
Ocean Software Ralli Building Stanley Street Manchester M35FD	<i>Mr Wimpy</i>	£5.90	8
Durell Software Castle Lodge Castle Green Taunton Somerset TA1 4AB	<i>Scuba Dive</i>	£5.50	8
Dk'Tronics Unit 6 Shire Hill Industrial Estate Saffron Walden Essex	<i>Jumbly</i>	£6.95	8
Beyond Competition House Farndon Road Market Harborough Leics	<i>Space Station Zebra</i>	£6.95	7
Starlite Software 1 Mercury Close Lordshill Southampton	<i>Double Trouble</i>	£5.90	4

THE FIRST IN DYNAMIC PACKAGES FROM PROCOM



WHAT IT IS

Whether you are a beginner or an experienced programmer it will make no difference with the DYNAMIC GRAPHICS package from Procom. You will be able to program professional looking graphics on your Spectrum. DYNAMIC GRAPHICS comes in two cassettes at the price you would normally pay for one. But do not let the low price put you off. DYNAMIC GRAPHICS is by far the most unique and much needed software aid on the market today.

£14.95

inc. VAT and P&P

*JUST LOOK
AT WHAT
WE HAVE
IN STORE FOR YOU!*

TAPE 1

THIS IS A CHARACTER DESIGNER WITH A DIFFERENCE * FULL SCREEN ANIMATION OF SPRITES * 27 FUNCTIONS INCLUDING SPRITE HANDLING 96 CHARACTERS WHICH CAN BE SAVED ON TAPE TO USE IN YOUR OWN PROGRAMS * EASY METHODS OF INCLUDING CHARACTER DESIGNS IN YOUR OWN BASIC PROGRAMS * NO KNOWLEDGE OF MACHINE CODE NEEDED * SCREEN SAVING * SPRITES MAY BE TREATED AS SUPER LARGE CHARACTERS (4 x 4). THE LIST IS ENDLESS. YOU WILL BE ABLE TO DESIGN LITERALLY THOUSANDS OF DIFFERENT CHARACTERS FROM PAC MEN TO SPACE MEN OR SPACE SHIPS TO BATTLESHIPS.

TAPE 2

THIS IS THE ULTIMATE UTILITY FOR COMPOSING HI-RES GRAPHICS ON YOUR SPECTRUM. AS WELL AS ESSENTIAL HAND DRAW CURSOR CONTROLS (OR JOYSTICK) THERE ARE MANY ADVANCED FEATURES, SUCH AS FAST FILL AND RESCALE. THERE ARE IN ALL OVER 50 COMMANDS. A CONSTANTLY UPDATED STATUS DISPLAY. GENERATED PROMPTS ARE FULLY DISPLAYED. NOW YOU CAN DESIGN SCREENS AS GOOD AS THE SOFTWARE COMPANIES.

- 1 DYNAMIC PROGRAMMING
- 2 DYNAMIC ANIMATION
- 3 DYNAMIC SOUNDS
- 4 DYNAMIC FILING
- 5 DYNAMIC EDITOR & ASSEMBLER

Package for the ZX Spectrum now!
(Also for the BBC, Electron and CBM 64)

EASY TO USE

DYNAMIC GRAPHICS is the one that everybody will understand. The instruction manual is simplicity itself. No more strained eyes — the manual has large 10 x 8 pages with plenty of diagrams to make it easy for you.

YOUR TICKET TO RICHES?

Use DYNAMIC GRAPHICS to make up your own program, and if it's good we will market it for you and maybe make you rich.

DYNAMIC GRAPHICS

**PROCOM
SOFTWARE**

309 HIGH ROAD
LOUGHTON
ESSEX
Tel: (01) 508 1216

HOW TO ORDER

Telephone orders
(01) 508 1216

Credit Card Holders (Access/Barclaycard only) can purchase by telephone. Please give card no., name, address and items required, and your order will be despatched the same day.

BY POST

Simply write your requirements in the coupon provided, enclose your cheque/P.O. or use your Access or Barclaycard. Please make cheque payable to: PROCOM SOFTWARE and post to address below. Allow 7 days for delivery.

IN PERSON

Visit our premises at the address below for a great selection — we will be delighted to see you.

Post to: PROCOM SOFTWARE, 309 HIGH ROAD,
LOUGHTON, ESSEX.

Please send me the following items:

- | | | |
|---|--|---|
| <input type="checkbox"/> DYNAMIC GRAPHICS | <input type="checkbox"/> DYNAMIC PROGRAMMING | <input type="checkbox"/> DYNAMIC ANIMATION |
| <input type="checkbox"/> DYNAMIC SOUNDS | <input type="checkbox"/> DYNAMIC FILING | <input type="checkbox"/> DYNAMIC EDITOR & ASSEMBLER |

(Please tick items)

I enclose my cheque/P.O. for £ _____
I prefer to pay with my ACCESS/BARCLAYCARD
(Delete whichever not applicable)

Card No. _____
Signature _____
Name _____
Address _____

Tel: (Day) _____ Tel: (Eve) _____

Credit cards valid if signed by card holder.
Address above must be the same as card holder.

PCW 3/84

The missing Lynx

Clive Newton dissects a few bugs lurking in the Lynx keyboard

Owners of Lynx micros will probably have discovered a couple of quirks in the Rom, particularly in the keyboard scanning routine.

The major problem is that the computer encodes the @ key and the order in which the @ and / characters are encoded, depending on whether you are in shift-lock.

The keyboard scan routine is located in the Rom at address 2907, the address pointed to by the system variable 25092/93. The routine has three tables which are used to obtain the necessary character codes, depending on whether you are in shift-lock or not, or are using keys in connection with the CONTROL key. It is these tables that are at fault in respect to the square bracket keys.

The quirk with the @ key is due to the way the Lynx deciphers which code to return when not in the shift-lock mode. The scanning routine has apparently been designed assuming shift-lock is on. If not —

detected by referencing the system variable at 25145 (contents 0 if shift lock is on, 1 if not) — it ignores character codes less than 64 and alters the state of bit 5 of the obtained character code (ie, equivalent to adding or subtracting 32). As an example, the character / printed on the @ key is incorrect and the £ obtained by using the key is in fact right; ie, the difference between the £ and @ is 32. The reason the @ key alters its output order is that this routine should have ignored codes less than 65 and not 64 (Rom error) as @ is code 64.

Now to alter the Lynx keyboard routines. It is possible to change them so that these errors are removed and also so that every standard ASCII code, given on pages 81 and 82 of the manual, is available on the keys — instead of having to use CHR\$ to access them.

The way this is done is by copying the keyboard scanning routine to the Ram,

changing certain addresses and then writing a new routine to deal with the case when shift-lock is off. Some of the values in the original routine's tables will also need to be changed. The computer will be able to find the modified routine by changing the address in 25092/93 to point to it. The new routine is written at the bottom of memory — taking up 450 bytes — and an additional machine-code program has been incorporated that will push the start of the Basic program area above this level. To do this it was necessary to change three system variable addresses:

25082/83 Start of the BASIC program area.
25084/85 End of the BASIC program.
25119/20 End of the array and string variable area.

To carry out the keyboard modification the Monitor facility on the Lynx is used to save unnecessary typing. If you have not used the Monitor before (type in the Basic command Mon or Escape K to enter), it may be useful to read pages 72 to 77 in the manual. But, if you follow the outlined procedure below, you should not get lost (ie, type in the listing after the asterisk prompt and to exit the modification (M) command type <RETURN>).

C 09BD 694D 019E	Copy the keyboard routine to the RAM.
C 0B5B 6A42 0A	
M 6985 06 6A	6A06 - Address of SHIFT LOCK table
M 6990 6F 6A	6A6F - Address of SHIFT LOCK Shift Table
M 6AB2 4D 69	Start of the new routine in memory
M 6A46 AB 6A	Call address modification
M 69AB CD D5 69 18 03	Alteration in call to SHIFT LOCK-off routine
M 69D5 EB 21 39 62 CB 46 C8 FE 41	New SHIFT LOCK-off routine
DB 01 69 00 FE 5B 38 0C FE	
61 DB FE 7B D0 EB AF ED 42	
18 02 EB 09 7E EB C9	
M 6A4C 21 42 6A 22 04 62 21 EB 6A	Routine to bring the new keyboard routine
36 0D 23 36 80 22 FA 61 22	into operation and set up the BASIC program
FC 61 23 22 1F 62 C9	above this.
M 6A38 5B	Set up left hand bracket key [(ASCII 91)
M 6A3D 5D	Set up right hand bracket key] (ASCII 93)
M 6A73 7D	SHIFT ↑ = ↑ (ASCII 125)
M 6A74 7E	SHIFT ↓ = ↓ (ASCII 126)
M 6A99 60	SHIFT 0 = £ (ASCII 96)

Continued on page 21



SUNSHINE

Mastercode Assembler for the Commodore 64

Full Commodore 64 Assembler/Disassembler

£14.95
inc VAT



Mastercode is a substantial and complex program of use to anyone interested in writing machine code on the Commodore 64.

Its features include:

- Machinecode monitor
- File Editor
- Disassembler
- Assembler

Mastercode is a full two pass assembler. It accepts labels, variables and equations within assembly language programs. It is possible to store programs anywhere in memory, even in parts occupied by the Assembler. Programs can be saved to either tape or disc.

The Machine Code Monitor includes:

- OUTPUT OF MEMORY TO SCREEN OR PRINTER ■ MODIFICATION OF MEMORY ■ EXECUTION OF MACHINE CODE PROGRAMS ■ SAVING OF MACHINE CODE FILES ON TO TAPE OR DISC
- LOADING OF MACHINE CODE FILES FROM TAPE OR DISC ■ STEP BY STEP TRACING OF THE EXECUTION OF A MACHINE CODE PROGRAM, INCLUDING DISPLAY OF REGISTER CONTENTS.

The Disassembler will translate into assembly language the contents of any area of memory, whether the 64's ROM or a user program. Output may be sent either to the screen or a printer.

The File Editor includes:

- ENTRY OF NUMBERED LINES OF ASSEMBLY LANGUAGE INSTRUCTIONS ■ LISTING, INDIVIDUALLY OR IN BLOCKS, OF PREVIOUSLY ENTERED LINES ■ DELETION, INDIVIDUALLY OR IN BLOCKS, OF EXISTING LINES ■ RENUMBERING OF EXISTING LINES ■ SAVING OF ASSEMBLY LANGUAGE FILES TO TAPE OR DISC ■ LOADING OF ASSEMBLY LANGUAGE FILES FROM TAPE OR DISC ■ ADDITION OF A BLOCK OF MEMORY SPECIFIED BY THE USER TO THE USER'S ASSEMBLY PROGRAM

The Assembler allows the translation of assembly language programs into machine code with full error checking, labelling and a range of assembler directives.

LOOK OUT FOR THE SUNSHINE RANGE IN W.H. SMITH'S, BOOTS, JOHN MENZIES, OTHER LEADING RETAIL CHAINS AND THROUGH OUR NATIONAL NETWORK OF BOOK SHOPS AND SPECIALIST STORES.

Please send me Commodore 64 Mastercode Assembler @ £14.95 inc VAT. I enclose cheque/postal order for £ made payable to Sunshine: 12/13 Little Newport Street, London WC2R 3LD. Or telephone your order through Access/Mastercard on 01-437 4343

Name _____

Address _____

Signature _____

M 6AA0 5C	SHIFT @ = \ (ASCII 92)
M 6AA1 5E	SHIFT [= ASCII 94
M 6AA6 7F	SHIFT] = ASCII 127
M 6AA5 5F	SHIFT DEL = _ (ASCII 95)
M 6AA7 7C	SHIFT ← = ← (ASCII 124)
M 6AAA 7B	SHIFT → = → (ASCII 123)
.G 6A4C	This will set the keyboard routine into operation.
D 694D 6AEB 6A4C *<Program name>*	This will save the routine on tape. Using MLOAD *<Program name>* will load the program into the correct area of memory and being it was saved with an auto entry address, it will automatically set up the new routine.

N.B. The ASCII codes 94 & 127 combined, give the copyright symbol.

SPRITES FOR THE DRAGON

Merlin's Sprite Magic offers a whole host of new features for the Dragon

Up to 128 sprites. Size up to 40 x 40 in mode 4, even larger in other modes. Sprite magic uses the 256 x 192 grid for screen addressing. Sprites are programmable for joystick control and/or keyboard control. Sprites may be defined as missiles fired from other sprites in response to fire-button or keyboard. Sprites may be programmed to rebound (like a bouncing ball), or wrap round, or disappear automatically when they get to the edge of the (user defined) screen. A wide range of commands and functions offers comprehensive control of speed, direction, screen edge behaviour and collision detection.

Animation is easily implemented with DRWG function which swaps the drawings being used for sprites and they needn't even be the same size.

Some of the commands are exceptionally powerful . . . MOVEn moves a single sprite, MOVEn,n moves a block of sprites, MOVEM moves all the sprites. All the MOVE commands observe the individual direction, screen-edge, joystick and keyboard instructions for the various sprites. The REPORT function reports how many have crashed. The HIT function reports crashed sprite numbers.

Sprites are non-destructive i.e. they do not leave a "trail". They're fast and they're efficient and they're easy to use.

The Dragon now has its very own BEEP command. This one, however, offers a range of 16 pre-programmed gunshots, explosions, sirens, laser sounds and the like. You can also program your own . . . BEEP (six parameters) lets you generate the kind of noises you have heard on other high quality software.

Keyboard handling has had some attention too . . . optional auto-repeat, INKEY function returns ASCII code, KEY function does the same, but waits for a keypress. CLEAR key clears hi-res screen and homes the print cursor.

We have also included a couple of routines to provide text on the hi-res screen . . . in all 5 PMODES with enhanced cursor controls providing relative as well as absolute positioning, PAGE command, HOLD command (to fix headers or graphics), COLOUR command changes text foreground and background colours etc. The hi-res screen is used just like the Basic text screen, including editing. You can also re-define the character set using the friendly new command CHR(n)=eight row values.

Sprite Magic requires absolutely no knowledge of machine code. The comprehensive manual describes the new Basic commands in full, with lots of examples. As well as the documented demonstration program, the cassette includes Character and Sound Generators, Mate in two (yes you can!), Shooting Gallery and Breakout. Price £17.25 all inclusive.



MERLIN (MICRO SYSTEMS) LTD,
93 HIGH STREET, ESTON, CLEVELAND
Tel: (0642) 454883



Calculated actions

Trevor Toms continues his series on machine code with a look at the floating point calculator

This week we're taking a look at the Spectrum ROM's floating point calculator. It constitutes a reasonable percentage of the ROM coding, and is the heart of the Basic interpreter. Unfortunately, there are far too many facilities to be covered adequately in one article, so I can only give details of the most useful features.

First of all, the calculator works like a standard reverse Polish notation calculator, in that each arithmetical operator works on the two topmost items on the calculator's stack (as distinct from the Z80 stack), while functions operate on the topmost item. In all cases, the calculator replaces the top two items (or one item in the case of functions) by the resulting value. Besides arithmetical and unary functions, there is an assortment of "utility" functions to manipulate the stack for programming convenience.

Your machine code program can place a number on to the FP (floating point) stack by placing an unsigned 16-bit value in register pair BC, then calling a ROM routine (which I call *XSTKBC*) at address 2d2bh. If you want to treat the BC value as a signed value, then you need to code:

```
XSTKDATA: EQU 2D31h
LD BC, (item) ;load data value
RLC B ;obtain data sign in
;carry
RRC B ;...but retain value
SBC A, A ;A=00 if +ve, FF if
;-ve.
LD E, A ;place data sign in E
XOR A ;clear accumulator
CALL XSTKDATA ;stack the data
```

Equally, you can take the top item off the stack by using routine *XGETBC* at address 2DA2h. The number thus obtained is left in registers BC and has been rounded to the nearest integer. If the value is outside the usual 16-bit range ($-32768 \leq x \leq 65535$) then the carry flag will be set.

So we've got items onto and off the stack, now we need to manipulate them. In all cases, use of the FP calculator is initiated by the *RST 28h* instruction. Following this, you need to code a series of data bytes which define the various operations that you want the calculator to perform. Your final operation is always "*DEFB 38h*", which returns control back to your own program.

Before I give you a list of some of the operations, let's see an example of dividing two numbers, giving a result in registers BC:

```
XSTKBC: EQU 2D28h
XGETBC: EQU 2DA2h
PRINT$NUM: EQU 1A1Bh
LD BC, 253 ;stack the first value
; (253)
CALL XSTKBC
```

```
LD BC, 17 ;stack the second value
; (17)
CALL XSTKBC
RST 28h ;start the calculator
DEFB 05h ;"divide" (giving
; 253/17)
DEFB 38h ;exit calculator
CALL XGETBC ;obtain result
CALL PRINT$NUM ;print it
RET
```

The list in Table 1 gives the operation code value of some of the more useful calculator operations. I trust that a lot of these are familiar and hopefully self-explanatory, but I will elaborate on some of the miscellaneous operations.

The first of these are "stack maintenance" operations — *DEFB 0h* swaps the two topmost items on the stack, *DEFB 02h* deletes the top item, leaving the next item on top. *DEFB 31h* duplicates the top item, normally used to allow your program to test for ranges without losing the original value. Operations *36h* and *37h* replace the top item with the value 0 or 1 depending on the truth of the test made.

Of particular interest are the "memory" operations. These allow you to save stacked items or retrieve them from one of five calculator-style memories. By coding as shown below, you can save a copy of the topmost item on the stack:

```
DEFB 0C0h ;save top item in memory 0
DEFB 0C1h ;save top item in memory 1
....
DEFB 0C4h ;save top item in memory 4
```

Similarly, you can retrieve one of these memories and place it back on the stack by coding:

```
DEFB 0E0h ;retrieve from memory 0
DEFB 0E1h ;retrieve from memory 1
....
DEFB 0E4h ;retrieve from memory 4
```

Two remaining operations need explanation. These are "jump"-type operations, and allow you to alter the flow of logic within the calculator. The first of these is *DEFB 33h*, which forces an unconditional relative jump to the operation "n" bytes away, where "n" is a single byte following the operation byte. For example:

```
RST 28h ;initiate calculator
... ;your own operations here
DEFB 33h ;jump...
DEFB 03h ;...three bytes forward to HERE
DEFB XX
DEFB XX
HERE: DEFB 38h ;exit calculator
```

You will notice that this technique differs slightly from the Z80 relative-jump convention in that the relative value is one more than a corresponding JR instruction offset. Negative offsets can be used as well.

The final operation is a conditional jump, *DEFB 00h*, which jumps in a similar fashion, but only if the topmost stacked item is non-zero. This operation also deletes the topmost item.

A final ROM routine for you this week is

TABLE 1

Arithmetic Operations

These operate on the top two items of the stack to leave one final result

```
DEFB 03h Subtract
DEFB 04h Multiply
DEFB 05h Divide
DEFB 06h Exponentiate
DEFB 0Fh Add
DEFB 32h Modulus
```

Logical Operations

These operate on the top two items, leaving a value of 1 for a true result, or zero for a false result

```
DEFB 07h OR
DEFB 08h AND
DEFB 09h <=
DEFB 0Ah >=
DEFB 0Bh <>
DEFB 0Ch >
DEFB 0Dh <
DEFB 0Eh =
```

Functions

These operate on the topmost item of the stack, replacing it by the new value

```
DEFB 1Bh Negate
DEFB 1Fh SIN
DEFB 20h COS
DEFB 21h TAN
DEFB 22h ASN
DEFB 23h ACS
DEFB 24h ATN
DEFB 25h LN
DEFB 26h EXP
DEFB 27h INT
DEFB 28h SQR
DEFB 29h SGN
DEFB 2Ah ABS
```

Miscellaneous

These are sundry items to give more flexibility

```
DEFB 01h Exchange top 2 items
DEFB 02h Delete top item
DEFB 31h Duplicate top item
DEFB 36h Top item less than 0
DEFB 37h Top item grtr than 0
DEFB 0Cxh Store in memory x
DEFB 0Exh Get memory x
DEFB 38h Exit calculator
DEFB 0A0h Place zero on stack
DEFB 0A1h Place 1 on stack
DEFB 0A2h Place 0.5 on stack
DEFB 0A3h Place P1/2 on stack
DEFB 0A4h Place 10 on stack
```


one that prints the topmost stacked item onto the current stream, deleting it afterwards. The printed value obeys the usual rules of using "E"-format if the number is beyond the standard range. This routine, called *XPRTFP*, is invoked by calling address 2DE3h.

Listing 1 gives you a complete example to look at. It is a small program that counts from 0 to 10 in 0.25 steps, printing each value in turn. I have written the program in a manner that makes use of most of the

features shown above — once you've worked your way through it, I'm sure you'll be able to make good use of the calculator in your own programs.

Incidentally, in producing Listing 1, I came up against a rather tiresome bug in the ROM, whereby the *XPRTFP* routine leaves an erroneous value on the calculator stack if the number being printed is in the range $-1 \leq x \leq 1$, but not zero.

Listing 2 is a small subroutine called *PRINT\$FP* which you can include in your

own programs. It prints the topmost item on the stack, leaving it unaffected in any way, and allowing for the fact that the number may have any value.

Next week we return to the hardware to look at ways of using the beeper. ■

By Trevor Toms, author of *The Spectrum Pocket Book*, published by Phipps Associates.

Listing 1

```

Addr Hex      Op  Operands
D6D8      XSTKBC:
D6D8      EQU 2D2BH
D6D8      XPRTFP:
D6D8      EQU 2DE3H
D6D8      SELDEV:
D6D8      EQU 1601H
D6D8      START:
D6D8 011400  LD   BC,20
D6DB CD2B2D  CALL XSTKBC      :STACK 20
D6DE 010400  LD   BC,4
D6E1 CD2B2D  CALL XSTKBC      :STACK 4
D6E4 3E02   LD   A,2         :SCREEN
D6E6 CD0116  CALL SELDEV
D6E9 EF     RST  28H
D6EA A1     DEFB 0A1H       :STACK 1
D6EB 01     DEFB 01H       :EXCHANGE
D6EC 05     DEFB 05H       :DIVIDE
D6ED A4     DEFB 0A4H      :STACK 10
D6EE 31     DEFB 31H       :DUPLICATE
D6EF 38     DEFB 38H       :FP EXIT
D6F0      LOOP:
D6F0 CDE32D  CALL XPRTFP      :PRINT IT
D6F3 3E0D   LD   A,0DH      :NEWLINE
D6F5 D7     RST  10H
D6F6 EF     RST  28H
D6F7 01     DEFB 01H       :EXCHANGE
D6F8 C0     DEFB 0C0H      :STORE 0
D6F9 0F     DEFB 0FH       :ADD
D6FA C1     DEFB 0C1H      :STORE 1
D6FB 01     DEFB 01H       :EXCHANGE
D6FC C2     DEFB 0C2H      :STORE 2
D6FD 0C     DEFB 0CH       :N>M?
D6FE 00     DEFB 00H       :J IF TRUE
D6FF 08     DEFB 8         : (OFFSET)
D700 E2     DEFB 0E2H      :GET MEM 2
D701 E0     DEFB 0E0H      :GET MEM 0
D702 E1     DEFB 0E1H      :GET MEM 1
D703 31     DEFB 31H       :DUPLICATE
D704 38     DEFB 38H       :FP EXIT
D705 18E9   JR   LOOP
D707      ALLDUN:
D707 38     DEFB 38H       :EXIT
D708 C9     RET            :TO BASIC

```

Symbols:
XSTKBC 2D2B XPRTFP 2DE3
SELDEV 1601 START D6D8
LOOP D6F0 ALLDUN D707

No error(s)

Listing 2

```

Addr Hex      Op  Operands
D6D8      XPRTFP:
D6D8      EQU 2DE3H
D6D8      PRINT$FP:
D6D8 EF     RST  28H       :FP CALCULATOR
D6D9 31     DEFB 31H       :DUPLICATE VALUE
D6DA 00     DEFB 00H       :JUMP IF NON-ZERO
D6DB 07     DEFB +7        : (TO "FPOK")
D6DC      FPOK:
D6DC 31     DEFB 31H       :DUPLICATE IT
D6DD 38     DEFB 38H       :EXIT
D6DE CDE32D  CALL XPRTFP      :PRINT TOP
D6E1 C9     RET            :BACK TO BASIC
D6E2      FPCHECK:
D6E2 31     DEFB 31H       :DUPLICATE ITEM
D6E3 2A     DEFB 2AH       :ABS(X)
D6E4 A1     DEFB 0A1H      :STACK 1
D6E5 03     DEFB 03H       :SUBTRACT:ABS(X)-1
D6E6 37     DEFB 37H       :((ABS(X)-1)>0?
D6E7 00     DEFB 00H       :JUMP IF TRUE
D6E8 F4     DEFB -12       : (TO "FPOK")
D6E9 31     DEFB 31H       :DUPLICATE AGAIN
D6EA 38     DEFB 38H       :EXIT
D6EB CDE32D  CALL XPRTFP      :PRINT VALUE
D6EE EF     RST  28H       :FP CALCULATOR
D6EF 02     DEFB 02H       :CLEAN UP STACK
D6F0 38     DEFB 38H       :ALL DONE
D6F1 C9     RET            :BACK TO BASIC

```

Symbols:
XPRTFP 2DE3 PRINT\$ D6D8
FPOK D6DC FPCHECK D6E2

No error(s)

DITTO DATA LTD

ATTENTION ALL TOP PROGRAMMERS !!

YOUR BEST AND ONLY THE BEST MACHINE CODE GAME PROGRAMS FOR COMMODORE 64 — VIC 20 — B.B.C. AND SPECTRUM.

WE WILL ENSURE YOUR PROGRAM HAS MAXIMUM SALES SUPPORT, WITH OUR LARGE DEALER AND MARKETING NETWORK.

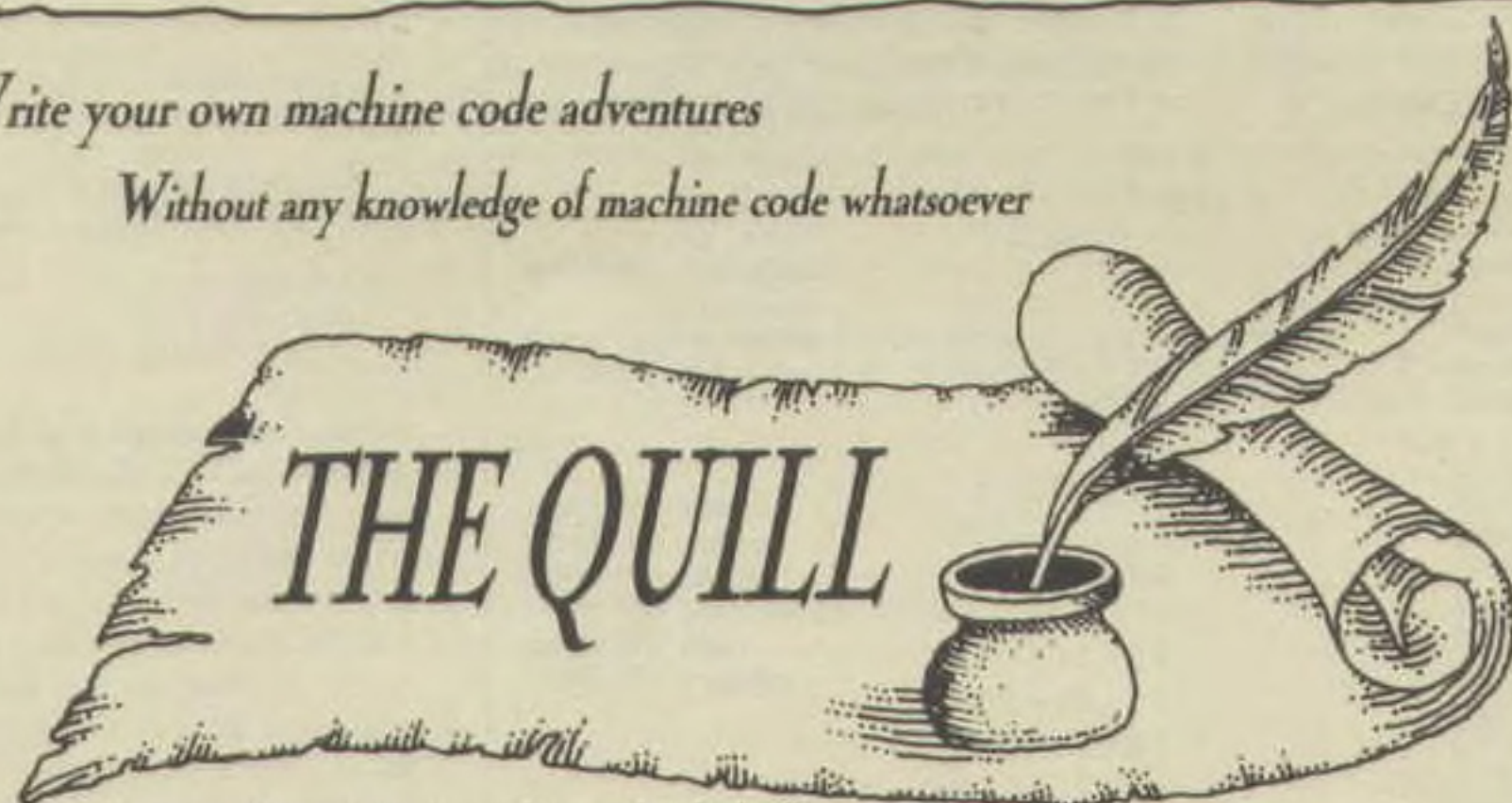
OUR OWN LARGE INHOUSE DUPLICATING OF TAPES AND DISCS.

Contact: **NEW PROJECTS DIRECTOR
DITTO DATA LTD.
CORNER HOUSE
6-8 THE WASH
HERTFORD
SG1 41PX**

Telephone: HERTFORD 554474/554484

Write your own machine code adventures

Without any knowledge of machine code whatsoever



THE QUILL is a major new utility written in machine code which allows even the novice programmer to produce high-speed machine code adventures of superior quality to many available at the moment without any knowledge of machine code whatsoever.

Using a menu selection system you may create well over 200 locations, describe them and connect routes between them. You may then fill them with objects and problems of your choice. Having tested your adventure you may alter and experiment with any section with the greatest of ease. A part formed adventure may be saved to tape for later completion. When you have done so *THE QUILL* will allow you to produce a copy of your adventure which will run independently of the main *QUILL* editor, so that you may give copies away to your friends.

THE QUILL is provided with a detailed tutorial manual which covers every aspect of its use in writing adventures.

FOR THE 48K SPECTRUM AT £14.95

Now available in W H Smith, and from many computer shops nationwide, or direct from us by post or telephone.

SAE for full details of our range.

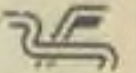
Dealer enquires welcome.

GILSOFT

30 Hawthorn Road
Barry
South Glamorgan
CF6 8LE
☎(0446) 732765

Credit Card Order line
Personally manned for 24 hours
☎0222 41361 Ext430





Thanks for the memory

Brian Cadge looks at the DOS cartridge and what it can do for your programming

Plugging the DOS cartridge into your Dragon does more than just attach the disk drives. On power up it rearranges the Dragon's memory map. To accommodate the 3/4k of disk buffer space and the additional memory mapping for the DOS Basic commands, graphics page one (ie, memory addresses 1536 to 3071) is used. Basic is adjusted so that graphics page 2 becomes page 1 and so on, so to the Basic programmer the only visible change is the loss of 1.5k of free memory.

For the machine code programmer there are many useful subroutines contained in the disk ROM that could be accessed. Many locations in the disk memory map are also useful, and we will come to these later. Firstly, I'm sad to say that there are the inevitable ROM bugs in the disk Basic. These are the ones I have come across, although there may be more.

When using the Save command to save a block of machine code, the format is Save "PROG", Start, End, Entry. The Basic starts dumping memory to disk from the location Start for the length End-Start; as you may realise, the length should be (End-Start) + 1, but as it is not adjusted, the result is that the last byte is not saved on disk. The obvious remedy is to add one to End when using the command — this is a fundamental programming error and how it was overlooked, I cannot imagine.

Another, more serious, bug is in the Chain command. If the program is too long to fit in the available space, it is likely to overwrite the DOS buffer causing a system crash. The remedy to this one is to avoid chaining programs over 10k and to use Clear and FRE\$ before hand. Of course, the whole point of Chain is that it does not affect variables as a Clear command would, so this is not a very satisfactory answer.

The Run command when used in conjunction with a disk program cannot be used with string variables. That is, you can

have Run "Program. Bas", but not A\$="Program.Bas":A\$. This isn't a bug as the Run command is linked to the disk Rom via a subroutine from location 404 and the standard Run command clears all variables so you cannot use a variable of any sort after the word Run; this explanation should have been included in the manual.

In case you are having trouble with the Boot command, there is no bug here, but it cannot be used on a standard directory program and will give a ?BT Error if it cannot find the 'OS' identifier. The command is only really suitable for loading new operating systems on a 64k machine.

Moving onto the internal organisation of the disk operating system, the directory is on track 20 and this track is therefore always verified after a write. The other tracks may be verified by use of the Verify On/Off command. Each program uses 25 bytes in the directory, the first starting on sector 3. The first byte is an attribute byte for the file — bit 2 if set identifies a protected file and if bits 0 and 7 are set this means that the file has since been killed off.

The next eight bytes are the filename and then come three bytes for the file specifier, either Bas,Bak,Bin,Dat,etc. The 15th byte is equal to the high byte plus one of the length of the file, and the 25th byte contains the low byte of the length.

It is not advisable to change the directory manually using Swrite as you may corrupt it and have to reformat the disk. If you do accidentally Kill a valuable file, it can be restored by zeroing the first byte of its 25 byte section. You will need to use Spread to find the position on the disk and Swrite to change the directory. The moral is to use Protect on valuable files.

Incidentally, if you save a file with no file name; ie, Save "", it cannot be changed or touched at all except to load it.

On to the disk memory map. The main change to the normal Dragon memory map

is that the USR entry address vector table has been moved to begin at 1667, and many of the link subroutines are now used; these start at 359. The interrupt has been extended to control the time delay before switching off the disk motor.

Often in a program it can be annoying to have the disk motor stop-starting, so if you want the drives to continue rotating until the program stops, simply type Poke 246, 255 on a program line. The new IRQ starts at 50944, and consequently the sound quality on high pitched notes deteriorates even further.

Below are all the useful memory locations in the new DOS memory map and their uses:

1541 =	Interrupt countdown to motor stop — when it gets to zero the disk drive is stopped.
1544 =	Verify on/off flag
1546 =	Current disk drive number
1549/50 =	Start line number for AUTO command
1551/52 =	Increment value for AUTO command
1555 =	AUTO on/off flag
1556 =	ERROR GOTO flag
1557/58 =	ERROR GOTO line number
1559/60 =	Line number of last error
1561 =	Error code of last error
1618/19 =	Start address for a machine code load
1620/21 =	Length of a machine code load
1622/23 =	Entry address of a machine code load
1667/1686 =	USR0 to USR9 entry address vectors
1725/1732 =	Filename of disk program
\$FF40 =	Disk controller I/O page
\$FF48 =	Disk controller motor on/off (D=all drives stopped)

There are a number of useful ROM routines that can be used; the routine starting at 53581 will return the amount of free disk space in the floating point accumulator, the zero flag is set for an IO error. 36055 performs the garbage collection that the FRE\$ function includes; this can be used by users without disk drives who therefore don't have the FRE\$ function.

The subroutine starting at 56267 can be used for delays, the X register is loaded with the length of the delay in milliseconds. The program listed will display all of the new DOS commands and their machine code entry point. Some routines can be used directly, while others, eg, Load, need some parameters to be set up first. ■

```

10 Z=57044:X=56915
20 FOR I=1 TO 26:A$=""
30 A=PEEK(Z):IF A<128 THEN A$=A$+CHR$(A):Z=Z+1:
   GOTO30 ELSE A$=A$+CHR$(A-128)
40 Z=Z+1:A=PEEK(X)*256+PEEK(X+1):X=X+2
50 PRINT#P,A$,STRING$(16-LEN(A$)," ");A
60 NEXT I
    
```


Gang of three

Lee Tanner demonstrates how you can draw pictures on the screen using three colours

This program allows you to draw pictures on the screen using three colours. You will need a joystick and Simon's basic to run it. When running the program, you will see the title page; press any key and you will be asked to enter the three colours you want to use. The screen will then clear ready for your drawing.

Use the fire button to draw a line and release it to move without drawing. You can draw in eight directions. On the left of the screen you will see three coloured blocks

and the words *Fill*, *Rub*, *Cls*, and *End*. The three blocks are coloured according to the three colours you entered at the beginning of program.

To change the drawing colour, move the drawing point to one of the blocks and press the fire button.

The four commands on the left are as follows:

FILL Enables you to fill an enclosed area
RUB Enables you to rub out any unwanted lines

CLS Clears the screen
END Ends the program

As the program is written in Basic it is relatively slow, but it's fun to use and can achieve some pleasing results. Here is a rundown of how the program works:

9 — 62	Title page
69 — 99	Enter the three colours you want
100 — 170	Set up drawing screen
200 — 280	Main loop for drawing and filling
300 — 320	Change the drawing colour
330	Sets FILL mode
340	Sets RUBOUT mode
350	If CLS then jump to 500
360	If END then jump to 600
400	Loop back to main drawing loop
500	Clear screen
600	End program

```

9 PRINT"J"
10 HIRES 0,0:MULTI 2,0,1:COLOUR 14,10
20 TEXT 52,15,"PAINTER",2,3,8
21 TEXT 53,16,"PAINTER",3,3,8
22 TEXT 54,17,"PAINTER",1,3,8
23 REC 48,10,65,34,1
24 REC 46,8,69,38,3
25 REC 44,6,73,42,2
29 LOW COL 6,0,1
30 LINE 150,70,80,90,1:LINE 150,74,81,100,1
31 LINE 150,70,150,74,1:LINE 79,90,81,100,1:PAINT 85,95,1
32 LINE 78,91,70,94,3:LINE 80,100,71,102,3:LINE 69,94,71,102,3:PAINT 72,96,3
33 LINE 68,95,57,102,2:LINE 69,102,57,104,2:LINE 68,98,59,101,2
34 LINE 68,100,58,103,2
35 PLOT 56,103,3:PLOT 56,104,3:PLOT 57,102,3:PLOT 57,103,3:PLOT 57,104,3
36 PLOT 58,102,3:PLOT 58,103,3:PLOT 58,104,3
37 PLOT 59,102,3:PLOT 59,103,3:PLOT 59,104,3:PLOT 59,101,3
39 HI COL
40 TEXT 26,112,"BY LEE TANNER",1,2,8
41 TEXT 27,113,"BY LEE TANNER",2,2,8
42 TEXT 28,114,"BY LEE TANNER",3,2,8
50 TEXT 42,130,"17/10/83",1,2,8
51 TEXT 43,131,"17/10/83",2,2,8
52 TEXT 44,132,"17/10/83",3,2,8
60 LOW COL 5,3,14:TEXT 14,160,"ANY KEY TO START",1,2,8
61 TEXT 15,161,"ANY KEY TO START",2,2,8
62 TEXT 16,162,"ANY KEY TO START",3,2,8
69 POKE198,0
70 GETG$:IFG$=""THEN70
80 NRM
85 INPUT"ENTER COLOUR 1 (0-15)";C1
86 IFC1<0ORC1>15THEN85
90 INPUT"ENTER COLOUR 2 (0-15)";C2
91 IFC2<0ORC2>15THEN90
95 INPUT"ENTER COLOUR 3 (0-15)";C3
96 IFC3<0ORC3>15THEN95
99 PRINT"J"
100 HIRES 0,0:MULTI C1,C2,C3:COLOUR 12,1
110 BLOCK 25,5,35,15,1:BLOCK 25,20,35,30,2:BLOCK 25,35,35,45,3
120 LOW COL 11,5,6:TEXT 1,60,"FILL",1,1,7
130 TEXT 1,70,"RUB",1,1,7
140 LINE 40,0,40,199,1
150 TEXT 1,80,"CLS",1,1,7
160 TEXT 1,90,"END",1,1,7:HI COL
170 X=100:Y=100:CO=1
200 PC=TEST(X,Y):PLOT X,Y,CO:A=X:B=Y:Z=(JOYOR128):T=(JOY>8)
210 A=A+(Z=134)+(Z=135)+(Z=136)-(Z=130)-(Z=131)-(Z=132)
220 B=B+(Z=136)+(Z=129)+(Z=130)-(Z=132)-(Z=133)-(Z=134)
230 IFA>319ORB<0ORB>199THEN200
240 IFA<42THEN300
250 IFF=1ANDT=-1THENPLOT X,Y,0:PAINT A,B,CO:X=A:Y=B:F=0:CHAR 29,60,81,1,1:
GOTO200
260 IFR=1ANDT=-1THENPLOT X,Y,0:X=A:Y=B:GOTO200
    
```


SPECTRUM JOYSTICK INTERFACE

KEMPSTON
COMPATABLE



£9.95
(TWO-YEAR GUARANTEE)



**ROBUST
JOYSTICK**

£9.75

**QUICKSHOT
JOYSTICK**



£11.95

**FROM: RAM ELECTRONICS (FLEET) LTD (PCW), 106 Fleet Road, Fleet
Hampshire GU13 8PA. (02514) 5858**

Send cheque or postal orders or ring with your Access or Visa card number

Enter quantity required in box

- Spectrum Joystick Interface @ £9.95
- Robust Joystick @ £9.75
- Quickshot Joystick @ £11.95
- Interface + Robust Joystick @ £18.50
- Interface + Quickshot Joystick @ £19.95
- Vic 20 standard 16K ram pack @ £27.95
- Vic 20 switched 16/3K ram pack @ £34.95
- Vic 20 switched 32/16/3K ram pack @ £49.95

ALL PRICES INCLUDE VAT
PLEASE ADD £1 p&p
(OVERSEAS ORDERS £3)

I enclose £.....

Charge my Access/Visa £.....

Name.....

Address.....

.....

.....

***** Joystick Interface and ram packs carry an unbeatable two-year guarantee *****

TO: RAM ELECTRONICS (FLEET) LTD (PCW), 106 Fleet Road, Fleet, Hants GU13 8PA
(Credit card payment for goods by return post.)

Special Christmas offer
order two complete sets and
pay only £59.90

More

fun & games from your
Spectrum
with the intelligent
interface + program + joystick
and for only

£34.90

Interface: * for Spectrum
* 1k on board memory * own
rear edge connector – for
printers etc * compatible with
ALL standard joysticks
Joystick: * self centring
* 8 directional microswitched
action * 2 independent fire
buttons **Tape:** * easy to use
program, the interface
WORKS ON ALL SOFTWARE
* keeps a record of all your
games – so you only need to
tell it about each game once!



**CAMBRIDGE
COMPUTING**

Cambridge Computing
1 Benson Street, Cambridge CB4 3QJ
Telephone: 0223 322905



To Cambridge Computing
1 Benson Street, Cambridge CB4 3QJ
Telephone: 0223 322905

Name _____

Address _____

Please send me

Joystick, Interface and Tape at £34.90 – Interface and Tape at £27.90

– Joystick only at £7.90 – For Spectrum

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

* delete as necessary.

PCW

Face the music

D Francis describes a routine that makes it simple to make music with your BBC

This is a program for the BBC A or B. In fact it is a *Procedure*, named *Procplay* which plays a tune which may be defined as a string, eg: "CDEFGAB". To use it, place the required string into the routine using something like this: *Procplay "V1503S24CE,GEG04C03G04CECEG"*. The following can be used in the parameter string:

NOTES C D E F G A B and their sharps and flats, indicated by a sharp sign and a minus sign respectively. Their lengths are assumed to be 4 (crotchets) unless you specify their type:

Semibreve 1
Minim 2

Crotchet 4
(assumed if no number specified)
Quaver 8

TEMPO The speed of the whole tune may be altered by setting the length of a semibreve (in twentieths of a second). So, to select a speed of .5 second per semibreve, the instruction would be S10 (10 times 1/20 is 0.5).

VOLUME This is set by typing V followed by a number from 0 to 15, eg, V15 sets the volume to maximum.

OCTAVE This enables you to choose between the BBC's five octaves. The full octaves are numbered 1 to 5, eg, 04 set octave to number 4. N.B. The octaves are each CDEFGAB, so BCBCBCBC would produce a series of notes 11 semitones apart, not 1 as may be expected.

NORMAL The instruction "N" resets the values of: Semibreve, Volume, Octave to those given in line 10.

As the routine itself is a *Procedure*, it may be called by *Basic*, although you must remember to use a line like line 10 *before* the first call to *Procplay*. The program could be speeded up (slightly) by using integer variables, enabling faster tunes or it can be compressed by omitting space and shortening the variable & *Proc* names. ■

```

10 CHANNEL=1 : SEMIBREVE=32 : VOLUME= -10: OCTAVE=3

30000 DEFPROCplay (A$)
30010 LOCAL X,Y,Z,LEGAL
30020 IF A$="" THEN ENDPROC
30030 FOR X = 1 TO LEN(A$)
30040   LEGAL= FALSE
30050   Y$=MID$(A$,X,1)
30060   Y=ASC(Y$)
30070   IF Y$>="A" AND Y$<="G" THEN PROCDoNote : LEGAL=TRUE
30080   IF Y$ ="S" THEN PROCgetno : SEMIBREVE=Z : LEGAL=TRUE
30090   IF Y$ ="V" THEN PROCgetno : VOLUME = - ABS(Z) : LEGAL=TRUE
30100   IF Y$ ="O" THEN PROCgetno : OCTAVE = Z : LEGAL=TRUE
30110   IF Y$ ="N" THEN VOLUME= -10 : OCTAVE=3 : SEMIBREVE = 32 : LEGAL=TRUE
30120   IF NOT LEGAL THEN PRINT"Error in PROCplay, Somewhere near Char. ";X: STOP
30130   NEXT X
30140 ENDPROC
30150 DEFPROCgetno
30160 LOCAL A, B$ : Z = 0
30170 X=X + 1
30180 REPEAT B$=MID$(A$,X,1):LEGALno=FALSE
30190   IF B$>="0" AND B$<="9" THEN Z=10*Z + VAL(B$):LEGALno = TRUE:X=X+1
30200   A=A + 1
30210   UNTIL X >= LEN(A$) OR LEGALno = FALSE:X=X-1
30230 ENDPROC
30240 DEFPROCDoNote
30250 LOCAL B,P,Z
30260 SF$ = MID$(A$,X+1,1): B=0 : IF SF$ = "#" THEN B=4: X=X+1 ELSE IF SF$ = "-"
      THEN B= -4:X=X + 1
30270 PROCgetno : IF Z=0 THEN Z=4
30280 P = B + OCTAVE*48 - 47 + VAL(MID$( "05132125334149",INSTR("CDEFGAB",Y$)*2-1,2))
30290 SOUND CHANNEL,VOLUME,P,SEMIBREVE/Z
30300 ENDPROC

```


Tiger Distribution Tiger Distribution Tiger Distribution Tiger Distribution Tiger Distribution Tiger Distribution Tiger Distribution Tiger Distribution Tiger Distribution

Your Best Source of Best Sellers

The collage features the following game covers:

- Thrusta** (Software Projects)
- Pool** (CDS Micro Systems)
- Speed Duel** (Ironics)
- Penguin** (Postern)
- McWimpy** (Ocean)
- Hunter Killer** (Protek)
- Android** (Vortex)
- Android Two** (Vortex)
- Pinball Wizard** (Bagittarian Software)
- Lothlorien** (Microsphere)
- The Guardian** (Personal Software Services)
- Pinball** (CP Software)
- Bugs** (Bug-Byte Software)

Surrounding the covers are numerous logos for software publishers and distributors, including: IJK, ISL, addictive, Protek, Imagine, fantasy, ULTIMATE PLAY THE GAME, Solar Software, MICROMEGA, CRL, DOCTOR SOFT, POSTERN, diamondraft, DJL SOFTWARE, cp software, BUG-BYTE SOFTWARE, Stell, CDS Micro Systems, R & F SOFTWARE, SQUIDREL, Opus, SUNSHINE, SUPERIOR, BANANNA SOFT, SOFTWARE PROJECTS, GIGAC, PROBEAL POWER, Visions, ANIROG, DIGITAL FANTASIA, MIKRO-GEN, GILSOFT, Doric, New Generation Software, mvtech.com, Vortex, ocean, CS, LONGMAN, MELBOURN HOUSE, bubble bus, Gemini, SUMLOCK, TERMINAL, SOFTEK, MASTER OF THE GAME, MICROSPHERE, Lamont, Kosmos, GAMES MACHINE, Durell Software, and ARCADE.

We know what's selling

As a leading distributor of home computer software, we know what's selling in retail outlets. We've also got the knowledge and capability to best service and supply the requirements of quality computer shops nationwide.

The 12 top games featured above are available now in

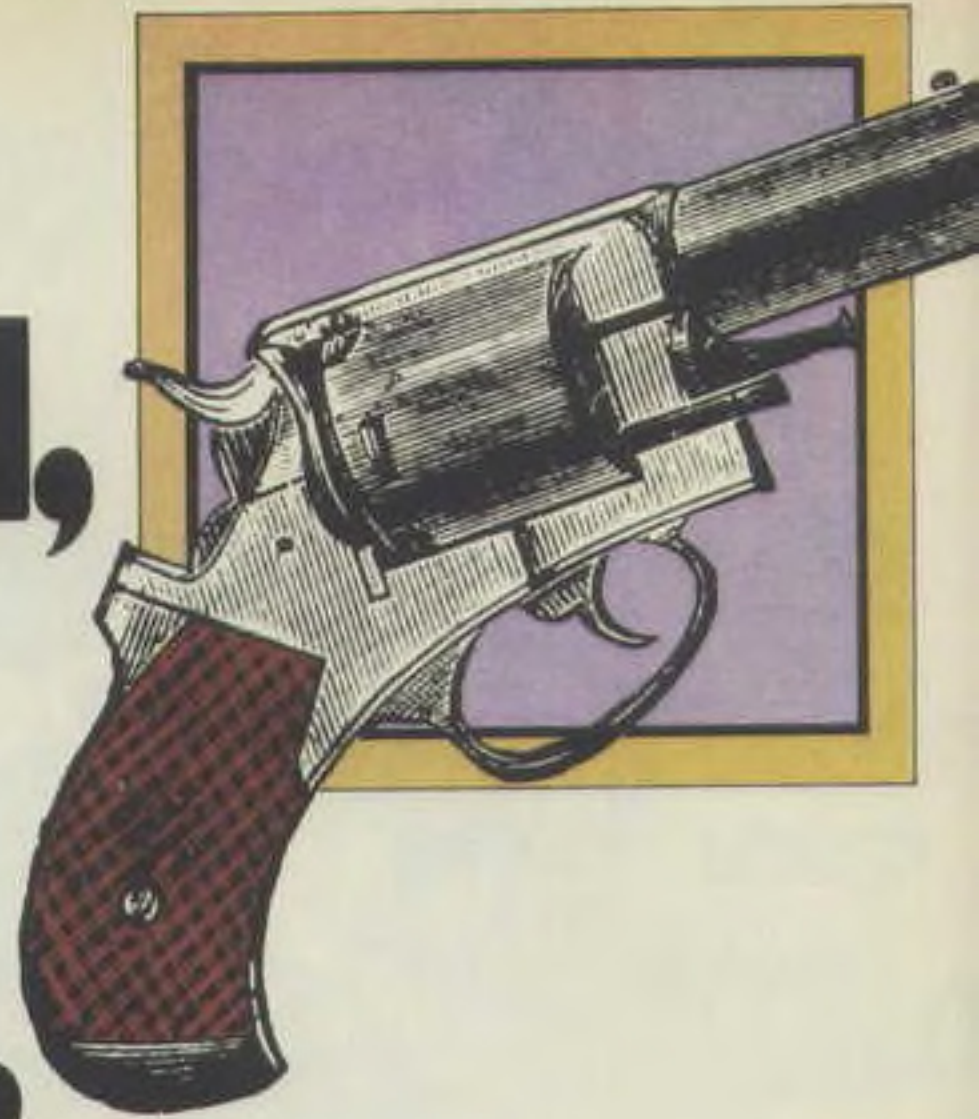
John Menzies Spectrum

shops and other good computer shops supplied by Tiger Distribution. Make sure of your stocks - and our support - by contacting your Tiger Distribution van-salesman - or by phoning our tele-salesgirls on 051-420 8888.

Tiger Distribution, Commercial House, 4 Victoria Road, Widnes, Cheshire, WA8 9QY.

Your Best Source of Best Sellers

**Challenging,
sophisticated,
advanced,
extra special.**



A real adventure!

COMING SOON FROM

Melbourne House



More than fun and games!

FIRST STEPS with the Mr. Men

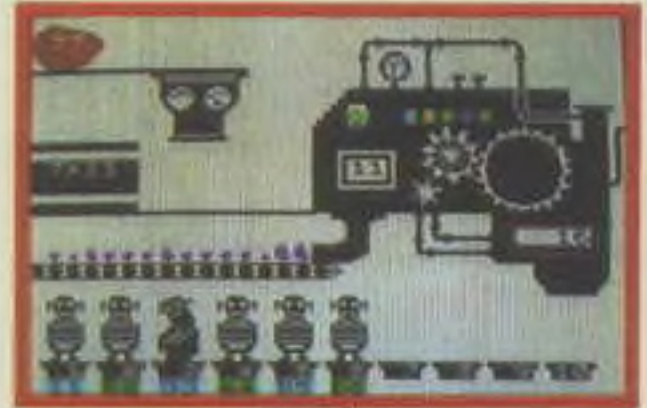
by Primer Educational Software

The ever-popular Mr. Men help prepare young children for reading with four simple and absorbing games designed to exercise essential skills as well as entertain.

An easy-to-use, colour-coded key guide is included with an illustrated introductory book, featuring the Mr. Men. For ages 4 to 8 years. Available now on cassette for the BBC B, Spectrum 48K and Electron. **£8.95**



for early learners, and more advanced children, to master an important and often neglected skill.



Available now on cassette for the Spectrum 48K, and Commodore 64, BBC B and Electron. **£6.95**

CAESAR THE CAT

by Andromeda Software

Meet Caesar, a cheeky young cat on duty in a well-stocked larder. He's kept busy chasing a gang of hungry mice eating the family's food. Playing against the clock, you guide Caesar along crowded shelves to pounce on the mice.

A fast, colourful, all-action, arcade-style game with catchy music and a best-score record. Challenging for high-scoring arcade addicts as well as great fun to play for the novice.

Available on cassette for the Commodore 64 **£8.95**



Prices include VAT and post and packaging. MIRRORSOFT programs are available from selected branches of W.H. Smith and Boots, and other leading software stockists.

Trade enquiries welcome: phone 01-822 3580.

QUICK THINKING!

by Widget Software

Two mind-stretching, space-age games to test mental arithmetic and nimble fingers.

In **Sum Vaders** alien robots invade the earth. Only quick thinking and fast reactions can prevent them. Several levels of difficulty and a two-player game with a handicap option make Sum Vaders equally testing for all family members, from 8 years to adult.

Robot Tables challenges the young player to make a series of perfect robots.

Knowing your multiplication tables is the key to controlling the robot-making machine. With a learning mode and a testing mode, Robot Tables is a fun way

MIRRORSOFT

SOFTWARE FOR ALL THE FAMILY

To MIRRORSOFT, PO Box 50, Bromley, Kent BR2 9TT

Please send me the following (enter number required of each item in the space provided):

	Price	Spectrum 48K (01)	BBC B (03)	Electron (04)	CBM 64 (05)
First Steps with the Mr. Men (MM01)	£8.95				
Quick Thinking (QT01)	£6.95				
Caesar the Cat (CC01)	£8.95				

I enclose a cheque/PO for £..... made payable to "Readers' Account: Mirror Group Newspapers Ltd".

Or please debit my ACCESS/BARCLAYCARD for the sum of £..... card no.

I understand that my remittance will be held on my behalf in the bank account named above until the goods are despatched.

Signature
Name
Address
Postcode

PC6

OPEN FORUM

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

Stunt

on Spectrum

You control a motorbike that must jump over some buses to land on a ramp at the other side. Each time you manage it another bus is added to the total (up to

eleven). The only key used is the *Space* key to make you gain speed.

As the only thing that moves is the bike *Plot* and *Draw* are fast enough, so the bike is in high revs.

Program notes

30 Graphics A+B

33 Graphics I
80 Graphics C D E F G H, H G F E D C
100-300 Main loop plots man and calculates his position
1000-1070 Bike lands on ramp
9010-9510 Bike crashes
9600-9670 Instructions

Variables

li Number of lives
Z(100)y Position of bike on the ramp
j X co-ordinate
y Y co-ordinate
bs Bus variable
made it Bike lands safely
crash Bike crash
b Velocity of bike going up
v Velocity of bike going across
c 1 if it is past the first ramp
g and h co-ordinates for crash

```

1005 PLOT x,y: DRAW 1,0: DRAW 0,
1: DRAW -1,0: PLOT x+1,y+2: DRAW
3,0: DRAW 0,-2: DRAW 1,0: DRAW
0,1: PLOT x+5,y+4: PLOT x+4,y+3:
DRAW -2,0: DRAW 0,2: DRAW 1,0:
DRAW 0,-1
1006 LET m=x: LET n=y
1010 IF x<d AND POINT (x,y-1)=0
THEN LET y=y-1
1020 LET v=v+.5: LET x=x+v
1021 IF x>d THEN LET y=55
1030 IF v>8 THEN LET v=8
1031 OVER 1: PLOT m,n: DRAW 1,0:
DRAW 0,1: DRAW -1,0: PLOT m+1,n
+2: DRAW 3,0: DRAW 0,-2: DRAW 1,
0: DRAW 0,1: PLOT m+5,n+4: PLOT
m+4,n+3: DRAW -2,0: DRAW 0,2: DR
AW 1,0: DRAW 0,-1
1032 OVER 0
1040 NEXT x
1050 LET j=j+1
1051 IF j=12 THEN LET j=11
1052 IF j=5 THEN LET li=li+1: PR
INT AT 0,20,"Lives=";li
1060 PRINT AT 0,0;"Buses=";j
1061 LET x=1: LET y=55
1062 PLOT x,y: DRAW 1,0: DRAW 0,
1: DRAW -1,0: PLOT x+1,y+2: DRAW
3,0: DRAW 0,-2: DRAW 1,0: DRAW
0,1: PLOT x+5,y+4: PLOT x+4,y+3:
DRAW -2,0: DRAW 0,2: DRAW 1,0:
DRAW 0,-1
1070 GO TO 80
9610 LET g=x+3-3*(x>245): LET h=
c+2
9620 FOR n=1 TO 30
9630 OVER 0: INK 5: PLOT g,h: BE
EP .004,RND*10-10: DRAW (INT (RN
D*12)-6),INT (RND*12)-6: NEXT n
9631 FOR n=1 TO 150: NEXT n
9632 INK 7
9635 LET li=li-1: IF li=0 THEN P
RINT AT 0,20;"Lives=0": GO TO 95
80
9640 CLS : PRINT AT 2,12;"STUNT"
: LET s=0: PRINT AT 0,0;"Buses="
: j,AT 0,20;"Lives=";li
9650 GO TO 10
9655 PRINT #1; FLASH 1;"ENTER to
play again"
9610 IF CODE INKEY$=13 THEN CLS
: GO TO 2
9620 GO TO 9510
9600 BORDER 0: PAPER 0: BRIGHT 1
: INK 7: CLS
9510 PRINT AT 0,12;"stunt";AT 1,
10;" "
9620 PRINT " You are in control
of a power-ful Stunt Bike."
9630 PRINT " You use the SPACE
key to gain speed.The longer
you keep your finger down,th
e futher you travel through
the air"
9640 PRINT " To make a landing
and to gain another bus you

```

```

must land on the "ramp on the
other side."
9650 PRINT #1; FLASH 1;"
Any key to play
9660 IF INKEY$="" THEN GO TO 966
0
9670 RETURN
1 GO SUB 9600
2 LET li=4: LET m=1: FOR n=0
TO 7: POKE USR "a"+n,m: LET m=m+
2: NEXT n
3 LET m=128: FOR n=0 TO 7: PO
KE USR "b"+n,m: LET m=m/2: NEXT
n
4 BORDER 0: PAPER 0: BRIGHT 1
: INK 7: CLS
5 PRINT AT 2,12;"STUNT": PRIN
T AT 0,0;"Buses=2";AT 0,20;"Live
s=4"
6 DIM z(100): LET m=0: FOR n=
50 TO 98: LET z(n)=INT (m/8)+1:
LET m=m+1: NEXT n
7 LET j=2
10 LET x=1: LET y=55
20 PLOT x,y: DRAW 1,0: DRAW 0,
1: DRAW -1,0: PLOT x+1,y+2: DRAW
3,0: DRAW 0,-2: DRAW 1,0: DRAW
0,1: PLOT x+5,y+4: PLOT x+4,y+3:
DRAW -2,0: DRAW 0,2: DRAW 1,0:
DRAW 0,-1
30 PRINT AT 15,0; PAPER 4; INK
0;"
31 RESTORE 32: FOR n=0 TO 7: R
EAD m: POKE USR "i"+n,m: NEXT n
32 DATA BIN 0,BIN 111110,127,B
IN 1101011,BIN 1101011,127,127,B
IN 1100011
33 LET bs=" "
34 LET made=1:1000
41 LET crash=9000
45 DATA "c","d","e","f","g","h"
50 FOR n=1 TO 5
50 READ a$: FOR m=0 TO 7: POKE
USR a$+m,0: NEXT m
70 FOR m=7 TO 7-n+1 STEP -1: P
OKE USR a$+m,255: NEXT m: NEXT n
80 PRINT AT 14,7;" "
90 LET d1=104+((2+j)*8): LET d
=104+((j+8)*8): LET c=0: LET v=0
: LET b=0
100 IF x<98 AND v<9 AND INKEY$=
" " THEN LET v=v+1
110 IF v<=0 THEN LET v=0: BEEP
.003,0: GO TO 100
120 IF v>8 THEN LET v=v-.25
130 IF x>98 AND c=0 THEN LET b=
v+1: LET c=1
150 IF x>d AND y=55 OR x>245 AN
D y>55 THEN GO TO crash
200 OVER 1: PLOT x,y: DRAW 1,0:
DRAW 0,1: DRAW -1,0: PLOT x+1,y
+2: DRAW 3,0: DRAW 0,-2: DRAW 1,
0: DRAW 0,1: PLOT x+5,y+4: PLOT

```


NOW YOU CAN LIFT STATIC DRAWINGS, PHOTOGRAPHS, ETC RIGHT OFF THE PAPER AND BRING THEM TO LIFE INTO YOUR PROGRAM!

FROM PAPER TO SCREEN...
...AND INTO YOUR PROGRAM.

POWER GRAPHICS

ACTION-TRACER + GHOST-WRITER
IMAGE-TRANSFER SYSTEM PROGRAM COMPILER

TWO POTENT FEATURES COMBINE TO BRING YOU UNIQUE NEW POWER OVER YOUR SPECTRUM GRAPHICS!

● ACTION-TRACER Gives you the power to transfer drawings, photographs, paintings, lettering - in fact ANY paper-based images into full colour line drawings on your Spectrum screen, with astonishing ease and an accuracy that rivals expensive digital tracers. But this time you get more than just a static on-screen design that has to be laboriously droned on and off tape, because...

● GHOST-WRITER Interprets your on-screen design into the precise sequence of Basic instructions needed to EXACTLY reproduce it, and then writes the program for you, directly into memory! New program lines appear in your listing which are indistinguishable from ones you might have written yourself. When you've finished, POWER-Graphics will 'self-destruct', leaving behind only your new program lines ready to use.

● TOGETHER THEY'RE DYNAMIC! The new program captures your design DYNAMICALLY, giving you instantly the power to MOVE it anywhere, to SHRINK it down to a single pixel, or EXPAND it to fill the screen. You can SQUEEZE or STRETCH it into weird distortions, flip it UPSIDE DOWN or MIRROR-IMAGE it, ROTATE it in the plane of the screen... in other words MANIPULATE IT UNDER YOUR FULL CONTROL!

Once GHOST-WRITER has captured Space-Shuttle, you can immediately reproduce it anywhere, any size. AND redesign it too!

No problem producing mirror-images... and turning them upside-down is just as easy, too!

Drawing a simple cross-section (above left) and rotating it through the plane of the screen to produce exotic architecture is just a peep into a whole new world of exciting, inventive graphics made easy as ABC by GHOST-WRITER's versatile programming.

ANIMATION OR MANIPULATION — IT'S ALL THE SAME TO POWER-Graphics

Switching individual parts of a design is easy, and thanks to POWER-Graphics' ability to produce high-speed curves, which DRAW as fast as straights, even curved shapes can be animated in real-time — like the lips of this well-known newsreader (recognise her?).

FUN TO USE, SIMPLE IN OPERATION, POWER-Graphics IS AN IMPORTANT NEW TOOL FOR BEGINNERS AND ADVANCED USERS ALIKE, AND EXTENDS THE SPECTRUM'S POTENTIAL INTO EXCITING NEW REGIONS.

NO EXTRA HARDWARE NEEDED! ALL YOU NEED IS...

POWER GRAPHICS

ZX SPECTRUM FOR 16K OR 48K ONLY £8.95

IF YOU WANT PICTURES YOU CAN USE, IT HAS TO BE

TYPESETTER
LET'S YOU PRODUCE DISPLAYS THE WAY YOU WANT WITH UNIQUE Magic Window...
PLUS BANNERWRITER

SHEER MAGIC!

THE POWER TO PRODUCE STUNNING TOP-QUALITY TEXT DISPLAYS FOR IMPRESSIVE PROGRAM OR VIDEO TITLES, OR ADVERTS, LETTERHEADS, ETC.

LOOK HOW EASY IT IS:

- ★ 4 movement-keys let you SET the 'Magic Window' to ANY rectangular shape and size, then MOVE it to any screen position.
- ★ ANY LINE OF TEXT NOW ENTERED WILL BE PRINTED TO EXACTLY FILL THE SHAPE USING CURRENT COLOUR AND ATTRIBUTE SETTINGS.
- ★ SETTINGS are always on display below the screen. Change and test-view your text in new colours etc. IN SECONDS!
- ★ PAINTBRUSH CURSER will 'paint-in' detail effects, sketch with any character, or position lines of normal text.
- ★ PRE-SET UDG's let you produce shimmer-effect borders, panels, etc. in new colours such as orange, pink, purple, etc... etc.
- ★ LABEL command prints standard cassette label shape, ready for you to add text. Prints out true-to-scale on ZX printer.
- ★ BANNER-WRITER MODE prints text sideways on ZX printer in the form of a huge banner, the height of each letter being full paper width.

SPECTRUM TYPESETTER 16/48K £4.99

GRAFFIX User-defined graphics made ultra-easy. Totally user-friendly. Continuous menu display of multi-functions. Whatever you think you might want to do, this program does it at a keystroke! PRODUCES UDGs THAT SCREENS WILL RECOGNISE!! Sheer convenience for only **£3.99**

SOUNDS FANTASTIC!

Superb sound effects from your Spectrum have never been so easy!

- ★ YOU conjure up your own unique sound-designs on the graphic synthesizer control panel.
- ★ AUTO-SONICS will instantly turn them into automatically compiled Basic program lines that will reproduce each sound again and again IN YOUR PROGRAM!
- ★ 26 built-in effects include animals, engines, siren, phone, Monster growl, space sounds... etc... etc...

Just the job... the effects are excellent!
Personal Comp. World

SUPERSCRIPT SOFTWARE

SPECTRUM AUTO-SONICS

SOUND EFFECTS

26 superb sound effects, including 16th arcade-style space effects, Outboard, Helicopter, Frog, Power Siren, Pig, Gauge, Telephone, Duck, Monster Growl, etc. etc.

PLUS An on-screen 'synthesizer' control panel that lets you create your own unique sounds.

16 or 48K

WINNER OF PCW "WHIZZ-KID '82"

"... a very powerful program... the ease of use amazes me — it is so simple to alter and amend the sound... Well done BUTTERCRAFT — this is an excellent programming tool." (Educational Computing Dec. 82)

16K or 48K £4.99

ALL PROGRAMS IN STOCK FOR QUICK DISPATCH!

BUTTERCRAFT SOFTWARE

14 Western Avenue, Riddlesden, Keighley, Yorks. ENGLAND

PLEASE DEDUCT 50p DISCOUNT ON 2nd AND SUBSEQUENT ITEMS ON YOUR ORDER

OVERSEAS CUSTOMERS ADD £1.00 EXCESS POSTAGE

OPEN FORUM

```

x+4,y+3: DRAW -2,0: DRAW 0,2: DR
AW 1,0: DRAW 0,-1
260 LET y=y+2*(b>1)-1.5*(b<0):
IF c=1 THEN LET b=b-1: LET x=x+1
262 IF x>=104 AND x<=104+((j+2)
+8) AND y<63 THEN GO TO crash
265 IF y<55 THEN LET y=55
268 OVER 0: LET x=x+y
281 IF x<=98 THEN LET y=55+z (IN
T (x+.5))
282 IF x>112 AND x<=112 AND y<=63
THEN GO TO crash
283 IF x>104 AND x<=104 AND POINT

```

```

(x,y-1)=1 THEN GO TO made it
290 PLOT x,y: DRAW 1,0: DRAW 0,
1: DRAW -1,0: PLOT x+1,y+2: DRAW
3,0: DRAW 0,-2: DRAW 1,0: DRAW
0,1: PLOT x+5,y+4: PLOT x+4,y+3:
DRAW -2,0: DRAW 0,2: DRAW 1,0:
DRAW 0,-1
300 GO TO 100
1000 FOR x=x TO 240

```

Stunt
by Mark Smith

Pontoon on BBC

This is a sophisticated version of the famous card game which should work on

both the BBC B and the Electron.

Program notes

80-250
290-400

Redefine characters
Construct and shuffle deck

490-650
700-840
850-1080
1090-1250
1290-1350
1440-1540
1550-1620

Set screen
Player's go
Deal next card
Computer's go
Rebuild deck from shuffled deck
Display rules
Outline spaces for cards

```

10REM *****
20REM *PONTOON *
30REM *(c)1983 *
40REM *N.FERRIS*
50REM *****
60MODE6
70VDU23,1,0;0;0;0;
80VDU23,224,34,119,127,127,62,28,8,0
90VDU23,225,28,28,107,127,107,8,28,0
100VDU23,226,8,28,62,127,62,28,8,0
110VDU23,227,8,28,62,127,62,8,28,0
120VDU23,228,207,73,73,73,73,73,79,0
130VDU23,229,1,1,1,1,1,1,1,1
140VDU23,230,129,66,36,24,24,36,66,129
150VDU23,231,128,128,128,128,128,128,128,128
160VDU23,232,255,0,0,0,0,0,0,0
170VDU23,233,0,0,0,0,15,15,15,15
180VDU23,234,15,15,15,15,15,15,15,15
190VDU23,235,240,240,240,240,15,15,15,15
200VDU23,236,240,240,240,240,240,240,240,240
210VDU23,237,240,240,240,240,0,0,0,0
220VDU23,238,0,0,0,0,255,255,255,255
230VDU23,239,255,255,255,255,0,0,0,0
240VDU23,240,255,255,255,255,240,240,240,240
250VDU23,241,15,15,15,15,0,0,0,0
260PW=0: CW=0
270DIM A$(51)
280PROCrules
290FOR A%=1 TO 13: FOR B%=224 TO 227
300 IF A%=1 THEN B%=B%+"A"+CHR$(B%):GOTO 360
310 IF A%=10 THEN B%=B%+CHR$(228)+CHR$(B%):GOTO 360
320 IF A%=11 THEN B%=B%+"J"+CHR$(B%):GOTO 360
330 IF A%=12 THEN B%=B%+"Q"+CHR$(B%):GOTO 360
340 IF A%=13 THEN B%=B%+"K"+CHR$(B%):GOTO 360
350 B%=B%+STR$(A%)+CHR$(B%)
360NEXT: NEXT
370FORA%=51 TO 0 STEP-1
380 B%=2*INT(RND(A%))+1
390 A$(A%)=MID$(B%,B%,2)
400 B%=LEFT$(B%,B%-1)+RIGHT$(B%,LEN(B%)-B%-1)
410NEXT
420PRINT TAB(7,30)"PRESS SPACE BAR TO CONTINUE"
430IF INKEY(-99) THEN GOTO460
440IF INKEY(-74) THEN STOP
450GOTO430
460E=0: F=0: PSC=0: CSC=0: PNC=2: CNC=2
470CARD=3
480SOUND 1,-15,100,5: SOUND 1,-15,52,5
490 MODE 1:VDU19,0,2,0,0,0,19,2,0,0,0,0:
VDU23,1,0;0;0;0;0;:PRINT

```

```

500PRINT TAB(16,1)"PONTOON":COLOUR1:PRINT TAB(16,2)
CHR$(224):COLOUR2:PRINT TAB(18,2) CHR$(225)
COLOUR1:PRINT TAB(20,2) CHR$(226):COLOUR2:
PRINT TAB(22,2) CHR$(227)
510COLOUR3:PRINT TAB(0,1) "'D' To Deal"' 'S' To
Stick":PROCscores
520C%=A$(0)
530PROCring
540X=2:Y=6:PROCdeal
550PSC=PSC+CV
560X=10:C%=A$(2)
570PROCdeal:P%=A$(0)+A$(2)
580PSC=PSC+CV
590PRINT TAB(6,15)"Your Score is ";PSC;
600IF LEFT$(A$(0),1)="A" OR LEFT$(A$(2),1)="A"
THEN PRINT " or ";PSC+10610 X=10:Y=19:C%=A$(3)
620COLOUR131:COLOUR1:PRINT TAB(2,19)" ____ "
630FORC%=20 TO 24:PRINT TAB(2,C%)CHR$(229);CHR$(230);
CHR$(230);CHR$(230);CHR$(231):NEXT
640PRINT TAB(2,25)" ";CHR$(232);CHR$(232);CHR$(232);" "
650SOUND1,-15,60,1: SOUND1,-15,90,1
660PROCdeal
670CSC=CSC+CV:E%=A$(1)+A$(3)
680X=18:Y=6
690IF(LEFT$(A$(2),1)="A"AND(LEFT$(A$(0),1)="Q"
ORLEFT$(A$(0),1)="K"ORLEFT$(A$(0),1)="J"))OR
(LEFT$(A$(0),1)="A"AND(LEFT$(A$(2),1)="J"
ORLEFT$(A$(2),1)="Q"ORLEFT$(A$(2),1)="K"))THEN
PRINTTAB(6,15)"PONTOON Scores 21
":PSC=21:PROCgood:GOTO1090
700*FX21,0
710R%=GET%
720IF R%="S" OR R%="s" THEN GOTO1360
730IF R%="D" OR R%="d" THEN GOTO750
740GOTO710
750CARD=CARD+1
760PNC=PNC+1:C%=A$(CARD):PROCdeal:X=X+8:
PSC=PSC+CV:P%=P%+C%
770PRINT TAB(6,15)"Your Score is ";PSC;
780FOR C%=1TOLENP%:IFMID$(P%,C%,1)="A" AND
PSC<12THENPRINT " or ";PSC+10:GOTO800
790NEXT:PRINT" "
800C%=CARD
810IF PSC>21 THEN PRINT TAB(6,15)"BUST":SOUND1,
-15,4,7: CW=CW+1:PROCscores:PROCshuffle:GOTO370
820IF PNC=5 THEN PRINT TAB(6,15)"Five-Card-Trick 1
":PROCgood:GOTO1090
830IF PSC=21 THEN PRINT TAB(6,15)
"You Have Scored 21":PROCgood:GOTO1090
840GOTO700
850DEF PROCdeal

```




The best books for the BBC Computer

functional forth
for the BBC computer



Functional Forth

Boris Allan develops routines in Acorn soft Forth to demonstrate a) how easy it is to write in Forth and b) that the programs are fast enough to dispense with the need for machine code.

ISBN: 0 946408 04 1

Programming for Education

The book, written by teachers, is aimed at showing younger children how the various features of the BBC Computer can be used to their best advantage. ISBN: 0 946408 10 6



graphic art
for the BBC computer



Graphic Art

The graphics in this book match the style and sophistication of the BBC computer and its Basic language. Boris Allan shows what can be achieved with Turtle graphics.

ISBN: 946408 08 4

DIY Robots and Sensors

Make your own joystick, robot, eye or whatever you like. The book gives you step-by-step instructions on how to construct a wealth of gadgetry for use with your BBC computer (Pub. 28th October). ISBN: 946408 13 0

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

Dealer Enquires: 01-437 4343

Please send me

- Functional Forth at £5.95 each
- Programming for Education at £5.95 each
- Graphic Art for BBC at £5.95 each
- DIY Robots & Sensors at £6.95 each

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

Name _____

Address _____

Signature _____

Or telephone Access Mastercard on 01-437 4343



The best books for the Commodore 64



The Working Commodore 64
A library of practical subroutines and programs. "The style is easy to follow and informative" — *Personal Comp. News* August 18th 1983

ISBN: 0 946408 02 5



Commodore 64 Machine Code Master
A library of machine code routines "At last a truly useful book for the machine code programmer — and it's easy to read as well" *Popular Comp. News* 25 August 1983

ISBN: 0 946408 05 X



Commodore 64 Adventures
A blueprint for the construction and playing of Adventure programs based on a full text Adventure.

ISBN: 0 946408 11 4



Graphic Art for the Commodore 64
How graphics facilities can be fully developed by using Turtle Graphics techniques

ISBN: 0 946408 15 7



Business Applications for the Commodore 64
Learn how to write your own packages

ISBN: 0 946408 12 7



Mathematics on the Commodore 64
Mathematical routines for use in programs

ISBN: 0 947408 14 9

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

Dealer Enquiries: 01-437 4343

Please send me

- The Working Commodore 64 at £5.95 each
- Graphic Art for the Commodore 64 at £5.95 each
- Commodore 64 Machine Code Master at £6.95 each
- Business Applications at £5.95 each
- Commodore 64 Adventures at £5.95 each
- Mathematics on the Commodore 64 at £5.95 each

I enclose cheque/postal order for £_____ made payable to: Sunshine Books: 12/13 Little Newport St., London WC2R 3LD
Or telephone Access Mastercard on 01-437 4343

Name _____

Address _____

Signature _____

We can normally deliver in 4/5 days.

OPEN FORUM

```

860 IF LEFT$(C$,1)="A" THEN CV=1:GOTO 890
870 IF LEFT$(C$,1)=CHR$(228) OR LEFT$(C$,1)="J" OR
LEFT$(C$,1)="Q" OR LEFT$(C$,1)="K" THEN CV=10
:GOTO 890
880 CV=VAL(LEFT$(C$,1))
890 IF RIGHT$(C$,1)=CHR$(224) OR RIGHT$(C$,1)=CHR$(
226) THEN COLOUR 1:GOTO 910
900 COLOUR 2
910 D$=RIGHT$(C$,1)
920 COLOUR 131:FOR Y%=Y TO Y+6:PRINT TAB(X,Y%)
":NEXT
930 PRINT TAB(X,Y)C$
940 IF CV=1 THEN PRINT TAB(X+2,Y+3)D$:GOTO 1070
950 IF CV=2 THEN PRINT TAB(X+2,Y+2)D$:
TAB(X+2,Y+4)D$:GOTO 1070
960 IF CV=3 THEN PRINT TAB(X+2,Y+1)D$:TAB(X+2,
Y+3)D$:TAB(X+2,Y+5)D$:GOTO 1070
970 IF CV=4 THEN PRINT TAB(X+1,Y+1)D$:" ";
D$ TAB(X+1,Y+5)D$:" ";D$:GOTO 1070
980 IF CV=5 THEN PRINT TAB(X+1,Y+1)D$:" ";D$ TAB
(X+2,Y+3)D$ TAB(X+1,Y+5)D$:" ";D$:GOTO 1070
990 IF CV=6 THEN FOR C%=1 TO 5 STEP 2:PRINT TAB(X+1
,Y+C%)D$:" ";D$:NEXT:GOTO 1070
1000 IF CV=7 THEN FOR C%=1 TO 5 STEP 2:PRINT TAB(X+1,
Y+C%)D$:" ";D$:NEXT:PRINT TAB(X+2,Y+3)D$:GOT
O 1070
1010 IF CV=8 THEN FOR C%=2 TO 5:PRINT TAB(X+1,
Y+C%)D$:" ";D$:NEXT:GOTO 1070
1020 IF CV=9 THEN FOR C%=2 TO 5:PRINT TAB(X+1,
Y+C%)D$:" ";D$:NEXT:PRINT TAB(X+2,Y+3)D$:
GOTO 1070
1030 IF LEFT$(C$,1)=CHR$(228) THEN FOR C%=1 TO 5:
PRINT TAB(X+1,Y+C%)D$:" ";D$:NEXT:GOTO 1070
1040 IF LEFT$(C$,1)="J" THEN PRINT TAB(X+2,Y+1)
CHR$(233);CHR$(238);TAB(X+3,Y+2)CHR$(236);
TAB(X+3,Y+3)CHR$(236);TAB(X+1,Y+4)CHR$(233);" ";
CHR$(236);TAB(X+2,Y+5)CHR$(239):GOTO 1070
1050 IF LEFT$(C$,1)="Q" THEN PRINT TAB(X+1,Y+1)
CHR$(238);CHR$(238);CHR$(238);TAB(X+1,Y+2)
CHR$(236);" ";CHR$(234);TAB(X+1,Y+3)CHR$(236);" ";
CHR$(234);TAB(X+1,Y+4)CHR$(236);CHR$(233);CHR$(234);
TAB(X+1,Y+5)CHR$(239);CHR$(239);CHR$(240):
GOTO 1070
1060 IF LEFT$(C$,1)="K" THEN PRINT TAB(X+1,Y+1)
CHR$(233);" ";CHR$(233);TAB(X+1,Y+2)CHR$(234);
CHR$(233);CHR$(237);TAB(X+1,Y+3)CHR$(234);
CHR$(235);TAB(X+1,Y+4)CHR$(234);" ";CHR$(235);
TAB(X+1,Y+5)CHR$(241);" ";CHR$(241)
1070 COLOUR 3:COLOUR 128:SOUND 1,-15,60,1:
SOUND 1,-15,90,1
1080 ENDPROC
1090 X=2:Y=19:C$=A$(1):PROCdeal:CSC=CSC+CV
1100 PRINT TAB(6,28)"Computer's Score is ";CSC;
1110 X=10:IF LEFT$(A$(1),1)="A" OR LEFT$(A$(3),1)="A"
AND CSC<12 THEN F=10:PRINT " or ";CSC+10
1120 IF CSC+F)=PSC AND PNC<5 THEN PRINT TAB(6,28)"
Computer Wins !":CW=CW+1:PROCscores:
PROCbad:PROCshuffle:GOTO 370
1130 CARD=CARD+1:CNC=CNC+1:C$=A$(CARD):X=X+8:
PROCdeal:E$=E$+C$
1140 CSC=CSC+CV
1150 E=0:PRINT TAB(6,28)"Computer's Score is ";CSC;
1160 FOR C%=1 TO LENE$:IF MID$(E$,C%,1)="A" AND
CSC<12 THEN E=10:GOTO 1180
1170 NEXT
1180 IF E=10 THEN PRINT " or ";CSC+10:GOTO 1210
1190 IF CSC>21 THEN PRINT TAB(6,28)"
OK YOU WIN !":PW=PW+1:PROCgood:PROCscores:
PROCshuffle:GOTO 370
1200 PRINT "
1210 IF PNC=5 AND CNC<5 THEN GOTO 1130
1220 IF CSC+E)=PSC THEN PRINT TAB(6,28)" Computer
Wins !":CW=CW+1:PROCbad:PROCscores:
PROCshuffle:GOTO 370
1230 IF CNC=5 AND PNC<5 THEN PRINT TAB(6,28)" Five-
Card-Trick,Computer Wins !":PROCbad:PW=CW+
1:PROCscores:PROCshuffle:GOTO 370
1240 IF CNC=5 AND PNC=5 AND CSC<PSC THEN PRINT TAB
(6,28)" Your Five-Card-Trick Wins !
":PROCgood:PW=PW+1:PROCscores:PROCshuffle:
GOTO 370
1250 GOTO 1130
1260 DEF PROCscores
1270 PRINT TAB(28,1)"Computer:";CW;TAB(33,2)"You:";PW
1280 ENDPROC
1290 DEF PROCshuffle
1300 LOCAL C%
1310 B$=""
1320 FOR C%=51 TO 0 STEP -1
1330 B$=B$+A$(C%)
1340 NEXT
1350 ENDPROC
1360 FOR C%=0 TO CARD STEP 2:IF LEFT$(A$(C%),1)="A"
AND PSC<12 THEN PSC=PSC+10:PRINT TAB(6,15)
"Your Score is ";PSC;"
1370 NEXT:GOTO 1090
1380 DEF PROCgood
1390 SOUND 1,-15,52,2:SOUND 1,-15,100,2:
SOUND 1,-15,148,2
1400 ENDPROC
1410 DEF PROCbad
1420 SOUND 1,-15,52,2:SOUND 1,-15,4,2
1430 ENDPROC
1440 DEF PROCrules
1450 VDU(19,0,4,0,0,0,19,7,7,0,0,0,0):CLS
1460 PRINT TAB(17,0) "PONTOON"
1470 PRINT " The idea of pontoon is to beat the
Dealer's score;however,if you only equal it the
Dealer wins!"
1480 PRINT " You play first,but can see one of the
Dealer's cards to help."
1490 PRINT "TAB(7)"YOU MUST NOT SCORE OVER 21!"
1500 PRINT " An Ace counts as 1 or 11,whichever
helps you most."
1510 PRINT " A five-Card-Trick beats all,except a
Five-Card-Trick scoring nearer 21."
1520 PRINT " To deal yourself another card press 'D',
to stay with your present total press 'S'
to stick."
1530 PRINT " ";
1540 ENDPROC
1550 DEF PROCring
1560 GCOL 0,2
1570 LOCAL X%,Y%
1580 FOR Y%=844 TO 430 STEP -414
1590 FOR X%=47 TO 1143 STEP 256
1600 PLOT 69,X%,Y%:DRAW X%+200,Y%:DRAW X%+200,Y%-256:
DRAW X%,Y%-256:DRAW X%,Y%
1610 NEXT:NEXT
1620 ENDPROC

```

Pontoon
by Nigel Ferris

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) 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 your 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 (eg. 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 March 1984 will be charged at the special introductory price of £12.50.

Reference manual alone £1.50 (Refundable against eventual purchase)
ACCESS/PO orders by return (cheques must clear)

Telephone orders (24 hours): 0642-787389

or mail order from:

MICROHOLICS ANONYMOUS

Lord Nelson House (PCWK)

21 High Street,

Yarm, Cleveland TS15 9BW



Dealer enquiries welcome

MICRON AUDIO LTD

Your microcomputer stockist for
South Yorkshire and North Derbyshire

COMMODORE 64, VIC20, ORIC,
DRAGON, ZX81 and SPECTRUM

APPOINTED DEALERS FOR
MEMOTECH MTX SERIES

We stock a large range of software, books and
accessories for most of the above machines

DEMONSTRATIONS and ADVICE given with pleasure
or try our efficient mail order service. Send SAE
for list. (Please state micro)

COME AND SEE US AT:
172 Baslow Road, Totley, Sheffield S17 4DR
Telephone: 360295

WANTED: MEMOTECH MTX PROGRAMS.
WE WILL BUY YOUR COPYRIGHT OR PAY TOP ROYALTIES

TEACHERS AND EDUCATIONAL GAMES DESIGNERS

We are looking for top quality educational
material for release on the CBM 64, BBC
Model B, Electron and Dragon computers.
We can offer excellent royalties or outright
purchase of copyright. Please send your
work on cassette or call Mark at:

TIGER SOFTWARE

63 Devonshire Street

Monkswearmouth

Sunderland

Tyne and Wear

SR5 1DP

Tel: (0783-484592)

OPEN FORUM

Nine Hole Golf

on ZX81

Your ball is in the bottom left hand corner, the hole is "H". You input a direction in an

angle; eg, 45 degrees and then an iron number: 1 = longest, 9 = shortest.

```

1 REM NINE HOLE GOLF
160 LET A$=""
170 LET T=20
180 LET S=1
190 LET I=0
200 FOR N=5 TO 21
230 PRINT AT N,0,"",AT N,31:"
250 PRINT AT 5,N-4,"",AT 21,N
4 270 PRINT AT 5,N+10,"",AT 21,
+10,""
290 NEXT N
300 PRINT AT 5,0,"",AT 5,31:"
310 PRINT AT 21,0,"",AT 21,31
320 PRINT AT 2,0:"TOTAL SCORE
0 FAR "
330 FOR N=1 TO 9
340 PRINT AT 0,0,"HOLE ",N
350 LET S=1
360 LET X=INT (7+RND*13)
370 LET Y=INT (1+RND*28)
380 IF ABS (Y-J)<4 THEN GOTO 3
0
390 PRINT AT X,Y,"H"
400 PRINT AT 0,10,"SHOT NUMBER
..5.."
410 PRINT AT 2,20,T
420 PRINT AT 1,0,"D"
425 PRINT AT 4,0,0$
430 PRINT AT 3,0:"WHICH DIRECT
ON? (0,HORIZONTAL TO 90,VERTIC
L)"
440 INPUT B
450 IF B>=0 AND B<=90 THEN GOT
460 PRINT AT 4,16,"ERROR; RE-1
PUT"
470 GOTO 440
480 PRINT AT 3,0,0$;0$
490 PRINT AT 4,0:"WHICH IRON 1
IS TIME? (1 TO 9)"
500 LET A=10-(CODE INKEY$-28)
510 IF A=1 OR A=9 THEN GOTO 50
520 LET C=B*PI/180
530 LET D=INT (A+SIN C)

```

```

535 IF D=1 AND B>40 THEN LET D
1
540 LET E=INT (A*COS C)
545 IF E=1 AND B<50 THEN LET E
1
550 IF I=X THEN LET D=-D
560 IF J=Y THEN LET E=-E
570 PRINT AT I,J," "E="E
580 LET J=J+E
590 LET I=I+D
600 IF I<5 THEN GOTO 570
610 IF I>20 THEN GOTO 600
620 IF J<1 THEN GOTO 550
630 IF J>31 THEN GOTO 700
635 LET J=30
640 GOTO 600
650 LET J=1
655 GOTO 600
660 LET X=20
665 GOTO 600
670 LET T=T+1
680 LET S=S+1
685 LET T=T+1
685 PRINT AT 2,0,0$
690 PRINT AT 3,0:"OUT OF BOUND
- PENALTY SHOT
ADDED"
692 FOR P=1 TO 100
695 NEXT P
700 PRINT AT I,J,"0"
710 LET T=T+1
720 IF I=X AND J=Y THEN GOTO 7
0
730 LET S=S+1
740 GOTO 400
750 PRINT AT 3,0,0$;0$
760 PRINT AT 3,0:"HOLED IN "S
" SHOT"
762 IF S=1 THEN PRINT "S"
765 PRINT AT 3,00,T
770 FOR D=1 TO 100
780 NEXT D
790 PRINT AT 3,0,0$
800 NEXT N
810 PRINT AT 2,0,0$
820 PRINT AT 4,0:"ROUND COMPLE
ED IN "T " SHOTS"

```

Nine Hole Golf
by Neil Hadgraft

SPECIAL CASSETTE OFFER!



Collector's edition of
Eye of the Star Warrior
for 48K Spectrum



Popular Computing Weekly is offering its readers the chance to buy **Eye of the Star Warrior** — a graphic arcade adventure cassette for the 48K Spectrum written by Tony Bridge and Roy Camell. All you have to do is cut out this coupon, fill it in, and send it together with the first four coupons and £1.25 (plus 30p p&p) to:

Popular Computing Weekly
Special Offer
Eye of the Star Warrior
12-13 Little Newport Street
London WC2R 3LD

Notes

- 1) Each order must consist of five coupons cut from the magazine together with £1.25 (plus 30p p&p).
- 2) Please allow 28 days for delivery
- 3) Please note that **Eye of the Star Warrior** is the program contained in **Spectrum Adventures** published by Sunshine.

Name

Address

5

Special Offer!
Eye of the Star Warrior

OPEN FORUM

Fruit machine on BBC

This program simulates a one armed bandit and will run only on the BBC B. The aim is to win as much money as possible; you win a

pound for three 'Jackpots' of 30p for any other three of a kind. You have the option to hold a wheel at the end of each spin.

Line 470 should read
470 Input "Return to start" start
I have made much use of procedures:

Procinst Instructions

Procinitialise Sets up arrays and variables
Procinput Place stake
Procplay Main routine
Procwheels Sets up screen and picks fruit
Proccalculate Checks to see if player has won anything
Prochold Asks the player if he wants to hold a reel
Procpayout Prints win

```

10 REM FRUIT MACHINE SIMULATION
20 REM WRITTEN BY NEIL McGLYNN
30 REM VERSION 2 26/10/83
40 REM IN BBC BASIC
50
60PROCinstr
70 PROCinitialise
80PROCinput
90PROCplay
100PROCpayout
110END
120
130DEFPROCinitialise
140 CLS
150 LETpayout=0
160 DIMfruit$(6),random(3)
170 FOR fruit=1 TO 6
180READ fruit$(fruit)
190NEXT
200DATA "ORANGE", "LEMON", "APPLE", "BANANA",
"PLUM", "JACKPOT"
210x=0:y=0;z=0
220ENDPROC
230
240DEFPROCinput
250 PRINT "HOW MANY 10 PENCES DO YOU WISH
TO GAMBLE"
260PRINT "(1 TO 5)"
270REPEAT
280INPUTa
290UNTILa<5.01
300IFa<1THENGOTO270
310pull=INT(a)*2
320ENDPROC
330
340DEFPROCplay
350FORgames=1TOPull
360 PROCwheels
370 PROCcalculate
380 PROCchold
390NEXTgames
400ENDPROC
410
420DEFPROCwheels
430 IFx<>1THENA$=fruit$(RND(6))
440 IFy<>1THENb$=fruit$(RND(6))
450 IFz<>1THENC$=fruit$(RND(6))
460x=0:y=0;z=0
470 INPUTRETURNTO START"start
480 CLS
490 PRINTTAB(5,2);" 1 2 3"
500FORf=1TO3
510random(f)=RND(6)
520NEXT f
530PRINTa$,b$,c$
540 FOR delay=1 TO 300
550 NEXT delay
560ENDPROC
570
580DEFPROCchold
590REPEAT

```

```

600 INPUT"DO YOU WISH TO HOLD ANY REELS
(YES OR NO)",ans$
610IF ans$="NO"THEN ENDPROC
620UNTILans$="YES"ORans$="NO"
630LETwheelie=0
640REPEAT
650INPUT"REEL 1 ?(Y OR N)"reelone$
660IF reelone$="Y"THENx=1
670IF reelone$="Y"THENwheelie=wheelie+1
680UNTILreelone$="Y"ORreelone$="N"
690REPEAT
700INPUT"REEL 2 ?(Y OR N)"reeltwo$
710IF reeltwo$="Y"THENwheelie=wheelie+1
720IF reeltwo$="Y"THENy=1
730IFwheelie=2THEN ENDPROC
740UNTILreeltwo$="Y"ORreeltwo$="N"
750REPEAT
760INPUT"REEL 3 ?(Y OR N)"reelthree$
770IF reelthree$="Y"THENz=1
780UNTILreelthree$="Y"ORreelthree$="N"
790ENDPROC
800
810DEFPROCcalculate
820IFa$<>b$THEN ENDPROC
830 IFb$<>c$THEN ENDPROC
840 IFa$="JACKPOT"THENpayout=payout+100
ELSEpayout=payout+30
850 ENDPROC
860
870DEFPROCpayout
880 CLS
890 PRINTTAB(0,5);"YOU HAD ";pull;"
PULLS"
900PRINTTAB(0,7);"YOU WON ";payout;"
PENCE"
910FOR delay=1 TO 1000
920NEXT delay
930 ENDPROC
940DEFPROCinstr
950CLS
960PRINT " FRUIT MACHINE SIMULATION"
970PRINT
980PRINT
990PRINT " YOU WILL BE ASKED HOW MANY 10
PENCES YOU WISH TO GAMBLE. INPUT A
VALUE BETWEEN 1 AND 5. FOR EACH 10PENCE
YOU GET 2 PULLS ON THE MACHINE.
WHEN YOU ARE ASKED TO HOLD "
1000PRINT"A REEL JUST FOLLOW THE
INSTRUCTIONS ON THE VDU."
1010PRINT"YOU CAN ONLY HOLD A MAXIMUM
OF 2 REELS"
1020PRINT
1030PRINT
1040PRINT " GOOD LUCK!!!"
1050FOR f=1 TO 10000
1060 NEXT
1070 ENDPROC
1080

```

Fruit Machine
by Neil McGlynn

Joystick

This program brings the Dragon's listing

facility under joystick control. After typing in and *Running*, the program can be deleted. Any program now typed in will list at full speed with the righthand joystick fully

forward, and progressively more slowly as the joystick is pulled back. The listing can be stopped completely by pressing the fire button on the joystick.

```

10 *****
20 *** JOYSTICK LISTING ***
30 *** CONTROL ***
40 *****
50 * <C>1984 DON EDWARDS *
60 *****
70 CLEAR200,&H7FC7
80 FORN=&H7FC8 TO &H7FFF
90 READ A:POKE N,A
100 NEXTN
110 DATA 142,127,212,191, 16
120 DATA 104,134,126,183, 1
130 DATA 103, 57, 52,127,189
140 DATA 128, 18,190, 1, 91
150 DATA 48, 1, 48, 31,182
160 DATA 255, 0,129,126, 39
170 DATA 12,129,254, 39, 8
180 DATA 140, 0, 0, 46,238
190 DATA 53,127, 57,182,255
200 DATA 0,129,127, 39, 4
210 DATA 129,255, 38,245, 32
220 DATA 238
    
```

Joystick
by Don Edwards

Microradio

GW6JJN



Baudot code

A few weeks saw the third Swansea Bay Microshow. The event, now an annual fair held at the Swansea Leisure Centre, held several attractions for the radio-computer hobbyist. One of the stands was occupied by the Swansea Amateur Radio Society who were demonstrating the use of a home computer programmed to send radio-teletype (RTTY).

The operator, Richard GW8TVX, was using his Dragon 32 to contact other RTTY stations around the world. The Dragon was used in conjunction with a machine code program to encode and decode the Amateur Baudot RTTY standard, as mentioned in Microradio a few weeks ago.

Also in use was a serial to parallel interface plugged into the cartridge port. The necessary tones were generated by a home-made modem and fed into a Trio shortwave transmitter.

On screen, the conversation being received was displayed in the upper part of a split-screen system. As this displayed the incoming text, the operator was able to compose a reply which was stored in a buffer

and, when the other station handed over, all that was necessary to send the stored reply was a simple keypress.

Also stored in the program were various pages written by the operator about such things as the local weather, the equipment in use and the Swansea Bay Microshow details.

An interesting and useful feature of the Dragon program was a visual indication of the reception of the high and low tones of the Baudot code. This made it a simple matter to tune the radio receiver to the optimum reception of the distant station.

During the time that Richard kindly allowed me to use the station, I managed to speak, via the Dragon, to amateurs in such places as Sweden, Ger-

many and Switzerland on the 20 metre (14Mhz) band.

Many thanks to Richard and the Swansea Amateur Radio Society for demonstrating and allowing me to use their excellent system.

Next week, I shall attempt to answer some of your many letters. If there are any questions that you need answering, or any suggestions about topics you would like to see dealt with in Microradio, then please drop me a line. ■

Ray Berry GW6JJN

This series of articles is designed for radio and microcomputer enthusiasts alike. If you have any queries that you want answered, hints and tips to share, or topics that you would like to see covered, write to: Ray Berry, Microradio, Popular Computing Weekly, 12-13 Little Newport Street, London WC2R 3LD.

HISOFT PASCAL DEVPAC

Quality ZX SPECTRUM Software HISOFT PASCAL 4T

"... I haven't seen any other compiler that could match Hisoft's Pascal" ... *Using the Spectrum Micro - Autumn 1983*
"This is a very impressive product ... of benefit to any Spectrum programmer ..." *David Bolton ZX COMPUTING Aug/Sept 1983*

Just two comments from full length reviews of our powerful and virtually full implementation of Standard Pascal. The advantages of using Pascal are well-known — fast, self-doumenting, and above all, structured programs and now, with Hisoft Pascal, you can reap all these benefits on a wide range of home computers, including the 48K Sinclair Spectrum! Hisoft Pascal produces programs that run typically 40 times faster than equivalent ZX BASIC programs and, sometimes, up to 1,000 times faster!

Hisoft Pascal supports FOR ... DO, WHILE ... DO, REPEAT ... UNTIL, CASE ... OF, INTEGERS, REALs, CHARACTERS, RECORDs, POINTERs, SETs, ARRAYs etc. etc. — it is not a Tiny Pascal but a virtually full implementation of the language allowing the user to develop true high-level language skills while attaining execution speed close to that of machine code. Complete with a 70-page manual.

HISOFT DEVPAC 3

"... DEVPAC is most highly recommended. The documentation is first class." *Your Computer May 1983*

"... if you write programs in machine code, buy DEVPAC — it is the best currently on the market." *Adam Denning, ZX SOFT in Which Micro September 1983*

Two comments from reviews of earlier versions of DEVPAC — now we have DEVPAC 3 available: a powerful Z80 assembler with conditional assembly, assembly from tape (to enable generation of very large code files), ORG, EQU, DEFB, DEFS, DEFW, DEFM, labels of any length — in fact all you need for fast (3,000 lines per minute) and powerful assembly programming. But it doesn't stop there: DEVPAC 3 also includes an incredible debugger/dis-assembler giving you a 'front panel' display of the Z80 system and allowing extensive debugging of your machine-code program, including single-stepping programs EVEN IN ROM!! Open up the secrets of low-level programming with DEVPAC 3.

Prices:

Hisoft Pascal 4T (ZX SPECTRUM) £25 inclusive
(NewBrain, SHARP MZ700 etc) £35 plus VAT

Hisoft DEVPAC 3 (ZX SPECTRUM) £14 inclusive
(NewBrain £25 inclusive)

STOP PRESS Hisoft Pascal for the SPECTRUM now comes complete with a Turtle Graphics package allowing fast and easy production of complex graphic displays



HISOFT
13 Gooseacre, Cheddington
Leighton Buzzard, Beds. LU7 0SR
Tel: (0296) 668995



THE ADVENTURES OF ERIC BEAN



Locate the ferret and you have a mischievous but useful ally against the Goblins of Murgar Mountain in —

THE LOST GNOMES

A challenging and entertaining text adventure game in machine code for the ZX 48K Spectrum.

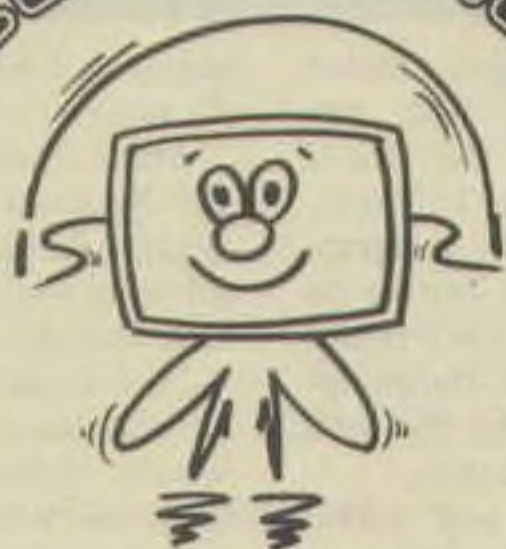
**COMPELLING! SUPERB VALUE AT
£5.95 inc p & p**

From ERIC BEAN ADVENTURES
Dept A, 9 St Lukes's Close
Kettering, Northants NN15 5HD

FREE C15 tape with every purchase when you bring this ad

Got a computer?
Give it a boost at

FLEXIWORDS



The Super Computer Shop

Software books and accessories for
ACORN COMMODORE SINCLAIR MICROWRITER

18 Otley Road, Headingley, Leeds
(0532) 758474

You're better off at a proper computershop



New from SUNSHINE Master your ZX Microdrive

programs, machine code and
networking by Andrew Pennell

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

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

Look out for the Sunshine range in W.H. Smith's, Boots, John Menzies, other leading retail chains and through our national network of book shops and specialist stores. Dealer Enquiries: 01-437 4343



ISBN 0 946408 19 X

Please send me

Master your ZX Microdrive at £6.95 each

I enclose cheque/postal order for £_____ made payable to: Sunshine Books; 12/13 Little Newport St., London WC2 3LD.
Or phone your order through on Access Mastercard 01-437 4343

Name _____

Address _____

Signature _____

We can normally deliver in 4/5 days.

A NEW SPECTRUM PROGRAMMABLE JOYSTICK INTERFACE

— PLUS SOUND

(Normally a £10 Add on)

from **Rainbow Electronics**

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

ONLY £24

plus £1 p&p.



This is a top quality product and we aim to give you an excellent service.

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

Glebe House South Leigh Witney Oxfordshire OX8 6XJ
Tel. Witney 5844



New from **SUNSHINE** Master your ZX Microdrive

master your
zx microdrive

programs, machine code and networking

Andrew Pennell



ISBN 0 946408 19 X

programs, machine code and networking by Andrew Pennell

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

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

Look out for the Sunshine range in W.H. Smith's, Boots, John Menzies, other leading retail chains and through our national network of book shops and specialist stores. Dealer Enquiries: 01-437 4343

Please send me

Master your ZX Microdrive at £6.95 each

I enclose cheque/postal order for £_____ made payable to: Sunshine Books: 12/13 Little Newport St., London WC2 3LD.
Or phone your order through on Access Mastercard 01-437 4343

Name _____

Address _____

Signature _____

We can normally deliver in 4/5 days.

Home
Computer
Centre



29 Millcroft, Crosby, Liverpool L23 9XJ
Tel. 051-727 8050

ASTERFRET TRADING LTD INCORPORATES
HOME COMPUTER CENTRE

MOTHERBOARDS

- VIC 20 4 SLOT SWITCHABLE — £28.95
- CBM 64 4 SLOT SWITCHABLE — £29.95

LIGHT PENS

- CBM 64 + FREE GAME — £28.75
- VIC 20 + FREE GAME — £28.75



VIC 20 and CBM 64 are reg'd trade marks
Commodore Business Machines



16K STANDARD
£27.95

RAM PACKS

- VIC 20 16K STANDARD — £27.95
- VIC 20 16K SWITCHABLE — £35.95
- VIC 20 32K SWITCHABLE — £49.95

ALL RAM PACKS CARRY 2 YEARS GUARANTEE

Please allow up to 21 days for delivery. All prices include V.A.T., postage and packing.

If you wish to be added to our mailing list,
please tick the appropriate box

PLEASE SEND ME

Qty

Name _____

Address _____

I enclose Cheque/PO for £ _____

- VIC 20
- CBM 64
- 16K Std. Ram Pack
- 16K Switchable Ram Pack
- 32K Switchable Ram Pack

- VIC 20 4 Slot Motherboard
- CBM 64 4 Slot Motherboard
- VIC 20 Light Pen
- CBM 64 Light Pen
- BBC Light Pen

Home
Computer
Centre



PCW

NOW 2ND GREAT YEAR!

HIRE ZX81/SPECTRUM PROGRAM TAPES

FREE ILLUSTRATED QUARTERLY MAGAZINE WITH TIPS, NEWS, REVIEWS, DISCOUNT OFFERS PLUS OUR TOP 40 TAPES CHART BASED ON THOUSANDS OF SCORES!

JOIN OVER 2,000 DELIGHTED MEMBERS!

UP TO 2 WEEKS FOR ONLY £1.20 INCL. FIRST CLASS POST AND VAT!

CHOOSE FROM TAPES BY 40 TOP SUPPLIERS ALL WITH PERMISSION!

YOUR FIRST TAPE FREE BY RETURN IF YOU JOIN WITHOUT DELAY USING THIS SPECIAL COUPON!

THE ORIGINAL SINCLAIR LIBRARY!

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

TO: SINCLAIR OWNERS' SOFTWARE LIBRARY, Warren Road, Liss, Hants GU33 7DD.

NAME _____ ADDRESS _____ MACHINE _____ MAIN INTEREST (for free tape) _____

Enclose £9.50 for year's membership (Spectrum) or £7.50 (ZX81), overseas (Europe only) + £2 unless with local branch.

Overseas branches:
Benelux: Jacobusstraat 75, B-2050 MCH, Belgium (mem. fee £4 & 49 Guilders) Tel 04 860 889.
Eire: Salthawk, 120 South Circular Rd, Dublin 8 (E) Tel 29 50 0000.
South Africa: P.O. Box 1769, Manzoni, Swaziland.

PCWK

WIN THE POOLS?

48k

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



If you've ever been killed by the evil goblin, flamed by a dragon or turned to stone by a wizard...

then you need Micro Adventurer — the new monthly magazine devoted to all microcomputer adventures, war games and simulations.

- Each issue offers a wide range of stimulating features, including:
- Helpline and Contact columns
 - Reviews of the latest adventures
 - Competitions with exciting prizes
 - War gaming advice
 - Adventures to type in and play
 - Profiles of famous adventurers
 - Advice on how to write your own adventures

If all this sounds too good to be true then fill in the form below to make sure you receive your copy of Micro Adventurer.



SUBSCRIPTION ORDER FORM

Please send me 12 issues (a year's subscription) of Micro Adventurer, beginning with the _____ issue.

Name _____

Address _____

Signature _____ Date _____

This order should be accompanied by a cheque made payable to Micro Adventurer.

UK subscribers

A year's subscription is £10.00 — please send this form with payment to Micro Adventurer, Subscriptions Department, Oakfield House, Perrymount Rd, Haywards Heath, Sussex.

US/Canadian subscribers

A year's subscription at air-speeded rates is US\$33.95 — please send this form with payment to Micro Adventurer, c/o Business Press International, 205 East 42nd St., New York, NY 10017.



Collective misery

This week in the corner, the Grand Elf and I are going to look at some of the letters we have had during the past couple of months — and my apologies now for not answering some of your letters sooner.

I've had several letters regarding an adventure, for the Spectrum, which I think has been rather underrated (although the sales figures may prove me wrong!). This is *Quest*, from Hewson Consultants. It's a nice mixture of traditional adventure, with lots of spells and Dungeon and Dragon-style monster-bashing, including a rating system which starts you off as *Cave Crawler*.

Ian Ritchie writes from Belfast: "I can achieve the rating of 'Dwarf Dodger', which is about 240 points out of the maximum 600. First of all, I cannot find the magical properties of the ring (which I found shortly after destroying the rat), nor can I find out how to cross the river which is just

south of a dwarf. However, probably my biggest problem lies in trying to get back along my route, having found the great sword and the scroll, underground. I have read the 'Scroll Book' which says that the 'Tree = Vampire', which I cannot find the solution to. The key to open castle oops (south of the Black Hobbit) never seems to be anywhere — I only found it once. I hope you can help me in some way, as I am being confused by a very detailed, interesting adventure."

Alan and Daphne Davis, from Lancaster, wrote to me some weeks ago about their experiences with *The Hobbit*, and have recently written another very interesting letter about *The Quest*: "With a score of 365, we have achieved a rating of 'adventurer, second class'. We now have a hut full of vases, chalices, rings and bracelets, and the countryside is littered for miles around with dead bodies (we made better progress as a wizard than a fighter).

"We have the scroll, but its message (what is needed is a quick change) baffles us. We have the long key and have unlocked the castle door, but we can't open it or get in. The trapdoor, though not locked, can't be opened.

"Don't trust the wizard in the study — he appears to be a charlatan! You pay him your hard-earned gold and get nothing! Worse still, the programmer is also a rogue — the hint here is 'pay him'!

"Some of the mazes are positively criminal. We spent hours wandering around them, dropping objects and mapping them out — and this is essential if you're to be able to move freely around the world. We think this is a truly excellent program — difficult, full of surprises and completely baffling even now we've come so far..."

As you can see from these letters, *The*

Quest is an absorbing adventure, well worth a place in the Spectrum owner's library. The Davis' letter contains some valuable hints on solving the mazes, and in a later corner, I'll go into them in more detail (notice the good advice about dropping objects in a maze — often the only way you can find your way around). In the meantime, if anyone out there can help us in our collective misery...

"Please can you give me all available help on one of the most frustrating adventure programs I have ever tried. It is, of course, Artic's *Ship of Doom*. I am really beginning to think that it is impossible to get the key from the glass cover. Also, I cannot understand what purpose the body in the block of ice can possibly serve, as it seems impossible to break, thaw or do anything with. This program is driving me insane — is it possible to get any further help? PS. Do Artic know all the clues, I wonder?" writes L J Rogers of London N1.

"Can you give me some advice as to how to progress in Artic's *Ship of Doom*? How do I power the rod? How can I get the key? I have all the objects to be found in the immediately accessible rooms," echoes Marcus Groan of Bristol.

Miller, of Weymouth, is another of the many stuck in the same place. These letters are just some of many I get about Artic's adventures. They are notoriously difficult. However, they are, strangely enough, ideal for the beginner, and are the first programs seen by many of us Sinclair adventurers — they have been around for an eternity (well, at least four years!).

On to the problems — regular readers of the corner will recognise the code that follows: starting from the second letter, read off every other letter. When you reach the end, return to the first letter, and repeat the process. To get the key from the glass cover and to power the rod:

RIONDS*EPROTIBNATTSTOENRICYAITNCTOOV
REOR

Meanwhile, J Croskell of Lancaster is playing *Planet of Death* and is stuck at the forcefield — neither can he get the coin from the lake. Try this first:

TWOGAERTBCOOOITNS
and at the forcefield:

CFEI*RTHELEANSDEARNTCWEI

Incidentally, Artic are quite happy, they tell me, to send a Help Sheet to anyone who finds themselves inextricably stuck in one of their adventures. Send a SAE to: Artic Computing, 396, James Reckitt Avenue, Hull, N Humberside. ■

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

Are you stuck in an adventure? Are you faced by a problem that seems insurmountable? *Adventure Helpline* may be the answer.

Adventure Helpline is, quite simply, designed to put adventurers in touch with one another. Where you may be stumped by a baffling puzzle, a fellow adventurer may be able to help. By the same token, you may be able to help other people with their problems.

If you are having difficulties with an adventure, fill in the accompanying coupon and send it to:

Adventure Helpline
Popular Computing Weekly
12-13 Little Newport Street
London WC2R 3LD

We shall publish *Adventure Helpline* entries each week in their own special column.

Adventure Helpline

Micro

Adventure

Problem

Name

Address

HIRE SPECTRUM SOFTWARE

CHOOSE FROM OUR VAST RANGE

FREE 20 page CATALOGUE with full details of our range of over 180 different programs for the ZX SPECTRUM. All hired with the consent of the publishers. Whether you prefer to ZAP aliens, get lost in an adventure game, EDUCATE your children, CALCULATE the family finances or COMPILE machine code programs WE HAVE THE RIGHT TAPES FOR YOU TO HIRE.

FAST SERVICE

We stock several manufacturers original copies of each tape, and can normally despatch your tapes the day we receive your order, and we always use first class post.

LOWEST PRICES

We believe our prices are the lowest of any library, yet we offer the LARGEST range of titles. TWO WEEKS HIRE OF ANY TAPE COSTS JUST 80p (plus 40p p&p).

FREE TAPE HIRE

For a limited period, we will send your first tape (your choice) FREE, so join our library now. You can't afford NOT to!!! If you've tried another library and are wary of our claims send a stamp and we'll gladly send you a copy of our catalogue - we're confident you'll join when you see it!!!



NATIONAL SOFTWARE LIBRARY

200 Mulgrave Road,
Cheam, Surrey SM2 6JT

I enclose cheque for £6.00 for LIFE MEMBERSHIP and I understand that my first tape hire will be FREE. If, within 28 days, I'm not delighted with your service you'll refund my membership fee.

Name _____

Address _____

PCW6



HEY YOU !!! SPECTRUM OWNER

DON'T MISS THESE



FARMER-16K/48K Arcade Game.
All machine code - Super graphics.
Progressive difficulty feature
Bonus scores - User tested.

A highly addictive game - How good are you at avoiding Fox Hunts, Bulls, Lorries, Tractors, Etc. ? Can you 'out Fox' the Dog & Hen to save the corn ?



ASSIGNMENT EAST BERLIN
48K Adventure Game.
Machine code search routines
for fast response, quick save
& auto verify (10 secs each).

Have you got what it takes to survive as a Spy in East Berlin ? You will be pursued by Police at every turn, will you complete your Mission ? Who is the Thin Man ? What secret does the Blonde Hostess hide ?

Both games user tested before release.
Both games £5.95 each inc post & package.

Link Enterprises Ltd, 20 Derwent St, Consett, Co. Durham.

Name: _____

Address: _____

Please rush me, by return of post, within 48Hrs. At £5.95 each :
Farmer. Assignment East Berlin. I enclose

Cheque/PO/Access Master Card No: _____

ATTENTION!!! ATTENTION!!! ALL VIC20 AND CBM 64 OWNERS!!!

Tired of waiting for a load/save? With TORNADO you can save/load a 16K program in 34 seconds — yes 34! It even beats the disk drive! The same 16K program loaded by: CBM basic save/load takes 300 seconds and CBM 1541 disk drive takes 42 seconds. But the Tornado does not stop there! It also allows you to copy any part of memory Ram/Rom... the lot! Available for 8K Vic and CBM 64 now.

Do you want to come out of those crashes or get out of those loops? Then you need BREAKER! The reset switch fits directly on the user port in seconds and gives you total reset power against any nasty being inside your Vic20/CBM 64!

Coming soon!! is the SS (Sprite Editor!!) Free!! Plastic pocket sized ref. cards!! with any orders received before end of February.

Please make your cheque payable to:

B&F COMPUTER SERVICES LTD

Please send me Tornado at £9.95 each

Please send me Breaker at £7.95 each

I enclose cheque/PO to the sum of £

Name Computer.....

Address

Block letters only. Prices inc VAT and p&p (mail order only, add £2 if outside UK).

Please post to **B&F CSL, 20-28 Bolsover Street, London W1**

Dealer inquiries welcome.

ULTRASOFT

BETTER SOFTWARE AT BETTER PRICES

MAIL ORDER ONLY

PO BOX 107, UXBRIDGE, MIDDX, UB10 0RG

SPECTRUM	DRAGON
CRYSTAL Rommels Revenge Invasion of the Body Snatchers RRP £7.50 Our Price £6.50	MICRODEAL All their titles RRP £8.00 Our Price £7.95
R SHEPHERD Urban Upstart RRP £7.50 Our Price £6.50	JMM Maurice Minor Crusader, Vultures, Droid RRP £6.95 Our Price £6.25
OCEAN Hunchback Mr Wimpey Transversion, Digger Dan RRP £5.90 Our Price £5.50	PEAKSOFT SAS , Champions RRP £6.95 Our Price £6.25
BUG BYTE Cavern Fighter Birds & Bees, Pool, Aquarius RRP £5.95 Our Price £5.50	S/V Quickshot Joystick RRP £12.95 Our Price £11.95
ULTIMATE Lunar Jetman Atic, Atac, Pssst, Cookie RRP £5.50 Our Price £4.95	
VIC 20	COMMODORE 64
ULTIMATE Jetpac RRP £5.50 Our Price £4.95	MICRODEAL Space Shuttle RRP £8.00 Our Price £7.75
LLAMASOFT Meta Llamas RRP £6.00 Our Price £5.00	OCEAN Mr Wimpey, Hunchback RRP £6.90 Our Price £6.25
OCEAN Caterpilla RRP £6.90 Our Price £6.25	S'WARE PROJECTS Manic Miner RRP £7.95 Our Price £7.25
DURRELL Quest of Merrarid RRP £7.95 Our Price £7.25	QUICKSILVA Ring of Power RRP £9.95 Our Price £8.25
QUICKSILVA Skyhawk RRP £7.95 Our Price £6.95	Purple Turtles, Aquaplane RRP £7.95 Our Price £6.50
CHANNEL 8 Black Squid RRP £9.95 Our Price £8.95	TERMINAL Super Gridder, Scramble, Dogfight RRP £9.95 Our Price £8.25
	INTERCEPTOR Siren City, Tokens of Gaul, Vortex Raider RRP £7.00 Our Price £5.95

SEND SAE FOR OUR CATALOGUE
(PLEASE STATE MACHINE)



ATARI JOYSTICK

M. E. Ramsden of Overthorpe Road, Thornhill, Dewsbury, West Yorkshire, writes:

Q I have owned an Atari VCS video game for nearly two years now and I have finally decided to sell the Atari and buy a brand new Dragon 32. But I would like to know whether the joysticks from the Atari will fit the Dragon. If they don't, do you know of an adaptor of some sort that will enable the joysticks to operate on the Dragon computer?

A Yes, they can be used, but a special Interface is needed. One is available from Cotswold Computing, who incidentally also do an interface that allows the Wico Track Ball for the Atari to be used on the Dragon. Cotswold Computing can be found at 6 Middle Row, Chipping Norton, Oxfordshire. The price of the joystick interface is £14.95.

PROGRAM BREAKER

Kulvinder Singh, of Vaughan Road, Willenhall, West Midlands, writes:

Q I have written a few programs for myself on my BBC micro (B), and would be interested to hear from you if you could help and tell me how to stop them from being broken into and listed — except, of course, by myself.

A Unfortunately, in the final analysis, any program that has been written can be broken. However, you can make it difficult. You could use some sort of *On Error Goto* where pressing the *Escape*, for example, produces an error,

thus overriding it. If you have the 1-2 Operating system, the following call will disable the *Escape* key *FX 221,1.

DIL SOCKETS

Michael Bromwich of Kirby Hill, Braddon, Isle of Man, writes:

Q There are a few points that puzzle me about the BBC model B.

1) What are the DIL sockets on the left of the keyboard for? Are they for ROM chips, for languages other than Basic. Can they be used to program Eproms?

2) Is it true that there is an analogue interface on the base of the computer? If so would it be possible to connect analogue devices such as thermistors to the BBC micro directly?

3) I remember seeing op-code mnemonics in Basic listings for the BBC. If another processor was connected by the tube could it be addressed in a similar way?

4) In some adverts I have seen the BBC has background and eight foreground colours. Are the foreground colours the same as the background colours, or are there 16 colours?

A Two questions here about the DIL sockets, and as they seem to cover areas which interest several people it seems sensible to deal with them both at once.

The Dip In Line (DIL for short) sockets are for a set of micro switches that can help you pre-set certain features on your keyboard. They represent a single byte of eight bits. The bits have the following functions:

- 0 - 2 Select the Mode.
- 3 Allows you to boot from Disc.
- 4 - 5 This sets the disc timing for disc drives other than Acorn's own.
- 6 - 7 These two bits are not used.

Obviously these sockets cannot be used to program Eproms or anything like this.

As for your other questions, the BBC has four analogue ports at the back which makes it compatible with a very wide selection of analogue devices.

I can only assume that Mne-

monics and code that you saw for the BBC were for the onboard 6502 processor. Obviously if you used the tube to connect up a further 6502, then there should be little problem. But what would happen if, for example, you had a Z80 connected via the tube? The BBC (6502) code would be of no use whatsoever. Machine code is entirely dependent on the specific processor, and while there may be similarities within a family, there is no compatibility. Any code would have to be written for the specific processor. Finally, the BBC only has eight colours, which can be either foreground or background colours.

A HIGH PRICE

Graham Freestone of Knights Avenue, Haverhill, Suffolk writes:

Q I am the owner of a TI 99/4a, and would like to know whether I can use my school Epson MX 80 printer with my computer? I ask because I have to produce listings and *Runs*, for my O-level computer studies course.

A One of the reasons for the failure of the TI 99/4a is the very high price of peripherals and cartridges. Atari have met a similar problem, where the British market is less willing to accept a situation where once they buy a computer, they are locked into having to deal with only the manufacturer, and perhaps a small group of outside suppliers who can then charge what they like, or what they think the market will accept. This is one of the major question marks over the new Sinclair QL. Good as it is, the only way to *Load/Save* programs is on Microdrive. It goes without saying that there is only one source of microdrive cartridges.

It is quite possible to use a TI with a printer, but in fact both a

buffer board and interface are needed! The combined cost is approaching £250. I tried to get current prices from no less than five shops in Tottenham Court Road recently. None of them stocked TI peripherals, and doubted whether or not they would now be readily available. They were just selling the computers. There might be a chance that you could get what you need if you could find a dealer selling off old stock. I would further suggest that you obtained a Centronics port, or else there might be even more cost as you find yourself having to add an RS232 interface to the printer.

Failing this, then a new computer might well be the answer. The BBC will interface to most common printers by the simple expedient of a ribbon cable.

MEMORY TRANSFER

Paul Rogers of Lowcroft Ashurst Estate, Skelmesdale, writes:

Q I have a Dragon 32, and I would like to know if a Rom cartridge program remains in the computer once the cartridge is removed?

A No, I am afraid that if you take out the cartridge then you lose the program. The Rom in the cartridge (there can be Ram as well), does not transfer its contents to the memory space of the Dragon.

As for stacking several cartridges together, it would depend on where they are mapped into the Dragon's memory. If, for example, two cartridges were both mapped into the Rom addresses of the Dragon, then not only would they override the onboard Rom, but they would also clash with each other. Your best hope is a mother board. I do not know of one for the Dragon, though Wessex produce an expansion board capable of having an extra 64K slotted in.

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



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 come in
- APPLE, BBC (B), COMMODORE 64, DRAGON, SPECTRUM (48K), ZX81 (16K)**
£15 (all inclusive)

We produce databases for those developing their own prediction program. Two years results £7.50. Five years results £12.50

Available from dealers, or direct (return of post) from . . .



Selec Software



37 COUNCILLOR LANE, CHEADLE, CHESHIRE 061-428 7425
DEALER ENQUIRIES WELCOME

THE



RUN

..... IS HERE

ZX81, SPECTRUM, DRAGON
BBC AND VIC

SOFTWARE LENDING LIBRARY

We have for hire from 50p (including postage) programs for your computer.

£5 for life membership (less than the cost of a single game) brings you the Software Lending Library membership kit including catalogue, newsletter.

All tapes lent with full manufacturer's permission.

Send a cheque or postal order for £5 to **Software Lending Library**, PO Box 3, Castleford, West Yorks stating name, address, and computer type.

DISCOUNT SOFTWARE

HUGE DISCOUNTS OFF MOST COMPUTERS
12-PAGE CATALOGUE, INCLUDING:

	RSP	Our Price
SPECTRUM		
Manic Miner (Bug-Byte)	£5.95	£4.95
Ant Attack (Quicksilver)	£6.95	£5.95
Hobbit (Melbourne)	£14.95	£11.99
COMMODORE 64		
Everest Ascent (Shepherd)	£6.50	£5.00
Hunchback (Ocean)	£6.90	£5.90
BBC		
Sticker Puzzler (DK Tronics)	£6.95	£5.95
Dictator (DK Tronics)	£6.95	£5.95
ORIC		
Asteroids (Artic)	£5.95	£4.95
Bozy Boa (COS)	£5.95	£4.95
DRAGON		
Maurice Minor (J. Morrison)	£6.95	£5.95
Leggit (Imagine)	£5.50	£4.50

CWO P&P 55p 1 Tape, 2 or more Post Free. SAE for 12-page catalogue of software for most computers, to:

DISCOUNT SOFTWARE, 45 Brunswick, Bracknell, Berks

FANTASTIC DEAL! SALE! LIMITED OFFER!

~~£14.95~~
£3.20 OFF! VALHALLA £11.75!

● Spectrum 48K only ● (LEGEND)

~~£14.95~~
£3.20 OFF! THE HOBBIT £11.75!

(MELBOURNE HOUSE)

● Spectrum 48K ● Commodore 64 BBC ● Oric1 ●

SAVE £7.40! GET BOTH FOR ONLY £22.50!

Send Cheque/P.O. to: (State Micro.)

ATLANTIS SOFTWARE,
Dept. PCW 2

28 Tile Kiln Lane, Hastings, East Sussex

SEND SAE FOR UP TO DATE LIST OF OUR AMAZING BARGAINS

POPULAR
Computing
WEEKLY

Back
Issues

Almost all the copies of PCW that you missed can still be bought as back issues for only 50p, including postage and packing.

An **index** of the contents of the 36 issues published in 1982 is now available from the Publishers for only £1.20. It includes full details of all the programs, routines, reviews and news that you might have missed.

Please send me the following back issues at 50p each

Total £ _____

Please send me a copy of the 1982 PCW Index at £1.20

I enclose a cheque/postal order for £ _____

Name _____

Address _____

Please return to Back Issues, PCW, 12-13 Little Newport Street, London WC2R 3LD.

MERCURY
HOUSE

GAMES FOR

AQUARIUS

MERCURY
HOUSE

Gamespack 1 contains — Bombadier, Fruit Machine, Hangman, Alien Descent, Soccer Manager — £4.99

Gamespack 2 contains — Dungeon Adventure, U-Boat, Golf, Starcatcher, Moonraker — £4.99

SPECIAL OFFER

BOTH TAPES ONLY £7.99

Din to Din or Din to Jack — £1.75

CHEQUES, POs TO

MERCURY HOUSE

PO BOX 157, MANCHESTER M60 1PP

Mail order only

Trade enquiries welcome

Please allow 14 days for delivery

CLASSIFIED

Semi-display — £5 per single cc
Lineage — 20p per word

CALL DIANE DAVIS ON 01-437 4343 FOR SEMI/DISPLAY ADVERTISING

GAMES SOFTWARE

SPECTRUM GAMES Aid, a set of machine code ?????? to give some of the graphic effects found only in m/c games. All can be called from your basic programs. Includes two sound effects. Send £3.99, to: 34 Knowsley Drive, Leigh, Lancs, WN7 3LY.

SPECTRUM GAMES Aid, a set of machine code routines to give some of the graphic effects found only in m/c games. All can be called from your basic program. Includes two sound effects. Send £3.99, to: 34 Knowsley Drive, Leigh, Lancs, WN7 3LY.

COMMODORE GOODIES, Boss Chess (VIC 20), £4.00. For CBM 64 Arcadia, £3; Snooker, £4; Joystick, £3; CBM 64 games book, £3. Tel: Ruislip 35588.

● IMMEDIATE DELIVERY ●

COMPUNTA

RACING FORECASTER
NEW NATIONAL HUNT EDITION

A tried and tested program.
Simple to use — no records to update.
Tape contains data for races at any of 22 National Hunt courses.
High success rate.

**DRAGON 32, SPECTRUM 48K,
TANDY COCO 32K,**
Only £5.50 inclusive

Only available from:
RED ROM DATA
72 LAMBERT ROAD, GRIMSBY DN32 0NR

TOP 100 Spectrum games, two for the price of one, Beedus Software. Tel: 01-954 7177.

SPECTRUM SPEEDYLOAD. Halve your waiting time! This short program lets you save/load at 3,000 baud. Easy to use with any tape command. cassette (48k) £3.95. Ness Micro Systems, 100 Drakies Avenue, Inverness.

SPECTRUM TRADE SECRETS. New booklet includes how to make programs unstoppable, unlistable, invisible. How

to reveal such. With hints/tips and Microdrive supplement, £3. ZX GUARANTEED, 29 Chadderton Drive, Unsworth, Bury, Lancs.

AMAZING SPECTRUM CASSETTE. Lets you Stop/Study Machine-Code programs. Includes a program to transfer Bytes to Microdrive. Send £3.50 and quote Study 2. ZX GUARANTEED, 29 Chadderton Drive, Unsworth, Bury, Lancs.

SOFTWARE DISCOUNTS

eg SPECTRUM
ATIC ATAK, JETPAC, etc.....£4.95
MANIC MINER (Bug Byte).....£5.30
HUNCHBACK (Ocean).....£5.90
FIGHTER PILOT (Dig Int).....£6.50
ALCHEMIST, ZOOM, etc.....£4.75

COMMODORE 64

MANIC MINER (S. Projects).....£6.50
PILOT 64 (Abbex).....£5.99
SUPER PIPELINE (Task Set).....£5.90
Fast service. List sent with order. Prices incl.

First class P&P.
CivPO to: O.J. SOFTWARE
273 Mossy Lea Road, Wroughton
Wigan, Lancs, WN6 9RN

AQUARIUS SOFTWARE only £2 per tape. Send £2 for game + list. D. Spencer, 230 Lowgrange Avenue, Billingham, Cleveland.

POOLS PREDICTOR for Commodore 64. Full instructions and database. Cassette based. £2.50. D. Hayton, 21 Lintford Road, Hamsterley Mill, Rowlands Gill, Tyne/Wear, NE39 1HG.

VIC SUB-COMMAND, a new graphic submarine game for Vic +3K and (joy or key) option. Send £4.50 to P. Nicholson, 56 Gillott Road, Edgebaston, Birmingham B16 0EZ.

SIGMASOFT KILLERSNAKE. Un-expanded Vic-20. Devour flies, beetles + bonus Sigma's with your Killersnake. Avoid poison mushrooms. Hires multicolour pixels. 10 levels. Hi-score table. Amazing sound-effects. Unbelievably squeezed into 3.5K. Only £4.00 cheque/PO, R. Ball, 160 Kiln Lane, St Helens, Merseyside.



3 FAST ACTION MACHINE CODE GAMES FOR THE 16K OR 48K ZX SPECTRUM £3.00

PAUL COYLE SOFTWARE
548 Great Horton Road
Bradford BD7 3HG

SPECTRUM SAVERS

Title	Publisher	Our Price
KRAZY KONG	P.S.S.	£3.80
MANIC MINER	Bug-Byte	£4.40
ATIC ATAC	Ultimate	£4.00
LUNAR JETMAN	Ultimate	£4.00
ANT ATTACK	Quicksilver	£5.75
SPLAT!	Incentive	£3.85
HOBBIT	Melbourne	£10.00
ARCADIA	Imagine	£3.85
PENETRATOR	Melbourne	£4.70
ZOOM	Imagine	£3.85
TRANZ AM	Ultimate	£4.00
JET PAC	Ultimate	£4.00
PSSST	Ultimate	£4.00
LIGHT CYCLE	P.S.S.	£3.80

The above is just a selection SAE for lists. Lists also for Oric, BBC, etc.
Post & Packing please add 40p per order
Cheques/POs to:

CAROLINE SOFTWARE
155 Sanctuary Way, GRIMSBY,
S.Humberside

SPRITE TRACK for any Spectrum, new, all-action game. The further you go, the harder it gets. Superb graphics. 100% m/c, only £4.95. From J. Fletcher, 29 Samuel St, Warrington WA5 1BB.

ZX81 161C Golf, includes all normal features, plus choice of handicap, cassette £3.95, or listing £1.95, from T. D. Frost, The Links, Montrose, Angus, Scotland.

SPECTRUM 16/48K, "Raquel" presents her games pack for ages 16 and over only (state age when ordering). Still only £3.50. I. Brooks, 17 Malvern, Coleman Street, Southend, Essex.

POOLS FORECASTING system: Spectrum 48k, guaranteed better than chance. Forecasts draws for all English and Scottish teams: Detailed owners manual launch price for limited period. £4.50 (inc P/P), cheque/PO to: Mistral Software, 241 Forest Road, Tunbridge Wells, Kent.

TRY US FOR SOFTWARE
CBM 64 SPECTRUM
UNIQUE BUY-BACK TRADE-IN SYSTEM
THE ONLY WAY
TO BUY SOFTWARE
SAE for details. State computer to:
JAYCEE SOFTWARE, FREEPOST (EN
64) (NO STAMPS), FORRES 1V36 0BR.

CLUBS

SOFTSWAP: THE new software exchange club for BBC, CBM 64, Spectrum and VIC owners. Free membership. SAE to J. White, Hillside, Totterdown Lane, Weston-Super-Mare, Avon.

VIDEO GAME Club by the Spectrum specialists. Phone 01-459 0831 for details of special offer, and catalogue of latest software available.

SPECTRUM SOFTWARE Library, two weeks hire £1, life membership £5. Join now, or SAE for lists. R. Gruszka, 113 Broomfield Rd, Marsh, Huddersfield.

SOFTOPTION. The Spectrum Software Swapshop, swap your cassettes within 24 hours, SAE for details. Softoption, 8 Wyre Street, Ashton, Preston, Lancs PR2 2RQ.

BORED with your Spectrum software?
Fancy a change? Then join

SOFT EXCHANGE

The Spectrum Software Exchange Club
Swap your used programs for new ones, £1 per swap, free life membership
SAE for details to: Soft Exchange (Dept. PCW), 11 Centerion Drive, Meols, Wirral L47 7AL

CLASSIFIED ADVERTISING RATES:

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

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

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

If you wish to discuss your ad, PLEASE RING Diane Davis 01-437 4343.

Here's my classified ad.

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

Please continue on a separate sheet of paper

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

Name

Address

Telephone

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

UTILITIES

C 64 PROGRAMS accelerated, £3.50; MCM assembler disassembler, has many features of professional systems, £7. Tel: 0222 865067 for details.

DRAGON 32, make your basic or machine code programs auto-run and display graphics whilst loading. SAE, £3.95. Impsoft, 63 Clarendon Way, Chislehurst, Kent.

COMPUTERISED NEWS System. Newsagents weekly accounts for Sinclair Spectrum, £19.95. SAE for details. Willowbank Computing, 42 Lawson Close, Warrington, Cheshire, WA1 4EG.

FIVE 48K Spectrum utilities for just £4! Biorhythms, header reader, word processor, anti-break and UDG character set. Romsoft, 6 Erroll Road, Romford.

ORIC Forth Floating Point extension words. Full facilities. Trig functions, complex numbers, and turtle graphics. £4.50 (including full documentation) David McKelvie, 86 Northcott, Bracknell, Berks.

★ ★ TAPE COPIER ★ ★

You need a BACK-UP copier to protect your Spectrum tapes. Our package copies all types of programs easily with many unique features. We offer a full money back guarantee if you are not satisfied.

- ★ M/drive copies basic/code/ data onto the microdrive stops programs to help make them run!
 - ★ LOADS in all program parts (no limit) CONTINUOUSLY — even without pressing a key. Most copiers require many loadings — MASSIVELY saving you time and trouble!
 - ★ Copies ALL programs that we are aware of (headerless/mc/etc).
 - ★ Break at any time — just copy a "header" if you like!
 - ★ First class post + updates at £1.50
 - ★ Verifies Repeat copies
 - ★ Maxcopy makes a working copy of the full 16K or 48K! Gives program name.
 - ★ FULL user instructions but the package is VERY SIMPLE to use.
- Cost £4.50
(£5.50 with m/drive)
(overseas + £1 Europe, £2 others) old customers old tape, SAE £1.50
(or £2 with m/drive).

MASSIVELY IMPROVE ALL YOUR SPECTRUM PROGRAMS using our GRAPHICS AND SOUND TOOL KIT

- Write impressive GAMES, or smarten up your other programs with PROFESSIONAL machine code effects. Yes m/code at your fingertips called from BASIC. No knowledge of m/c required!
- ★ Over 80 routines including PIXEL scrolls — all directions — wrap around.
 - ★ Character rotates and reflects, border effects, screen inverts. BOX fill.
 - ★ Sound, memory left, etc. etc. DEMO tape and FULL MANUAL.
 - ★ Easy to use, and relocatable in memory. ONLY £5.50 (not the usual £10+)

LERM, DEPT PW
16 STONEPIT DRIVE,
COTTINGHAM
MARKET HARBOROUGH, LEICS.

DRAGON/32 BBC MODEL/B ATARI 400/800 TRS80 C/C 32K ELECTRON 747 FLIGHT SIMULATOR

Superbly realistic instrumentation and pilot's view in lifelike simulation which includes emergencies such as engine fires and systems failures. This program uses high resolution graphics to the full to produce the most realistic flight-deck display yet seen on a home computer. There are 21 real dials and 25 other indicators (see diagram). Your controls operate throttle, ailerons, elevators, flaps, slats, spoilers, landing gear, reverse thrust, brakes, etc. You see the runway in true perspective. Uses joysticks and includes options to start with take-off or random landing approach. "A real simulation, not just another game" (*Your Computer*, April 19, 1983).

"The cockpit display is impressive" (*Which Micro*).

Cassette £9.95 (p&p and VAT included):

DACC Ltd (Dept. PCW)

23 Waverley Road, Hindley, Greater Manchester WN2 3BN
(Despatch within 48 hours)

ROMREAD

An aid for the advanced BBC MICRO user
A sideways ROM support utility
Transport your firmware to other memory media
Friendly . . . Versatile . . . Fast!
Only £6.50 incl

Cheques/POs to:
COMPROMISE CONSULTANTS
20A Kings Avenue, Woodford Green
Essex IG8 0JA

Schools, clubs, offices, collectors
salesmen!!

DATASHEET (SPECTRUM)

Sorts and edits your own defined lists. Names, addresses, dates etc. You choose the headings and columns, type in the lists, and DATASHEET will reorganise them for you — alphabetically, numerically — machine code fast! Add, delete, amend, then save for reference.

Send cheque/PO, for £6.95, or see for details.

P. B. Software, 8 Beechwood Road,
Chippenham, Wiltshire SN14 0EZ.

SOFTWARE

FREE SOFTWARE

If the idea of free software and a good second income appeal to you send SAE to:

DATAGRAPH (C)
11 CONNAUGHT PLACE
LONDON W2 2ET

DIY FOR MICROCOMPUTERS — VOL. 1

Let your MICRO assist you to work out the quantities of Building Materials for your home improvements and repairs, using x:

**DRAGON 32 & 64
SPECTRUM 48K
BBC 32K**

SIDE 1 of the cassette gives guidance and calculates the average materials for BRICK-LAYING, CONCRETING, TILING and PAVING, PAINTING and WALLPAPERING, 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 and HINTS on the above subjects, plus HEALTH AND SAFETY AND METRICATION.

£5.00 (or SAE for details) to:

D. A. Hanson, 4 South Cottages
Shenley Lane, London Colney
Herts AL2 1AD

CENTRAL HEATING design for the Spectrum 48k, 16k version available, this program describes and graphically displays the main types of domestic heating system. It also calculates heat losses, the size of boiler required and offers a choice of radiators for each room, £6.95. (State 16 or 48k). Dorte Software, 2 Buttermere Drive, Allestree, Derby DE3 2SN.

DRAGON 32 SUPADRAW

"The respectable game." Brings graphics to life. Draw shapes — preprogrammed or freehand — using joysticks or keyboard — then colour them in, menu driven, £7.95, including user manual.

Steeplesoft, 58 Deepfield Way,
Coulson, Surrey CR3 25R.

QUICK-DRAW. 16/48K Spectrum. Machine code drawing program. Will draw straight, isometric lines, circles, curves, full delete mode. Fast shading. Full colour. Load and save option. £4.50 with full instructions. T. Wardle, Pyramid Software, 59 Lord Haddon Road, Ilkerton, Derbyshire DE7 8AU.

SPECTRUM RENUMBER. Tidy up those Spectrum listings quickly, handles GOTO's etc., Approx 1K machine code, State 16K or 48K. Send £2.75 for cassette. Dunkley, 26 St Michaels Avenue, Guildford, Surrey.

HORSE RACING ANALYSIS BY COMPUTER RATING METHODS

Be like the Professionals, do your own RATINGS with real confidence when you use this unique "METHOD". There's nothing to beat it, so IT'S GOT TO BE YOUR BEST BET. Also included in this unique package is a very successful and easy Method for finding the most consistent "HORSE TO FOLLOW" plus a superb Staking Plan. Remember, you've nothing to lose but a lot to gain when you know "HOW".

Suitable for both FLAT & N/H and supplied on one cassette. Don't delay, write today for further information leaflet enclosing SAE to: CRM 14, Langdale Place, Newton Aycliffe, Darlington, Co. Durham, DL5 7DX.

COMMODORE AND Spectrum software, 10% off RRP — over 600 titles! Bargain vic 20 cartridges, £6 each, or 4 for £18. Telephone: 01-594 9979 for price list.

SOFTWARE ONLY £1.00

CONTACT VIC ON (0482) 706767
MAIL ORDERS WELCOME
★ WANTED — CLEAN COMPUTERS

M. MICRO'S
14 DORNOCH DRIVE
JAMES RECKITT AVENUE, HULL

EDUCATIONAL SOFTWARE

EDUCATIONAL SOFTWARE for 48K Spectrum. GCE O/CSE Physics, six programs £6.50, chemistry six programs £6.50, or both tapes £12. Think Tank, Dept. PCW, 35 Wellington Road, Wimbledon Park, London SW19 8EQ.

DEALERS

24 The Parade
Silverdale, Newcastle
COMPUTER CABIN Tel. 0782 636911

Official dealers for Commodore, Sinclair, & Acorn. BBC service and information centre

Huge range of hardware and software backed up by sophisticated service department
The New Memotech Computers now in stock

LANCASHIRE MICROS

ACORN/BBC, SINCLAIR, COMMODORE, ORIC, MEMOTECH, DRAGON + LYNX PERSONAL COMPUTERS.
We have a very wide range of software, books and accessories, including over 200 titles for the Spectrum alone.
51 QUEEN STREET,
MORCAMBE
Tel: 411435.

COMMODORE 64 £164 (Excluding VAT)

Disk drives and cassettes also available
Tel: Floyd Patterson; Tel: 01-969 0819 or send SAE

Image Science Micro Computers Ltd
189 Freston Road, London W10 6TH
or cheques/POs (add 15% VAT) and £8 for p&p Securicor delivery

Full after-sales maintenance on all Commodore equipment bought from us

SOFT MACHINE

OPEN MON-SAT, 10.30-6

We offer a selection of the Finest Books and Software currently available for: Oric, ZX81, Spectrum, BBC, Dragon, Vic20 and Commodore 64 Microcomputers.

3 STATION CRESCENT
WESTCOMBE PARK
LONDON SE3

Tel: 01-305 0521

or send SAE for free Catalogue (State which Computer)

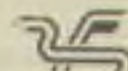
PENNINE COMPUTER CENTRE

WE HAVE NOW MOVED TO:

30 BURNLEY ROAD
ACCRINGTON
LANCS.

Tel: 0254 390424.

MAGAZINES



DRAGON USER

To make the most of your Dragon you need **Dragon User** — the independent magazine for Dragon owners. To make sure that you receive a copy of Dragon User regularly subscribe direct to us. A year's subscription costs £8 for 12 issues or subscribe for two years for £14.40 and receive a free copy of either **The Working Dragon** or **Dragon Gamesmaster** (overseas rates available on application). Send a cheque or postal order made payable to Dragon User, and accompanied by your name and address, to Dragon User, Subscriptions Department, Oakfield House, Perrymount Road, Haywards Heath, Sussex RH16 3DH.

ACCESSORIES

DON'T WAIT until examination panic sets in. Consult London's foremost tutorial agency now. Almost all subjects at all levels. Tel: 01-722 1379.

COMPUTER USERS, expand with our range of books, manuals, games/educational software. SAE for free lists/introductory offer. Adepak, 109 Bellamy Drive, Stanmore HA7 2DG.

DRAGON QUICKSHOT — NEW!

- ★ Gain the winning edge
 - ★ Needs no expensive interface
 - ★ Plugs straight into joystick port
 - ★ Comfortable single handed operation
 - ★ Removable suction pads
- Send cheque or postal order for £11.95 plus 55p p/p to:
Timian Computer Products
3, Lichfield Passage,
Wolverhampton WV1 1DZ
Trade enquiries: 0902 25304.

BIG DISCOUNTS

We can supply almost any make of computer game, software utility, hardware or book for Spectrum, VIC20, Commodore 64 or BBC. Hundreds of titles at up to 25 per cent off. R.R.P. send large S.A.E NOW!
Rainbow Systems Ltd., P.O. Box 42,
Harrogate, N. Yorks HG2 9JW.

SERVICES

COMPUTER PROGRAMS COPIED:
1-7 minutes from 33p; 7, 1-13 minutes from 41p per cassette, including VAT and library case. Tel: M.G. Copies, Burntwood 75375 (24 hours).

COMPUTER PRINTED.

Self-adhesive
CASSETTE LABELS
4p each — min. chg. £2 — £3.50 per 100
Black on white (text only) CWO
Paincomms Ltd, 21 Wycombe Lane,
Woburn Green,
High Wycombe, Bucks HP10 0HD.

EPROMS. New immediate despatch
2764 8K byte 250nS £6.50. 27128 16K
byte 250nS £18.00. Prices all inc. UFF,
1 & 2 The Corner, Horsey, Gt Yarmouth,
Norfolk.

FOR HIRE

HIRE A COMPUTER from ZX81 up-
wards for a week or a year. We also buy

APPLE II Europlus with disk drive, APF,
DVM 10 monitor, Anadex DP 8000
printer, and manuals, little used, £500
ono. Phone 435 8331.

ZX MICRODRIVE and interface, one
order form for sale, best offer secures.
Tel: 05255 2275, after 6pm. Monday —
Friday.

MICRODRIVE order form, best offer
secures. Telephone 0846 611856.

HOME COMPUTER BARGAINS

SPECTRUM 48K @ £124.99
MEMOTECH 500 @ £249.99
MEMOTECH 512 @ £289.99
VIC20 PACK @@@ £138.99
COMMODORE 64 @ £199.99
EPSON HX-20 @@ £401.75
EXCESS HP-85
STOCK AT HALF PRICE
Add £5 P&P. Price includes VAT
(Access and Barclaycard welcome)

CALL

HEATHER RUFFLES
ANGLIA HOMES
COMPUTER BARGAINS
88a ST BENEDICTS STREET
NORWICH NR2 4AB
Tel: (0603) 667036 7 Telex 975201

FOR SALE. BBC model B plus
View Word processor. High resolu-
tion VDU Sanyo and cassette re-
corder Sanyo. Price negotiable.
Tel: 7236633.

WANTED

CASH PAID for your unwanted games
(Spectrum or BBC). No copies please.
Tel: Bob 0992 552637, evenings or
weekends.

VIC 20, swap Chess, Catcha Snatcha,
Wacky Waiters, for other games. 551
4853.

WANTED ATARI 800 48k, with disk
drive and printer. 01-570 3690.

WANTED

Quality Games and utility programs for
any Micro. All programs considered.
*Instant cash plus royalties on all
programs accepted with a view to
distribution in UK, USA and Europe.*
Dream Software PO Box 64
Basingstoke, Hants RG21 2LB
Tel: Basingstoke (0256) 25107

PROGRAMMERS — expanding soft-
ware company requires top quality
assembly language programmers for
Commodore 64, BBC Micro, Electron
and Atari. Every consideration shown to
experienced machine-code program-
mers who wish to participate in a
profit-sharing scheme with high roy-
alties. Write to: Leisure and Business
Developments Ltd, 125 Melody Road,
Biggin Hill, Westerham, Kent TN16
3PL.

SUNSHINE

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

Sunshine Publishers of Popular Computing and
Dragon User

NEW IN THE UK "THE JUGGLER" WANTED

Participating distributor of US or UK
manufactured machine, capable of mov-
ing files amongst 83 different systems —
3.5 and 8 inch floppy to floppy.
Interested parties: please write initially to:
101 DORSET HOUSE
GLOUCESTER PLACE
LONDON NW1

Computer Swap 01-437 4343

Free readers entries to buy
or sell a computer.
Ring 01-437 4343 and give
us the details.

Spectrums for sale

SPECTRUM SOFTWARE for swap or
sale. 90 popular titles from £1.25. Send
SAE for list or send your swap list to
(Eddie), 65 Anner Road, Dublin 8,
Ireland.

SPECTRUM SOFTWARE for sale.
Espionage Island, £3. Jet Pac, Manic
Miner, and Zoom, £2.50. Star Trail,
Mined-out, Slipper Sid, £1.75, plus 30p
P + P. Tel: 0323 82 4336. Ask for Jason.
48K ZX SPECTRUM plus 100 games,
Kempston joystick and interface. S35
computer compatible cassette recorder,
all superb games, postage paid.
Boxed, micro drive leaflet, worth £850,
any offers looked at. Tel: 0626 68235.
SPECTRUM SOFTWARE for sale, all
brand new. Flag, Penetrator, Backgam-
mon, Games Designer, will swap for

AQUARIUS

GAMES PACKS FOR UNEXPANDED COMPUTER BUNCH OF 5 / GAMES PACK 1

Snake, Masterguess, Symon, Bomber, Hi-Lo £4.95

GAMES PACK 2

Collector, Blocked?, Rocket Run, Minefield, Air Defence £4.95

SPECIAL OFFER

ORDER BOTH TAPES FOR ONLY £8.95
CASSETTE RECORDER LEAD £1.95

PROCESSOR LTD
A.O.S. House
1 Willow Parade
CRANHAM
Essex RM14 1DZ

BOOK NOW IN STOCK £5.95

AQUARIUS AND HOW TO GET THE MOST . . .

MAIL ORDER ONLY

SAE FOR FURTHER DETAILS

HARDWARE

SINCLAIR OWNERS

If you want to use your computer to help
you in your business, or write games in
machine-code, and you don't know how,
Phone Mr Sarhang-Mehr
Tel: 01-354 1584
for advice and assistance.

DISK DRIVE FOR BBC MICRO £95

Limited number of ex-equipment bare drives
with warranty, formatter and two Fuji disks at
£95 including VAT. Cable kit £17. Carriage,
insurance £8. Brand-new drives complete in
cabinets also available.

Phone Lynda, Aylesbury (0296) 630364,
631446, 631424, or write to: Hellstar Ltd,
150 Weston Road, Aston Clinton, Aylesbury,
Bucks HP22 5EP.



and sell second-hand computers,
magazines and books. Business and
Computer Services, 29 Caledonian
Road, London N1 1BA. Tel: 01-607
0157.

FOR SALE

VIDEO GENIE computer. 16K, VGC
built-in cassette recorder, TR80 basic
with over £150 software (arcade
games, education, utilities), maga-
zines. £95 ono. Tel: 01-578 3934.

ATARI 16K, with keyboard, tape recor-
der, software, basic cart, Galaxian
Asteroids, Scram, £260, swap Com 64
with recorder. Tel: 01 807 9746.

ATARI 800XL, perfect condition, used
once, plus books worth £45, and maga-
zines and joystick, cost £310, accept
£225. Tel: 021-705 7211.

COMPUTER SWAP

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

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

Warning: It is illegal to advertise
pirated software.

COMPUTER SWAP

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

Name

Address

Telephone

software or hardware add ons. Call Farley, at Staines 57086, after 4.30pm. **SPECTRUM S/W**, all £2 off, Planet of Death, Planet of Death, games 5, Embassy Assault, History Etch. Tel: Towcester 51202.

SPECTRUM 2X48K computer and printer, plus tape recorder and 8 tapes, and S/W, sell for £210 ono. Tel: 01-692 4714.

ORIGINAL SPECTRUM S/W, Shepherd Flag, Death Chase, Pyramid, Jumping Jack, Galaxians, Trans AM, Galaxy Attack, Zip Zap and others. £3 each inc P + P. Ring Ben, 0625 433341, after 5pm.

48K SPECTRUM, leads and S/W for sale, £100, (buyer collects). Towcester 512012.

SPECTRUM 48K, 11 months old, £30 of s/w inc: Hobbit and Kempston, Centronics interface "E", 2 months old, sell separately. (0604) 719026.

48K SPECTRUM interface 2, ZX printer and s/w, £150, or will swap for Commodore 64 plus tape recorder. Tel: 01-6910717.

48K SPECTRUM, tape recorder, joystick, excellent condition, speaker, £120, s/w worth £50, £30 of books. Tel: 01-928 7669.

ZX SPECTRUM 48K, printer and some s/w, £190. Tel: 0604 413021 (eves).

ZX SPECTRUM 48K plus Kempston joystick and interface, £90. Tel: 01-485 4884.

48K ZX SPECTRUM, plus over 100 games, (5600 software), Kempston joystick interface, all best games and boxed. Postage paid, microdrive leaflet, worth £800. Any offers looked at. Tel: (0626) 68235.

SPECTRUM SOFTWARE for sale, also microdrive order form, best offer secures, if interested. Tel: 550 6904, after 6pm.

SPECTRUM SOFTWARE for sale, £3.50 new condition, titles include Pool (CDS), Jet-Pack, Manic Minor, Zoom, Winged Warriors, many more, send SAE to Aliem, 16 Bentinck Street, Goose Green, Wigan, Lancs.

SPECTRUM SOFTWARE: T. Tower, Cruising, H. Horace, Jackpot, 30 Tank, Intruders, Missile, Android, Derbyday, Planetoids, Meteors, Sorcerers Castle, Softpack 2 plus chess. Swap for printer/klack keyboard. Write A. Wilkinson, "Glenthorne", Buckle Hill, Milnrow, Rochdale, OL16 4BUJ.

SPECTRUM S/W, worth over £40, inc: Zip Zap, Timegate, Teradactyl 4D and Molar Man, will sell or swap for your originals. Ring 01-561 6958, after 6pm.

48K SPECTRUM twin microdrives fitted to professional keyboard with number pad, software supplied already on cartridges, all manuals and Dr. Logans microdrive book, purpose written microdrive program selector, £350 ono. 0242 523917.

48K SPECTRUM for sale, includes printer, cassette recorder, software, Kempston joystick interface plus joystick, any offers? Also wanted CBM 64 and tape deck with software and joysticks, if possible. Telephone Canterbury 69590, after 7pm.

48K SPECTRUM, games, mags, manuals, and programming book, vgc, only £105 ono. Ring 01-857 2905, after 6pm. Nottingham.

Dragons for sale

CASH BOOK program for Dragon 32/64 Delta compatible 400, plus entries print, save, load or edit entries. 7.00, 95 Donegore Drive, Antrim BT41 1DZ.

DRAGON 32 for sale, £180, including software worth £120, or swap for 48k Spectrum with software. Tel: West Malling 845781.

DRAGON 32 for sale, two joysticks, cassette recorder, all leads, £150 software, magazines, worth £330, sell for £200 ono. Tel: 0444 452451, after 5pm.

DRAGON 32K computer, with joysticks with interfaces worth £45, sixteen software tapes worth £128, good condition, only three months old, total value, £350. Bargain price, £175. Phone Hounslow (01) 570 7513.

DRAGON 32 for sale, with all leads, plus loads of software and tapes, plus loads of books and a new joystick, only £180. Phone Nottingham (0602) 625835.

DRAGON 32, perfect condition, over 50 games, joystick, light pen, compatible cassette recorder, plus all Dragon users mags, will swap for BBC 32k micro or consider offers. Tel: 01 907 8330.

DRAGON STUNTBIKE game, how many buses can you jump? Includes m/c and hi-res, £3.95. Also other new Dragon programs, SAE for details. John Martin, 35 Little Gaynes Lane, Upminster, Essex.

DRAGON 32 manual, leads etc, £45 of software, plus many magazines and books, — worth £75, plus Joysticks included, excellent condition, only £175. Tel: Swansea (0792) 401823, after 4pm. Weekdays.

DRAGON 32, two joysticks, £100 software inc: one cartridge game, boxed with manual, leads and working Dragon book — good condition, as little used, £135 ono. Tel: 0742 662313.

DRAGON 32 boxed, plus £300 software (30 programs from Microdeal, Salamander, Dragon Data, etc.) for £169. Send address or Tel: number, to 53 Polefield Road, Blackley, Manchester. Will sell all software separately for £50.

Acorns for sale

LYNX S/W Mooncell, £5. ??????? £3.50, Spacetrack £3.50, Racer £5, or £15 for the lot. 01-428 1415.

BBC MODEL Micro B plus over £100 of S/W and accessories, best offers around £350 secures. Tel: 061 794 1696. Mint condition.

BBC B — usual extras, 1.20/S, almost unused, urgent sale plus many ????? plus disk inter take, £350 ono. Tel: 01-997 3919, (eves).

ZENITH Green Screen monitor, £65. Micro Vitec 14" colour monitor, £199, only a few months old. Tel: Peter, 01-958 8021.

FOR SALE to good home, Acorn Atom 12k + 12k, Acorn assembled, full sized keyboard, 65 keys. Also 6502 assembler in basic, as BBC, all leads, good condition. Phone (0339) 2757.

BBC B plus software, £350 ono. Bradford (0274) 833449.

BBC B Zenith 1.2 operating system, very good condition, + £200 worth of software, eg. Forth plus Plantoids, only £450. Tel: Ongar 3624 87, (Simon).

BBC B updated to operating system, 3 months old, under guarantee, £380, but will split. Tel: 0329 282525 (eves).

BBC 1.2 Model B, centronics 737 printer plus 8B Bug Club cassettes, all new condition, for disposal due to project accomplished, accept Model A in part settlement. Tel: 0629 56771.

ACORN ATOM, unexpanded, very good condition, hardly used, £50. Tel: 01-554 9530, after 4.30pm.

12K ACORN ATOM plus much software, including games, plus all leads and power pack, sell for £70, or consider swap for Forth Computer. Also much Spectrum software for swap. (0553) 5207.

BBC MICRO Model B, 1.2 O/S, as new, plus cassette recorder, leads and S/W, £370, no offers! 061 740 3858.

BBC B 1.2 O/S, Exmon Rom, joystick, light pen, prism, modern books, (6502 advanced user guide, etc.), software, Planetoid, Heist etc. Acorn and BBC user mags, worth £620, £400 clinches. 578 7704.

BBC B for sale, includes software and joysticks, also prism, acoustic mode M with or without Beeb, both excellent condition, price negotiable. Tel: 01-381 4650.

Tandys for sale

VIDEO GENIE 1 48K expansion, one disk drive ?????? manual and discs, e?asm etc, valued at £1,200, bargain at £450, reason moving onto 16 bit. Ring Bob 051 920 8321.

LINE PRINTER, Tandy 7, 80 colours U-R case plus graphics, pararell and ORS 232 interface, £120 inc cable etc. Tel: Bolton (0204) 41459.

APPLE 11 Computer, 16K lang card, disk drive, loads of software, inc Zardax W/proc, £550 ono. Tel: Clevellys 853136, anytime. (Near Blackpool, Lancs).

TANDY CGP 115, color graphic printer, excellent condition, with two extra rolls of paper and brand new pens, £115 ono. Also Dragon to Centronic printer cable, only £10!!! Telephone (0604) 28379 (N'pton).

BBC B £350, Shinwa CP80, £250 with leads, desk, £50, teletype £25, games £5 each, lots mags, books and tapes (blank) to sell; cassette recorder, £10. St Helens (0744) 812608, after 7pm weekdays.

ZX81s for sale

ZX81 16K with 3 computer games, manuals, leads etc, any reasonable offers considered. Tel: 0707 50345.

16K ZX81, leads, manual, and books, software: Flight Simulation plus Mazogs, good condition, will give 13 rank cassette price: £40. Tel: Colwyn Bay 516257.

ZX81 16K, £200 of S/W and books, sell for £170. Tel: Kevin (Crawley) 512951, after 5pm.

ZX81 with leads, manual etc, and software, including Breakout, 10 game tape (J. K. Greye) plus 30 game book, worth £37, sell £28. Tel: 021 430 2114.

ZX81 with Sinclair 16K Ram, full documentation and Sinclair text book, and S/W, will swop for Atari 12K + 12K, or any machine with business S/W, cash settlement considered. Tel: 0203 665 623.

ZX81 COMPUTER boxed, as new, still under guarantee, complete with 16K Ram basic manual and book of games programs, £35. Telephone 055123122.

ZX81 plus Cherry keyboard, £50. Mr Edwards. Tel: 570932 (Rossett) N. Wales.

ZX81 16K plus MBD, £20 of software on cassette 133 programs, on paper 30 mags, including Sinclair user, just serviced by Sinclair, good condition, the ideal starter pack, £85 ono. Tel: 051 677 8585.

ZX81 with Ram pack and case plus 12 games and books, £65. Tel: 51405. (Farnborough).

Commodores for sale

SALE OR swop, VIC 20 plus 16K switchable, 9 months guarantee, over £100 quality software, £180 ono, (worth £250), or swap (plus cash) for CBM 64. Tel: Tadley (07356) 2841. Will collect 50 mile radius.

VIC 20 plus 3K super expander, 8K, 16K Rams, £150 of software, cartridge and cassettes, including machine code monitor and Introduction To Basic Part

I, going for £165. Tel: 01-291 3329, after 6pm.

COMMODORE VIC 20 machine code monitor cartridge, brand new, only £25. Tel: Southport 44351.

VIC 20 starter pack, (VIC 20 plus cassette deck and Introduction To Basic Part I, plus 4 games), new, still under guarantee, excellent condition, £125. Tel: 521-1459, Saturday and Sunday, 6-7.30pm.

VIC 20 Vicwriter, £10, Golf £3, Backgammon, £3. Tel: 0272 837617.

COMMODORE 16K Ram pack, £20, also games 16K, 8K and standard, £2.50 each, Roms £5 each, all are not cypis. Phone Ingrebourne 76431 for details.

VIC 20 data cassettes, suitable for the BBC Master Mind program, are practically being given away, at only £1!!!! each, (amazing). Write to Humphrey Dunn, 49 Underdale Road, Shrewsbury, Shropshire, SY2 5DT.

VIC 20 Mastermind data cassettes, all brand new, only £1 each! Most subjects catered for. Write to: M. Valentine, 101a Underdale Road, Shrewsbury, stating subject preferred. (Also second choice preferred).

VIC 20 tape deck, super expander, joystick, intro to basic, £100 of software, count cartridge, worth £250, sell for £140. Tel: 0733 75110 (Peterboro), or will swap for 48K Spectrum and printer.

FOR SALE CBM64 computing book, £3. Working 64 book, £3. CBM64 games book, £3. Quicksilver, Aquaplane 64, £5. P55 Moby Dick 64, £5. Melbourne House Hobbit 64, £10. Phone 593 6579.

For sale

MICRO drive order form for sale, also wanted Kempston conversion tapes 1, 2 + 3. Tel: 0407 3273.

T199WA software swap wanted mini-memory or speech synthesiser. Swap for music maker parses and connect four. Tel: 01-643 2310 Sutton. Ask for Andrew.

MICROTAN 65 in custom system rack. 24k ram 30k ram. Full options including eprom programmer. Too many hardware extras to list plus lots of useful software/firmware. Details: 0487 812868.

TRS — 80 Model 1, level 2, 16K, also books on the computer and games lists, included are many programmes on cassette, £100 ono. 0206 45285.

FOR SALE — Sinclair QL order forms, why wait months for Uncle Clive to send you one? Phone me after 5pm, on 01-886 2931. Ask for Vince.

FREE SERIAL interface with Espon RX80, £280, 2 months old, cable for Newbrain available, urgent need to sell. Tel: 061 8811368 (anytime).

MICRODRIVE/INTERFACE 1 order form for sale. Telephone offers after 5pm. Tel: Stevenage (0438) 723958.

Wanted

WANTED, CATCHA Snatcha, Wizard, The Princess. 04862 70318.

WANTED, portable colour TV, in exchange for 22in colour TV, 12in B & W TV, (both in good order) vgc. Tel: (04862) 70318.

BBC MICRO games to exchange. Send a list of what you have and what you want. All letters answered and I'll do my best. S. Menges, 2 Rattemore Road, Cheadle, Cheshire, S88 5LE.

CBM 64 games, over 70 to swap. Ring anytime to 7pm anyday. 01-748 8176.

WANTED, CBM 64 s/w, specially games with utilities. Weekends only, 01-574 4122.

FREE SPECTRUM PROTECTION

A collection of routines to protect your basic programs.
UNLISTABLE, UNBREAKABLE, etc. etc.

WHEN YOU BUY ANY OF THE FOLLOWING 48K PROGRAMS

DIGGER DUGGER: Superb arcade action. Fantastic graphics. Excellent sound effects. **Our Star Game.** 100% M/code.

30 BLITZ/ICE BERG: Our own double sider. These graphics and sounds are not to be missed. Classical. Both 100% M/code.

TRONN: You've seen the film, played it in the arcades, now have your own copy. **Totally addictive.** 100% M/code.

SPECIAL OFFER: ALL THREE TAPES ONLY £9.99 OR £5.50 EACH
Cheque/P.O. **CAVERN SOFTWARE**

14 High Street, Cranford, Northants NN14 4AA.

EAGLE

25 BRAMBLE AVENUE, BEAN, DARTFORD, KENT DA2 8BP

DRAGON 32 - *Microdeal* Space Shuttle, Frogger, Glaxxons, Crazy Painter £7.50

SPECTRUM - *Ultimate* Atic Atac, Jetpac, Lunar Jetman, Trans-Am £5.00

VIC 20 *Imagine* Arcadia, Bewitched, Catcha Snatcha, Wacky Waiters £5.00

COM 64 - *Anirog* Hexpert, Kong, Skramble £7.45

Send cheque or Postal order. Full catalogue sent with order.
Eagle Software, 25 Bramble Avenue, Bean, Dartford, Kent DA2 8BP

ALL SOFTWARE PURCHASED FROM EAGLE
INCLUDES POSTAGE AND PACKING
AND ARE CHEAPER THAN RECOMMENDED RETAIL PRICES

MAIL
ORDER
ONLY

ASTROLOGY

Wide range of Self-teaching and Accurate
Calculation Programs for many machines including:

48K Spectrum, BBC, Commodore 64
Dragon, 16K ZX81, Sharp MZ80A
NewBrain, Tandy, Genie, PET

Please send large SAE to:

ASTROCALC

67 Peascroft Road, Hemel Hempstead
Herts HP3 8ER. Tel: 0442 51809

SAVE 75%

BY EXCHANGING SPECTRUM SOFTWARE

Most popular games covered. £1.25 per exchange.
Send now for list and details. (Stamp appreciated).

SOFTSWAP
MIN-YR-AWEL, PENTFAI
BRIDGEND, MID-GLAM CF31 4LS

LWS

VIC20 CBM64
OWNERS!!!

BUY DIRECT FROM THE MANUFACTURERS AND SAVE POUNDS!!!

3-SLOT SWITCHABLE MOTHERBOARDS, VIC20 £18.95; CBM 64 £19.50
4-SLOT SWITCHABLE MOTHERBOARDS, VIC20 £21.50; CBM 64 £22.50

NEW NEW NEW

ROBOT DRIVE INTERFACE

Plugs into the Vics or 64s user port and gives complete computer control of DC motors. Contains all the circuitry for stop start and reverse. Comes complete with software cassette giving full instructions and control program. £18.95

COMING SOON

WANT TO BUILD A DROID?

We are currently testing a large range of robot components that can be assembled in many different forms. ie, swivelling base units motorised arms gripper units. DC motor and gearbox drive units with optical encoders and much, much more!!!
All prices inclusive of VAT and P&P.

L. W. STAINES & CO, UNIT 2 RODING TRADING ESTATE
LONDON ROAD, BARKING, ESSEX IG11 8BU Tel: 01-591 2900

ZX81 and Spectrum Repair and Add-on Specialist

- ★ 48K UPGRADE
- ★ Eprom Programmers for ZX and Spectrum
- ★ Audio Generator
- ★ Graphic Board
- ★ RS 232 Interface (ZX81) *Angle Cards

FAST MICRO AND POWER SUPPLY REPAIRS
PLUS ELECTRIC COMPONENTS
OPEN 9AM-PM MONDAY-SATURDAY

MANCOMP LTD

PRINTWORKS LANE, LEVENSHULME
MANCHESTER M19 3JP
TEL: 061 224 1888

LOADE ENTERPRISES

THE BEST SOFTWARE AT BETTER PRICES.
COMMODORE 64 SPECTRUM

QUICKSILVA: Quintic Warrior, Puple
Turtles, Aquaplane.
R.R.P. £7.95 Our Price £7.15

OCEAN: Hunchback, Armagedon,
Mr. Wimpy
R.R.P. £6.90 Our Price £6.20

INTERCEPTOR: Crazy Kong, Vortex
Raider, Siren City, China Miner, Star
Trek
R.R.P. £6.95 Our Price £6.25

ANIROG: Kong, Skramble,
Moonbuggy Hexpert
R.R.P. £7.95 Our Price £7.15

LLAMASOFT: Laser Zone, Matrix,
Revenge of the Mutant Camel.
R.R.P. £7.50 Our Price £6.70

VISIONS: Star Warrior, Pitman 7
R.R.P. £5.95 Our Price £6.25

SHEEP PANIC: Rapides
R.R.P. £5.95 Our Price £5.35

SHEPHERD: Devils of the Deep,
Invincible Island, Super Spy,
Transylvanian Tower
R.R.P. £6.50 Our Price £5.85

ULTIMATE: Jetpack, Transam,
Lunar Jetman, Attic Attack
R.R.P. £5.50 Our Price £4.95

LLAMASOFT: Laser Zone, Matrix,
Traxx (8K)
R.R.P. £6.00 Our Price £5.90

IMAGINE: Wacky Waiters, Arcadia,
Frantic, Catcha Snatcha, Bewitched
R.R.P. £5.50 Our Price £4.95

Prices include P & P. S.A.E. for lists stating machine.

LOADE ENTERPRISES, c/o Ensemble (PCW) 35 Upper Bar,
Newport, Shropshire TF10 7EH. Tel: (0952) 813667 or 814292.

POPULAR COMPUTING WEEKLY

is looking for a

Technical Expert

to take over our *Peek & Poke* reader enquiries
section. If you are familiar with the BBC,
Spectrum, Vic 20, etc., please write to:
Brendon Gore, Technical Expert,
12-13 Little Newport Street,
London WC2R 3LD
with details of your background and experience.

NEW RELEASES

HIGH STAKES

Play for Planets is a version of Pontoon where the stake is planets rather than pence.

You can play against the computer and other players and the program allows you to do things like shuffle the cards or even change the pack.

Unlike some versions of the game on computer, this one also has the authentic feature of allowing you to 'buy' additional cards to increase your stake.

Program *Play for Planets*
Price £4.95
Micro *Spectrum 48K*
Supplier *Sugar Loaf Software*
14 Maryhill Road
Glasgow G20 9Z

ROLE CONFUSION



Things are getting crowded in the *Donkey Kong* department. Ocean had a great deal of success with their version of this famous game on the Spectrum and now Artic have joined the fray with *Monkey Bizness*.

This version has all the main features of the original including ladders, hammers, fireballs, and helpless female in the clutches of a deeply Freudian monkey. Can you (a man, of course) save her?

There are eight levels all together, with various new problems in each — level eight has some weak points in the scaffolding, other levels have

springs that throw the barrels upwards.

In the promo blurb it says that you are a butcher boy and the girl is your queen; whether this mixed metaphor and confusion of roles is specifically relevant I know not.

Program *Monkey Bizness*
Price £5.95
Micro *Spectrum 48K*
Supplier *Artic Computing*
Main Street
Brandesburton
Driffield YO25 8RL

ENTERTAINING

At £3.99 for three machine code games it would perhaps be a bit churlish to complain that all the games are based on the ancient *Breakout* formula.

Brick Wars contains *Genesis (Breakout)*, *The Brick Strikes Bat (Breakout)* where you must also avoid bricks that come straight for you) and *Return of the Brickie* (a sort of competitive *Breakout* where a brickie is trying to rebuild the wall).

In fact, the programs are very well done and enough changes are rung on an old theme to justify their release here. More entertaining than many, seemingly more original, games.

Program *Brick Wars*
Price £3.99
Micro *Spectrum 16/48K*
Supplier *Paul Coyle Software*
548 Great Horton Road
Bradford BD7 3HG

PYRAMID GAME

One of the most frequently down-loaded Micronet games for the BBC is *Q Man* by MRM Software. For a mere £3 you can get a very faithful copy of the bizarre *Q Bert* game that dominated the arcades.

On the strength of its success, MRM has decided to release this and other popular games on conventional cassette so that modemless people can join in the fun.

The game involves a little cartoon character with a funny nose who bounces around a pyramid of bricks. Whenever

he lands on a previously un-bounced on brick it changes colour — the idea of the game is to land on every brick.

However, nameless shadowy nasties are concerned to keep the little thing from its task by rolling boulders down at him — there is also a poisonous snake that lurks on the bricks and sometimes pounces. It's a good game, well copied and (for a limited period only) it retails for an unbelievable £4.95

Program *Q Man*
Price £4.95 (+ 55p P+P)
Micro *BBC B*
Supplier *MRM Software*
17 Cross Coates Road
Grimsby
South Humberside

HEROIC STUFF



Angels one five, tally ho, look out, Chalkie, there's a bally 109 on your tail!...if we don't make it, sir, would you go round and see my old woman? She'd think a lot of that she would...My God, the bally boffins were right after all...the dam's going! (amazed silence followed by military music).

If this sort of thing appeals to you and fires your imagination, then you've probably seen the film too, — now you can play the game in *Dambusters* by Alligata Software.

In this game you must pilot your bomber low over the Rhine lands to the Mohnesee Dam avoiding anti aircraft fire and enemy fighter planes, once there you must match up the search lights (just like the real thing) to pin point the exact

point to release your bouncing bomb. Heroic stuff.

Program *Dambusters*
Price £7.95
Micro *BBC B*
Supplier *Alligata Software*
178 West Street
Sheffield S1 4ET

FREE RIDE



More *Q Bert* impersonations — this time from Automata who has mutated the game to suit its own weird obsessions.

Like the original it's all about bouncing from brick to brick on a pyramidal structure dodging various things that are coming for you.

However, aside from the balls there are all kinds of other problems for you to tackle — one is another creature that turns pyramid bricks back to their original colour.

The Pi-man is not entirely blameless — this previously only slightly shoddy supporter of the free and defender of the brave has now joined the enemy and is actively involved in ensuring your demise.

Other features in the game include some escape discs that will give you a free ride to the top of the pyramid if things get too hot — there are also various other nasties that drop from time to time

In the past Automata's programming has tended to leave something to be desired in the technical department — whatever its other merits — but this game is a real departure.

The quality of the graphics and the slickness of the movement are comparable with *Ultimate* — watch what happens

when you jump on one of the ascending saucers.

The flip music B side is a bizarre reggae mish-mash, but it sounds as if Automata have bought some expensive musical equipment — they must be doing well.

Program *Pi-balled*
Price £6.00
Micro *Spectrum 48K*
Supplier *Automata*
 27 Highland Road
 Portsmouth
 Hants PO4 9DA

SYMBOLIC



It's surprising how many companies are releasing fortune telling programs for home micros — you'd have thought mysterious ancient wisdoms and modern technology would mix about as well as oil and water.

Tarot is the latest in this genre and includes some excellent graphics to depict the various symbolic pictures — the 48K version does this for the entire 78 card pack.

As you might expect, you deal the cards and can ask specific questions; the cassette inlay contains stern warnings about the immutability of fate.

The program also contains a 16K version and comes packaged with a Penguin paperback which explains what it's all about. Personally I'm waiting for a tea leaves simulator.

Program *Tarot Card*
Price £12.95
Micro *Atari*
Supplier *English Software*
 Box 43
 Manchester M60 3AD

MORE SPEED

Maybe they've all bought other, more conventional machines but I'm sure there must still be a few people around with a Jupiter Ace bemoaning and bewailing the lack of software.

For this reason I thought I would mention Plasma Software who are one of the small companies still producing games for the machine.

Moonbuggy is a simplified version of the arcade game — you have a buggy which you must guide over various different types of terrain whilst avoiding rocks, potholes, mines and aliens.

Although Forth is very fast, this game is partly written in machine code for more speed still. With all of Plasma's games only costing £4.95, it could be worth dusting down that funny little white plastic box again.

Program *Moonbuggy*
Price £4.95
Micro *Jupiter Ace (16K)*
Supplier *Plasma Software*
 32 Bayview Road
 Bangor
 Co Down
 Northern Ireland
 BT19 2AR

COSMIC TRADER



Star Trader is a trading game with the cosmos as your supplier and a starship as your delivery van.

You must purchase a computer urgently needed on earth (a man or woman of honour

obviously, you can't just steal it.) To buy it you will need to mine for rare minerals and trade them with other races in the galaxy.

Aside from making sure nobody rips you off, you will need to maintain your supplies of basic commodities like food, air and fuel. The screen display keeps you up to date with how much of everything is left and where in the universe the next goodies are to be found.

Program *Star Trader*
Price £7.95 (+ 50p+p)
Micro *BBC B*
Supplier *FBC Systems Ltd*
 10 Castlefields
 Main Centre
 Derby DE1 2PE

BASIC MATHS



Stell Software are one of a growing number of companies who are specialising in providing educational programs for the popular home micros.

Maths Invaders takes the theme of the old arcade hit and uses it to test basic maths in the age range of 4 to 12. To shoot at the rows of invaders that are shuffling down the screen you must discover the right answer to a maths problem and 'load' your gun with it.

The program allows for a wide variation in abilities, with 50 speed levels and nine difficulty options.

Program *Maths Invaders*
Price *BBC B/Electron*
Micro £6.95
Supplier *Stell Software*
 36 Limefield Avenue
 Whalley
 Lancs BB6 9RJ

DOUBLE DEAL



Jokers Wild is one of the first Spectrum offerings in Phoenix Software's double Adventure/Arcade package systems.

There are two programs, an arcade style game and an adventure game — you must master the first to get clues and the start code to the latter.

The arcade game is basically a maze chase game where you must run around a series of chambers getting cards of each suit — each chamber will only let you enter if you have passed over an appropriate key. All the while you are chased by a sullen looking king's head. It's fast and quite addictive.

worth playing — the setting is a mysterious funfair where the jollity is strictly limited. On the 48K version the locations are all illustrated with simple, but effective drawings, well up to Digital Fantasia standard. Recommended.

Program *Jokers Wild*
Price £9.95
Micro *Spectrum 16/48K*
Supplier *Phoenix Software*
 Spangles House
 116 Marsh Road
 Pinner
 Middlesex

New Releases is designed to let people know what software is coming on to the market. If you have a new game or utility which you are about to release send a copy and accompanying details to: New Releases, Popular Computing Weekly, 12-13 Little Newport Street, WC2R 3LD.

Top 10

Top 10

- Spectrum**
- (2) Atic Atac (Ultimate) *
 - (1) Chequered Flag (Psion) *
 - (5) Manic Miner (Bug-Byte) *
 - (4) Lunar Jetman (Ultimate) *
 - (10) Kong (Ocean) *
 - (7) Flight Simulation (Psion) *
 - (3) Death Chase (Micromega) *
 - (8) 3D Art Attack (Quicksilva) *
 - (-) Hunchback (Ocean) *
 - (-) Jetpac (Ultimate)

* Requires 48K.
(Figures compiled by W H Smith and Son, London)

- Atari**
- (-) Warlok (Calisto) † ‡
 - (1) Zaxxon (Datascop)
 - (-) Astro Chase (Parker Brothers) *
 - (7) Slinky (Cosmi)
 - (3) O'Riley's Mine (Starcade)
 - (9) Caverns of Kafka (Cosmi) †
 - (-) Sea Dragon (Adventure International)
 - (-) Frogger (Parker Brothers) *
 - (-) Q-Bert (Parker Brothers) *
 - (-) Savage Pond (Starcade)

* Cartridge, † 32K cassette, ‡ 48K disc.
(Figures compiled by Calisto Computers, Birmingham 021 632 6458)

- BBC ***
- (1) Killer Gorilla (Program Power)
 - (3) White Knight Mk 2 (BBC)
 - (5) Planetoids (Acornsoft)
 - (6) Chess (Acornsoft)
 - (7) Snapper (Acornsoft)
 - (9) Sphinx Adventure (Acornsoft)
 - (8) Wordspell (Griffin)
 - (10) Pheasibility Experiment (Digital Fantasia)
 - (4) Laser Command (Program Power)
 - (2) Disc Doctor (Computer Concepts)
- * All Model B.
(Figures compiled by Micromanagement, Ipswich 0473 59181)

- Books**
- (-) Advanced Programming Techniques for the BBC Microcomputer, *McGregor and Watt* (Addison-Wesley)
 - (6) 30 Hour Basic, Spectrum edition, *Prigmore* (BBC/NEC)
 - (1) Advanced User Guide for the BBC Micro, *Bray* (Cambridge Micro Centre)
 - (5) BBC Micro Disk Companion, *Latham* (Prentice Hall)
 - (9) 6800 Assembly Language Programming, *Kane and Laventhal* (Osborne)
 - (4) Graphics on the BBC Micro, *Gryer* (Prentice Hall)
 - (-) Spectrum Microdrive Book, *Logan* (Melbourne House)
 - (2) Commodore 64 Programmers Reference Guide, *Commodore* (Commodore)
 - (8) Programming the M5800, *King* (Addison-Wesley)
 - (-) Language of the Dragon-6809 Assembler, *James* (Sigma)
- (Figures compiled by Watford Technical Books, Watford 0923 23324 Prestel 28844)

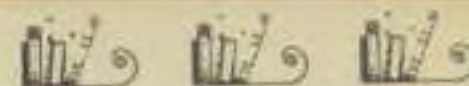
- Vic 20**
- (-) Bewitched (Imagine)
 - (1) Wizard and the Princess (Melbourne House)
 - (-) Catcha Snatcha (Imagine)
 - (-) Crazy Kong (Interceptor Micros)
 - (2) Snooker (Visions)
 - (-) Flight Simulation (Ferranti)
 - (9) Super Vaders/Bomber Run (K-Tel)
 - (-) Wacky Walters (Imagine)
 - (-) Skyhawk (Quicksilva)
 - (6) Arcadia (Imagine)

- Dragon 32**
- (4) Space Shuttle (Microdeal)
 - (1) Eightball (Microdeal)
 - (-) Leggit (Imagine)
 - (-) Skramble (Microdeal)
 - (2) Dragon Chess (Oasis)
 - (5) Devil Assault (Microdeal)
 - (-) Transylvanian Tower (Richard Shepherd)
 - (8) Dream Bug (Kenfig)
 - (9) Intergalactic Force (Microdata)
 - (-) Ring of Darkness (Wintersoft)
- (Figures compiled by Boots/Websters)

- Commodore 64**
- (-) Crazy Kong (Interceptor Micros)
 - (4) Space Shuttle (Microdeal)
 - (-) Scramble (Interceptor Micros)
 - (5) Cosmic Convoy (Tashsoft)
 - (-) Hover Bovver (Liamsoft)
 - (7) Frogger (Interceptor Micros)
 - (-) Falcon Patrol (Virgin)
 - (-) Grand Master (Audiogenic)
 - (-) Motor Mania (Audiogenic)
 - (3) Forbidden Forest (Centre Soft)
- (Figures compiled by Boots/Websters)

- ZX81**
- (1) Astroids (Quicksilva)
 - (4) Scramble (Quicksilva)
 - (-) Football Manager (Addictive Games)
 - (2) Defender (Quicksilva)
 - (3) Invaders (Quicksilva)
 - (-) ZXAF (Bug Byte)
 - (7) Krazy Kong (PSS)
 - (-) Espionage Island (Sinclair)
 - (-) VuCalc (Sinclair)
 - (8) ZXDB (Bug-Byte)
- (Figures compiled by Boots/Websters)

Book Ends



HISTORY

Exploring Adventures on the Oric 48K is the first book I've seen on this all pervasive subject, for the machine. It covers the usual areas, history of adventures, tactics, scenarios, basic programming techniques, etc, and includes three complete adventures listed out in full.

The book is illustrated here and there and the programs are fully explained individual problems within adventures like how to deal with the Oil, or what conditions enable you to enter the hidden cave, are treated as separate subroutines thus making the logic as clear as possible.

Book *Exploring Adventures on the Oric*
Price 48K
Micro £6.95
Supplier Oric 48K Duckworth
The Old Piano Factory
43 Gloucester Crescent,
London NW1

to be a flood of books on this difficult subject for the new Acorn machine.

With the BBC B the Basic was so fast that it was often possible to do in Basic things for which other machines would have required machine code — alas, the Electron, although similar, is a lot slower.

The book adopts the usual format of machine code books, firstly assuring you that it's all very useful and worth persevering and then discussing hex, registers, bits and bytes, etc.

Later chapters show you how to use interrupts and the extensive Appendices list ASCII codes, 6502 instruction set and 6502 opcodes. Although more expensive than the norm — £7.95 — it's also longer with 270 pages.

Book *Electron Assembly Language*
Price £7.95
Micro Electron
Supplier Shiva Publishing Limited
4 Church Lane
Nantwich,
Cheshire CW5 5RQ

INTERRUPT

Electron Assembly Language is the first of what I expect

This Week

Program	Type	Micro	Price	Supplier
3D Spell	Ed	Spectrum	£5.95	Camel
Abyss	S	Electron	£6.95	CCS
Airline	S	Electron	£6.95	CCS
Besieged	Ed	Commodore 64	£8.65	Sulis
Biology	Ed	BBC	£7.95	Tom Shipman
Bugaboo	Arc	Commodore 64	£7.95	Quicksilva
Bull Run	Arc	Spectrum	£5.95	Phipps
Centipod	Arc	Spectrum	£6.00	Orwin
Chariot Race	Arc	Vic 20	£6.95	Micro Antics
Corn Cropper	S	Electron	£6.95	CCS
Crystal	Ut	BBC B	£3.45	Scientific S/W
Curse of Zoltin	Ad	Vic 20	£3.00	Mikmag
Cut "n" Val	Ed	BBC	£14.50	MP Software
Dallas	S	Electron	£6.95	CCS
Delivery	Ad	BBC B	£7.50	Paen
Diamond Quest	Ad	Spectrum	£6.00	CCS
Digger	Arc	Oric	£6.95	Mercury
Dinky Digger	Arc	Spectrum	£6.95	Postern
Disassembler	Ut	Dragon 32	£5.99	Compusense
Dragon Bane	Ad	Spectrum	£6.95	Quicksilva
Dwarfs Domain	Ad	Spectrum	£4.00	J Maddocks
Educational Compendium	Ed	Spectrum	£6.00	Orwin
Epson Screen Dump	Ut	Dragon 32	£5.99	Compusense
Europe Rally	Ed	BBC	£7.95	Tom Shipman
Fireball	Arc	Dragon	£7.95	Abacus
Forty Niner	Arc	ZX81	£5.95	Software Farm
Fred	Arc	Spectrum	£6.95	Quicksilva
Game of Life	S	Dragon 32	£5.99	Compusense
Grand National	S	Vic 20	£3.00	Mikmag
Graphdrawer	Ut	Dragon 32	£9.95	Compusense
Greyhound Derby	S	Vic 20	£4.00	Mikmag
Heavyweight Champion	S	Vic 20	£4.00	Mikmag

Hicksted	S	Spectrum	£6.00	CCS
Hidden Letters	Ed	ZX81	£4.95	Poppy
Islets of Langerhan	Ad	Spectrum	£4.00	Amazing Games
Jumpwinner	Ut	Vic 20	£5.00	Mikmag
Jungle Adventure	Ad	Spectrum	£6.00	CCS
Kingdom of Vargo	Ad	Vic 20	£4.99	Mikmag
Magic Numbers	Ed	BBC	£7.95	Tom Shipman
Manage	S	Spectrum	£6.00	Cases Computer
Micro Drivin	Ad	Spectrum	£6.95	Softel
Mission 1	Arc	Spectrum	£6.95	Mission
Oric-Calc	Ut	Oric 48k	£14.50	Tansoft
Pascal	Ut	Commodore 64	£49.95	Oxford
Pop Star	S	Vic 20	£3.00	Mikmag
Rat Splat	Arc	Oric 48k	£7.95	Tansoft
Safe Cracker	Ad	Vic 20	£4.00	Mikmag
Seiksha Screen Dump	Ut	Dragon 32	£5.99	Compusense
Simply Assemble	Ut	Commodore 64	£22.00	Simple Software
Space Rescue	Arc	ZX81 (16k)	£4.25	D Pinch
Spanish	Ed	BBC B	£14.95	Acornsoft
Sting 64	Arc	Commodore 64	£7.95	Quicksilva
Stock Market	S	Spectrum	£6.00	CCS
Super Spy	Ad	Dragon	£8.50	Richard Shepherd
The Lost Gnomes	Ad	Spectrum	£5.95	Eric Bean
The Snowman	Arc	Spectrum	£6.95	Quicksilva
Which Salt?	Ed	BBC	£6.95	Program Power
Word Chaser	Ed	BBC	£7.95	Tom Shipman

Key: Ad — adventure/Arc — arcade/Ed — education/
S — strategy-simulation/Ut — utility

This Week is a new section that covers all the new software coming on to the home micro market each week. All suppliers should send details of their new programs to: This Week, Popular Computing Weekly, 12-13 Little Newport Street, London WC2R 3LD.

Ziggurat



No excuse

I expect that you are familiar with the various surveys which report that women and young girls constitute a minute percentage of home computer users. Why is it a male dominated hobby and why should women be left behind as a new world of home computing approaches? Surely some mistake, methinks!

Some software houses have looked with interest at the idea of cracking this potentially huge market. However, it is not as simple as 'writing games that girls enjoy'. Personal experience has shown me that the whole family can greatly appreciate existing games such as *Manic Miner* and *Jumping Jack*, even if some of the cruder 'shoot-em-ups' are less popular.

There is one change, however, that can be easily identified and should be dealt with — there is no excuse for computer games to be insulting to females and perpetuate the invidious stereotypes of 'feeble women' that the other forms of media had largely to forsake many years ago. I am not referring to the inevitable small ads, but to the mainstream of games software which includes some outrageously offensive things.

Arcade games must be the most frequent, if not the worst, culprits in the way that women are usually shown as pathetic creatures worthy only of rescue by the intelligent and resourceful man. Of course this is usually all 'in fun' — as in the various versions of *Donkey Kong*.

It is refreshing to see the arrival of some non-sexist arcade games. One of the best must be *3D Ant Attack* by Quicksilver's Sandy White. Here you are given the option of choosing a man rescuing a woman or a woman rescuing a man. As a man, once you have played the part of the helpless victim for a few games, you begin to get

a faint flavour of how irritating it is always to be regarded as the helpless sex.

Since *Mrs Mopp* from *Computasolve* for the 48K Spectrum was written by a woman, I hope it is a sarcastic look at a housewife's life rather than an attempt to produce a game women can identify with. Playing the title role in this game, you are confronted with a huge and ever increasing heap of household junk to collect such as cups which must be washed at the sink and clothes for the washing machine. Finally, and understandably, Mrs Mopp has enough and leaves home.

I once read that detective stories appealed to women because they enjoyed the orderliness and sense of logic involved in spotting 'whodunnit'. This immediately suggests to me that there could be a market amongst women for well written adventure games. How unfortunate then that adventures contain some of the most adolescent material and insulting writing of any computer games. The worst example I can think of is Arctic's early attempt, *Ship of Doom*. Any adventure that presents you with an android woman, complete with vanity mirror of course, that can be 'raped' is an absolute disgrace. Try any similar tactics on Legend's *Valhalla* and you receive a suitable reward.

Staying with Legend for a moment, their prophecy that one day we will see computer-generated movies in which we can participate and act as in real life, reinforces my point that its about time some programmers grew up and started dealing sensibly with issues such as human relationships and sexuality if they feel they really must include them in their games.

Of all the adventure games I have seen recently *Snowball* from Level 9 wins my prize as best in the genre. Here the central character — a space-age secret agent of some kind — is a woman. Whilst in *Snowball* itself this fact is largely superfluous, I understand that in later games this aspect of the character will have an influence on solving the rest of the Silicon Dream Trilogy. If this is so, how much better if the agent's sex had not been revealed.

I wonder how many hardened dragon slayers would have been completely stumped before they made the intuitive leap to realise that they were not supposed to be representing some space-age macho James Bond figure.

It could have been the hardest adventure Level 9 had ever produced.

Jane Stoneham

Puzzle

Free lottery

Puzzle No 93

Following the January Sales, at Pott's Department Store, there was still a large luxury hamper of food left unsold, which was to be given to one of the employees in a free draw.

Each person was invited to write his or her name on a piece of card. These cards were then stacked into a pile. The top card was taken off and discarded. Then the second card was taken from the top and placed at the bottom of the pile.

This process was then repeated until all but one card had been rejected. This card was the winner.

If there were 999 employees taking part, can you say at what position in the pile the winning card was originally at.

Solution to Puzzle No 88

First, we need to find all five-digit squares in which the second and fourth digits are alike, and are either 1, 9, 8 or 4.

The program checks for these by testing all squares of the numbers between 100 and 316.

```
10 FOR N = 100 TO 316
20 LET S = N * N
30 LET SS = STR$ S
40 IF SS(2) <> SS(4) THEN GOTO 60
50 IF SS(2) = "1" OR SS(2) = "9" OR SS(2) = "8" OR SS(2) = "4" THEN PRINT SS
60 NEXT N
```

This reveals the following squares: 14641, 21316, 24649, 41616, 44944, 58081, 69696, 94249.

Of these, 58081 and 69696 can be entered straight away, as they are the only numbers with eights and nines. The puzzle stated that all digits except one were to be used, and as the number 7 does not occur at all, this must be the missing digit.

But the number 3 only occurs once — in the square 21316. So, if we are to include this digit, 21316 must be put in the fifth column. Of the four possibilities for the last column, 94249 should be entered if the total sum of squares is to be as large as possible.

Therefore, the finished grid is:

2	6	5	9
1	9	8	4
3	6	0	2
1	9	8	4
6	6	1	9

giving a sum of 243342.

Winner of Puzzle No 88

The winner is: P Belugou, quai de Bourbon, 75004 Paris, France, who receives £10.



... but seriously, **AUTOMATA**

- PIMANIA** - the cult adventure that's for real
16K ZX81 £5 BBC 32K £10 Dragon 32 £10 Spectrum 48K £10
- GROUCHO** - the Pimania sequel, Concord-DE2-USA prize
Free rock music on the flipside. Spectrum 48K £10
- PI-EYED** - the comedy cartoon arcade game, starring
the PiMan. Free protest disco record. Spectrum 48K £6
- PI-BALLED** - A triumph of the arcade programmer's art
Starring the PiMan. Free offensive Reggae music. Spectrum 48K £6
- MORRIS MEETS THE BIKERS** - exciting arcade fun,
as seen on TV. Outrageous free doo-wop record. Any Spectrum £6
- YAKZEE** - Bruddy wonderfurr game of ruck and skirt
An oriental masterpiece for Dragon 32 plus Spectrum 48K £5
- GO TO JAIL** - Play the game
find out what all the fuss is about, cookie. Spectrum 48K £6
- THE PIMAN'S GREATEST HITS** - amazing stereo L.P. cassette £3

I ENCLOSE THE RIGHT MONEY, OR DEBIT MY ACCESS/VISA CARD

CARD NUMBER

MY SIGNATURE

MY NAME

MY ADDRESS

POST CODE

NO EXTRAS! ALL OUR PRICES INCLUDE DELIVERY AND V.A.T.
Send to: **AUTOMATA U.K. LTD.**
27 Highland Road, Portsmouth, Hants. PO4 9DA

THE PIMAN, HOME AGAIN, TELLS OF HIS RECENT MYSTICAL JOURNEY AFTER HIS SPELL ON THE SKIDS - AND HIS ENCOUNTER WITH EVIL SPIRITS

